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TRANSPORT

ITS HISTORY AND ECONOMICS

BY

ALFRED DUDLEY EVANS

SECRETARY OF THE BIRMINGHAM EXCHANGE

BEING THE SIXTH (ABRIDGED) EDITION OF
THE HISTORY AND ECONOMICS OF TRANSPORT

BY

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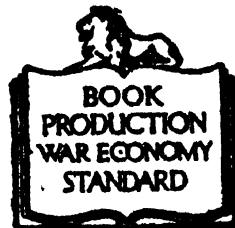
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PREFACE

TRANSPORT problems do not provoke so much public discussion as they did a generation ago, when railway rates and the Classification of Goods and Merchandise engendered so much heat and widespread protest, but more serious and intensive study than ever before is given to them since the new Universities began to teach the subject, and since the establishment of the Institute of Transport. This book is intended to help such students by giving them a comprehensive view of Transport history and economics. It owes much to its predecessor, *The History and Economics of Transport*, by the late Professor Adam W. Kirkaldy, M.A., B.Litt. (Oxford), M.Com., formerly of Birmingham and Nottingham, and the present author. It follows much the same lines, but is not merely a condensation of that book. All the figures have been brought up to date and where necessary there has been considerable amplification, particularly in the section dealing with civil aviation. The author hopes that it will be found useful to students, and assist business men to understand some of the problems which transport organizations have to solve.

A. D. E.

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TRANSPORT

ITS HISTORY AND ECONOMICS

PART I

METHODS OF TRANSPORT AND THEIR DEVELOPMENT

CHAPTER I

THE LAND OR THE WATER ROUTE

EVER since trade and commerce necessitated the transport of goods the same problem has confronted the trader. With improved methods its terms have been modified; but in the main, the primitive trader of centuries ago debated the same question as does the twentieth-century trader to-day: Shall I send my goods by land or by water? This question, which, to the superficial observer, appears so simple, is not easy to answer. The primitive trader might, or might not, have the choice of routes. If he lived on the banks of a river, or lake, or by the sea, he enjoyed the advantage of choice. If he wished to send his goods by land two questions had to be answered—is there a suitable road, and what form of conveyance is there? In other words man has to provide both a road and a vehicle for road transport. If our primitive trader lives on the banks of a river, or by a lake side, he has an alternative route differing in almost every respect from the other. The waterway is there ready for use, and all that is necessary is a craft of some kind that will float. It is obvious, therefore, the water road offered many advantages over the land road, and so it is fairly certain that the invention of the coracle preceded the invention of the cart.

Water Cheaper than Land Transport

Throughout commercial history water transport has been cheaper, on the whole, than land transport. The reason is obvious: the land road has to be constructed, often by great labour and expense, and it has to be kept in repair, or, sooner or later, it will become impassable. Nature and time may cause modifications in the water road, but, in the main,

it changes little during the history of a nation; it enjoys a permanency foreign to human attempts at road-making on land. The modern example of this can be illustrated by contrasting the capital outlay required for a railway company, and a steamship company. The largest railway company in the United Kingdom has a capital of 448 millions sterling, and the capital of the four great companies is 1126 millions sterling, but there is not a single British shipping company whose capital is more than 20 millions sterling, and returns relating to shipping, published in *Syren and Shipping* in January, 1944, showed for 57 companies a total capital of 90½ millions sterling. The cause of this great difference is the cost of acquiring and constructing the track, or permanent way. For example, 852 millions sterling has been spent on acquiring and equipping railway lines open to traffic in this country. It is not surprising, therefore, that primitive man chose the water rather than the land route when he had the chance, and that he first applied himself to the provision of a suitable water vehicle.

The first water vehicle may have been a rudely constructed timber raft, but it would soon be superseded by the coracle, then by the canoe formed from a tree trunk, and later by a vessel with planks fixed to a framework. With this latter method of construction great possibilities opened out for the shipbuilder and trader; the dimensions of the ship could be enormously increased. This necessitated modifications in form, construction, and propelling force, but from this point of view it was no great distance from the first Viking ship to the first clinker-built ship. The improvement from the coracle to the Viking ship made international trading possible.

The Development of Roads

Side by side with the evolution of the watercraft land transport also advanced; both road and vehicle improved. When Caesar invaded Britain in 55 B.C., he found the war-chariot in use. It is evident, therefore, that two-wheeled vehicles, and some sort of roads, have been in use in this country throughout the Christian era. The coming of the Romans had an important effect on methods of transport for they were great road-makers; it was an essential feature of their policy of maintaining their hold over the countries they conquered. Wherever they went they made roads, and in Britain, after 2000 years, many hundreds of miles of these roads are still in use; not, of course, in their original condition, but in their plan or direction. When the Romans withdrew in A.D. 410,

there ensued centuries of strife and uncertainty arising from the invasions of European peoples, and roads went mostly to ruin. It was not until the coming of the Normans that road improvement began again, but it was mostly in the direction of the South coast ports. Northward and westward road communication remained difficult for some centuries. It was so bad that the main traffic in the country was carried by pack animals, and the restriction which this imposed on commercial exchanges can be imagined. As the years advanced, revenue necessities of the kings caused them to foster industrial development, and with this came the pressing necessity of improving the roads. In the reign of Edward III commenced the system of charging tolls for their use, the theory being that the toll collected should be sufficient to keep the road in repair, and even extend its length. For a considerable period the toll system was found to be the best method of providing the necessary funds for the maintenance and construction of roads. The first Act of Parliament authorizing the levying of a toll was passed in 1346, and it dealt with a road which ran from St. Giles-in-the-Fields to the "Village" of Charing, which, of course, is now Central London. From Charing it went to Temple Bar and then turned northward along the line now occupied by Grays Inn Road. This Act reveals information about the state of the road. When Edward rode to Parliament, the roads in Westminster were so bad that the ruts and holes had to be filled with faggots to make a passage for the Royal procession. If this was the state of the highways at the centre of Government, what were they like away from London?

The Stage Coach

The country was too poor in those times to bear the strain which would have been entailed by a big scheme of road construction, but as the years passed and manufacturers and commerce increased, so the roads developed until about the middle of the seventeenth century came the stage coach. At first these coaches operated only on the best roads in the vicinity of London, but in 1663 there was an organized service to as far north as Preston. The vehicle, however, was only a superior kind of wagon without springs, and travel by it over "corduroy" roads was an uncomfortable, hazardous experience. A century later, it took a fortnight to travel from London to Edinburgh, but for much traffic pack horses were still used. Whether by coach or by horse, transport in those days was a slow and most expensive business. The really big improvement in road travel did not come until the days of Metcalfe (1717-1810), who has been called

the first great road engineer in England, Macadam (1756–1836), and Telford (1757–1834). Those men began the revolution of road making in England.

The Canal Era

During all this period, of course, the natural waterways were in use—the Thames, the Severn, the Mersey, the Humber; but the inland canal did not come until the making of the Aire and Calder Navigtion in Yorkshire in the beginning of the eighteenth century; and it was not until the middle of the century that canal making received its great impetus from the Duke of Bridgewater, and his engineer Brindley. The Act of Parliament permitting the construction of the Bridgewater canal was passed in 1760, and the first barge load of coal passed along it in 1761. It was a small canal (from Worsley to Manchester is only $10\frac{1}{2}$ miles) but it included what at the time was considered a great engineering feat, the bridging of the river Irwell at Barton. The canal was carried over the river by an aqueduct 200 yards long and 12 yards wide. The immediate result of the canal was that Manchester secured a regular and sufficient supply of coal from the Duke's pits at Worsley at a price which, on the average, was 50 per cent less than the previous intermittent supply.

The success of the Bridgewater canal led to the vigorous construction of many others. Brindley himself was the engineer for the construction of over 360 miles of them. The Mersey, Thames, Severn, and Trent were joined and there was a network of canals in the Midlands. The part which canals played in facilitating the revolution of transport cannot be overestimated. Its effect on the cost of transport may be obtained from the following figures¹—

COST OF GOODS TRANSPORT PER TON

				By Road.			By Water		
				£	s.	d.	£	s.	d.
Between Liverpool and	Etruria	.	.	2	10	0	13	4	
"	"	"	Wolverhampton	5	0	0	1	5	0
"	"	"	Birmingham	5	0	0	1	5	0
"	Manchester	"	Wolverhampton	4	13	4	1	5	0
"	"	"	Birmingham	4	0	0	1	10	0
"	"	"	Lichfield	4	0	0	1	0	0
"	"	"	Derby	3	0	0	1	10	0
"	"	"	Nottingham	4	0	0	2	0	0
"	"	"	Leicester	6	0	0	1	10	0
"	"	"	Gainsborough	3	10	0	1	10	0
"	"	"	Newark	5	6	8	2	0	0

¹ Reproduced in E. A. Pratt's *History of Inland Transport and Communication in England* from Barnes's *History of Liverpool*.

In their book *Our Waterways*, Forbes and Ashford state—

“Up to the close of the year 1838–39, according to a calculation made by Rennie, there had been formed in Great Britain, 2236 miles of improved river navigation at a cost of £6,269,000 and 2477 miles of canals at a cost of £24,406,389.”

Naturally the canals were prosperous, and almost as naturally there was the inevitable “mania” in 1791–1794. It gave rise to much unwise speculation; much money was lost, but that was the fault of individuals and in no way detracted from the useful service which canals performed and continued to perform for many years.

The coming of the railway in the thirties of the nineteenth century marks the end of the canal era, although for a long time after many of them retained a large share of the transport industry; and some of them in this twentieth century still carry a large volume of traffic.

CHAPTER II

THE EVOLUTION OF THE RAILROAD AND THE LOCOMOTIVE

As the desire to find a market for coal led to the beginning of canals, so almost the same motive led to the evolution of the railroad and the locomotive. The difficulty of dragging coal from the pits' mouths to the rivers or canals, caused the colliery owners to lay tracks. Stone and timber were used, but the former was expensive and the latter perished too quickly. To prevent decay, the timber was sheathed with wrought-iron plates, but it still rotted and so cast-iron rails were tried with success at first. These, however, were found to be too brittle for heavy loads. They were superseded for a time by wrought-iron rails and these, in turn, by steel.

For many decades, before James Watt perfected the stationary engine, there had been attempts to use steam engines on the roads, e.g. Cugnot's steam carriage tried on the roads of Paris in 1770, and William Murdoch's engine tried on the roads in Cornwall in 1786. A little later came Trevethick's steam carriage, which was the first to run on the roads in England. The defect which frustrated all these attempts was the difficulty of keeping up steam pressure, and it was not until George Stephenson, in 1815, produced an engine with forced draught that steam locomotion became a practicable thing. The first railway to be built for use in this way was the Stockton and Darlington, in 1825. The first train to run over the line was made up of thirty-four vehicles, of which six, placed immediately behind the engine, were loaded with coal and flour, and the last six were loaded with coal. The remainder carried the directors and between 500 and 600 people under very primitive conditions. The speed is said to have averaged twelve miles an hour for the whole journey.

The Period of Railway Construction

From 1825 to 1846 may be regarded as the first period of railway construction. The companies that laid them out were comparatively small affairs. At first it was thought they could be worked on the same lines as canals; that owners of vehicles should use the railbed and pay the companies tolls for its use. This, however, soon proved impracticable and if they were to get the best out of their systems the companies were

forced to become common carriers. The success of the Stockton and Darlington railway led to rapid increase of railway construction in all parts of the country. The two men who came into prominence in this period were Stephenson and Brunel, the latter the builder of the Great Western Railway. They were respectively the protagonists of the narrow and broad gauge lines about which there was to be some controversy, until in 1846 Parliament fixed the standard gauge at the narrow 4 ft. 8½ in. gauge.

The First Amalgamations

This unification was an invaluable aid to the many amalgamations of companies in future years, but it was not until 1892 that the last stretch of 7 ft. gauge disappeared from the Great Western Railway. The London to Birmingham railway, which later became the old London and North Western, was an amalgamation of over 100 separate companies and dates from 1833; the London and Southampton, which became the London and South Western, from 1834, the Great Western, 1835, the South Eastern, 1836, the Eastern Counties (from 1862, the Great Eastern), 1836, the London, Brighton and South Coast, 1837, and the Great Northern, 1846.

Parliament did not like amalgamations. It feared they would reduce competition and lead to abuses arising from monopoly conditions, but they were inevitable. Under the old conditions there were many disadvantages. For instance, the old Midland Railway when it first got through to London had not acquired St. Pancras terminus; it ran in over the Great Northern to King's Cross. Other companies ran over "foreign" lines into important towns. It was alleged that these arrangements, although friendly as distinguished from compulsory, resulted disadvantageously to the companies running over the "foreign" lines; that the owning companies gave first consideration to their own traffic to the detriment of the company running in over their lines. The ultimate outcome was the creation of "compulsory running powers" which became part of the Railway and Canal Traffic Act of 1854.

The First Railway Commissioners

Concurrently with their physical development, British Railways in their early years were subject to much legislation of a controlling, or restrictive nature. The Act of 1854, mentioned above, was stultified by the fact that the Court set up for determining questions

was the Court of Common Pleas, as it was then called, the judges of which declined to deal with purely technical questions. It was not until 1873 that the defect was remedied by the appointment of Railway Commissioners, to whom were transferred the powers given to the Court of Common Pleas. Procedure was altered and made more elastic, but also the commissioners were given more drastic powers. They were given power to hear and determine questions as to terminal charges, and to make orders requiring the companies to divide up particular charges so as to show the toll, the conveyance charge, and the terminal charge. Their powers were increased in 1874, but the most important development took place under the Railway and Canal Traffic Act, 1888. This Act was enormously important, affecting railway rates and charges. It created a new Commission called the Railway and Canal Commission (canals being brought into the title for the first time) and made it permanent. It consisted of two appointed and three *ex officio* members, who were judges of the superior courts of England, Scotland, and Ireland. The other members were appointed by the Board of Trade and one of them was to be of experience in railway business. It was made the supreme authority for dealing with all questions as to rates and facilities and it could order traffic facilities notwithstanding any agreements into which the companies concerned might have entered. Theoretically it was perfect and it served a useful purpose, but the business community was not satisfied because proceedings before it became very costly. The Associated Chambers of Commerce maintained a fairly constant agitation in favour of cheapening the procedure for dealing with grievances against railway companies.

The Light Railway Commission

An important departure from precedent was made in the appointment of the Light Railways Commission in 1896. For the first time in history Parliament surrendered to a subsidiary authority its powers of dealing with the rights of landowners. The Commission was established because it was thought the light railways would serve a useful purpose in extending efficient means of transport into parts of the country not effectively covered by the ordinary railways. Schemes for the construction of light railways were referred to the Commission. If passed they were formally reported to the Board of Trade for approval, and on this being given a scheme required no further sanction. Another novel feature was that the Treasury was given power to assist financially where it was

proved that the localities proposed to be served were so poor that otherwise the scheme would be impossible. It cannot be said that on the whole this departure from long-established custom has been conspicuously successful. Evidence of this is furnished by the fact that in the Ministry of Transport annual report as to the Railway Companies of Great Britain they are not considered sufficiently important to require production of collective figures such, for instance, as those relating to canals. In the "Statistical Abstract for the United Kingdom," tramways and light railways are lumped together, and the last issue (1938) gave the following particulars:—Capital of undertakings owned by local authorities £18,128,000; company-owned undertakings £8,430,000, number of route miles open for traffic 1008 miles, total receipts £12,936,000, total expenditure £10,480,000. These figures do not enable us to abstract those relating solely to light railways, but bearing in mind the extent of ordinary "tramways" throughout the country it is evident that light railways are relatively insignificant and unimportant.

Pooling Arrangements

One other important stage in the evolutionary process must be dealt with. It has been pointed out, already, that at the outset Parliament fostered competition. On the surface there was uniformity of conditions, e.g. one classification and standardized rates and charges; but in various indirect ways the companies made concessions, which in effect reduced charges. It was a favourite and successful way of obtaining these concessions to set one company off against another. In the end the companies got tired of this treatment, and began to act together to enforce warehouse and demurrage charges and to resist claims. From this to formal working agreements to "pool" competing traffic was a natural, inevitable progression, and they extended to passenger as well as goods traffic. Several of them were brought into operation in the early years of the century.

How far this drifting together of the companies might have gone cannot be conjectured because of the coming of the European War of 1914–1918. Under an Act of Parliament passed in 1871, and called the "Regulation of the Forces Act," the Government took control of all the railways and retained it until the middle of August 1921—nearly three years after the armistice.

CHAPTER III

WAR CONTROL AND AMALGAMATIONS, 1914-1921

As may be guessed from the date of the Act of Parliament (1871), the control of railways for war purposes was not a sudden, unconsidered action. It had been carefully prepared for during the intervening years and when war was declared there was already in existence a Railway Executive Committee consisting of the general managers of the great railways—Sir Herbert Walker (London and South Western Railway) was the acting chairman (the *ex-officio* chairman was the President of the Board of Trade) and the committee included the general managers of the following companies:—The London and North Western, Midland, Great Western, Great Northern, Great Central, Lancashire and Yorkshire, North Eastern, South Eastern and Chatham, and the Caledonian, as they were then called.

The terms on which they were taken over were that the Government should pay them the sum by which their aggregate net receipts fell short of the aggregate net receipts for the corresponding period of 1913. If, however, the aggregate net receipts for the first half of 1914 were less than those for the first half of 1913, the sum payable was to be reduced in the same proportion. This payment was to cover "all special services such as those in connection with military and naval transport rendered to the Government," and therefore, "it will be unnecessary to make any payments in respect of such transport." Circumstances, however, compelled modification of this arrangement. In 1915, railwaymen's wages were increased and it was agreed that 25 per cent only of this payment should fall on the companies. Also later on, when it was found that the continuance of the war was preventing necessary works of renewal and replacement, the companies were permitted to make provision for these before arriving at the balance of net receipts, even though the renewals and extensions had not been, and could not be, carried out.

In this way the railways became one system so far as war traffic was concerned, but the ordinary business went on as before, subject, of course, to the requirements of the war traffic. This inevitably meant in the long run considerable curtailment of passenger services.

This war control led, naturally, to a further great amalgamation of separate systems into the four main groups as we know them now. The

unification of control of war traffic was the first step in this direction; the second was the creation of a Ministry of Transport. This took all railway affairs (all traffic affairs in fact) out of the hands of the Board of Trade, and much more, such as the supervision of roads and road transport.

The 1921 Amalgamations

One of the first acts of the new Ministry was to outline a scheme for the amalgamation of the various railway systems into five great groups, but ultimately this was not carried into effect. The scheme did not receive Parliamentary sanction until 1921, when the Railways Act (11 and 12 Geo. V, Ch. 55) was passed and the four (not five) groupings finally adopted were as follows—

1. *The Southern Group*, called the Southern Railway, and comprising the following companies—the London and South Western, the London, Brighton and South Coast, the South Eastern, the London, Chatham and Dover, and the South Eastern and Chatham Managing Committee.

2. *The Western Group*, called the Great Western Railway, comprising the following companies—the Great Western, the Barry, the Cambrian, the Cardiff, the Rhymney, the Taff Vale, and the Alexandra (Newport and South Wales) Docks and Railway Company.

3. *The North Western, Midland, and West Scottish Group*, called the London, Midland and Scottish Railway, and comprising the following companies—the London and North Western, the Midland, the Lancashire and Yorkshire, the North Staffordshire, the Furness, the Caledonian, the Glasgow and South Western, and the Highland.

4. *The North Eastern, Eastern and East Scottish Group*, called the London and North Eastern Railway, and comprising the following companies—the North Eastern, the Great Central, the Great Eastern, the Great Northern, the Hull and Barnsley, the North British, and the Great North of Scotland.

Of course, a multitude of minor companies was also absorbed into these four main groups, the details of which are given in Appendix VII. Prior to this Act there were no fewer than 214 separate companies. Of these 121 were amalgamated into the four groups.

Amalgamations have been Disappointing

Much was expected from these amalgamations, at any rate by outside observers. Some felt that the result would be economies of management, greater earning power, and increased net earnings. Experience, however,

has been most disappointing. There were unrecognized indications of it between the time of the armistice, in 1918, and the coming into effect of the amalgamations. Whereas, during the war period, the railways earned more than the Government guarantee (according to a statement in *The Economist*), in 1919, 1920 and 1921 it was necessary to award them "Government compensation" amounting to thirty-three, forty-one, and fifty-one millions in the respective years.

There was no single cause for this. At the outset, of course, they could not resume their functions fully because of the lack of labour, rolling stock, and other facilities; but probably their profit-earning abilities were more hampered by the great increase of working expenses. Every commodity they required was badly inflated in price, and wages were considerably increased. Railwaymen's earnings did not nearly approach those of munition workers, but they were given war bonuses which carried the pre-war adult minimum from somewhere about 20s. to 38s. per week, and finally, after a strike in 1919, there was a general reorganization of grades, and a permanent basis of 100 per cent over pre-war wages was established. It was also agreed that Wages Boards should be set up and that wages should follow the cost of living as shown by the Board of Trade Index number.

The Influence of Road Transport

Another contributory cause of this failure to realize expectations was the extraordinary growth of road transport competition in passengers and goods. Omnibus companies that had been relatively local in their operations increased the scope of these, developing regular, well-organized, long-distance journeys. In this way they attracted much passenger traffic which otherwise would have gone on to the railways. On the goods side, road transport operators developed services in all directions and captured much traffic. For some things they were able to offer facilities superior to those of the railways, having in view the special conditions for which road transport catered. For example, manufacturers found that they could arrange for articles finished in their factories during the day to be loaded on to motor lorries in the early evening and delivered to their customers 100 miles or more away early next morning. This enabled them to arrange their output and deliveries to the exact requirements of the customers. For some kinds of traffic, this direct delivery was found to be an enormous advantage. It saved time and terminal handling, and in some cases it cut out warehousing with

its attendant cost. For such traffics the railways were unable to meet the competition of the road operators in the matter of facility, time, or cost, each of which is in itself frequently a considerable influencing factor.

There seemed only one way out of the difficulty: to permit increases in rates and fares. The increase in passenger fares had begun long before this, but was inadequate to meet the deficit, and in January, 1920, a really serious attempt was made to wipe out the deficit by authorizing percentage increases varying from 25 to 100 per cent in the class rates for goods, and flat rates varying from 3d. to 1s. per ton were also imposed. Even this did not restore the balance, and an Advisory Committee appointed by the Ministry of Transport recommended still further increases: a further 25 per cent on ordinary passenger fares, making a total of 75 per cent addition to pre-war charges, and, on goods and merchandise traffic, a larger flat rate ranging from 6d. to 1s. per ton, and a further increase of roughly 100 per cent in the class rates.

Even this did not restore the balance. The tide was flowing strongly against the railways. Only a very prosperous industry could support such increases, and industry was not prosperous. It looked so on the surface. The world-wide deficiency of consumer goods, and, in fact, of materials of all kinds, which had been enormous, was almost wiped out or stifled out by 1920, for in the following year a big trade set-back began. To use a colloquialism, "the bottom fell out of the market." In such conditions what industry wanted was not the increased transport burdens put on it in 1920, but appreciable relief from them. It came in 1922, when on January 1st the rates for primary products were reduced; they were still further reduced in the following May and again in the following August. Notwithstanding these it was still felt that the charges were too heavy.

Efforts to Restore Remunerative Working

The next move was the revision of the "General Railway Classification of Goods by Merchandise Trains" by the Railway Rates Tribunal set up by the 1921 Act. As a preliminary the Railway Clearing House produced a very formidable document running to 187 pages and containing provisional proposals for amending the classification. This was followed by long and arduous study by a Traders' Co-ordinating Committee. What was done need not be followed in detail. The final result was the production of a revised classification which sorted goods into a greater number

of classes. The object was to bring into more effective operation the well-established principle that goods shall be charged according to their value and the size of the load consigned; and carried, of course. This threatened to cause a general increase in rates which, obviously, industry could not support, but this fear left out of account the special or reduced rates which the companies had power to make where the traffic passing justified them. Existing special rates were overhauled and all active ones were continued.

"Standard Net Revenue" Never Reached

In spite of all this, however, the companies have never been able to earn their standard net revenue, which was fixed at 50½ millions sterling per annum. Trade recovered, of course, but other disadvantages became more acute. For instance, there was increasingly keen competition by road traffic. Following the first world war road transport developed very rapidly and on a considerable scale. It covered passenger as well as goods services and the companies were hit rather badly. They contended that their hands were tied because of the restrictions governing rates and charges set up by the various Acts of Parliament, and began an agitation for fair play—for power to vary their rates to meet the necessities of the situation—and this agitation was still being carried on when the second world war began and they were once more taken over by the Government. The one outstanding fact of the whole period between the two wars was that they were never able to earn their "Standard net Revenue" and that, such was the condition of trade, and the competition they had to meet, they were never able even to contemplate an application for increases sufficient to give them the required revenue. To do so would probably have added still further to their difficulties by having a reverse effect to that desired.

The Second War Control

The second world war beginning in 1939 brought the railways again under Government control just as completely as did that of twenty-five years earlier. This control is not ended at the time of writing, and its results and effects are yet unknown, but it has been on much the same lines as those which previously became familiar. The negotiated agreement as to terms provided for the companies a minimum annual revenue based on the average earnings for the years 1935–37 (£36,302,313), but if the earnings exceeded that figure, the companies were to receive up

to the first three and a half millions of the excess, and all further earnings were to be shared equally between them and the Government until the standard revenue of the 1921 Act (£51,700,000) was reached. In 1941 this agreement was ended, and the companies were allowed £38,164,294. All that need be said about this arrangement is that it has caused dissatisfaction among those people who hoped the 1921 standard revenue would be reached under the first agreement, and that some of the "junior" stock would receive dividends.

CHAPTER IV

UNITED STATES AND EUROPEAN RAILWAYS

It is impossible to attempt a detailed description of the railways of the United States of America within the limits of a book such as this. It is the largest system in the world; in mileage alone it is more than ten times as big as that of the United Kingdom. The history of the development of the railways of the United States is very different from those of this country. England was settled and well developed industrially and agriculturally. These conditions possessed advantages and disadvantages. Among the former have to be placed the fact that both industry and agriculture were waiting for the stimulus of efficient transport. The disadvantages may be summed up in the cost of construction and equipment arising from this settled condition of the country. In complete contrast to this were the conditions prevailing in the United States. Except on the coast lines, and on the banks of the great rivers and lakes, the country may be described, without exaggeration, as unsettled at that time. In the United States, therefore, railway construction (except principally in the eastern populated regions) was entirely pioneer work. Lines were pushed out westwards in advance of the population, and then the pioneers set to work to obtain populations for the regions they had opened up. It was a very different problem from that which confronted railway pioneers in this country. In America the pioneers had every inducement given to them to push on with their work. There were then no severe restrictions as to the kind of track which should be laid, or of rolling stock which should be used; and there were no landlords to be conciliated by inflated prices for their land. The history of these railways cannot easily be divided into two periods (construction and consolidation) as it can be here, because the two processes were so inextricably mixed, and overlapped.

Rates Agitations in America

In one respect, however, their history is very similar to ours—the agitations and outcries about railway rates. The trouble began early in the second half of the nineteenth century. The expansion of agriculture fostered by railway development had been so rapid that wheat prices fell considerably, and with the existing railway rates farmers were unable

to make a profit. From the point of view of the railways the reductions demanded would have meant disaster, but unwisely they did not rise to the necessity of doing something useful to help the settlers whom they had planted on the soil. Naturally in this crisis the indignation of the farmers became acute. In 1867, there was formed a society known as "The Patrons of Husbandry," the object of which was the social improvement and industrial betterment of agriculturists, though those interested in other industries eventually joined.

The Granger Movement

The meetings were held in granges, or barns, and the movement became known as "The Granger Movement." It promoted laws which were primarily directed against the railways and ultimately became known as "The Granger Laws." In 1873, as the result of their agitation, an Act was passed which required rates to be "reasonable" and a Commission was appointed to decide what were reasonable rates. The success of the Grangers, however, proved to be short-lived because the restrictive laws so diminished the earning powers of the companies that they became unprofitable, and in two years in the State of Wisconsin, for instance, the general level of rates was so reduced that none of the railways could pay a dividend, and for the time being development ceased. The Supreme Court, in 1877, decided that these laws were valid, but even before then they had come to be regarded as unwise, and it was recognized that it would be bad policy to enforce the decision.

The Inter-State Commission

Ten years of agitation followed until the ultimate solution of the difficulty was found in the creation of the Inter-State Commerce Commission in 1887. By this Act the regulation of railways became national rather than local; pooling was prohibited, and the relationship of "through" rates to local rates was dealt with. The Commission assumed the right to order the companies to fix reasonable maximum rates; but when taken to the courts they failed to establish that right. They obtained it, however, under Acts passed in 1906 and 1910. One of the most important enactments was that where a company reduced rates in competition with a water route it should not be allowed subsequently to increase them again unless it could show changed circumstances other than the elimination of the water competition as justification for its action. The Commission was also empowered to enforce compliance

with requirements as to equipment ; to regulate the carriage of explosives ; to regulate the hours of the operating staff, and to arbitrate in case of labour disputes.

Evolution in Europe

Railway conditions in Europe are quite different from those of the countries already dealt with. The United Kingdom of Great Britain and the United States of America obtained their railways entirely as the result of private enterprise, although, as has been seen, relatively small but valuable assistance in the shape of land grants was given to the pioneer American railways. European countries have obtained their railways largely as the result of State enterprise. At the outset there was some measure of private enterprise, but for various reasons this was soon superseded either by complete State ownership or by a combination of partial ownership and financial assistance to companies operating under concessions. In no European country is there an instance of private enterprise constructing railways, amalgamating them, financing them, and generally developing them until they obtained the extent and importance of those of the United Kingdom and the United States. Much the same can be said of railways in other parts of the world. In Australia and South Africa, for instance, pioneering lines depended on State action.

PART II

RAILWAY ECONOMICS

CHAPTER V

BRITISH RAILWAY CAPITAL

HITHERTO we have been dealing with the historical and physical features of railways; their origin and development, more particularly in Great Britain. It is now necessary to turn to the economic side of them, and to obtain a broad general view of their size and importance as business undertakings; as industries employing capital and labour, not for the purpose of production but to perform important services to mankind, and (a point which is almost of equal importance) of earning dividends for the owners of the capital employed.

The wonderful group of organizations to which we owe the extraordinary development of British transport since the days of roads and canals, had a total capital at 31st December, 1938 (the last year for which there are figures), of £1,126,946,057. The realization of this immense figure will be helped by comparing it first with the relatively small capital of shipping companies given in an earlier chapter, or, to look at it from a different angle, with the National Debt, funded and unfunded, which in 1939, stood at £8,163,181,000; or with the national income on which tax was paid in the 1937-8 tax year, viz:—£1,437,434,000. Of course, this huge capital has been of gradual growth. In 1854, it amounted to £271,717,672, so that in roughly ninety years it has increased just over 314 per cent. In the same period length of line has increased from 7157 miles to 20,006; passengers from 104,295,537 to 1,235,943,726; total traffic receipts from £19,341,247 to £187,666,955; working expenses (railways only) from £8,818,606 to £137,666,223; net receipts (from all sources) from £10,522,641, to £27,690,796.

This £1,126,946,057 of capital is divided into six main classes as follows:—Loans, £132,000; Debenture, £319,722,000; Rent Charge, £10,384,000; Guaranteed, £149,905,000; Preference, £366,338,000; Ordinary, £280,465,000.

Nominal Capital

Included in the total capital are the following nominal additions:—Debenture, £11,095,000; Rent charge, £15,263,000; Guaranteed,

Preference and Ordinary, £18,305,000—a total of £44,579,000. In 1921, these nominal additions were given as £201,210,000, but when the amalgamations sanctioned by the 1921 Act took place, the companies undertook some reorganization of capital which enabled them to reduce the total of nominal capital and there have been some further reductions since then to the 44½ millions mentioned. This is a remarkable reduction, and, of course, it is all to the good, because nominal additions to capital are altogether opposed to sound finance, however harmless they may appear under some conditions. Apart from anything else, they provoke hostile, and sometimes ill-informed, criticism. Without attempting to defend nominal additions to capital in principle, we can say that there is at least one feature not open to unqualified condemnation. This may be simply explained. Before the first European War the tendency was for the ratio of interest on really first-class, well secured, capital stock such as debentures, to fall. That war put up interest rates, but it was a temporary interference, and the downward tendency was resumed. Assume, for the sake of an easy illustration, that one of the railway companies years ago issued 6 per cent debentures. Whatever may have been the case then, 6 per cent became for many years a very high rate of interest for a first-class debenture secured on so important an undertaking as a railway. Naturally the directors of a company having debentures carrying such a rate of interest would want to bring their stock into conformity with modern conditions. They would no longer desire to borrow money at 6 per cent. Their idea, probably, was that in all the circumstances 4 per cent was quite sufficiently high and they would seek to reduce the rate of interest accordingly.

Causes of Some Nominal Additions

But the man who has invested £100 in these particular debentures has an inalienable right to his covenanted 6 per cent; and that right can only be disturbed by paying him out or by compensating him for disturbance. To pay him out would be an undertaking not lightly to be faced. In the first place, it is probable that the market value of his £100 has risen to £150, or even more; but this figure best serves to illustrate the point. This comes about because, on the assumption that the prevailing value of money lent on debentures is 4 per cent, then the more recent investor seeking employment for his surplus wealth is willing to pay £150 for a debenture of £100 yielding 6 per cent. Such a payment will give him exactly 4 per cent. The railway directors who desire to

reduce the rate of interest on their debentures from 6 per cent to 4 per cent are therefore faced with the alternative of either buying out the 6 per cent debenture-holder at the rate of £150 for every £100 of stock he holds, or of putting him in a position which shall be no worse than that he now occupies. Whichever course is adopted the ultimate result is the same. If the directors choose the latter alternative they must continue to give the debenture-holder the equivalent of his 6 per cent, and to do this they must give him in exchange for every £100 of stock at 6 per cent £150 of stock at 4 per cent. If they do this the stock is immediately watered to the extent of 50 per cent. The directors are not called upon to find an extra penny for payment of the interest on the debentures issued up to that time, and in all subsequent issues they borrow at 4 per cent and thus save 2 per cent. In the long run probably the company may be better off, although the amount of the original debentures has been increased 50 per cent; while the original debenture-holder remains in enjoyment of precisely his original income. Thus "watering," a practice so liable to abuse and disaster, may be a harmless, and even a beneficial transaction.

"Watering's" Effect on Dividends

The wisdom, or otherwise, of these nominal additions to capital may be criticized from another point of view—their effect on dividends. Unfortunately, changes in the form and returns issued by the Ministry of Transport do not enable the question to be answered as fully and certainly as did the returns in the days when the Board of Trade was the supervising authority. The information for 1912 can be tabulated as follows:—

Class of Capital	Dividend actually paid per cent	What it might have been per cent
Ordinary . . .	3.45	4.25
Preferential . . .	3.52	4.01
Guaranteed . . .	4.02	4.65
Loans . . .	3.61	3.61
Debentures . . .	3.42	3.92
All classes . . .	3.52	4.13

"What it might have been" refers to the dividends that might have been paid had there been no nominal additions to capital. The figures relate to the period when these nominal additions were heavy, and

obviously made an appreciable difference to the rate of dividends paid. Possibly because these additions are now relatively so small it is not thought necessary to give comparable figures, and the only ones now available show that the average rate in 1938 for all issued capital was 2·66 per cent, whereas the rate excluding nominal additions and deductions was given as 2·77 per cent. The difference, ·11 per cent, is no doubt a mere arithmetical figure without any exact relationship to any class of capital, and there may be variations in the different classes, but it serves to illustrate how little is the effect ; how harmless from this point of view, are nominal additions. From other points of view there may be criticism. It has resulted in increasing capital on which dividend has to be paid and there must be a constant effort to provide it with dividend. This, it may be argued, constitutes an obstacle to the reduction of rates and fares. It also lends itself to criticism by the advocates of nationalization.

What the Capital Represents

What the total railway capital represents is set out in the following table given in the Ministry of Transport Returns for 1938—

Lines open for traffic	£ 852,939,845
Lines not open for traffic (including new lines)	1,106,296
Lines leased	386,567
Rolling Stock	155,671,310
Manufacturing and repairing works and plant—	
Land and buildings	13,402,369
Plant and machinery	9,056,639
Total railways proper	1,032,563,026
Horses	103,474
Road Vehicles (goods and passenger)	4,608,373
Garages, stables, etc.	2,752,879
Steamboats, etc.	9,093,697
Marine workshops and plant	276,760
Canals	8,062,906
Docks, Harbours, and Wharves	71,824,898
Hotels	9,796,278
Electric Power Stations, etc.	2,806,983
Other businesses	8,075
Land property, etc., not forming part of the railway or stations—	
Used in connection with railway working	3,076,812
Not so used	32,160,624
Subscriptions to other undertakings—	
To Irish railway companies	1,326,625
To companies other than railway companies	12,224,615
Stamp duty on additional capital	397,432
Special items	8,130,748
Total capital expenditure	<u>£1,199,214,215</u>

This figure of total capital expenditure, 1199 millions sterling, does not square with the 1126 millions sterling given as the total of capital issued. The excess of expenditure, on capital account, 72,268 millions sterling, is capable of two explanations. First there is the fact that on some of their issues the companies have received no less than 33,918 millions sterling in premiums; the remainder has come from expenditure out of revenue. The Ministry of Transport Return gives a very interesting modification of the figures. It deducts the balance of nominal additions and deductions, 44,579 millions, and makes other adjustments to show that the total capital receipts (as distinguished from capital issued) were 1116 millions. Capital expenditure compared with this shows an excess over capital receipts of 82,701 millions.

Whichever figure is accepted as the most representative throws a very interesting light on the subject of nominal additions. Adopting the smaller excess the nominal 44 millions added is counterbalanced by 72 millions of assets created from premiums and revenue expended.

CHAPTER VI

RAILWAY REVENUE AND EXPENDITURE

Revenue

THE gross receipts of the railways of the United Kingdom in 1938 amounted to £187,666,955. This is an impressive figure, but it requires to be reduced to its true proportions by means of comparisons. The total capital issued we have seen is £1,126,946,057; gross earnings therefore amount to 16·65 per cent of capital. The net receipts for the same period were £29,757,554 and this is only 2·64 per cent of the capital issued. Both percentages, especially the latter, seem astonishingly small. It may be suggested that they are so because the figures are averages, but even so they do not appear to be really misleading when tested by the returns of the four big companies. The total net income on the capital actually in their businesses is:—Southern 3·78 per cent; Great Western 3·07 per cent; London, Midland and Scottish 2·63 per cent; London and North Eastern 2·00 per cent. On the whole, the percentage given for the whole country cannot be said to be unrepresentative to any serious extent of individual experience. The percentage of gross earnings to capital indicates that it takes the companies more than six years to turn over their capital, which, general knowledge suggests, is a very much longer period than that occupied by the average industrial concern. For purposes of comparison the returns of ten public limited companies were selected, and though now old, the figures probably will still serve. These ten companies had a total capital of £68,482,898 and their net earnings for a year were £9,965,237, which is equal to 14·55 per cent. The fact that there is this disparity between the net receipts of the British railways and those of industrial companies seems to point to one of three things: the railways are (1) over capitalized, (2) badly and extravagantly managed, or (3) extremely efficient and rendering very cheap services to the public. These points are worth examination.

Are Railways Over Capitalized?

It seems obvious, in view of what has been said as to the cost of construction, that there must be some degree of over capitalization; and apart from the initial expense of construction and equipment there

is reason to believe that capital accounts have been unduly swollen in comparison with what is the general business custom. In the average business, one of the things most suspiciously regarded and carefully guarded against, is the increase of capital account, unless, of course, the increase arises from important developments of business. As far as the railways are concerned, it will be realized when expenditure comes to be considered, that it is the custom to provide, normally, for extensive repairs, renewals and replacement of permanent way, rolling stock, the plant generally, and also minor extensions out of the annual revenue; but still experience shows that in pre-amalgamation times they were too prone to borrow fresh capital for extensions while the ordinary limited liability companies contrive to provide for much more of their growth out of reserve funds. In recent years the companies have exercised more restraint, but previously their attitude in this matter was very well summed up in a remark made by Sir Richard Moon, a former chairman of the old London and North Western Railway Company, who once said: "If the capital account were closed the company would never pay another dividend."

There is much truth in the remark. Possessing insignificant depreciation and reserve funds, those companies, if they closed capital accounts, would be unable to undertake necessary developments on a large scale, and that would soon mean congestion, delay, loss of traffic and diminished earning power. Sir Richard Moon's remark, however, is not to be accepted as an inviolable principle of railway economics, but rather as the outcome of a policy which some persons would not hesitate to call short-sighted and foolish, but one which now cannot be appreciably, or rapidly, altered without the unfortunate results he foretold. While there is some truth in Sir Richard's remark, there is also some exaggeration, for in recent years capital issues have been restricted to the fullest possible extent; and there has been some reduction in the total of railway capital apart from that which resulted from the 1921 amalgamations.

Management and Services?

Whatever may be the case now, there seems to be no question that at one time the charge of bad or extravagant management was amply justified. The improvement is shown in the increase in earnings since the beginning of the present century. In 1903, passenger receipts averaged 49·21d. per train mile; in 1938, they were 62d. In the same years goods earnings averaged 82·55d. and 158d. respectively. The bare comparison of

the figures is a little misleading, perhaps, because in the period there has been a revision of the classification and some increase in rates and fares.

Efficiency

That from the point of view of the services rendered to the public the railways are extremely efficient is a point that need not be laboured. Everyone is familiar with the character of the services rendered to the public. During the railway era, the cost of transport of individuals and of goods has been greatly reduced and service has improved immensely.

The result of the examination seems to be that the extremely small percentage of gross and net earnings in relation to the capital employed is due to a combination of all three causes.

Expenditure

There are, of course, two kinds of expenditure, (1) capital or permanent, and (2) working or recurring. The extent and growth of capital expenditure has been dealt with. Working expenditure is a very heavy item; how heavy will be more easily realized from the table below, which brings receipts and expenditure together.

	Gross Receipts	Expenditure	Percentage of Expenditure to Gross Receipts
1933	£ 169,579,169	£ 142,645,849	84.11
1934	176,561,123	147,151,351	83.3
1935	179,233,350	148,304,741	82.7
1936	186,469,767	152,182,845	81.6
1937	195,427,770	158,966,183	81.3
1938	187,666,955	159,976,159	85.2

As a matter of interest, and to illustrate the remarkable growth of expenditure, it may be recalled that in 1870, the proportion of working expenditure to total receipts was 48 per cent, and at ten year intervals the figures have been: 1880 51 per cent; 1890, 54 per cent; 1900, 62 per cent; 1910, 62 per cent. These figures all relate to the United Kingdom, Ireland being included. It is interesting to compare these percentages with the figures tabulated. In the years after 1918, the percentages rose to over eighty, and there has been no diminution since.

In the same way the percentage of net revenue to capital has shrunk. In the period from 1870 to 1890 (Ireland still being included) it ranged down from 4.41 per cent to 4.10 per cent, and from 1895 to 1913 it sank gradually from 3.80 per cent to 3.59 per cent. In the six years to 1938,

which owing to the war is the last year covered by the returns, the comparison has been 1933, 2·6 per cent; 1934, 2·8 per cent; 1935, 2·9 per cent; 1936, 3·2 per cent; 1937, 3·4 per cent; 1938, 2·6 per cent. From these comparisons it is impossible to resist the conclusion that working expenditure is too heavy in relation to capital and revenue, and that it leaves a very meagre net revenue. Side by side with this has to be set the fact that since 1921 there have been some appreciable capital reductions.

Working Costs and "Overheads"

The railway companies have always been under an obligation imposed by Parliament, not only to publish the gross amount of their expenditure, but also to analyse it in some detail. Students and critics of railway affairs complained that this information was inadequate; that the prescribed headings mixed up the expenditure incurred in the different branches of the work. They asked for an analysis under headings that would distinguish the cost of maintenance from the cost of working the railways. They desired figures which would correspond to those that in an ordinary business show (1) actual works costs, and (2) "overhead," or dead expenses. Their demand was based on the argument that much railway expenditure is continuous and varies surprisingly little irrespective of the volume of traffic handled; that in fact "the bulk of the expenditure goes on whether the traffic to pay for it comes or not."¹ The returns issued by the Ministry of Transport now give this information. There is first a general statement of expenditure under various headings—

EXPENDITURE ON RAILWAYS AND ANCILLARY BUSINESSES (in thousands 000 omitted)

	1933	1934	1935	1936	1937	1938
Railway	£ 123,122	£ 126,783	£ 127,409	£ 130,570	£ 136,135	£ 137,666
Road transport	458	506	543	585	579	571
Steamboats	3,139	3,191	3,232	3,295	3,476	3,490
Canals.	210	210	220	219	233	237
Docks, harbours, and wharves	5,953	6,068	6,168	6,185	6,461	6,107
Hotels and refreshment cars	4,599	4,804	4,941	5,183	5,492	5,527
Collection and delivery of parcels and goods	5,147	5,557	5,728	6,075	6,501	6,308
Other businesses	15	28	60	67	85	67
£	142,645	147,151	148,304	152,182	158,966	159,976

¹ The late Sir William M. Acworth.

These different headings of expenditure are also analysed in detail. The same years are given in these tables, but probably the point sought to be made will be sufficiently illustrated if only two of the years are taken—the first and the last.

EXPENDITURE IN RESPECT OF RAILWAY WORKING
(in thousands 000 omitted)

	1933	1938
Maintenance of way and works . . .	£ 13,487	£ 21,376
Maintenance of rolling stock . . .	20,113	23,694
Locomotive running expenses . . .	30,059	34,697
Traffic expenses	42,890	46,955
General charges	5,129	5,312
Law charges	157	150
Parliamentary expenses	17	15
Railway rates tribunal expenses . . .	11	11
Compensation (Accidents and losses)—		
Passengers	45	112
Workmen	291	332
Goods, property, etc.	407	479
Rates	1,292	788
Railway freight rebates fund—		
Rate relief	3,814	2,174
Deficiency	62	—
Taxes and tithe rent charges . . .	22	24
National Insurance—		
Health, pensions, etc.	851	896
Unemployment	296	369
Running powers (balance)	48	26
Mileage, demurrage and wagon hire		
(balance)	21	64
Miscellaneous	97	82
	123,122	137,666

Relative Weight of "Overheads"

The various headings of expenditure given above are self-explanatory, with the exception of "traffic expenses," which seems to require elucidation. It includes such things as the salaries and wages of the operating staff (excluding those of engine drivers and stokers, which come under locomotive running expenses) and these total well over 29 millions. Ticket collectors, policemen, porters, etc., take $11\frac{1}{2}$ of those 29 millions, and shunting expenses, other than mechanical, come to well over $3\frac{1}{2}$ millions. It is apparent, therefore, that to get at what corresponds with "manufacturing costs" in an ordinary business, locomotive running expenses and

traffic expenses must be added together. This gives a total for 1938 of £81,652,000 for "manufacturing costs" and £56,014,000 for "overheads." The former are equal, roughly, to 59·3 per cent of the cost of railway working and the latter roughly to 40·7 per cent. Whether this is abnormally heavy in comparison with industries generally, it is impossible to say; everything depends on the nature of the industry or business. Equally impossible is it to say how much of the "overheads" go on irrespective of the volume of traffic, but it is quite obvious that "way and works" must be maintained at the requisite standard without regard to variations in traffic, unless these become abnormal; and it is certain salaries and wages cannot be adjusted quickly to meet minor variations; men cannot be engaged and dismissed to cope with every fluctuation. Probably a maintained reduction in the volume of traffic and the earnings arising from it would force the companies to make substantial reductions under either or both headings; but the reductions in traffic would have to be sustained as well as substantial before anything appreciable could be undertaken. Probably it is safe to agree with the critics (1) that a substantial portion of the expenditure of the railways of the United Kingdom has no direct relation to the volume of traffic; (2) that the great bulk of the expenditure is incurred on behalf of the traffic as a whole and cannot be strictly allocated; (3) that while expenses are bound to increase as traffic increases, the rate of increase will not be in direct proportion to the growth of traffic. It follows that railway officials must recognize this relative tendency to constancy, and aim to obtain a large volume of traffic over which to average expenses.

CHAPTER VII

THE EVOLUTION OF RATES AND FARES

BRITISH railway rates were not the result of, nor were they based upon, any well thought-out, clearly defined system. They were evolved empirically and as the result of expediency. Originally the railways were provided primarily for goods, or rather mineral, traffic, and the original passenger accommodation was primitive as well as expensive in comparison with present-day conditions. It was not until 1872 that the then Midland Railway Company admitted third-class passengers to all their trains. This caused many protests from other companies, but eventually the example had to be followed, and finally second-class accommodation was almost abolished. This may be regarded as the first indication, the beginning of a revolutionary movement which shifted both revenue and numbers carried to the third-class and such things as workmen's tickets and monthly return fares at greatly reduced rates. The question which now concerns railway managers is not whether it pays to carry third-class passengers in all their trains, but whether it pays to carry first-class passengers. The question, as it concerns first-class, arises not so much from the reduction of fares, but because of the comparatively small number of first-class passengers and the unoccupied seats reserved for them in normal times. Of course, surplus first-class seats are not to be found on through express trains. They are more the characteristic of local, "stop at all stations" trains, although this does not apply to such services in all areas. The difficulties of the period between the 1914-18 war and the present time have forced some increases in fares, but that does not upset the main argument.

Goods and Merchandise Rates

The development of goods and merchandise rates was equally piecemeal and empirical. The original idea of a railway was that it should be a specialized sort of road along which traders would haul their own goods as they had done in the case of canals on payment of a toll; but it was soon realized that railways could not be worked on these lines. There are obvious disadvantages in such an arrangement; it did not facilitate the organization of traffic and the best use of the road. The companies found it necessary to exercise control and in fact to provide their own

locomotives and rolling stock and to act as carriers. This required Parliamentary sanction (given in 1845) for three tolls—for the use of the road, for locomotive haulage, for the provision of trucks. As the companies became common carriers as well as toll collectors it also became necessary to increase their staffs to handle the traffic and to provide warehouses. This in its turn led to what are called "terminal charges." Parliament again fixed the maxima which could be charged and required the "terminal charges" to be shown separately.

Concurrently with this development of charges there was evolved a primitive classification. The canal companies had roughly classified minerals and merchandise according to value. The earliest railway tolls authorized by Parliament were based on the same principle. The following example afforded by the Manchester and Liverpool Railway is given in Sir William M. Acworth's book, *The Elements of Railway Economics*—

	<i>Per Ton per Mile</i>
For all limestone	1d.
„ „ coal, lime, dung, compost, manure and material for roads	1½d.
„ „ coke, culm, charcoal, cinders, stone, sand, clay, building, paving, and pitching stones, flags, bricks, tiles, and slates	2d.
„ „ sugar, corn, grain, flour, dyewoods, timber, staves, deals, lead, iron, and other metals	2½d.
„ „ cotton and other wool, hides, drugs, manufactured goods, and all other wares, merchandise, matters and things	3d.

These charges were for the use of the road-bed only. When the company acted as carriers they were authorized to make the following charges, which included the road-bed toll:—

	<i>Per Ton s. d.</i>
For all lime, limestone, dung, compost, manure and materials for roads, stone, sand, clay, building, pitching, and paving stones, tiles, slates, timber, staves, and deals	8 0
„ „ sugar, corn, grain, flour, dyewoods, lead, iron, and other metals	9 0
„ „ cotton and other wools, hides, drugs, groceries, and manufactured goods	11 0
„ „ wines, spirits, vitriol, glass, and other hazardous goods	14 0

The Evolution of the Classification

This was a very elementary classification, and it is obvious that the time must soon come when it would require supplementing and elaborating. The various companies did not long act independently in this matter. In 1842 they established a Clearing House to adjust claims for services rendered to each other, and this, of course, involved uniformity

of classification. In this way came the General Classification applicable to all companies. And it seems to have become a continuous, progressive job for the Railway Clearing House. Its first classification comprised 300 commodities, and as the years passed the numbers grew until there were some thousands of items. Parliament again took a hand in the business, and, in 1865, a Royal Commission recommended that the Clearing House Classification should be approved and imposed on the companies in all subsequent Railway Acts.

The large development came, however, in 1888, on the passing of the Railway and Canal Traffic Act, which required the companies to submit to the Board of Trade a revised classification of merchandise traffic and a revised schedule of maximum rates and charges. When this was lodged it was open to objection by interested persons and the Board was to consider and settle the objections. Thousands were lodged, and it was necessary to appoint Lord Balfour of Burleigh and Sir Courtenay Boyle to inquire into them. The task was immense and though the schedules were lodged in February, 1889, it was not until 1892 that the confirmatory Acts of Parliament were passed.

The classification adopted was that of the Railway Clearing House, and it was divided into six sections, as follows: (1) goods and minerals; (2) animals; (3) carriages; (4) exceptional articles; (5) perishable articles carried by passenger train; (6) small parcels carried by merchandise train. Class 1, goods and minerals, was subdivided into A, B and C. The Act also insisted on the division of all rates into two parts—(1) conveyance charges; (2) terminal charges. But, perhaps most important of all, it introduced what has come to be known as the "tapering rate." The original Acts of most of the companies permitted a charge of so much per mile for any distance beyond 6 miles. The 1891-92 Acts imposed a rate for the first 20 miles, a smaller rate for the next 30 miles, a still smaller rate for the next 50 miles, and an even smaller rate for the remainder of the journey. The result, of course, is that the greater the distance carried the smaller the average rate per mile for the whole distance.

The Resulting Muddle

The years of hard work given to the preparation of the classification did not produce satisfaction, but had quite the opposite effect. The new schedules meant the framing of new rates, and the rate books, in which every station handling goods entered its rates, were withdrawn. As a

consequence a considerable volume of traffic that had formerly been dealt with at "exceptional" rates, lost temporarily the benefit of those rates. The immediate result was an extremely violent storm of protest by traders throughout the length and breadth of the land. The charges were not above the legal maxima allowed by Parliament, but as the exceptional rates had disappeared, for the time being at any rate, the rates were appreciably increased in many cases. Again Parliament had to take notice of the chaos and the protest, and the ultimate result was the passing of the Railway and Canal Traffic Act of 1894. This placed on the companies the onus of proving that any increased rate they had made since the end of 1892 was "reasonable," and the fact that it was within the limits fixed by Act of Parliament did not of itself make it a reasonable rate. The effect was to set up new and reduced maxima, because the companies were so bound by the Act that they were chary of increasing rates which might have to be defended under the stringent provisions of what was, from their point of view, an antagonistic Act. They also became exceptionally careful of reductions in existing authorized rates because of the extreme difficulty which would occur in raising them to their former level should experience prove them to be unprofitable. The economies they sought to make by pooling competitive traffic and agreeing to efface terminal charges and to resist unreasonable claims have been mentioned in an earlier chapter.

CHAPTER VIII

THEORIES AS TO THE BASIS OF RAILWAY RATES

THERE is hardly a more fruitful source of controversy than the theories as to the basis of railway rates. Business men who had anything to do with the consigning of goods used to be dissatisfied with, and keenly critical of, the principles which underlie the system. They considered that not only were charges excessive, but that their basis was theoretically unsound, with resulting unjust discrimination against different kinds of goods and merchandise, against individuals and districts, and against home as compared with foreign imported produce.

Cost of Service Rates

One criticism is that the rates are unjust because they are not based strictly on cost of service. It may seem to the superficial observer simple to ascertain what is the actual cost of service. In business, cost of production is regarded as one of the essential facts for a manufacturer to know. But it is not so simple to the railway manager whose complex organization is not solely engaged in carrying goods and merchandise. The bulk of what constitutes a railway system has been provided for the use of passenger as well as goods traffic; and it is so used indiscriminately. Who then is to disentangle the complications and say what is the actual cost of moving a particular consignment a certain distance? This point has been dealt with at some length when discussing the statistical returns required by the Ministry of Transport, and need not be elaborated again.

Points Against " Cost of Service "

Briefly summarized the points against the strict application of charges based on the cost of service are: (1) From the point of view of the trader it would not work; it would place an insupportable burden on some individuals and some kinds of traffic and would force traffic off the railways; (2) from the point of view of the railway managers it would be (a) too complex to be obtained in sufficient detail to be of real value; (b) and if it could be obtained it would ignore the equally important principle that, as there is so large an expenditure that cannot be avoided

if the railway is to exist and be worked at all, it will pay to deal with the traffic from a commercial rather than a scientific point of view and so increase the volume of traffic that dead and unavoidable expenses per unit will be reduced to the smallest possible average; (3) under this latter system some traffic may appear to be overcharged in comparison with other traffic, but in reality it is being carried at a smaller rate than would be the case if the low value traffic were driven from the railway by being called upon to bear an arithmetically exact share of costs equal to that which the higher value traffic could bear without appreciable difference or without its effect being felt.

Equal Mileage Rates

Another system that has its advocates is equal mileage rates, i.e. that the charge for conveying one ton one mile, or a number of miles, should be equal whatever the direction the traffic moves. Theoretically this does happen to some extent. The schedules of charges are based strictly on mileage, but they do not impose equal mileage rates. The charge per mile differs with each class of traffic, and, in addition, it diminishes as the distance carried increases, whatever the nature of the traffic. Probably these departures from strict equality would escape criticism, but the multiplicity of "exceptional rates" introduces complications. These have largely superseded the statutory rates. Railway managers have worked on the principle that wherever additional traffic could be obtained in sufficient volume to justify it, the statutory rates should be reduced. Traders have pointed out that a market for their goods exists in a particular place, but they cannot compete there because other manufacturers are nearer and their cost of transport is lower. Inquiry has shown that given an exceptional rate a sufficient volume of transport could be secured and so the rate has been granted. Possibly the question of competition has not arisen. Traders have asked for reduced rates solely because of the volume and regularity of their traffic. In both these instances it seems a business-like procedure to grant exceptional rates, specially in view of what has been said about spreading the costs of railway working over as large a volume of traffic as possible. But it is precisely these reductions that have led to complaints of the inequality of the mileage rates charged. Exceptional rates have brought the companies increased volume of traffic. If the strict mileage rate, increasing arithmetically with each mile travelled, were the rule much traffic would be forced off the lines.

Postal Principles, or Zones

Another suggestion made was that rates should be based on "postal principles," or that there should be zones within which the charges should be the same. The desirability of charges based on postal principles need not be discussed, but the zone principle exists. Stations in certain districts, such as those in the South Staffordshire "Black Country," are grouped together and the rate to each of them is the same, irrespective of slight differences in distance. The Metropolitan area and some of the ports also constitute zones. But to apply the system completely to the whole country would create difficulties. The man whose traffic did not go the full length of the zone mileage would feel that he was being unfairly treated in comparison with others whose traffic regularly travelled the full zone mileage.

"What the Traffic will Bear"

The principle on which the railways work is known as "charging what the traffic will bear." This must necessarily be a blend of three things—(1) cost of service; (2) distance; and (3) value of the commodity carried. Usually the critic looks upon the third quality as the only consideration and consequently charging what the traffic will bear is regarded as unjust. No doubt the attention paid to this aspect of the problem is considerable, but it is obvious that, roughly, cost and mileage cannot be entirely ignored. For instance, it will have been seen that class rates invariably decrease with distance, whatever the nature of the commodity carried. The things that vary are the levels at which the charges for the different classes start and the rate of decrease in the charge as the distance increases. The starting level gets higher as the classes ascend from 1 to 21, while the rate per mile decreases as the mileage travelled grows greater. The railway manager declines to be bound absolutely by either cost or mileage. He has a certain object in view—to keep the system well occupied, on the principle that the greater the turnover the lower the average of dead charges per unit of the thing "produced," which in his case is transport. It has been seen already that if a railway is to exist at all there is much unavoidable expenditure of money in providing for traffic and in maintaining the service. This preliminary expenditure must be incurred whether the traffic obtained is much or little, and so must the continuing maintenance expenditure, except, of course, that while some of it is unavoidable whatever the volume of traffic, there must necessarily be variations in its extent.

according to whether the volume is large or small. One of the primary objects, therefore, must be to get traffic and, within limits, the more traffic increases the less will be the cost per unit. The principles have been admirably summarized as follows—¹

1. Get traffic. The more traffic carried the less it costs to carry. Therefore, first and foremost get traffic.

2. Charge no rate so high as to stop the traffic from going: subject to

3. That no rate shall be so low as not to cover the additional cost incurred by the railway in dealing with the traffic to which the rate applies.

It will be seen from this that the phrase "what the traffic will bear" is capable of negative expression, i.e. not to charge what the traffic will not bear.

The principle has world-wide application not only to railways but to shipping, and it has been applied in other countries besides this. If traffic were not charged on this principle the result would be that much low-class traffic, such as coal and iron ore, could not be carried beyond a very limited area and would lose many of its markets.

¹ *Elements of Railway Economics.* (Acworth.)

CHAPTER IX

ALLEGATIONS OF DISCRIMINATION AND PREFERENCE

THERE used to be a widespread opinion that the railway companies discriminated unfairly between different districts and that foreign imported goods were given preferential rates to the detriment of home products. Such complaints are seldom heard now, but it is desirable to deal with them from the historical point of view, if no other. Discrimination between districts, or places, when closely examined becomes very largely a question of equal mileage rates, or rather the absence of them. Traders found from experience differences in the rates charged for carrying the same commodity to places at equal distance, or approximately so, from the point of dispatch. Or the rate from two places, again about equally distant, to a common centre was not the same. This caused complaint that one or other place was being discriminated against, to its detriment. The explanation, as a rule, is a perfectly reasonable one. In some cases the difference is due to water competition, by sea, navigable river, or canal. Normally water transport is cheaper than land. Liverpool and London, and Hull and London, furnish instances of sea competition, and the same conditions apply to other ports. Another form of so-called discrimination arises from competition between the railways themselves, and is due to geographical causes. Two companies may serve the same towns, but the one whose track is a few miles longer will not be able to charge more than the rate for the shorter distance. The shorter route has its maximum charge fixed by Act of Parliament and is unable to exceed this charge. It follows that if the company with the longer route desires to get any traffic it must come down to the rate for the shorter route.

Complaints that British rates are excessive compared with those of foreign countries are not usually based on exactly comparable conditions. Often the British rates used in controversy include not only haulage, but collection and delivery and other terminal charges which are not included in the foreign rate with which comparison is made. One of the most important sources of international disparity arises out of differences in origin and ownership. State ownership, which applies so largely to European railways, has led very considerably to State subsidies and lower rates in connection with exports to foreign countries. The railways

in this way have been used as an economic weapon to foster industries and to promote exports.

United States Ton-mile Rates

The critics made great use of the very low ton-mile rates produced by the railways of the United States of America. Here something is due to what in effect were subsidies granted to the companies. For instance, in their early days they were freely given land for their tracks and also on its borders; the latter for sale to settlers so that they might reap some of the benefit which flowed from their enterprise in opening up the country. It has been estimated that the cost of construction in this country was £36,400 per mile, while in America it was somewhere about £15,071. Heavier cost of construction, of course, means larger capital on which dividend has to be paid and that, of course, is an obstacle in the way of reductions of railway rates.

There seems little doubt, however, that differences arising from causes such as these have had much less influence than the length and tonnage of hauls in America. It will be sufficient to illustrate this by taking the case of grain, particularly for export. Large quantities from the surrounding agricultural country are collected in elevators at convenient centres, and from these transported to the ports of shipment. The trains are exceptionally large, carrying thousands of bushels of grain which is carried three or four hundred miles without a break. It is not surprising in such circumstances that very low ton-mile rates are produced. In Great Britain there are neither the distances to carry nor the quantities to handle; but if the comparison of rates on this basis is unfavourable the fact remains that on the average the cost of moving merchandise and minerals in this country is lower than in the United States of America. In 1938, the average receipt per ton per mile of all freight carried here was 1.347d. and the average receipt per ton was 6s. 6d. Our distances being shorter, the cost does not add up to so large a figure, and consequently, on the average, the cost of transport in this country is not so heavy as it is in the United States.

The Question of Foreign Preference

Allegations that preferential treatment is given to foreign imported goods and produce are not now made with such frequency as they were in the past, but it is desirable to examine some of the allegations that have been made. Railway law prohibits undue or unreasonable preference

in respect of the same or similar services, and the governing conditions are to be found in the words "undue" and "unreasonable." The complaints which had been made may be roughly divided into two classes: (1) those which compare a continental through rate to some place in this country with the corresponding British rate for the corresponding journey from this country to the continent; (2) those which compare a British rate for imported goods from the port of disembarkation to an inland centre with rates charged for British produce carried over the same line in the same direction.

With regard to the first complaint, it has been mentioned already that European governments have thought it desirable to encourage the export of the products of their own country by means of reduced rates, and it follows that these lower rates are not extended to imports into their countries; that would be altogether opposed to their economic policy. It is true that British railways also quote "exceptional" (and of course, lower) rates for goods intended for export as compared with the rates charged, even to the same seaport, when the goods are intended for home consumption; but under the "same or similar services" law whatever rate is put on the books for export is also available for home goods between the two points to which it applies. The difficulty is that the service rendered to British goods between these points is seldom the "same or similar." For one thing the quantities handled are smaller and do not entitle the goods to the same low rates. Its comparison is equivalent to comparing wholesale with retail prices.

There is another interesting feature of these comparisons of through rates from the Continent of Europe. An example of this was furnished some time ago by means of a rate for spelter from Stettin to Birmingham. For 10 ton lots this was quoted as 16s. 6d. per ton and the reverse rate as 23s. 5d. The German forwarding agents who quoted the through rate quoted 6s. from Stettin to Hull. This suggested that the land rate from Hull to Birmingham was 10s. 6d., whereas the corresponding rate from Birmingham to Hull was 11s. 4d. Inquiry showed this inference to be inaccurate. North of England shipowners of repute definitely stated that the railway rate between Birmingham and Hull in either direction was 11s. 4d. The sea freight from Stettin to Hull was thus reduced to 5s. 2d. per ton. In the reverse direction the sea freight after deducting the 11s. 4d. to the port of shipment, was 12s. 1d. per ton. The difference was entirely due to shipping policy. Spelter from Stettin was in competition with the same metal produced on the borders of Belgium and shipped by way of

Antwerp to Harwich. If, therefore, the shipping company trading between Hull and the Baltic desired to carry spelter from the German Baltic ports, the rate must be such as would compete with the far shorter sea journey, but if it had been desired to carry spelter in the reverse direction the shipping rate would not be influenced by such or similar considerations. What looked like a case of preferential railway rates turned out to be entirely a matter of shipping policy or economics.

Other similar instances could be given, but probably it will be agreed that it is unnecessary to multiply examples. The fact is, that the people who made the complaints were content to take the figures as they found them without inquiring as to the causes of the differences.

More easy to examine are the complaints that fall under the second heading—those based on comparisons of British rates for imported goods from the port of entry to an inland centre with the rates charged for home produce carried over the same line. Again cases need not be multiplied. It will be sufficient to take one which was very common—that of meat carried from Liverpool to London at 25s. per ton, with that from Cheshire stations at 40s. per ton. The answer is that the rate from Liverpool applies equally to foreign and English meat as long as the specified minimum tonnage is maintained. But unfortunately the British consignments seldom if ever came up to the minimum. In the days when the complaints were made the railway companies were sending from two to six meat trains daily to London. They were large trains, fully loaded, and, once made up, they ran through to London without stopping or shunting, except such as arose from the exigencies of the service as a whole. There was no crawling from station to station to pick up a succession of small consignments. Consequently the cost of running these through trains was reduced to a minimum, and though, perhaps, the rate per ton may have been barely profitable, the tonnage handled was so great, and the labour of handling it reduced to the lowest possible limit, that the trains were very profitable and helped to reduce the average of dead expenses per unit, which, as already pointed out, is a very important consideration.

Asomewhat similar case, "the Southampton case," was brought by the Mansion House Association. It alleged that foreign hops, fish, meat, etc., arriving at Southampton docks were sent by through train to London at rates which constituted an undue preference. The case is only mentioned because the Railway and Canal Commission gave a clear decision that mere difference in the rates charged did not constitute undue

preference and that a railway company is entitled to take into consideration, when framing a rate, the nature and volume of the traffic for which it is quoting special terms. The governing conditions in all these questions are that the preference must not be "undue" and that there must be no difference in the treatment for "the same or similar services."

The allegation of preference is defeated by the principle of lower rates for large quantities not only of foreign traffic coming in from the ports, but also for home produce moving about inland, and further by the fact that a special rate, as long as it remains on the ratebooks, is applicable to all consignments in both directions between the two points to which it relates as long as the attached conditions as to quantity, etc., are fulfilled by the consignor. If Parliament dropped the word "undue" it would not prevent all foreign competition because of the competition of water with railway carriage. If the rates for the Southampton dock traffic were raised it would not mean that the goods would cease to reach the London market. They might disappear from the railways, to the detriment of the latter, but they would make the whole journey to London by sea.

CHAPTER X

PARLIAMENTARY CONTROL OF RAILWAYS

IN an earlier chapter there have been references to control exercised by Parliament. This control is so familiar that probably few people pause to think about its origin, the reason for it, and its extent. Probably the origin lies in the fact that railways preceded the company laws which created limited liability companies. Nothing was then known but a private partnership, a Charter of Incorporation granted by the King, or company incorporated by Act of Parliament. Probably the reasons which actuated Parliament at the outset were not clearly defined. There may have been a feeling that something new, and of unascertained power for good or evil, was being created; and that special care in regulating the powers conferred was required. The reasons for it may be assumed to have been: Because (1) special powers of land purchase were being given; (2) monopoly powers were given; (3) of the relation of the railways to the welfare of the public; (4) the interests of the owners and the public vary to a large extent.

Take briefly these four points: First, special powers of purchase. In earlier pages reference has been made to the way the landowners "bled" the companies, but, notwithstanding, without compulsory purchase the companies might not have come into existence at all, or their routes might have been so extraordinarily devious, and circuitous, as to have imperilled their existence, or nullified the advantages of rail transport.

The monopoly powers, which form the second reason for control, were more apparent in the early days than they are now. The present system of trunk lines, with their subsidiary lines, has left scarcely any place of importance at the mercy of one company, but it must be remembered that the original lines were not trunk lines. The third and fourth reasons are really inseparable. The interests and welfare of the public demand cheap and rapid means of communication, for passengers, and goods of all kinds. Parliamentary control is exercised, therefore, over construction and equipment, over the rates and fares charged to the public, and by requiring the companies to publish detailed particulars as to the nature and volume of the business they conduct, the charges they make, their earnings, and their profits.

From the inception of the railway companies a huge body of legislation has been built up. It began in 1840, when notice of the opening of new lines was required to be given to the Board of Trade. This may seem a curious requirement in view of the fact that before anything could be done the companies had to obtain an Act, and Parliament, therefore, must have been fully informed concerning the schemes authorized. The reason was to give the Board of Trade an opportunity of inspecting the permanent way and equipment. Two years later the Board was given power to delay the opening of a new railway, notwithstanding its Act of Parliament, until the Board's Inspectors were satisfied as to the quality of the work done and approved of the equipment.

The Railway and Canal Commission

The really important control was set up by the various Acts which created what ultimately became known as the Railway and Canal Commission. These Acts put various requirements on the companies. They established the ratebooks in which each station, or wharf, was required to enter every rate in operation there, and to keep the books open for inspection without charge at reasonable hours. They gave the commissioners judicial powers to deal with complaints as to facilities and rates, to pass judgment, and to award damages. Possibly the most important feature of the 1888 Act was the requirement that the companies should submit to the Board of Trade a revised classification and schedule of maxima rates and charges showing the amount of terminal charges included in the rates. Reference has already been made to this, in earlier chapters; to the complications to which this requirement led and to its utter failure and ultimate abandonment in 1894, in favour of a new Act which set up new maxima within and below those of the 1888 Act.

This latter Act also affected railways through their canal ownership. It provided that directors or officers of a railway company, or anyone on their behalf having control over canal charges, must not raise them to such a level as to divert traffic from the canals to the railways, and required the canals to be kept in an efficient condition. The companies were also prohibited from using their funds to acquire canal interests, without statutory authority; but they were given one relief—power to the Board of Trade to authorize the abandonment of a canal, or part of one, if satisfied that it was unnecessary or derelict.

Another Act of importance was the Railway Companies (Accounts and

Returns) Act of 1911. This required the companies to make annual returns according to forms devised by the Board of Trade.

The Ministry of Transport

Finally there was the 1921 Act, the most important object of which was the amalgamation of the companies into four great groups. By this time the Ministry of Transport had been created and it fathered the amalgamation—a work which was altogether foreign to the ideas that had prevailed in the earlier days of railways. Some of its ideas were unusual, to say the least. One of them concerned management, and a White Paper explanatory of policy laid down that in the opinion of the Ministry the Boards should be comprised of representatives of the shareholders, who should form the majority, and of employees, of whom one-third might be administrative officials to be co-opted by the Board, and two-thirds members elected from and by the workers on the railway.

Another idea affected finance. Rates and fares should be fixed at a level, which, with efficient and economical management, would enable the companies to earn a net revenue substantially equivalent to the combined net revenue of all the companies absorbed in a group. If the new, amalgamated companies improved on their pre-war return, the surplus revenues should not solely accrue to the companies; the State should participate. The Government's share of the surplus, however, should not be thrown into the general revenues of the country, but should be funded for development purposes, to assist backward districts, to develop light railways, and for any other "appropriate purpose" in connection with transportation.

Criticism of the Ministry's Ideas

The ideas as to management were criticized on three grounds—(1) That it was unnecessary to put officials on the Boards; their experience and advice were already available to the Boards, and (2) that the management of these undertakings created out of shareholders' money should not be entrusted to men who had no financial interests at stake and no capital to lose, (3) why should a Government which had not put any money into the transport industry, endeavour to set up what might be described as a colourable imitation of a State system? If the Government wanted a State system, they should set up one legitimately by buying out private ownership on fair, equitable terms.

In the end these particular provisions did not appear in the 1921

Act. This established three Tribunals: (1) For the purpose of effecting the amalgamations, (2) for the fixing of rates and fares, and (3) for regulation of wages.

The appointed day for the amalgamations to come into effect was January 1st, 1923, and by this time the four new companies (not five as originally contemplated) were operating, although some details yet remained to be settled.

The provisions as to labour were very important. They were designed to prevent strikes or lockouts. They required each company to have one or more councils consisting of officials of the companies, and representatives of the employees. If these failed to agree, the matter at issue was to be referred to the Central Wages Board, and if this failed to agree, or on appeal, to the National Wages Board.

It is not necessary to go to any length to prove that all this control to which the railways had been subjected from their earliest days, however desirable it may be, adds to the expense of their operation. It is self-evident.

Control of Statistics and Accounts

The control of statistics, or accounts, required to be published by the companies is considerable. For a long time there was much dissatisfaction with the extent and form of the accounts which they were required to publish, and in June, 1906, the President of the Board of Trade appointed a departmental committee to consider what changes were necessary or desirable. The recommendation of this committee as to the form of financial statistics did not arouse any controversy. At their suggestion the publication of half-yearly accounts was abolished in favour of annual accounts, and there was substantial agreement that income from railway working proper should be separated from that derived from subsidiary enterprises. On the question of purely statistical returns, however, the committee were not unanimous. They discussed at length the desirability of such things as figures showing ton-miles and passenger-miles, average train load, average wagon and carriage load, ton-miles per engine hour, average length of haul for goods and passengers, average receipts per ton-mile and per passenger-mile and the average density of traffic per mile of road, or track. They did not recommend adoption of these things; but when the Ministry of Transport came into being in 1920, they all became compulsory.

CHAPTER XI

STATE RAILWAYS

THE acquisition of the railways by the State has been for many years in the programme of some of the British political parties. Now that a Labour Government has been elected for the United Kingdom, it has become a live question. The Trades Union Congress has outlined a scheme for nationalization of all forms of transport, which will be dealt with later. As a preliminary, however, the general question may be considered shortly. Joint stock companies are the owners of the railways in Great Britain and Ireland, the United States of America, and in Canada. In Europe (to a very large extent), Australia, and South Africa, they are the property of, and almost exclusively worked by, the various states. In this country their establishment under private ownership was largely due to the economic conditions and opinions prevailing at the time, which were almost exclusively individualistic. It was the general opinion that the State was not fitted to conduct businesses; that they should be left to individual enterprise, which would pursue a policy of enlightened self-interest, and that in this way the nation would attain the greatest possible measure of prosperity.

There was a second reason: industry and commerce were expanding rapidly, wealth and capital were increasing, and the people who possessed them were far-sighted enough to foresee the possibilities of railways, and enterprising enough to devote their capital to railway construction, as they had been previously to the construction of canals. There have been many changes since those early days and the main direction has been evolutionary. Gradually great systems were built up, and until comparatively recent years, these systems had been the subject of national pride, even of foreign envy.

Continental State ownership was not the outcome of an enlightened national policy; with the possible exception of Prussia—prior to the creation of a united Germany, of course. It is not questioned that in Prussia railways were acquired, and later in Germany as a whole worked with the object of facilitating national development, and also of ministering to military needs, which perhaps has been equally important as a motive. In other cases, States took over railways because private finance broke down, or in "new" countries, such as some of the British Dominions

were, because it was desired to develop their natural resources more quickly than private enterprise might have done.

Why the Change of Opinion?

Why has there been any change of opinion, however slight, in this country? It is not suggested that there is anything like unanimity in favour of State ownership here, even now; but undoubtedly there has been change of opinion as to the directions in which the State may usefully act. It is no longer held that a policy of enlightened self-interest is all sufficient, and the State has gradually become the regulating body in one or other sphere of industrial or commercial activity until such regulation has become so familiar that the majority accept it unquestionably, although they may not all feel that, in the case of railways, it is the best system that could be devised. The arguments in favour of State ownership may be summarized under the five following headings—

1. The socialists would welcome it because it would be a large step forward towards the attainment of their ideals.

2. Some traders desire it because they believe it would be possible to obtain reduced rates and fares through the systems being organized with a greater regard for the requirements of commerce rather than the earning of dividends.

3. Some favour it because they believe that the profits realized from a national industry such as transport should be applied to the relief of taxation.

4. Social reformers look to it as a means of helping their schemes for the rehousing of urban populations in suburban and rural districts.

5. Labour organizations look to it as a means of securing better working conditions, shorter hours, and higher wages.

Mutually Destructive Reasons

One brief, simple reply is often made to these reasons—that they are mutually destructive. If the railways are to be nationalized and used as instruments for the accomplishment of social and labour projects, then they can neither be expected to realize a profit for the relief of taxation, nor to give reduced rates and fares to the trading and travelling public. All these ends cannot be attained concurrently with complete success. The real question is as to whether State ownership is desirable. When, and if, that is decided affirmatively will come the question as to which line of policy is to be pursued—are the railways so acquired to be

worked for a profit in relief of the National Exchequer, or are they to be worked for the benefit of trade, labour, and the social advancement of the nation?

The Possible Cost of Nationalization

Whatever the policy to regulate future working, however, there would seem to be small chance of realizing it effectively. That is, of course, assuming that the undertakings are not expropriated; and that is unthinkable. The national attitude in such matters is altogether opposed to such a one-sided action. At least the undertakings would have to be purchased, whatever the cost may be, and probably there would be much keen dispute as to the amount of the purchase price. As to that, it is extremely unlikely that the companies would consent to sell out at what the Ministry of Transport calls the "total capital receipts"—£1,116,512,939, because that cuts out the nominal additions, although it leaves in the balance of premiums and discounts. On its own showing the capital expenditure on the railways and their ancillary undertakings is £1,199,214,215. In other words, not only has the whole of the subscribed capital been expended, but an appreciable sum taken from revenue; money which otherwise might have been distributed in dividends. No just policy could fail to take into account what may not inappropriately be described as the results of self-sacrifice, or self-denial.

Assuming that the larger figure is accepted (and even this would exclude any solatium for compulsory purchase) the next question to be settled is that of method of payment. Obviously a cash payment would have to be ruled out, and the only alternative is the issue of Government stock to the railway stock holders,

That being agreed the next question is the rate of interest to be paid. In these days probably 3 per cent would be regarded as an adequate rate, and that would absorb approximately 36 millions sterling of the annual net revenue of the combined undertakings. The Ministry of Transport Returns show that the net revenue for the last six years covered was as follows:— 1933, £29,589,089; 1934, £32,254,896; 1935, £33,695,058; 1936, £36,527,499; 1937, £38,684,383; and 1938, £29,757,554. In that period only twice has the net revenue been sufficient to cover the amount suggested above as required to provide the required interest on the cost price.

The obvious conclusion is that under present conditions (excluding those arising from the second world war) there would be little margin

(in some cases no margin) left for the promotion of any of the objects mentioned above, unless the undertaking was conducted on much more profitable lines than it is at present. State ownership does not encourage any hope of this being done. The Post Office is often spoken of as a fine example of efficient State ownership and management—probably the best there is; but if it were possible to total all the capital expended on the Post Office proper, the telegraphs and the telephones, and to contrast it with the net earnings reported to Parliament, it is likely that the latter would sink into relative insignificance, and there would be no pæan of praise.

The Trades Union Congress Scheme

The Trades Union Congress scheme for the nationalization of all forms of transport, referred to at the opening of this chapter, is unofficial and not as yet a Government scheme, but it is a straw which shows the way the wind blows, and probably it will not be very long before it is blowing in strong direct course without veering. The report, which was presented to the 1945 meeting of the Congress, says that transport must be organized and deliberately operated as an instrument of national development, and of providing an improved standard of wages and conditions for the workers in the industry. It is estimated that one-fifteenth of all public and private expenditure is on transport services; that the number of workpeople normally engaged in the operation of public or private transport services and the provision and maintenance of vehicles is 2,000,000, and that the capital employed is £3,500,000.

It sets out seven forms of transport service—rail, canal, road haulage, road passenger, ports and docks, coastwise shipping, and internal airways. These, it says, must be operated as one system, but each separate service should carry the traffic most appropriate for it. So far as possible surplus capacity must be determined by strategic, operating, and social requirements only, and should not occur incidentally as a by-product of a competitive struggle.

The scheme provides for, first, a public corporation appointed by, and responsible to, the Minister of Transport. The members of this corporation would hold full-time appointments and would have to resign from all other paid occupations (including the House of Commons) and from all other transport or ancillary undertakings in which they might be interested. This corporation, in association with the Minister of Transport, would appoint a board to operate each separate section of transport.

This would involve seven subsidiary boards. The system being unified, it will be the responsibility of the national corporation to ensure that traffic is carried by the form of transport which is most economical for the community; traffic must be taken so far as possible by the service which shows the lowest net operating costs.

The framers of the scheme think this could be achieved most simply and thoroughly by a completely co-ordinated service, in which the consumer (of transport) does not specify the form of transport by which his goods are to be moved and in which the rates do not vary according to the service utilized. It is admitted, however, that this co-ordination cannot be accomplished quickly and that while it is being produced the consumer must be allowed to retain a degree of choice.

The Labour Government will no doubt produce its own scheme in due time, and it may differ appreciably from that adumbrated for the benefit of the Congress. Such as it is, however, it has been criticized from the strictly economic point of view as distinct from the purely political. It must not be overlooked that it is merely a theoretical outline and contains no information as to how it is to be carried out; nothing as to the terms of acquisition; nothing about its finance. One of the features most severely criticized is that which proposes to withdraw from the consignor any choice of the form of transport by which his goods shall be carried. This interference with individual freedom is certain to cause much outcry.

PART III

CANAL ECONOMICS

CHAPTER XII

CAPITAL, REVENUE, AND TRAFFIC

THE student seeking for full and authentic information about canals can have only one experience—a sense of extreme frustration. There are no up-to-date figures giving the total capital, and length of *all* canals. The latest appear to have been collected in 1905, for the purposes of a Royal Commission on Canals and Waterways. These may have some bearing on present-day conditions; but it is extremely unlikely. It is unsafe to regard them as possessing more than antiquarian interest. From this point of view they may be mentioned briefly. The effective figures for England and Wales were then given as:—length 4673 miles; total paid up capital £47,550,768; total annual revenue £2,680,710; total annual expenditure £1,891,213; and annual profit £789,497.

Many things may have happened since 1905; but there is nothing to compare with these figures. The only comment that seems to be called for is surprise and disappointment that the Ministry of Transport has not thought it worth while to collect such information. It has ample power to do so, but apparently does not think it necessary. It is a great pity, because there must be some people who would like information as to the length of all the canals of the United Kingdom, the capital employed, and the earnings.

Railway-owned Canals

There is such information with reference to railway-owned canals, but it has to be sorted out from the mass of figures relating to railways contained in the annual report of the Ministry of Transport and, with the exception of the traffic carried, it relates solely to their own canals, which, to say the least, is disappointing. There are thirty-four railway owned canals and their length is slightly less than 1000 miles. The figures in the latest returns are:—1933, 998 miles; 1934, 997 miles; 1935, 996 miles; 1936, 996 miles; 1937, 991 miles; 1938, 991 miles. During the period covered by the return, therefore, five miles have gone out of use. How this compares with the independently owned canals is not indicated,

except that there are shown to be twenty-four canals (excluding the Manchester Ship Canal) "other than railway owned." The capital of these railway canals is given as follows—

1933	1934	1935	1936	1937	1938
£8,161,841	£8,145,971	£8,150,346	£8,135,058	£8,080,614	£8,062,906

The slight fluctuations from year to year are surprising, but unexplained. Taking the final year, the capital is distributed over the four companies as follows:—Southern, £40,000; Great Western Railway, £737,936; London, Midland and Scottish, £5,983,050; and London and North Eastern, £1,301,920. These figures, and in fact all given so far, are remarkably insignificant and unimpressive when compared with the aggregate figures for the whole of the British railways.

Unremunerative Undertakings

Small as it is, this capital is altogether unremunerative. Not once in the six years dealt with has it earned a profit. It is interesting to set out the receipts and expenditure and deficits of those years—

	1933	1934	1935	1936	1937	1938
Receipts . . .	£168,191	£176,559	£170,591	£170,707	£168,682	£171,497
Expenditure . . .	210,504	210,524	220,044	219,438	233,348	237,067
Deficit . . .	42,313	33,965	49,453	48,731	64,666	65,570

The most striking thing about these figures is the comparative uniformity of the receipts—round about £170,000 per annum—which suggests that there are certain consignors who regularly send much the same "traffics" over the railway canals year in, year out. The largest variations are in expenditure, as to which there is no explanation. The surprising thing is that the companies appear unable to abolish these deficits, insignificant as they are compared with their total business. Possibly they may think their canal undertakings too small to be worth the time and attention needed to make them profitable; or maybe, that

time and attention would not make profitable a declining industry. One other reflection arises—what would happen if the companies were not under legal compulsion to maintain their canals? It cannot be imagined, in such circumstances, that there would be much chance of their long survival.

The Tonnages Carried

The Ministry of Transport returns are much more satisfactory under this heading, because the information given covers not only the railway, but also the independent canals. The figures may be set out before comment, and first it will be interesting to reproduce some which relate to twenty years or so ago. Those earlier returns showed the following tonnages for the canals of Great Britain, excluding the Manchester Ship Canal:—

TRAFFIC ORIGINATING ON CANALS IN GREAT BRITAIN

	1921	1922	1923	1924	1925
	Tons	Tons	Tons	Tons	Tons
Railway owned . . .	1,708,547	1,885,830	2,058,944	2,183,933	2,030,675
Other than railway owned . . .	10,175,948	12,708,547	13,804,929	14,272,046	13,540,266
Totals . . .	11,884,495	14,594,377	15,863,873	16,455,979	15,570,941

	1926	1927	1928	1929
	Tons	Tons	Tons	Tons
Railway owned . . .	1,712,716	1,987,799	1,863,152	1,772,663
Other than railway owned . . .	11,249,524	13,185,072	12,710,685	12,589,517
Totals . . .	12,962,240	15,172,871	14,573,837	14,362,180

In considering these figures and comparing them with the more up-to-date ones which follow, it should be remembered that in 1921 there was a strike of coalminers lasting about three months and that consequently the tonnage of coal carried decreased considerably. For that reason it were better to exclude 1921 from the comparison. Even so an appreciable variation is shown in such relatively small tonnages. From the table on p. 55 it will be seen that in the period that has elapsed, still

further shrinkage is shown. These totals again exclude the Manchester Ship Canal.

TRAFFIC ORIGINATING ON CANALS IN GREAT BRITAIN
(in 1000 tons—000 omitted)

	1933	1934	1935	1936	1937	1938
	Tons	Tons	Tons	Tons	Tons	Tons
Railway owned	1,250	1,187	1,279	1,345	1,258	1,112
Other than railway owned	10,183	10,727	12,513	12,890	13,100	11,839
Total	11,434	11,914	13,793	14,236	14,358	12,951

The increase in the totals for the independent canals is explained by the fact that returns from the Lee Conservancy waterways (Lee Navigation and Stort Navigation) were not included for 1933 and 1934. For the years they are included these navigations have contributed the following tonnages:—1935, 1,722,181; 1936, 1,806,377; 1937, 1,784,347; 1938, 1,756,656.

Decline in Traffics

Inclusion of the Lee figures has arrested a substantial decline in traffic. The falling off in 1933, compared with 1923, and of 1924, with 1934, was, roughly speaking, $4\frac{1}{2}$ million tons, which was attributable chiefly to the $3\frac{1}{2}$ million tons shrinkage shown by the independent canals, between the periods 1921–25 and 1933–38. It is sufficient to shake the faith of the believers in the essential usefulness of inland waterways, because it cannot be said that canal improvement and development have been entirely at a standstill between the two periods. This movement may not have been large, but in some directions (such, for instance, as the amalgamation of canals which has become the Grand Union, and the money spent on improving the waterway) it has been somewhat important.

What is Carried ?

It will be useful and informative to give some details of the things carried, for which purpose the last two years of the return are set out in detail (see table on page 56).

In this table the Lee Navigation figures are excluded because the return does not give the details; it merely adds the Lee aggregates without giving any particulars of what the total includes, which is unsatisfactory

because for each of these years about $1\frac{1}{2}$ million tons are not included in the list of commodities carried.

	1937		1938	
	Railway	Other	Railway	Other
	Tons	Tons	Tons	Tons
Coal, coke, etc.	492,286	5,491,583	453,120	4,823,580
Building materials (other than wood)	160,329	894,153	120,689	912,634
Manures	54,701	531,237	49,772	367,695
Wood	63,969	317,175	55,519	267,817
Machinery	424	26,659	1,326	25,391
Raw materials	32,062	992,247	23,517	736,692
Industrial products	78,208	1,102,315	66,683	978,676
Agricultural produce and foodstuffs	205,585	1,094,074	170,857	1,071,675
Liquids in bulk	167,836	806,234	168,883	863,499
Unclassified	2,643	60,253	1,710	35,355
	1,258,043	11,315,930	1,112,076	10,083,014

Small Tonnages

There is in the return another table giving the 1938 tonnages for each canal, railway owned and independent. It has some interest, but not sufficient to call for its inclusion here. Its interest is in the tonnages which passed over each canal, and the surprising thing is that only one railway canal carried slightly more than a quarter of a million tons in the year; the rest have relatively insignificant totals, falling as low as 288 tons. But even so the table is slightly misleading, because among the "other than railway owned" is the Birmingham Canal Navigations. Technically, its inclusion under that heading is correct. These canals belong to a "Company of Proprietors," who are summoned to an annual meeting, which in its way used to be rather amusing. It used to begin at noon with a resolution authorizing the payment of the dividend. This was seconded and carried and the meeting ended as the city clock finished striking twelve. But though privately owned it is worked under an agreement by the London Midland and Scottish Railway Co., which guarantees the annual dividend. For all effective purposes it might be a railway-owned canal. Another remarkable thing about it is that it carries the second largest tonnage of all the canals, excluding, of course, the Manchester Ship Canal. The Aire and

Calder stands at the top of the list, not only alphabetically, but by reason of carrying 2,399,696 tons in 1938, and the Birmingham comes next with 2,034,206 tons. In both cases the bulk of the tonnage comes from "coal, coke, patent fuel and peat." Aire and Calder carries 1,703,965 tons of this, and Birmingham 1,205,371. A word may be added with reference to the Birmingham. In the 1905 figures, it was credited with a tonnage of 7½ millions, with which the 1938 figure compares very badly. Possibly this decline may be attributed to a change in the structure of the iron and steel and allied industries to which the canal has always ministered largely.

CHAPTER XIII

ADVANTAGES AND DISADVANTAGES OF WATER TRANSPORT

IF it were necessary, the advantages of water transport might be summed up in a sentence—it is cheaper than that by land. The difference arises entirely from the medium used. The cheapest, of course, is the sea. Inland waterways are not in quite the same happy position, apart from rivers; artificial canals have to be constructed and maintained. Cost of construction is not now ascertainable. The only information bearing even indirectly on the point is the capital now invested in the railway canals, and the figure may be altogether misleading. Taking it at its face value, however, it is small in relation to the total of the companies, and obviously does not burden the undertakings with large prior charges for interest. There is the same absence of information as to the cost of maintenance. Again the only figures available relate solely to the railway canals, and in 1938 maintenance and water supply cost them about £184 per mile, whereas, the maintenance of way and works of the railways themselves cost about £1130 per mile. Obviously there must be a considerable margin in favour of the canals under both these headings. Another advantage which contributes to the cheapness is the smaller cost, load for load, of barges than rolling stock. The weight of a wagon itself is said to be half to threequarters of the weight of the load it can carry, but canal barges can carry five or six times their own weight. This means that a railway engine has to haul a much greater proportion of non-paying load than that hauled on the canals, and it follows also that the wear and tear, which is reflected in the cost of maintenance, is so much greater in connection with the railways. It is claimed that the extra wear and tear arising from increased canal traffic is practically negligible. It follows from all these advantages that the cost of motive power is less on suitable waterways than on railways. There are critics who dispute the lower cost of canal transport on the ground that if it were so the railways would not carry such an overwhelmingly greater weight of goods than canals, and to this the reply of the canal advocates is that the success of the railways is not due to any inherent disadvantage of canals, but to the lack of enterprise and antiquated, unprogressive methods of their owners.

Why the Decline?

The defects also of the canal system can be summed up in a sentence—"With a few exceptions they stand as they stood in the middle of the nineteenth century." Considering the enormous growth of commerce and industry, and concurrently, of course, transport, since that period, that statement which was made by a Royal Commission is sufficient condemnation. With one or two conspicuous exceptions the physical condition of the canals is inferior to what it was at the time, and, as the figures given in the previous chapter show, the traffic which passes over them has diminished in volume.

Why is it that a means of transport, which, at its introduction, conferred such great advantages, has fallen into desuetude? The primary reason seems to have been the lack of faith in them shown by their owners at the time of the introduction of railways. These people who had enjoyed a remunerative monopoly came to the conclusion that the day of canal usefulness was ended and it behoved them to get rid of them as quickly as possible. The railway ownership of canals, which resulted, is advanced as one of the reasons why the use of them has diminished, and the companies are often accused of acquiring them so that they might "strangle" competition. There is some injustice in this accusation for in some cases the railways were forced to acquire them, and the people who forced them were the canal owners. Anticipating competition, and possibly the ruin of their business, they forced the hands of the promoters of railways. They raised Parliamentary opposition to the Bills empowering the creation of new railways. They even went so far as to promote Bills to empower them to convert their canals into railways. The price of the withdrawal of this opposition was the purchase of their undertakings. In this way the railways became absolute owners of 965 miles of canals in England and Wales, and in addition they controlled another 218 miles—roughly about half the mileage of the country.

Railway Ownership not Beneficial

But while so much is advanced in justice to the railways, it is impossible to escape the fact that their ownership of canals has not been entirely beneficial. They may have saved them from becoming derelict, and have used them locally as feeders for their own traffic, but their ownership and control have impeded their use for through, or long distance, traffic. It is charged against them that while they have been willing to use the canals and to allow them to be used, for local purposes, they have taken

care to get the through long distance traffic from them on to their own systems. If waterways are to be used for through traffic it is essential that there should be through rates. It is discouraged, if not made impossible, if all the companies over whose ways it passes, insist on charging their full tolls established for local journeys confined to their own systems. There is irrefutable evidence that this happened and the railway companies were among the chief opponents of through rates. Independent companies might be willing to create such rates, but where the traffic had to pass over railway-owned canals in the course of its longer journey, the railways refused to reduce their rates to a level comparable with those of the independent companies until compelled by Governmental authority. Railway ownership also diminishes competition, which was a condition Parliament desired to retain. Ultimately Parliament prohibited agreements which would give railway companies power to interfere with the traffic, rates, or tolls of canals, and the application of railway companies' funds for the acquisition of an interest in a canal.

Multiplicity of Ownership

Multiplicity of ownership and the indifference of the canal companies themselves are equally as disadvantageous as the railway ownership. They were given power to create a Clearing House, but never exercised the power; they were given power to fix a through rate to any place, give notice to the other companies affected by the rate, and, if they objected, to go to the Railway Commissioners. The same power was conferred on traders. But apparently these powers were never exercised, or, if they were, so sporadically that they might never have existed. The Royal Commission condemned canal companies for their want of organization, and co-operation; for remaining mere toll takers. That condemnation was uttered many years ago and is not so completely deserved now, but even so it was one of the causes of the decay.

The physical defects of the canals are answerable for much of their failure to keep pace with the growing transport industry of the country. With exceptions, the navigable rivers have not been kept in the best possible condition to facilitate traffic; and they were the chief highways in pre-canal days. The artificially constructed canals suffer because their water supply is not always adequate. There are occasions when great care has to be exercised in order to conserve water passing down the locks as they are used. But possibly the most serious hindrance to their best use is variation of dimensions, particularly of locks. On a

through journey the smallest lock to be passed governs the size of the barge that can be used. Possibly the width of bridges has almost as much effect. Up and down the country there are many "accommodation" bridges. Frequently they are for the "accommodation" of the farmer through whose land canals pass. They are not required for general traffic, or public purposes; their sole use is to enable the farmer to get from one end of his land to the other. Naturally in such circumstances the canal companies were not disposed to spend too much on them, and often their span is inadequate; they are an effectual block to the use of large barges. The boat and its load must be such as will pass the narrowest lock, bridge, or the shallowest water, no matter how wide, or large, the canal may be in other places.

Deceptive as to Capacity

It is easy to be deceived about the carrying capacity of a canal. It is not top width that solely matters. The contour of the bottom is of great importance. The really effective contour, if such a word can be used in such a connection, is a perfectly rectangular trough equal in depth at sides and middle. Too often the bottom is a curve shallow at the sides and only really deep for a comparatively small width in the middle. Sometimes the width of this middle section is not sufficient to pass two fully loaded barges. The top width would be adequate, apparently, to pass two large barges travelling in opposite directions, but the below water section is hopeless for such a purpose. To get the necessary width it might be necessary (probably would be) to pile the sides and dredge the channel right up to the sides. There are no modern figures as to dimensions. The Royal Commission laid down as the standard for "barge" canals locks 14 ft. wide, and those with smaller locks were called "narrow" canals. They found that of the artificial canals 1165 miles were "narrow" and 762 miles "barge" canals. These figures are very old, but they illustrate the point that much of the stagnation of canal traffic is due to the inadequacy of the systems and also why they have not been able to compete with the railways. There has been some improvement since, e.g. the Grand Union Canal; but not sufficient to enable the waterways to recover a substantial portion of the lost traffic.

CHAPTER XIV

THE GRAND UNION AND OTHER SCHEMES

THE creation of the Grand Union Canal is sufficiently unique to demand a short chapter to itself. This amalgamation covered a number of waterways established in the following years:—Grand Junction 1793, Leicestershire and Northamptonshire Union 1793, Warwick and Birmingham 1793, Warwick and Napton 1794, Grand Union 1810, Regent's 1812, Hertford Union 1824, and Birmingham and Warwick Junction 1840. Most of them remained separate entities for about a century. The Hertford Union, however, was acquired by the Regent's in 1855.

The next absorption did not occur until 1894, when the Grand Junction acquired the Leicestershire and Northamptonshire and the Grand Union. From a working point of view, however, the Warwick and Birmingham, the Warwick and Napton, and the Birmingham and Warwick Junction were virtually one canal. Their Boards of Directors remained separate, but management and operation were in the hands of a joint committee representative of all. The final amalgamation which secured unified control of approximately 240 miles of independent canals became effective on 1st January, 1929. Even now it is not generally recognized how extensive was this amalgamation or the large area it covers. Barges can leave the Thames at Regent's Dock and proceed straight through, not only to Birmingham, but well into Leicestershire. There is also a connection with the Thames at Brentford; and, of course, the traffic can proceed in the opposite direction—from the country to the Thames at either of these places.

What the Grand Union has done

Mere amalgamation is not sufficient to convert a number of hitherto separate canals into an efficient system. When they came under unified ownership and management they still suffered from the defect of varying physical conditions such as locks and depth of water. The locks on the Regent's Canal section, for instance, would pass barges 78 ft. long by 14 ft. 6 in. wide carrying 100 tons on a 4 ft. 6 in. draught. Those between Brentford and Braunston, where the old Grand Junction joined the Coventry, and on the Paddington branch, would pass 72 ft. by 14 ft. The bottle-neck was between Braunston and Birmingham, where the

locks would pass only one "monkey boat" of 30 tons capacity at a time. Obviously this was a limitation of usefulness which could not be allowed to continue. The new company promptly set about removing it by a scheme to improve the locks to 100 tons capacity and to pile and dredge; to pile not merely to protect the banks from erosion, but to facilitate the dredging and the provision of a deeper channel. It was estimated that this would enable loads to be increased from 55 tons per pair of boats to 80 tons in a single boat which could come through from the company's own private dock (the Regent's Canal Dock on the Thames side at Limehouse) to Birmingham.

Apparently the ideal has not been realized. The locks have been made to the required size and much piling and dredging have been done, but traffic is still mainly carried in smaller motor boats towing a "butty." Still the improvement is a notable one. For instance, it enables both the motor boat and the "butty" to pass through the locks at the same time. Whether all this has paid from the financial point of view it is impossible to say, but there seems to be very definite evidence that it has not resulted in an increase in the tonnage carried. In 1929, the Ministry of Transport gave this as over 2,900,000; their 1938 return credits the Grand Union with 1,810,000. That, of course, does not indicate the whole story. The Ministry's return gives only the tonnage "originating" on the canal and takes no account of that which, while not "originating" on it, may be passed over it from other canals. The distinction is necessary to prevent misleading figures as to the total canal traffic of the country; to prevent duplication of tonnages; but is not a full or accurate measure of the earning capacity of a canal. It will have been noticed that the latest tonnage figures are pre-war. There is some ground for believing that the national emergency forced more traffic on to the waterways, but so far there are no later figures of any kind published to show whether this is so, and, if it is, to what extent the canal has benefited.

Another Improvement

Another improvement deserving of mention is that of the Trent Navigations, which was sponsored by the city of Nottingham. There was a Trent Navigation Company as long ago as 1783, but the really determined attempt to improve the Trent dates from 1914. The first European war put an end to that. It was taken up again in 1921, and, to improve the river, weirs were raised, locks increased in size, and the river dredged. Capacity has been increased by the new locks which were

designed to pass a tug and three barges of 100 tons each. This is a notable achievement, but unfortunately the waterway does not seem to carry much traffic. The Ministry of Transport return shows that in 1938 the Trent Navigation as a whole carried 589,207 tons. The quantity of this conveyed over the Nottingham portion (Trent Bridge and Avenham Weir) is given as 278,689 tons. In the two previous years it was—1936, 273,239, and 1937, 263,431 tons. This does not suggest that a very substantial volume of traffic has been captured from the railways.

Difficulties of the Birmingham Area

The Birmingham area, including the many industrial localities surrounding it, being farthest from the seaports, feels the burden of transport charges more than any other. This probably explains why so much attention has been given to the subject of improved water transport between the area and the sea, schemes which never got beyond discussion and seem to have been stillborn. On more than one occasion the City Corporation has taken up the preliminaries with some approach to energy. Sometimes the Government in power has been sympathetic; another Government has flatly refused any help. This, however, is not the only reason why the preliminaries have come to nothing. The position is a very difficult one. The shortest length of canal improvement required is from the city to the Severn at Worcester, but this route has the disadvantage of presenting a considerable fall in gradient from the city, which is more than 400 ft. above sea level. Parenthetically, it may be remarked that the fall in gradient from the city affects all waterways radiating from it, whatever the direction, but the fall is not so precipitate in the other directions. There is a canal to Worcester at present, and, as may be imagined, it requires a number of locks to work it. Allied to this is the fact that Birmingham does not stand on the banks of a considerable river, so that the problem of water supply is very difficult. It would entail a lot of pumping back to the summit.

The physical problem, however, is not the only one. Quite as important is the question of the direction of the canals which should be chosen for improvement. This inland area sends much factory produce to the Thames and the Mersey, and receives much from both these ports. Imports and exports come and go by way of Bristol, also, but experience shows that the bulk of the traffic on the river Severn and the connecting canals is incoming, or import; and what the people in the Midland area require are less costly facilities for getting away their exports; apart, of course,

from internal trade. The Grand Union now removes London from the discussion, but the problem still remains—ought the improvement to be in the direction of Liverpool or Bristol? For many years the question has remained unanswered, apparently because the State has not been sufficiently interested, or inclined to find the large but unknown number of millions sterling which would be required.

Observers who have studied the subject for the last generation or so, have watched these various schemes emerge from obscurity (more than once) into the full light of public discussion, and then fade back again into the obscurity from which they appeared, and have become sceptical as to whether they will ever get beyond the talking stage.

The Latest Schemes

At the time this is being written there comes news of further resuscitations. The Severn Conservators have put on to paper a plan for improving that river from Gloucester Docks to Stourport, and the canal from there to Wolverhampton. From Gloucester to Worcester, if the idea were carried out, there would be a waterway capable of carrying seagoing vessels up to 500 or 600 tons capacity. From Worcester to Stourport the capacity would be 300 tons and on the canal to Wolverhampton 100 tons. This scheme has received some publicity, but though the Ministry of Transport is said to be interested, there is no information as to how the money is to be found for such an ambitious undertaking, or as to what is the next step.

Also there have been inquiries as to the Liverpool route. The scheme is stated to include the provision of a canal with 100-ton capacity from the Mersey to Autherley Junction, which is seven miles or so north of Wolverhampton. Less has been heard publicly about this, but the Ministry of Transport is understood to be interested in this also.

Two things may be said about these schemes. The first is why occupy time in more inquiry? The Royal Commission of 1906 (whose report is dealt with in the next chapter) spent about three years in inquiring and reporting—in seven volumes. It has been a long time since then, but what was then the ideal scheme must necessarily be the ideal scheme now. There may be differences in detail, but the main questions still are whether it is worth while, and if it is, who is going to pay for it—the State or the localities affected? The second comment is that neither scheme is likely to be of great interest to the Birmingham area. One of the main objects of canal improvement is to enable large barges, of at

least 100 tons capacity or even more, to get straight through to industrial centres without transshipment, and thereby save cost and time. It is extremely improbable that the Birmingham area will be interested in a barge canal that stops short miles away. If the traffic has to be taken to and brought from terminals at Worcester or Autherley Junction in small barges involving transshipment at the terminals, the improved canal will not be fulfilling its proper function to the greatest advantage. The cost of bringing the 100-ton canal through the congested areas of Wolverhampton and Birmingham, or up the gradient from Worcester, seems to be the reason for the suggested termini, but is that essential? It could be brought much closer to the outer and less congested fringe of both places at less cost and would serve both towns much more usefully.

CHAPTER XV

RECOMMENDATIONS OF THE ROYAL COMMISSION

THE last Royal Commission on canals and waterways was appointed in 1906, and reported in 1909. Its terms of reference were very wide, and although the final report is now so old, it is worth while to reproduce them in order to show how very comprehensive they were. The terms were:—
“to inquire into the canals and navigations of the United Kingdom, and to report on—

- (1) Their present conditions and financial position;
- (2) The causes which have operated to prevent the carrying out of improvements by private enterprise, and whether such causes are removable by legislation;
- (3) Facilities, improvements, and extensions desirable in order to complete a system of through communication by water between centres of commercial, industrial, and agricultural importance, and between such centres and the sea;
- (4) The prospect of benefit to the trade of the country compatible with a reasonable return on the probable cost; and
- (5) The expediency of canals being made or acquired by public bodies or trusts, and the methods by which funds for the purpose could be obtained and secured; and what should be the system of control and management of such bodies or trusts.”

In preceding chapters there have been many references to the Commission's report, and the condition of the canals, their financial position, and the causes which have operated to prevent improvements by private enterprise have been dealt with at some length; and it is not necessary to reproduce the findings under references 1 and 2.

“The Cross” Scheme

On the third term of reference the Commission came to the conclusion that as a first step in any comprehensive scheme of development it would be desirable to take what has been called “The Cross” in hand. This scheme has always been considered ideal, and the only questions arising out of it which need be considered are (1) the cost, and (2) what benefit or return might be expected from the large outlay of money involved.

On the question of cost, the figures in the report were not convincing. There was no estimate of the cost of acquisition, and that is almost an insurmountable obstacle to the consideration of whether the scheme is worth while. It is not probable that the proprietors of the canals would be likely to let the State "get away" with so many hundreds of miles of waterway for nothing, however inadequate and unremunerative their waterways may be. The Commission only suggested that "it may well be considered whether, with a fair regard to existing transport interests, the State might not wisely take upon itself the cost of acquisition of such waterways as may be needed for each successive scheme of development." That is a pious expression of opinion unaccompanied by any information as to what the cost is likely to be, and so cannot carry much conviction, when a decision has to be made as to whether waterways should be acquired and improved.

The Cost of Improvement

An estimate of the cost of improvement was given, and so possibly the Commission thought the State as an alternative to purchase might find money for improvement, and claim an influence in future working and policy by means of a Waterways Board. They did not favour a plan that the State should make the improvement and lease the canals to the present canal companies, or an amalgamation of them, because they did not think it possible to evolve a capable body out of them, which was rather drastic condemnation. On one question the Commissioners were very definite. They realized, they reported "how hopeless it would be to expect anything from the waterways system of England and Wales in the future for the benefit of trade and industry, if the waterways were left in their present disunited and unimproved condition. With a few notable exceptions the canals at least would become less and less efficient and useful; and many would swell the list, as years went on, of disused or derelict canals. Thus, a system of transport which in foreign countries has become of great value to trade, as a result of measures of unification and improvement, would in this country be practically lost."

The Financial Procedure Recommended

The financial procedure recommended, if the State acquired the canals, was something resembling that set out in the Port of London Act, 1908. Under this, the properties of the dock companies were vested in the newly created Port Authority, which was authorized to issue port stock in

substitution for the existing stock of the dock companies. Further recommendations were (1) that the stock issued to acquire canals should be in the nature of a free grant, or a loan with long deferred date of repayment of interest and capital, or a combination of free grant or loan; (2) that stock issued, or loans raised, by the new authority should be guaranteed by the State; and (3) that the commencement of the sinking fund for the redemption of this stock or loans should be deferred for a period of years.

The Commissioners were not more helpful in their estimate on the second point—what benefit, or return, might be expected from the large outlay of money involved. As to cost of improvement and maintenance, two sets of figures were given. The first dealt with “The Cross” and excluded branch lines which might be dealt with later, and the second included the branches; and as this extension was the ultimate objective, only the latter figures need be given. They were—

Cost of improvement	£16,951,924
Cost of water supply	581,986
	<u>£17,533,910</u>
Annual charge for interest and sinking fund at £3 12s. 6d. per cent	£633,411
Annual cost of pumping	65,303
Annual cost of management and maintenance	305,467
Other expenditure	93,844
	<u>£1,098,025</u>

At the time of the report the total gross income of the waterways on the four main routes covered by “The Cross” was £567,971, made up of tolls £434,509, and other income £133,462. To get at the revenue from tolls which would be required were the scheme adopted, the Commission deducted the “other income” as follows—

Total annual charge	£1,098,025
Less revenue from other sources	133,462
	<u>£964,563</u>

The Required Revenue and Traffic

In other words, in order to make the expenditure on improvements (not acquisition) remunerative, it would be necessary to procure a revenue from tolls more than double that shown by the companies in the period under review. The Commission “assumed” that the average

toll would be 0.2d. per mile, but did not state on what they based the assumption, which is rather a weakness. Taking their average toll they estimated that the total ton-miles of traffic required would amount to 1,158,000,000; they assumed that the existing traffic at that time amounted to 199,200,000 ton-miles, and that, consequently, an additional 958,800,000 ton-miles would be required. In other words, the traffic would have to be increased approximately five times.

Such figures appear to be very vague, and many people might hesitate about entering on such a large undertaking on the strength of them, but the Commissioners stated their conviction that the measures they proposed for improvement of the waterways, and their central administration were "not only the best steps that could be taken to save the system from destruction, but also to afford a reasonable prospect of benefit to the trade of the country commensurate with the expenditure to be undertaken." It was a further weakness that the report was not unanimous; some of the Commissioners argued that, even if all the benefit to trade claimed were to result, there would not be an adequate return on the capital outlay.

The years have slipped on since 1909, and there has not been any attempt to put the scheme into operation. The Grand Union Canal has given the country one leg of "The Cross" which travels south-westwards from the Midlands, but that has been entirely a matter of private enterprise.

Since those days there has been a committee appointed (in 1920) by the Ministry of Transport to consider and report as to what portions of the inland waterway system of the country should be acquired by the Ministry of Transport with a view to improvement and on what terms. This committee seems to have faded away without presenting any final report; but there were two interim reports, the second of which was much more definite in its recommendations. It was provoked by the Railways Act of 1921. While this was before the House of Commons, the Committee, regarding the proposals as likely to lead to a great strengthening of the railways by amalgamating them into groups, thought it necessary that other forms of transport should be considered, and, if necessary, safeguarded "at this critical stage."

Ministry of Transport Views

The Committee were convinced that if certain important waterways were given a fair chance, and put under unified and competent

management, they would be capable of playing a very important part in the transport of the country. Nationalization, they thought, involved liabilities greater than the nation was prepared to face, but if the different waterways could be grouped, each centering round some important traffic route, the conditions necessary for a successful experiment would be attained without incurring the risks involved in a national scheme. They considered that the waterways of the country naturally arranged themselves into seven groups as follows—

1. The River Trent and its connections,
2. The Yorkshire canals,
3. The Lancashire canals,
4. The canals joining Liverpool with the Midlands,
5. The river Severn with its connections,
6. The river Thames and its connections with the Midlands and Bristol,
7. The Birmingham canal and its connections in the Midlands.

The ultimate fusion of all these systems into a single ownership was contemplated, but as a beginning they thought one or two groups possessing the best prospect of success and the least amount of capital expenditure should be selected, and the remainder left until their amalgamation seemed justifiable in the light of experience.

How the Experiment should be made

The experiment should not be made by a mere amalgamation of the existing owners, but by means of a Public Trust suitably constituted and supplementing its financial resources by the aid partly of the State and partly of local authorities having a special interest in the development of the group. They did not suggest that any group should receive specially favoured treatment permanently if it could not maintain its position on an economic basis, but they considered it necessary that it should be protected from unfair competition during its earlier years. It was essential that special concessions in either rates or conditions given by the railway companies for the purpose of cutting out water competition should be barred by Statute. It was contemplated by them that the Public Trusts should be statutory bodies composed of representatives of the Ministry of Transport, the local authorities of the area covered by the group, users of the waterways, Chambers of Commerce, and the stockholders. The latter were to be given Trust Stock in return for their

interest and apparently it was contemplated that the Trusts should raise capital in the form of Debentures, or Preferred or Deferred Stock.

Another "Fade-out"

The scheme seems a good one although there was one dissentient—the late Sir William M. Acworth, a recognized authority on transport questions—but nothing happened as the result of its recommendations. Its second "interim" report became, in fact, its final report, and nothing has been heard of it, or its recommendations, since those rather far-off days. It is much to be regretted that after two full scale inquiries nothing has been done to unify and improve the waterways. The schemes were complementary to each other and both were good, as good as could be devised; both thought it desirable that something on a big scale should be done to save the waterways from an inevitable, if gradual, extinction, but the nation has been too supine, or too nervous as to cost and usefulness, to take any action.

PART IV

SHIPPING AND OCEAN TRANSPORT

CHAPTER XVI

EVOLUTION OF THE SHIP

THE evolution of the ship, her management, the science of navigation, and shipping business is one of the most interesting stories in the annals of human activity. This evolution from the days when the Phœnician traders came to Western Europe and to Cornwall was relatively slow at the outset. Next in importance came the Venetian ship, which did its regularly organized trading cycles, and put Venice in power at the head of the Adriatic. These Mediterranean ships became the model for English builders. For some centuries the Venetians were the link between East and West. They brought spices, which were necessities, and luxuries from the East and exchanged them against the wool, cloth, and metals of Western Europe. How necessary were the spices may be seen from the fact that in the England of those days, it was difficult, if not impossible, to maintain flocks and herds through winter, and large numbers of them were killed, and their flesh preserved by means of salt and spices for use in winter.

Trouble came when in 1453 the Turk captured Constantinople and stood astride the land routes by which the spices, etc., of the East came to the Mediterranean; he could tax them, or prohibit their transit through the lands he governed. The situation had in it the elements of calamity for the Western nations, and like so many other impending calamities, it had its far-reaching, stimulating effects on enterprising men. It impelled them to persevere with and extend their coasting journeys down the African coast in the hope of finding a sea passage to the East Indies. They found it in 1498; it was a long and perilous journey for those days, but it freed them from the possibility of Turkish interference with the supply of these essentials to life. Before this Columbus, under the auspices of the Spanish sovereigns, sailed West in the hope of reaching the Indies that way, and found the West Indies. The English tried to find either a north-east, or north-west passage. They did not get to India, but got to the White Sea, which opened commercial relations with Russia, and ultimately freed Russian trade with Western Europe from the Hanse monopoly; and in the other direction they failed to

get through, but found the coast line of North America, thus laying the foundations of Anglo-Saxon dominion there. In this way these mariners found not merely the answer to the Turk, but new lands for colonization and trade. The same was true with regard to Australasia. The development which gave England the start in shipping supremacy was the passing of the Navigation Acts in Cromwell's time, but there were such laws prior to them. They dated from Plantagenet days, and continued, with modifications, of course, until the middle of the nineteenth century. They prohibited ships of foreign nations from trading with English "Plantations," as some of the lands now known as Dominions and Colonies were then called. This prohibition was extended to this country. Goods could not be imported here, or in any of the dependencies, unless they were in English "bottoms," or in the ships of the European nation of which they were the growth, or manufacture. At the time of the Restoration, the laws required that the masters and three-quarters of the crew should be British subjects. As the years passed these laws were modified, as has been seen, but they remained in some force until Free Trade days in the middle of the nineteenth century, when foreign vessels were admitted to the English coasting trade.

World Expansion's Influence on Shipping

Naturally this world expansion stimulated improvement in shipping. Something better than the existing vessels was required for journeys to these far-flung countries. It went forward steadily until at the beginning of the nineteenth century the English mercantile marine had developed on two main lines two types of ships—the Indiaman and the Free Trader. Established in the days of Queen Elizabeth the East India Company became not only a great trading company, but from Leadenhall Street in London a Board of Directors also governed an Empire. The great exchange of goods between Europe and the Far East was principally in their hands, and they created a trading fleet of ships which were the finest specimens of naval architecture in their day; the precursors of the modern liner.

This, however, was not the extent of England's trade. Her ships carried on a great trade with other parts of the world, for which a different type of ship was evolved, smaller, cheaper to build, and more economical to handle—the West Indian Free Trader. These ships differed greatly from those of the East India Company. The Indiaman's tonnage might vary from 1000 to 1500 tons; she was frigate-built, carried a large crew,

was fully armed, and a fast sailer. The Free Trader was from 300 to 700 tons; had to meet the competition of all comers in certain trades, and consequently had to carry every possible ounce of trade, and to be run as economically as possible. Keen competition led to the evolution of a very useful ship, small, capable, and performing a great amount of work at small expense. From these beginnings, from experience of the requirements of the different trades and of their management and organization, modern English shipping and its management have evolved.

For a time English shipping secured a monopoly, but ultimately America produced competition which put it on the defensive and threatened its supremacy. English builders and designers clung too conservatively to their bluff bow and heavy stern with proportionate beam which ensured safety, but made their ships relatively slow. American builders evolved a new model, the "clipper," which could sail at almost twice the speed of the English ship. In the end the English builders were forced to redesign their ships. The credit for leading this departure is given to a Richard Green of London, who produced the *Challenger* in 1850. This set up a new standard of strength, speed, and economy of working. From this, the British "clipper" type of ship, the country went into the lead again in the development of a world commerce.

The Coming of the Iron Ship

But this was not the only thing which led the country to supremacy. The defects of wood were recognized; its limitation of length, for instance. After a length of 300 ft. had been reached, the wooden ship became unstable for ocean voyaging, and builders began to search for a metal-built craft. The result was an iron frame sheathed with iron plates, which had a greater carrying capacity and, of course, greater strength. For some decades, however, the iron ship was not popular; its magnetic effect on the compass was feared. This danger was removed by Sir William Thompson's inventions in connection with the compass, and though some owners still clung to wood, and others tried iron frames with wood planking, the wooden ship was doomed. The iron ship gave the country a great lead, but, of course, it was relatively heavy and in time iron was replaced by steel, with a corresponding decrease in weight and increase in carrying capacity. For a time the iron and steel ships remained sailing vessels. Steam propulsion gradually replaced sails, however, until in 1926, Lloyd's Register gave particulars of only four deep-water sailing ships belonging to British owners.

As the ship developed, so did the science of navigation. It equipped them with instruments of precision; every ocean, sea, and river through which world commerce passed was mapped, charted, buoyed where necessary, and hydrographical and meteorological phenomena recorded. The skilled navigator had all this information to assist him. The special organization required for steam shipping, such as coal supply in distant parts of the world, was built up. All these things coupled with our pre-eminence in the steel industry gave our Merchant Navy a lead for many years.

The two main lines of division, passenger and cargo ship, remain, but both can be sub-divided into several classes. The passenger ship evolved in two directions, due largely to the Suez Canal. The dimensions of this limited the size of the boats which could be passed through to India, or Australasia. On the other hand the Atlantic, having no such limitations, permitted the construction of much larger ships. At the beginning of the twentieth century the largest mail steamers to Australia were 6000 to 7000 tons, but as the Suez Canal was deepened and widened they increased to round about 30,000 tons, while the corresponding measurement for the Atlantic at that time was between 45,000 and 50,000 tons. This was exceeded by the most modern vessels afloat at the beginning of the war in 1939. These were the *Queen Mary*, 81,235 tons, and the *Normandie*, 83,425 tons, the latter belonging to the French mercantile marine. The competition of these vessels for the fastest crossing of the Atlantic to North America will long be remembered; it interested the people of both nations. To the *Queen Mary* belongs the credit of the fastest crossing (on the westward trip 3 days, 21 hours 48 minutes; on the eastward trip 3 days, 20 hours 42 minutes), but what might have happened had there been no war might have been still more interesting. The Cunarder *Queen Elizabeth* (85,000 tons) had not then left the builder's yard, and because of the war, nothing could be said about its launching and being sent to sea, but one fine day there leaked out in what seemed quite a casual way the fact that she had been sent to sea and was at work. Some day perhaps there may be equally interesting news as to the speed with which she can make the Atlantic crossing.

Specialized Ships

The cargo steamer has developed into a variety of specialized types, such for instance as the tanker for carrying oil in bulk, and the refrigerator

ship. It is hardly necessary to dwell on the advantage derived from carrying oil in bulk instead of barrels. We are familiar now with the tanker's function, but its production was not a simple matter. Difficult problems had to be solved before it could be run safely. The refrigerator ship has placed at the disposal of the people of these islands many perishable things, particularly meat, which otherwise could not be transported to them. The cargo ship is not likely to reach anything like the tonnage dimensions of the passenger liner. Its particular function demands that it should be able to touch at many ports to discharge and take up cargo, and all docks are not laid out for immense tonnages. Also the smaller tonnage facilitates what in effect is coasting trade. It has been found more economical not to discharge a full cargo at London, Liverpool, or any other port, and distribute the load among smaller ships which take it to its final destination at other ports of this country. Instead partial unloading may be done in the Port of London, and then the ship goes on to other ports, where she discharges more, and probably takes more in.

CHAPTER XVII

THE ECONOMICS OF MARINE FUEL

WITH the coming of the mechanically propelled vessel fuel has become the great factor in ocean-transport—fuel of two kinds, coal and oil. The invention of the steam engine was soon followed by attempts to install it as the motive power for shipping. It began as early as 1802, when William Symington put a small steam-propelled craft, the *Charlotte Dundas*, on to the Forth and Clyde Canal, and proved its efficiency. America was also at work on the same idea, and in 1807 Robert Fulton built the *Clermont* at New York. This vessel engaged in a regular coasting trade. The first British steamer to run regularly in European waters was the *Comet*, built in 1812 on the Clyde, by Henry Bell. These were primitive affairs, but builders and engineers seeing the advantage of artificial propulsion devoted themselves to produce increased power and endurance in the engine. The story of the evolution of the marine engine is most interesting, though too long to be dealt with in detail here. The first engines worked on low steam pressure and were "heavy" on fuel. It has been stated when worked at the absurdly low pressure of 6 lb. to the square inch they required 10 lb. of coals for each horse power produced per hour. The result, of course, was that for transatlantic passages the bunker space required was so great that very little cargo space was available, and little else but mails and passengers could be carried.

Necessarily these first steam vessels were confined to journeys where supplies of coal were available; there were no organized coaling stations in those early days. It was the attempt to solve this problem which inspired the construction of the *Great Eastern*, the largest vessel of her day. She was designed with sufficient bunkering capacity to make the voyage to the Far East without rebunkering, and yet to give her a considerable cargo carrying capacity, and accommodation for an exceptionally large number of passengers. Unfortunately she never justified these expectations; they were never really put to the test of carrying out the original Far Eastern scheme. Her claim to fame and remembrance lies in the fact that she was used in laying the first Atlantic telegraph cable.

Fuel Economies and the Marine Engine

Within limits, the development of the marine engine may be attributed to efforts to economize fuel. Like all generalizations this statement has its inaccuracies, because engineers generally were bent on perfecting the steam engine, whether marine, stationary, or locomotive. They saw its possibilities, and were keen to perfect it, until it was a really great and useful power unit. In the case of the marine engine there was perhaps even more inducement to strive for progress towards perfection. Vessels were wanted with greater carrying capacity, both passenger and goods, and to attain this and also to reduce bunkering space in ships and their dependence on bunkering facilities abroad, it was necessary to evolve an engine which produced more power per pound of coal consumed. The first stage of development was the compound engine, which utilized the expansive quality of steam to a greater extent; and the compound principle was developed until the quadruple expansion engine was arrived at. The result was an enormous reduction in the fuel required to produce the desired horse power. It has been stated that the low pressure engines at about six pounds per square inch required ten pounds of coal for each horse power per hour, compared with one pound of coal per horse power per hour which fed engines developing upwards of 200 pounds to the square inch. The reciprocating marine engine further increased the efficiency of power production until in a vessel of say 20,000 tons with engines indicating 45,000 horse power, a speed of 24 knots per hour could be obtained on a consumption of 700 tons of coal per day.

The next step forward was the Parsons steam turbine engine. It was first tested as far back as 1894, in the *Turbinia*, a comparatively small craft, which with these engines broke all previous records with a speed of 34 knots. It was tried in larger vessels with success, particularly by the then Cunard Company, and steadily new speed records were set up. At first it was thought that the turbines offered no advantage in slow-going vessels over the reciprocating engine (its economy increased as the speed increased), but eventually, by means of gearing, this relative disadvantage was overcome.

The Oil Fired Boiler

This stage of engine development having been reached, attention seems next to have been directed to the type of fuel. Oil fired boilers were substituted for those which used coal. To give an example of what this

effected reference may be made to a statement made by the builders when the well-known *Mauretania* was converted from coal to oil, this vessel being one of the earliest of size which made the change.

"The time occupied in filling bunkers is reduced to a very large extent. The absence of coal dust does away with a great deal of labour in cleaning the ship. The steaming efficiency of oil is much greater than that of coal so that fewer boilers need to be used for maintaining the same speed as when coal is used. Furthermore, a greater reserve of power can be kept in hand to make up for lost time by reason of bad weather, or other adverse conditions: or else a higher speed can be developed. The number of hands in the stokeholds was reduced (in the *Mauretania*) from 328 to 90, and, of course, the laborious and heavy work of the stoker disappears."

The change enabled the *Mauretania* not merely to maintain her previous records with greater ease, but ultimately to set up new records for herself.

The Diesel Engine

As with so many other things, so with seagoing vessels. No sooner does perfection appear to have been attained than men of ingenuity, whose minds have been running in other directions, bring new ideas to fruition. It is not suggested that the turbine engine has been superseded; probably it has many years of usefulness still remaining to it, and may, in fact, never be completely displaced. Its superior advantages were no sooner recognized than the Diesel type of internal combustion engine began to find its way into the shipbuilding yards. The advantage of this type of motor power, of course, is its abolition of boilers with concurrently a reduction in the number of stokers, and the freeing of more space for cargo, or passengers, or both. The usefulness and efficiency of the motor ship for both passenger and cargo carrying have been convincingly established.

Double Effect of Bunker Coal

The necessity of providing coaling stations abroad and of shipping coal to them has had a pronounced effect on British industry. British owners were the first to provide these stations and it was British coal that was sent out to them. It was to be obtained at almost every seaport in Europe, Asia, and Africa, and at many islands in mid-ocean on the main steamship routes. This export of coal had a double effect. It

not only met the needs of our (and other) shipping when abroad, but it served a very useful purpose in cheapening the handling of our foreign trade generally. The nature of our foreign trade meant that imports were more bulky than exports, and it has been stated that under these conditions many ships leaving our ports would have been poorly loaded. Bunker coal for foreign stations restored the balance to a large extent, enabled freight rates to be averaged down, and placed British owners and British trade in a very advantageous position in the competition for world trade. With the passage of time, however, all these advantages have not been retained. Other nations have taken a share of the business, and in addition the increasing use of oil fuel has changed the outlook still further. When oil first began to be used there were doubts whether the world supply was adequate for its extensive adoption, but time has resolved these doubts. Discoveries of new oilfields and of new methods of producing oil have made the future certain. The only requisite remaining is a market price which will make it, and keep it, competitive with coal.

CHAPTER XVIII

SHIPPING REGULATION AND MANAGEMENT

IN previous chapters much has been written concerning Government control of railways and canals. The control of shipping is quite as elaborate and complete. Until the middle of the nineteenth century shipping was regulated by the Navigation Acts, to which brief reference has already been made. These stretched right back to the time of the Plantagenets, but it was not until Cromwell's days that legislation reached its most effective state. The enactments of those days were the foundation of England's mercantile supremacy; they were all shaped with the object of fostering British shipping. In the middle of the nineteenth century the whole commercial policy of the country was given a "Free Trade" basis, which led to the repeal of the Navigation Laws, and the throwing open of even British coasting trade. At first it seemed as though the U.S.A. would follow this example, and, in fact, the restrictions were relaxed to such an extent that foreign ships were permitted to carry American foreign trade. The coasting trade, however, was restricted to American shipping, and as this was defined as trade between any two ports belonging to the Union, it followed that a voyage from New York to San Francisco round Cape Horn was held to be "coasting" trade. Within this same definition came a voyage to Manila.

When the Panama Canal was opened it was sought to give some privileges to some classes of American vessels, but Great Britain protested that this violated the Hay-Pauncefote treaty and the attempt was abandoned. This treaty was a modification of the Clayton-Bulwer treaty made in 1850 between Great Britain and the United States of America. The canal was then merely a project. The treaty provided that the canal, whether in Panama or Nicaragua, should be neutral and should be used and enjoyed on equal terms by the citizens of both countries. The Hay-Pauncefote treaty of 1900 modified its predecessor, but preserved the principle of neutrality and equal use.

Board of Trade Supervision

The only restriction now placed on shipping in the British Empire is that the trade from one part of a British possession in Africa, America, or Asia, to another part of the same possession can only be carried in

British ships, but even this seems to have fallen into desuetude. British shipping law was consolidated in the Merchant Shipping Act of 1894, but has since been amended and extended. Its administration is carried out by the Board of Trade and the following are some of the things which come under the Board's supervision—

The registry and measurement of ships.

The survey of ships' equipment, including life-saving appliances.

Responsibility in connection with various goods that are carried.

The load-line and general seaworthiness of ships.

The examination of all candidates for positions as ship's officers, either on deck or in the engine-room.

Responsibility for passenger and emigrant ships.

As to seamen and firemen, the Board supervises their engagement and discharge, and protects them from crimps, and will, if desired, take care of their earnings.

The inspection of provisions and the granting of certificates of efficiency to cooks.

Inquiries into wrecks and casualties at sea.

The testing of anchors and cables.

International conventions as to safety of life at sea, the unification of maritime law and signals.

Pilotage and the control of Trinity House are other functions of the Board. Trinity House has the duty of lighting our coasts and channels.

Other Forms of Control

This is not the extent of control, however; quite a lot is exercised on behalf of Lloyd's Association of Underwriters. From this famous body of insurance underwriters, who will insure anything, not merely shipping, came Lloyd's Register of Shipping.

Lloyd's Register was founded in 1760 and reconstituted in 1834. Its affairs are administered by a committee representing shipowners, underwriters, merchants, and ship and engine builders. Its headquarters are in London and it maintains a large staff of highly trained surveyors at all the principal ports throughout the world. There are no shareholders and the work is not carried on for profit, the income being devoted exclusively to the maintenance of its operations.

In addition there is the British Corporation Register of Shipping and Aircraft, which was established in 1890 and has headquarters in Glasgow. Its functions are similar to those of Lloyd's.

The French counterpart is the Bureau Veritas, with headquarters in Paris. It was founded in 1828. It is different from Lloyd's in one respect, in that it has a share capital and is a profit-making institution.

Theoretically a man, or a company, may build a ship to his, or their, own plan, but in fact it is not so. The great corporations for the registry of shipping have drawn up regulations based on long years of experience and scientific knowledge, and the designs of all ships built are submitted to and passed by a Registry before the work of construction commences. Without a class a ship would be unable to obtain either cargo or passengers; nor if these difficulties were overcome would it be possible to effect an insurance upon either ship or cargo. The Registries classify them, and their insurance depends considerably on this classification. It follows that this semi-official control is very effective and complete, as much so as that of the State.

Evolution of Shipping Business

Changes in the conditions affecting shipping have been continuous throughout the shipping industry, but particularly in the past century or so. Many have required a radical alteration of method and have tested the business ability of shipping managers in an exhaustive manner. The owner of a small Free Trader ship had a comparatively easy task. His chief care was to obtain the services of a capable, businesslike captain, for on him almost everything depended when the ship once left her terminal port; and then he had to be careful in selecting honest agents at the ports of destination. For when once a ship sailed on a voyage, which might last two or three years, the owner's control was reduced to a dangerous minimum. He could, it is true, lay down the main principles to be followed by his servants and agents, but it was the man on the spot who had to act, and on his decision would, to a great extent, depend the success or failure of the voyage.

A shipping voyage is known as a venture. The word is still adequate in describing the chances of shipping business, but in the days before the submarine cable, and now radio telegraphy, gave the owner complete control over every transaction, it more justly and fully expressed the situation. The owner in the old days might worry, but he could not fully control.

Compare his position and responsibility with those of the manager of a modern tramp steamer. The latter not only needs to know the main facts about steam, fuel, constructional materials, and the many items of

knowledge which are necessary if he is to keep the vehicle he employs abreast of the times, but he must know the exporting and importing centres of the world and the commodities available at or for each. He must keep his finger on the pulse of many markets, know when the crops have failed in one part of the world, and have been above the average in others. He must be watchful and on the alert, so that his ship or ships may be where they are wanted at a given moment, and not side-tracked when there is a boom with consequent high freights.

Sixty-fourths

In the eye of the law a ship was looked upon as consisting of sixty-four "parts," and so long as there was no further division these sixty-four parts might be registered in the names of any number of owners from one to sixty-four. The liability of the owners was limited on the basis of these "parts." It is remarkable that this custom continued to exist long after the days of the Limited Liability Acts. The advantages of these Acts have become increasingly recognized and more extensively used.

The modern tendency in business of all kinds towards great units has spread to shipping. The small owner has not disappeared, but during the last twenty-five years or so a great change has taken place, and there exist most extensive combinations which have increased the ramifications of such old companies as the Peninsular and Oriental and the Royal Mail Steam Packet Companies. The many absorptions and alliances, the interlocking shareholdings effected by these two companies, and, of course, others, are very interesting and illuminating. They are justified by their advocates as leading to economies in management, by the elimination of wasteful competition, and the organization of more efficient services.

Shipping Conferences

Experience has shown that this form of combination, while most useful, has not been adequate for the elimination of competition. On top of it has been built the Shipping "Conference," which aims at regulating export freights in the first instance. The conference has been described as "the weapon of the regular lines against possible depredations by irresponsible tramp vessels." To enter the shipping business is relatively easy compared with other forms of transport, e.g. railways. The capital required is much less. Newcomers naturally sought employment where remunerative business was available and, cutting in on the old-established lines, they

brought about reductions in freights, sometimes to such an extent as to make the business unremunerative. The great disadvantage was that originally there was nothing to "tie" the shipper to any particular line, or group of lines working together. He could take advantage of any facilities which offered him a lower freight rate, and this threatened to destroy all attempts to regularize freights on a steady, unfluctuating basis. In the end the shipper was tied by the conference system of deferred rebates, payable on a declaration that the shipper had shipped exclusively by conference lines. Deferred rebates are not peculiar to shipping. In the period between the two wars they spread to many industries, but particularly to iron and steel. Large shippers cannot afford to imperil the rather considerable sums to which these rebates amount by shipping with other than conference lines. It is natural that these conferences should spread from this country to other competing nations, and that, in some spheres, they should become international in their scope.

They have not been popular, and there have been attempts to break them. No business man likes anything which restricts his power to go on to the market and buy at the cheapest possible price. In reply to the criticisms it is stated that "a conference undoubtedly offers a better service than competing lines can." Regularity of service and freight rates are claimed to offer advantages, not only to shippers, but to the labour employed on the ships and in the ports, and as conferences have become international they have resulted in some uniformity as between nation and nation in the law and practice of the trade. The power of conferences to raise freights to an uneconomic level and maintain them there, which is another subject of criticism, is questioned, and the reply to this is that all they can do is what a well organized Trade Union does for its members. Under such conditions it can obtain for its members the full economic freight rate under all circumstances; it can postpone a fall in rates to the last possible moment, and, in the reverse direction, can enforce a rise immediately the market can bear it. But even so its influence is limited in the long run by the law of supply and demand.

PART V

CIVIL AVIATION

CHAPTER XIX

ITS RAPID EVOLUTION

FROM remote antiquity man has desired to transport himself through the air as well as on land and water, and yet the impressive features of civil aviation are its modernity, its rapid progress, and the debt it owes to war for the development of its vehicle of transport. Notwithstanding the many interesting exploits of the users of the lighter than air vehicle—the balloonists, for instance, whose flights, hailed in their day as wonderful achievements, were little more than the providers of mildly sensational entertainment at sports meetings, garden parties, and country fêtes—the inception of the heavier than air machine and the ability to get it air-borne, date back little more than four decades.

The honour of being the first to get an aeroplane off the ground is given to the brothers Wright, Wilbur and Orville, in the U.S.A. in December, 1903. They flew only 284 yards, but it was regarded as a great feat. The first European flight did not take place until 1906, when Santos Dumont flew for an even shorter distance. Three years or so later came the first cross-Channel flight, Blériot coming over from France to England on 25th July, 1909. Again the achievement was regarded as epoch-making; and, of course, it was, but how very puny compared with present day records!

From then onwards aviation developed, but it did so rather slowly until the first world war, when, for the first time in history, it was used as an adjunct of warfare. When that war began in 1914, it was still thought to be rather wonderful to be able to fly, and the machines in use were of a very primitive kind, as were some that were actually taken to France by the British Air Force. The exigencies of war forced a great change. It produced fast (for those days) and more easily manoeuvrable fighter planes and larger observation and bomber machines; and these were the starting point of the after-war development, which made trans-oceanic and trans-continental flight possible. The war was scarcely

over, and formal peace treaties had not been signed, when the first commercial air service between London and Paris, using converted military aircraft, was established—in August, 1919.

The Beginning of Civil Aviation

That was really the beginning of civil aviation. It seemed wonderful then; the lapse of time has reduced it to smaller proportions. In the same year John Alcock made the first successful transatlantic flight from Newfoundland, and Ross Smith flew from London to Australia, a distance of 13,500 miles. What was thought of these feats (and they were indeed sensational) is indicated by the fact that each pilot received a knighthood as part of the reward. London to the Cape, 6281 miles, was also covered in 1920, by Colonel Van Ryneveld. The pioneers were busy in those and subsequent years, and many similar flights were accomplished. A catalogue of them would be wearying; their records can be found in any good book of reference.

But if they are dismissed thus summarily, it is not to be assumed that their work was trivial. On the contrary, all these flights were tremendous undertakings. The machines were not reliable beyond question; they always required careful handling; sometimes some coaxing to do their job; there was no established organization to assist them; everything of the kind had to be improvised for the special purpose. The pilots' achievements were brilliant; they covered themselves with glory and not a little notoriety. What other rewards they had, financial and otherwise, does not concern us, but it may be mentioned that among the knighthoods was that of Sir Alan Cobham; a pioneer, very steady and reliable in all that he did. In this way intrepid men (and women also) laid the foundations of Civil Aviation.

Regular Atlantic Flights

It was not until 1939 that regular passenger flights across the Atlantic were set up from both sides, by Great Britain and the U.S.A., although in 1924 Imperial Airways, Ltd., was formed to amalgamate four English companies, and to extend the work. The development proceeded almost uninterruptedly until the second world war began in 1939.

Statistics collected and published by the British Air Ministry are given in the appendices, and it will be interesting to examine them. Beginning with 1920, the expansion of air travel is surprisingly large. In the first year there were only 5800 passengers carried in British

aircraft which flew 644,000 miles and the cargo carried totalled only 137 tons. By 1938, the last year for which there are any figures, there were 222,200 passengers and 5980 tons of cargo carried. The aircraft mileage flown grew to 14,331,000. There have been fluctuations in both passengers and goods, which suggests that this form of transport, as well as others, may be influenced by trade fluctuations; but from 1930 onwards progress was very steady. It will be noticed that the scope of the information given was changed after 1924. In addition to the mileage and number of passengers, the tables have been enlarged to include passenger mileage and cargo ton-mileage. People whose special interests or avocations have not been such as to make them interested in such matters will be impressed by the fact that the passenger mileage had grown to 56,368,000, and the cargo ton-mileage to 11,085,900. It will help to bring this figure, impressive as it is in its own connection, into its true proportions if it is contrasted with the 15 to 18 thousand million net ton-miles worked by British railways during a year.

Possibilities of the Future

What of the future? It is impossible to say anything definite, or authoritative; only to generalize with the remark that possibilities are immense. War experience has been astounding from three points of view: the growth in size of the bomber; its increased weight-carrying capacity; and the enormous non-stop distances flown. It is on the bomber's achievements that the future passenger and goods transport planes will be based. Designers and engineers have learnt a lot from these. Our ideas of transatlantic travel, for instance, have been revolutionized. The regular ferrying of war planes from the U.S.A. and Canada to the United Kingdom has been remarkable. Details of what has been done are not available, but it is general knowledge that the number flown over has been very large, and that the distances have been flown in incredibly short times. So many records have been announced that people have lost count of them. The time occupied under favourable conditions has been reduced to little over 5½ hours, and a pilot has been known to breakfast in Newfoundland and lunch in the United Kingdom!

Then also there has been the great increase in weight carrying capacity. Tanks, guns, and all kinds of war gear have been transported by air, and it is on record that in June, 1943, a fully laden glider was towed by transport aircraft from Montreal to England, 3500 miles, in 28 hours. If tanks and guns can be carried in this way the future of

goods transport seems unlimited. Probably nothing like the speed records set up in the ferrying of planes across the Atlantic will be attempted for passenger transport, at any rate at the outset ; but speed is bound to have its influence, and as after-war civil aviation "gets into its stride" he would be a stupid person who set limits to its possible speed. As engines and construction improve, so will speed increase, if such an increase is desired. As far as passengers are concerned the only limit seems to be comfort, and the limit will be raised from time to time as experience increases. Already the forecast is that we shall have planes carrying one hundred passengers and having a cruising speed of 340 miles per hour (which is almost equal to the average speed with which Britain won the Schneider trophy in 1931) and that the journey between London and Sydney, Australia, will be done in sixty hours.

The Chicago Conference

All the world is "on its toes," as the cricketers say, with regard to the future, waiting only for the right time to launch schemes of civil aviation (internally as well as externally) on an unprecedented scale. An indication of this widespread interest is furnished by the fact that no fewer than fifty-two nations were represented at the Chicago conference in 1944. This conference was held not only to define rights of nations anxious to take part in international air transport, but also to lay down rules for its conduct. To many who followed the newspaper reports of the discussions the impression formed was that to a very large extent the conference was a failure, but we have it on the authority of the then Minister of Civil Aviation that its deliberations met with a large measure of success, particularly on what he described as the "technical" side.

Lord Swinton, the then Minister, summed up the problems of international transport in what he called the "five freedoms"—freedom to fly across the territory of another country ; freedom to land for non-traffic purposes ; freedom to set down passengers and mails all along the route providing these were embarked in the country of origin of the aircraft ; freedom to take up passengers, freight, and mail for the country of origin, and freedom to pick up and set down passengers *en route*. The United Kingdom proposed a convention which would cover the first four and that the fifth should be subject to bilateral negotiation between the countries concerned along the route. It was also proposed that there should be an international authority with power to see that these provisions were fairly observed.

The representatives of the United States pressed for the fifth freedom and the conference failed to reach agreement on it. There was agreement on other points and those not accepted were referred to an interim council. Among the proposals put forward, but not adopted, was one from Australia and New Zealand that there should be "an all-embracing international company, or corporation" which would own and operate all the civil aircraft of the world, but it did not commend itself to the fifty-two nations represented. The interim council will sit in Canada.

CHAPTER XX

BRITISH COMMONWEALTH'S HOPEFUL FUTURE

So far as the British Commonwealth is concerned the future looks hopeful because of the establishment of a Commonwealth Air Transport Council, with representatives from all the dominions and a permanent secretariat in London, but not tied to London. It is intended that the meetings of the council should be held in all parts of the Empire as and when necessary. In all probability this will be a great stabilizing force because the United Kingdom and the Dominions will themselves furnish so many and such widespread air routes, with so many landing places which will not necessarily be subject to the whole range of international agreement; some being within the bounds of the Empire their arrangement and working should be relatively easy. The preliminary work is well advanced, a thorough survey of the routes having been made.

British Overseas Airways Corporation

The organization for carrying on the work, the British Overseas Airways Corporation, has been brought into existence. It was established in 1939, but on the outbreak of war it was taken over by the British Government, which had exclusive control over its priorities and confined its work to official passengers and goods and mails, for troops and generally. It was not able to cater for the public, but it has plans ready for a prompt "take off" on the job for which it was founded. This new corporation acquired the undertakings of Imperial Airways, Ltd., and British Airways, Ltd., in the following year. Imperial Airways, Ltd., had already amalgamated four English companies in 1924. The name, British Overseas Airways Corporation, sufficiently indicates its objects. It has a capital of £4,250,000 in 3 per cent stock guaranteed by the British Treasury and this stock is owned by public bodies nominated by the Government, and as there is now a Minister for Civil Aviation it is obvious that the British Government will have a very large part in shaping its policy and business.

British Railway and Shipping Proposals

British railways, also, were keen to have a hand in the future of civil aviation. They were prepared, through subsidiary companies,

to run a network of air services in this country and to the Continent of Europe. They have been in the business since 1933, having got air powers in 1929; and they had as partners the shipping companies operating the same routes. How they worked may be indicated by a reference to the Channel Islands Service, which was owned jointly by the G.W.R. and the Southern Railway Companies. Under this partnership it was made possible to book through passages at all the principal railway stations and travel agencies. A non-stop service was operated between London and the Islands, but experience was that the majority of passengers preferred to travel by rail to the coast air port and thence by air.

Apart from the railways, shipping companies are also interested. Five of them formed a company to cater for air transport on the sea routes they operate.

The First Government Scheme

There was some doubt as to how these railway and shipping proposals would be organized; how they would fit into the general scheme, and how they would be received officially, but it seemed to be removed by the White Paper published in the spring of 1945, "British Air Transport." Since this paper was published there has been a change of Government, and a new statement of policy has been made. It sets out completely different ideas and intentions for the future conduct and management of civil aviation. This is referred to later, but to trace the development of thought and policy it will be well to retain what was written about the first White Paper. The Minister for Civil Aviation proposed to establish three corporations, which would be responsible for air services on the following routes—

(1) The Commonwealth air routes together with the transatlantic service to the United States and the services to China and the Far East.

(2) European air routes and the internal services of the United Kingdom.

(3) The South American route.

These divisions of spheres of operation follow the lines already indicated, and though at first sight the use of the word "corporations" may suggest that the railway and shipping companies were to be cut out, the detailed statement as to the constitution of the corporations made it quite clear that they were not. They were not, however, to be given free and unfettered independence. In each case they were to "work"

the services, but the Government would keep considerable control of them through the British Overseas Airways Corporation.

The Three Corporations

This is how the Coalition Government proposed to organize the three corporations:—

(1) *Commonwealth routes (including the Atlantic).*—The Commonwealth and Atlantic routes, together with the ultimate extension to China and the Far East, will be assigned to the British Overseas Airways Corporation. This Corporation and their predecessor, Imperial Airways, have been responsible for the development and operation of these routes in the past. They are in close relation with the corresponding operators of other Commonwealth countries. They are, therefore, clearly the appropriate instrument for the operation and further development of these routes.

Relying on Shipping Experience

Even this service, however, while predominantly, was not intended to be exclusively, B.O.A.C. The White Paper said that on many of the routes a valuable contribution can be made by British shipping lines with their well-established organization and local connections, and their experience of the special transport requirements of particular areas served. It was, therefore, proposed that these shipping lines should be afforded the opportunity of becoming associated with B.O.A.C. in the operation of those routes to which they can make a useful contribution; "an association which is welcomed alike by B.O.A.C. and the Shipping Lines. It will probably be convenient, in any case, for B.O.A.C. to operate certain of these routes through subsidiary companies; and as the interest and organization of the different shipping lines are confined to particular routes, such a structure will clearly be desirable for those services in which British shipping lines participate. In any subsidiary companies, the predominant financial and managerial interest will normally be held by B.O.A.C., but the shipping lines will, at their own risk, take a share in the capital, and their transport experience and commercial acumen will be represented on the boards."

A Wealth of Knowledge of Transport Problems

(2) *European and Internal Routes.*—"An agreed schedule of European and Internal United Kingdom routes will be assigned to a new company

in which the participants will be the railway companies, the short sea shipping lines, travel agencies, and B.O.A.C. and such other pre-war operators as desire to participate."

Concerning this second Corporation the White Paper says:—"In the first four groups is concentrated a great wealth of British knowledge and experience of aviation, transport, and travel problems. In addition to their knowledge of United Kingdom and European traffic needs and their extensive organization here and on the Continent, the railways and their associated air companies have, in the past, successfully operated the great majority of the internal air services of the United Kingdom. The short sea shipping lines operate and have built up a valuable organization and goodwill in connection with sea routes to Europe; some of them have also been associated with the operation of air lines in the past. The travel agencies combine a peculiar knowledge of the needs of the travelling and touring public with a wide organization in this country and throughout the Continent. All the proposed participants are agreed on the importance of B.O.A.C. having its share in this Corporation. It will bring to it all its knowledge of aviation and its experience of the continental air-routes which its predecessors operated before the war."

In addition to the groups mentioned, the White Paper recalls that before the war there was a small number of independent British operators who ran air lines. "These will be given the opportunity of taking shares in the new company on the same terms as the other participants, and the possibility of forming subsidiary companies to operate these routes is contemplated, and the pre-war operator will be given an opportunity of participating in the capital of these subsidiary companies."

The South American Route

(3) *South American Route*.—"The South American route will be assigned to a new company in which the majority participants will be those British shipping lines operating to South America who have associated together for this purpose as British Latin American Airlines Limited. Here again it is proposed that B.O.A.C. should participate in the capital and management of the new Corporation, but its share in the capital will be smaller than that which it will receive in the Corporation responsible for the European and internal services. The British shipping lines which have for so many years carried a large proportion of the passengers and trade between Europe and South America and have their wide connections and organization and their goodwill in the areas to

be served by the new air route are, in the view of the Government, in the best position to make the service a success. They have expressed their willingness to risk their own capital in operating the route without subsidy."

A Comprehensive Scheme

The organization thus outlined appeared comprehensive and on right lines. It took advantage of all sources of experience not merely in carrying on the actual business of operating air routes but of securing traffic. It has been criticized on the ground that it will rule out private enterprise and make it extremely difficult, if not impossible, for operators other than those contemplated to come into the industry. This, of course, is altogether opposed to the old British ideas of freedom, of *laissez-faire*, the widely applied doctrine on which so much of our past policy was founded. The Minister of Civil Aviation indirectly recognized this when he proceeded to justify the restriction. Unrestricted competition, his white paper says, would mean concentration on remunerative routes to the exclusion of those unlikely to be remunerative but desirable, even necessary, from the point of view of public interest. Competition of this character would soon cause the remunerative routes to become unremunerative, the "public interest" routes would be impossible without subsidies; and in the long run civil aviation as a whole would suffer. But when all this control is exercised, and rates and fares and participation in services are agreed, internationally as well as locally, there is certain to remain competition in some form, especially international, in such matters as speed and luxury of travel.

Advantages of Centralized Control

There are, however, some directions in which centralized control can operate to good effect. The three corporations proposed were to be required to join in the creation and management of a combined organization for the overhaul of aircraft. There is nothing new or oppressive in this requirement. It is only another form of the control, however remote, exercised over the railways by the Minister of Transport, that exercised over shipping, or that maintained over other forms of public service. The country has advanced a long way since the days when *laissez-faire* was supposed to be, but never was, the supreme aim of all our policy, and has come to realize that there are some directions in which control, instead of being harmful, has its beneficial influence, is in fact essential if the public interest is to be not merely protected, but well served.

Training of air crews and ground staff is another direction in which control is to be exercised. The Ministry will insist on the highest standards of skill and reliability in the men who will have to do the actual operation, and the three Corporations will be required to combine to maintain a training establishment. Side by side with this is the fact that the Ministry of Aircraft Production has put out the report of an Interdepartmental Committee appointed to detail proposals for the establishment of a School of Aeronautical Science. This is only indirectly related to civil aeronautics; it is intended to be a very comprehensive school mainly for the instruction of those who are to be engaged in the design and manufacture of aeroplanes, and for research into performance and design.

All these things show how seriously the question is being tackled. It has been suggested that Great Britain will be at a disadvantage when compared with other countries in the establishment of these services which have now come to be regarded as so essential to our future welfare and prosperity. It may be so, but at least it is consoling to know that everyone concerned is alive to the necessities of air transport and, as far as is humanly possible, is determined that this country shall not be left behind permanently, but shall be prepared in organization, in staff and in equipment to fill the place given to her as the centre of a great Commonwealth of Nations far flung over the surface of the world. And the unfolding of the scheme will be watched more with interest and assurance than with trepidation.

The Nationalization Scheme

As is the case with rail, canal, and road transport, the position has been changed by the scheme for State control of civil aviation foreshadowed by the Government in the House of Lords on 1st November, 1945. It was then announced that public ownership is to be the overruling principle in air transport and that there would be no financial participation in it by existing surface transport interests. But these interests will be asked to co-operate by placing at the disposal of the Minister of Civil Aviation their experience of some of the traffic problems which would confront air transport. It is intended that the B.O.A.C. will operate services for the Commonwealth, North America, and Far Eastern services; that there shall be a second Corporation for European and internal services and a third for the South American. All are to be financed from public funds and their boards will be appointed (and dismissed if necessary) by the Minister. They will be required to conform

to Government policy and the directions of the Minister in order to keep them in step on large issues. Until all this is put into legislative form, the B.O.A.C. is to inaugurate European and South American services. For internal services existing operators will be allowed to continue temporarily; and on present information chartered flying will be open to private operators as well as to the United Kingdom Corporation. "Chartered" has the same meaning in this connection as it has in connection with shipping or other forms of transport. Until the official White Paper giving more detailed information is issued, it is impossible to say how this service will be affected, but so far it looks as though the scheme does not amount to much more than a change of name coupled with even closer supervision than was intended originally.

Economic Theory still Evolving

The economic theory of air transport is still in process of evolution. As far as passengers are concerned conditions are likely to remain as they were during the period between the two wars. It was found that air transport does not possess sufficient advantages to make it fully competitive for short journeys. The telephone and non-stop trains diminished its advantages, and brought into action its disadvantages such as the journeys to the departure and from the arrival aerodromes. For overseas journeys, however, it had established itself beyond question. To be able to fly to the Continent, to Paris, Rotterdam, or Berlin for instance, had already been found to be an immense convenience. It was possible to leave London in the morning for one of these cities, do a day's work, and be back in London the same evening. As to cost, the difference between the two forms of transport was not so excessive as to act as a deterrent, and also it was slightly levelled out by the abolition of hotel expenses, which, of course, must be added to the rail and sea fares when comparing the cost of the two services.

Possibly the element of danger will continue to have its influence on the popularity of air travel. It is not yet forgotten that few of the pioneers escaped violent death, and an accident to an aeroplane which results in fatalities seems more appalling than any other. Wrecked express trains and ships have consequences even more appalling, but rightly or wrongly there seems to be less chance of either happening than of an aeroplane crashing. But the days of initial experiment are receding, the vehicle has been made more reliable, and travellers are becoming more accustomed to the idea. As far as statistics are concerned it seems never to

have been excessively dangerous. The Air Ministry publishes a table giving information as to accidents and their consequences. This shows that in the nineteen years from 1920 to 1938, inclusive, there were only thirty-three fatal accidents in which sixty members of crews and ninety-six passengers were killed. During this period the numbers of passengers carried and the mileage flown grew steadily until they ran into many millions as will be seen from the figures in the appendix. These results do not suggest that flying is so extremely dangerous as it is often thought to be, and this opinion is enforced by the extremely low insurance rates fixed by the companies which do this class of business.

Conditions Affecting Goods

There seems to have been a much greater change in the conditions affecting the transport of goods by air. When this service began it was thought that it would be useful for valuable commodities only. No one then thought that it would ever handle heavy goods of low monetary value such as heavy chemicals, constructional steel, large machine tools, engines, or awkward things like pianos. The war has changed all that, however, by increasing the carrying capacity of the aeroplane to which reference has been made. Carrying capacity settles the limits of this trade. That, apparently, was the reason the shipping companies running services to South America, for instance, refrained from venturing into it. The paying load of the plane was too limited to hold hope of financial success. That disadvantage seems to have been removed to some extent, but even with this improvement there must remain disparity between the ton-mile rate by air as compared with sea or land transport.

It is obvious from all this that we are at the beginning of a new era and that no one can set a limit to its possibilities. Its starting point will be an immense distance in front of that reached when war began. Engines will be better with greater power both actually and relatively to their own weight. The jet propelled plane may attain such efficiency as to displace the pattern at present in use. Larger planes will add to the comfort of flying, and safety devices, including more efficient radio communication, will give the public greater confidence than ever before. In a few years, fewer perhaps than seems possible now, civil aviation will have added a new and most important chapter to its history.

APPENDIX I

TABLE SHOWING THE DEVELOPMENT OF RAILWAY MILEAGE, CAPITAL, TRAFFIC EXPENSES AND RECEIPTS FOR THE UNITED KINGDOM

(The figures are taken from the Statistical Abstract)

Year	Length of Line open at end of each year	Total paid-up Capital	Number of Passengers carried. ¹ Including season-ticket holders. ² Excluding ditto	Total Traffic Receipts	Ditto. per Mile	Working Expenses	Net Receipts	Proportion of Working Expenses to Gross Profits
	Miles	£		£	£	£	£	Per cent
1848	5,127	200,173,059	57,965,070 ¹	9,933,552	1,937	10,299,709	11,207,890	54
1855	8,280	297,584,709	118,595,135 ¹	21,507,599	2,597	17,149,072	18,602,582	53
1865	13,289	455,478,143	251,959,862 ¹	35,751,655	2,691	33,220,728	28,016,272	56
1875	16,658	630,223,494	506,975,234 ¹	58,982,753	3,563	36,787,957	32,767,817	62
1885	19,169	815,858,055	697,213,031 ¹	66,644,967	3,505	47,876,637	38,046,065	62
1895	21,174	1,001,110,221	929,770,909 ²	81,396,047	3,844	70,064,663	43,466,356	63
1905	22,847	1,282,801,000	1,199,022,000 ²	105,131,709	4,601	76,569,676	47,355,889	
1910	23,387	1,318,515,000	1,306,728,000 ²	114,237,132	4,885	81,224,343	47,329,074	
¹ 1912	23,441	1,334,964,000	1,294,337,000 ²	118,307,216	5,047			

¹ These figures are continued only to 1912, because in 1913 a new system was introduced and the figures for subsequent years are not properly comparable with those in the above table.

APPENDIX II

TABLE SHOWING THE CAPITAL, LENGTH OF LINE, RECEIPTS, AND EXPENDITURE ON RAILWAY WORKING FOR
THE UNITED KINGDOM (IRELAND EXCLUDED) SINCE 1919

(Taken from the Statistical Abstract and the Ministry of Transport Return)

Year	Capital	Length of Line Open	Receipts from Railway Working	Expenditure on Railway Working	Proportion of Expenditure to Receipts	Net Profit on Railway Working
1919	£ 1,298,505,000	Miles 20,289	£ 178,171,988	£ 164,646,083	Per cent 92	£ 13,525,905
1920	1,299,265,000	20,292	238,930,239	231,968,870	96	6,961,369
1921	1,299,824,000	20,282	217,796,991	226,767,460	104	8,970,469 ¹
1922	1,281,256,000	20,298	219,330,693	174,844,342	80	44,486,351
1923	1,155,533,000	20,314	205,814,233	165,978,844	81	39,835,389
1924	1,161,399,000	20,329	203,416,985	166,882,592	82	36,534,393
1925	1,177,417,000	20,390	199,652,875	165,024,012	82	34,628,863
1926	1,175,473,000	20,415	171,852,239	153,980,141	87	17,822,098
1927	1,187,705,000	20,422	202,415,768	160,589,822	79	41,825,946
1928	1,187,790,000	20,408	194,005,049	153,500,818	79	40,504,231
1929	1,189,974,000	20,418	195,409,523	151,319,964	77	44,089,559

¹ Deficit on railway working.

APPENDIX III

**TABLE SHOWING CAPITAL, LENGTH OF LINE, RECEIPTS, AND EXPENDITURE ON RAILWAY WORKING FOR
THE UNITED KINGDOM (IRELAND EXCLUDED) SINCE 1928**

(Taken from the Statistical Abstract and the Ministry of Transport Return)

Year	Capital	Length of Line Open	Receipts from Railway Working	Expenditure on Railway Working	Proportion of Receipts to Expenditure	Net Profit on Railway Working
	£ 000 omitted	Miles	£ 000 omitted	£ 000 omitted	Per cent	£ 000 omitted
1928	1,110,260	20,271	186,878	149,137	79.8	37,741
1929	1,112,209	20,271	188,195	146,944	78.0	41,250
1930	1,119,718	20,265	177,706	143,276	80.6	34,429
1931	1,119,624	20,269	163,140	132,614	81.2	30,525
1932	1,124,379	20,248	149,648	125,227	83.6	24,420
1933	1,126,721	20,333	149,642	123,122	82.2	26,519
1934	1,126,640	20,216	155,578	126,783	81.4	28,795
1935	1,127,080	20,152	157,709	127,409	80.7	30,300
1936	1,127,066	20,121	163,983	130,570	79.6	33,413
1937	1,127,021	20,080	171,391	136,135	79.4	35,256
1938	1,126,946	20,007	164,726	137,666	83.5	27,059

NOTE:—These figures differ from those in Appendix II because of the omission of figures relating to the companies taken over by the London Transport Board in 1933 and have all been brought into line.

APPENDIX IV

BIRMINGHAM CANAL NAVIGATIONS

TABLE A

PART I. MAXIMUM TOLLS AND WHARFAGE CHARGES

SCALE I

APPLICABLE to all articles comprised in the classification, except cannel, tap mill forge, and coal cinders, coal, coke, culm, and slack.

In respect of Merchandise comprised in the under-mentioned Classes, except as above	MAXIMUM TOLLS				Maximum Wharfage Charges	
	For the first 3 miles or any part of such distance	For the next 10 miles or any part of such distance	For the next 10 miles or any part of such distance	For the remainder of the distance		
	Per ton per mile	Per ton per mile	Per ton per mile	Per ton per mile	Per ton	
A.	d.	d.	d.	d.	d.	A.
Division 1	0.50	0.50	0.25	0.25	1.50	Division 1
A	1.20	0.75	0.25	0.15		A
(Except Division 1) and B						(Except Division 1) and B
C	1.20	0.85	0.50	0.25	3	C
(Except Timber)	1.30	0.95	0.55	0.35	3	(Except Timber)
For Timber					3	For Timber
1					3	1
2					4	2
3	1.45	1.00	0.60	0.40	4	3
4					4	4
5					4	5

Division 1 of Class A comprises the following articles : Basic slag, unground gaslime or gas purifying refuse, gravel, limestone in bulk, manure (street, stable, farmyard) in bulk, night soil, slag or scoria (blast furnace) and stone and undressed material for the repair of roads, lime, gas water, refuse, and rubbish, to tips, and ashes.

Part I, Maximum Tolls and Wharfage Charges. Scale 2. Applicable to cannel, tap mill forge, and coal cinders, coal, coke, culm and slack not intended to be *bona fide* and exclusively used and consumed at a district work under the provisions of Section 20 of this schedule. On the part of the canal between Farmer's Bridge at Birmingham and Whittington Brook, including the Digbeth Branch—

Maximum Tolls
per ton per mile, 1d.

Maximum Wharfage Charges
per ton 1.50d.

On any other part of the canal—

Maximum Tolls
ton per mile, 1.40d.

Maximum Wharfage Charges
per ton, 1.50d.

Notwithstanding anything in this Schedule the toll in respect of cannel, tap mill forge, and coal cinders, coal, coke, culm and slack, to which Scale 2 is applicable, shall not exceed ninepence per ton for any distance except when conveyed by the way of the Birmingham Top Level to any part of the canal in Birmingham, or when conveyed to or from any other canal in Birmingham by the way of the Birmingham Top Level, in which case the toll shall not exceed ninepence halfpenny per ton for any distance, but the said toll of ninepence or ninepence halfpenny shall be in addition to the special charge authorized by this schedule for the Netherton Tunnel.

CANALS OF THE SHROPSHIRE UNION RAILWAYS AND
CANAL COMPANY

PART I. MAXIMUM RATES AND CHARGES

Applicable only to the canals of the Shropshire Union Railways and Canal Co.

In respect of Merchandise comprised in the under-mentioned Classes	MAXIMUM RATES FOR CONVEYANCE				Maximum Station Terminal at each end	MAXIMUM SERVICE TERMINALS				
	For the first 10 miles or any part of such distance	For the next 10 miles or any part of such distance	For the next 10 miles or any part of such distance	For the remainder of the distance		Loading	Un-loading	Cover-ing	Un-cover-ing	
	Per ton per mile d.	Per ton per mile d.	Per ton per mile d.	Per ton per mile d.		Per ton s. d.	Per ton s. d.	Per ton d.	Per ton d.	
A	0.90	0.80	0.70	0.60	Per ton s. d.	3	—	—	—	A
B	1.15	1.00	0.90	0.75	3	—	—	—	—	B
C	1.50	1.40	1.25	1.00	6	3	3	1	1	C
1	1.65	1.50	1.30	1.10	9	5	5	1.50	1.50	1
2	2.10	1.90	1.75	1.40	9	8	8	2	2	2
3	2.60	2.20	1.75	1.65	1 0	1 0	1 0	2	2	3
4	3.00	2.75	2.20	1.95	1 0	1 4	1 4	3	3	4
5	3.60	3.25	2.80	2.25	1 0	1 8	1 8	4	4	5

APPENDIX V

THE CLASSIFICATION OF MERCHANDISE

SOME EXAMPLES OF THE CLASSES IN WHICH VARIOUS KINDS OF GOODS ARE PLACED .

CLASS 1.—Cinders containing iron, to blast furnaces; cinders and ashes for road repairs or waste tips; chalk e.o.h.p. in bulk; gas water or liquor in owners' tank wagons, 8 tons per truck; limestone in bulk; ore iron and purple; pyrites; slag for road repairs or waste tips.

CLASS 2.—Basic slag unground; bricks; brine; cinders and ashes for concrete, etc., making; iron oxide waste; lime, carbonate of, and sulphate of, waste in bulk; manure in bulk; ore; chrome, iron, manganese and manganiferous iron; sand in bulk; shale, bituminous; stone, wholly undressed as quarried e.o.h.p.; tar.

CLASS 3.—Ammoniacal liquor in owner's tank wagons, 8 tons per truck; lime in bulk; magnesite in bulk or sacks; road-making material tarred, e.o.h.p.

CLASS 4.—Copperas, green in bulk; creosote; dust layers; salt in bulk or sacks; rock.

CLASS 5.—Asphalt; bricks, unglazed; cinders and scrapings from brass furnace fireholes; gas water or liquor in casks or iron drums; ore, lead and spelter; pig iron; scrap iron and steel; slates, roofing; stone blocks sawn or roughly wrought.

CLASS 6.—Ammoniacal liquor in casks or iron drums; bars, iron or steel (not crucible steel); clay china; lead scrap ashes and skimmings; lime in sacks; moulds, iron and steel; shell blanks (ordnance); spelter scrap, ashes and skimmings; tin scrap, skimmings; zinc oxide, crude.

CLASS 7.—Anchors, iron or steel; axles, iron or steel; bones or bone waste not ground or prepared; cables, chain, iron, or steel; electric tramway poles and fittings; hoop iron or steel; leather cuttings and shavings for manure manufacture; manure packed e.o.h.p.; oils, not flashing below 150 deg. Fah.; ore, copper; pipes, iron or steel for gas or water mains; pit props, iron or steel; rails, iron or steel; tubes and fittings, iron or steel; tyres, iron or steel in the rough.

CLASS 8.—Bolts and nuts, iron or steel; brass scrap, metalliferous dirt containing not more than $\frac{1}{8}$ copper; castings, iron and steel, not machined; chemicals as listed; copper scrap, metalliferous dirt not exceeding $\frac{1}{8}$ copper; electric cable junction boxes; grain, whole, as listed; horse shoes; lead, pig; nails and spikes, iron and steel; oil cake; plates, armour; spelter cast not machined in ingot plate or bar; starch; terra-cotta ware; wire, iron or steel; wood pulp.

CLASS 9.—Antimony, crude; bark for tanning, etc.; bones, calcined; hoops, iron or steel; head plates, waste from accumulators; lime, acetate of, etc.; marble in blocks rough; ore, antimony; sacks, old; sails, old; slates, asbestic; stamping and pressings, iron or steel undamageable not less than $\frac{3}{8}$ thick; telegraph poles and stores as specified; wagons, railway e.o.h.p. loaded in other wagons.

CLASS 10.—Boards, thin in bundles for picture backs; clog blocks, rough; crane: work, jibs and girders; firewood, prepared; flower pots, unglazed; hay and straw, $2\frac{1}{2}$ tons per truck; laths, wood in bundles; mill-stones, rough; oils as listed not flashing below 150 deg. Fah.; ore, nickel and tin; paraffin wax and scale in owner's tank wagon in 8 ton lots; plough parts; sinks, fireclay or stoneware; tubes, sanitary; tyres, solid rubber; wood paling.

CLASS 11.—Ale and porter in casks or cases; candles and tapers; copper, matte and regulus; fruit pulp; lead oxide, etc.; oils, hardened of various kinds in casks or drums; ordnance (heavy guns); paper, printed; spelter wrought in plate, rod, strip, or bar; springs, cart, iron or steel; sugar.

CLASS 12.—Bottles and bottle stoppers; glass common; brass, cast in bar, ingot, or plate; copper scrap metalliferous dirt not more than half copper; fuel economizers; insulators, electric; machines and machinery; paper, corrugated; skins, hides or pelts for leather making; underframes and bogies, tramcar.

CLASS 13.—Antimony, metallic in bars, etc.; battery parts; borax; brake drums for motor-cars; brass, wrought in bar, plate, rod, and strip; bronze, cast not machined in bar ingot or plate; cages, pic; copper, cast not machined in bar, ingot, or plate; cotton, raw; ice; jacks, lifting; ladders, iron or steel; mantelpieces, slate; sheets, steel coated with brass or copper; timber, rough sawn; tin concentrates; varnish, black not flashing below 150 deg. Fah.

CLASS 14.—Bacon and hams; bolts and nuts, brass; bronze scrap; butter in casks or cases; machines and machinery, certain kinds as specified; rivets, brass and spelter; tape lead; washers, brass, lead, and spelter.

CLASS 15.—Boilers, engine, furnace and kitchen; bronze, cast not machined, hollow blooms, and wrought in bar, plate, rod or strip; coffee; copper, cast hollow blooms or wrought in bar, plate, rod or strip; dyes and colours; glue; grease; hay and straw; lead chromate; leather, undressed in bundles; paints and colours in casks, iron drums, or in tins in cases; tar stills; tobacco leaf; tubes (constructional iron work exceeding 3 ft. 6 in. in diameter); yarn, twist, or weft (coir, cotton, hemp, jute, linen, ramia or tow).

CLASS 16.—Accumulators, dry; acids (as specified); aeroplane parts; aluminium and alloys, cast; asbestos board; axle boxes, brass; battery parts; bedsteads (metallic in cases or crates); blocks, glass for pavements; boot and shoe protectors and studs; buckets; bunks, ship, iron or steel; cable, electric; cans, milk; carriage or wagon bodies, railway; cartridge cases, exploded; chains cycle, packed; cotton, felted or pulp; cotton banding for driving spindles; dust bins, galvanized; electric trucks; electrodes; emery; essences; fruit; fenders; files and rasps; flocks; forks, digging; frames, window, iron or steel; gas plant, suction; gates, iron, steel, or wood; hoe heads, holloware, cast iron, or steel; ink; insulators; ivory, vegetable; leather, heavy mechanical; engines, steam, hydraulic, or internal combustion; machines and machinery as specified; metals, white antifriction; nails; netting, iron or steel wire; nickel and alloys, cast not machined in bar, ingot, or lump; paper (as listed); pewter in bars or ingots; preserves, fish, fruit, meat, provisions, jam or marmalade; safes, iron or steel; screens, or tips, colliery; tin, cast not-machined in bar or ingot; tin foil; tubes of bronze, copper, or zinc; twine; tyres, solid rubber on rims; varnish, black,

not flashing below 150 deg. Fah.; vices, iron or steel; wheels, for motor vehicles; wire, bronze and copper; wool, raw.

CLASS 17.—Aluminium and alloys, wrought; belts, driving; forgings, brass or bronze; nickel and alloys, wrought; sheets zinc, nickelled; tin, wrought; wines in casks; wire, cotton covered; yarn, silk veil.

CLASS 18.—Basins and stands, lavatory, earthenware; baths packed; beds and bedding; bicycle frames, accessories, tyres, and wheels; boots and shoes; brooms and brushes; buttons, other than metal; clock dials; coin, copper or bronze; curtains, cotton net; drapery, mixed; evaporating plant; fire extinguishers; floor cloth and oil cloth; frames, garden; desks, school; glass, plate, polished; golf balls; guns, machine; hardware in brass, bronze, and copper; hawsers; looking glasses; machines and machinery; organs, part of; pumps, air; harness and harness furniture; safety fuzes; sparking plugs; tubes, aluminium or alloys; vulcanite and ebonite; wheelbarrows; wire, aluminium and alloys.

CLASS 19.—Bedsteads, wooden; boilers, copper or brass; casts, plaster for ceiling ornamentation; cigarettes; dentists' sundries; firearms; frames, door, and doors made of mahogany or other expensive timber; lace, not silk; lithographic stones; marble, carved, in cases; stone, decorative carved; tobacco, manufactured; wire, insulated.

CLASS 20.—Aeroplanes, packed; animals, stuffed in cases; barometers; bicycles and tricycles, unpacked; cigars; cinematograph instruments; embroidery, silk; furniture, antiques or as detailed; glass, cut, plate, and silvered; gramophones and records; lace, silk; machines, addressing, calculating, cash registering, etc.; mantles, incandescent; musical instruments; optical instruments; poultry and pigeons, alive in crates; quick-silver; statuary, bronze; tables, bagatelle and billiards; telescopes; watch movements; watches, common metal; yarn, silk or containing silk.

CLASS 21.—Gold leaf, gold liquid, gold and gold articles; gold precipitate; Platinum and platinum articles, silver and silver articles; silver precipitate; statuary e.o.h.p.

NOTE.—Throughout the classification the letters e.o.h.p. mean "except otherwise herein provided."

APPENDIX VI

THE MINISTRY OF TRANSPORT'S ORIGINAL OUTLINE OF RAILWAY POLICY

THE following is a copy of the White Paper in which the Ministry of Transport foreshadowed the 1921 Act, and outlined its policy for the future regulation by the State—

RAILWAYS

GROUPING

It is proposed that the railways of Great Britain should be formed into a limited number of groups, say, five or six for England and Wales, and one for Scotland. The Irish railways naturally fall to be dealt with under the new legislation in regard to Ireland. The groups will be determined on the basis of operating economy, and all direct competition between the groups will, as far as possible, be eliminated. The groups which it is proposed to form are roughly—

1. *Southern*, combining the South Eastern and Chatham, the Brighton and the South Western.
2. *Western*, the present Great Western system with the Welsh lines.
3. *North Western*, combining the North Western, the Midland, and the Lancashire and Yorkshire, North Staffordshire, and Furness.
4. *Eastern*, combining the Great Northern, the Great Central, and the Great Eastern.
5. *North Eastern*, the present North Eastern system and the Hull and Barnsley.
6. *London Group* (local lines);
and a
Scottish Group for the whole of Scotland.

In each case the new group would absorb the smaller and independent broad gauge lines within its area, but railways which may be classified as "light," whether existing or future, will be wholly excluded from this grouping arrangement, and proposals with regard to these light railways are indicated later.

It is hoped that the amalgamation of companies in the respective groups will be carried out voluntarily; but as the scheme depends on the amalgamations, powers will be sought in a future Transport Bill to compel amalgamations on terms, failing agreement, to be settled by some tribunal in any cases where they are not voluntarily completed in a reasonable time to be specified.

It is recognized that a more logical grouping of the existing systems might result if regard were had exclusively either to geographical or to operating considerations; but the amalgamation of complete undertakings as the initial step will avoid many of the difficulties which would arise if undertakings had to be divided. It would be open to the new group companies to exchange between themselves lines which project from the territory of one group into that of another, and at a later stage it may become necessary to require them to do so.

MANAGEMENT

Each of the grouped railways will require a Board of Management, and in order to secure efficiency and uniformity, and avoid undue cost, the number of members comprising the Board should be limited to probably 21. The composition of the Board is considered to be of the greatest importance, and whilst in the past the directors of railway companies have all been appointed by the shareholders, the Government are of opinion that the time has arrived when the workers—both officials and manual workers—should have some voice in management.

The Board of Management should, in the opinion of the Government, be composed of representatives—

- (a) of the shareholders, who should form a majority of the Board, and of whom a proportion should hold large trading interests; and
- (b) of employees, of whom one-third might be leading administrative officials of the group, to be co-opted by the rest of the Board, and two-thirds members elected from and by the workers on the railway.

FINANCE

The Act of Parliament should lay it down that rates and fares shall be fixed at such a level as, with efficient and economical management, will in the opinion of a prescribed authority enable railway companies to earn a net revenue substantially equivalent, on some pre-war basis to be settled in the Act, to the combined net revenue of all the companies absorbed in the group. With due care and economy it should be possible for group companies to improve on their pre-war return; but, in that event, the Government is of opinion that such surplus revenues should not accrue entirely to the companies. The State would be very materially extending the "charter" of the companies and is entitled to participate in such surplus revenues, and settlement of a suitable sliding scale to regulate their division presents no insuperable difficulty.

DEVELOPMENT FUND

It is not contemplated that the Government's share of the surplus revenues should be thrown into the general revenue of the country. Much development work has to be done which is beyond the financial resources of the localities, and the intention is that the Government's share of these surplus profits should be funded for development purposes, to assist backward districts, to develop light railways, and for other appropriate purposes in connection with transportation, as may be approved by Parliament in the Act.

RATE-FIXING MACHINERY

The financial stability of the groups on the one hand, and reductions of rates on the other, can, in the opinion of the Government, only be assured if there is adopted a procedure for fixing rates which, whilst being flexible, will command the confidence of railways and traders. The Statutory Rates Advisory Committee is now engaged upon a systematic review of railway rates and charges, the principles upon which they are to be fixed, the machinery by which they shall be governed, and the Committee's reference will later will be extended to cover fares.

The machinery for dealing with the railway rates and charges of the country is generally admitted to rest upon an unsatisfactory basis; but it is hoped to place the whole system of rates and charges upon a sound footing after the Rates Advisory Committee has reported.

The first object of the revision will be to secure financial equilibrium to the railways of Great Britain as a whole, and it is anticipated that, having regard to the size and diversity of traffic conditions in each group, the revision in aiming at this result will also secure an approximate equilibrium within each of the proposed groups. If, however, revenue were not obtained at least equal to the basic revenue agreed upon, the procedure contemplated is that the Rates Advisory Committee—or whatever body may be appointed to exercise its functions—should be asked to consider modifications in the scheme and to make recommendations to the Minister as to-day.

It is not possible at this stage to indicate in detail what machinery should be set up for dealing with appeals from traders on railway rates. The Rates Advisory Committee is conducting an exhaustive inquiry, and the Government must await their report before it can embody any proposals in a Bill.

The Government does not propose to give to the companies any financial guarantee. It proposes to set up a flexible rates machinery, which will enable appropriate charges to be levied, and to leave the railway companies to rely upon this machinery for the maintenance of the financial position of the groups at the level agreed.

The earnings of the companies must, of course, be subject to the normal fluctuations of traffic, and to the express stipulation that the undertakings are being managed with due care and economy. This stipulation is considered essential to the protection of the public; but on the other hand it is proposed to grant to the companies a right of appeal to a judicial tribunal if the Minister of Transport refused, upon their application, to put the machinery for revising rates in motion.

WAGES AND WORKING CONDITIONS

It is proposed to provide by the Bill for a permanent machinery to deal with questions of railway wages and working conditions, on the lines of the two Boards which have been established temporarily by agreement, namely, the Central Wages Board, consisting of equal numbers of managers and men with an appeal to the National Wages Board, consisting of four managers, four men, and four users of the railway, with an impartial chairman.

FUTURE POWERS OF THE STATE IN RELATION TO RAILWAYS

It will be proposed to confer certain powers upon the State in relation to railways. These powers may be conveniently grouped under the following headings—

- (a) For the protection of the public.
- (b) For the economical working of the railway systems of the country.
- (c) To safeguard the national interests.

(a) *For the Protection of the Public.*

(1) The State would have the right to require adequate services and adequate facilities, including minor extensions in the geographical area which it is proposed to allot to each group company. A group company should, however, have a right of appeal to a tribunal to be prescribed if it

contends that the requirement involves a capital expenditure which would seriously interfere with its finances.

(2) Subject to the same right of appeal, the State should have power to require alterations, improvements, and additions necessary for public safety.

(b) *For the Economical Working of the Railway Systems of the Country.*

(1) In order to obtain the best standards of permanent way, rolling stock, plant, and equipment which are necessary to secure the financial returns to the groups and yet keep railway rates as low as possible, the State must (subject to a similar right of appeal by the companies) have the power to impose such standards.

(2) The State ought to have the right to require co-operative working, including granting of running powers, common user of rolling stock and facilities on equitable terms, the pooling of traffic and receipts where competition is causing waste, and the common user of workshop and manufacturing plant.

(3) In order that the public may know, and the Government be in a position to judge of the working of the railways, the Ministry should have full power to prescribe the form of accounts, to regulate the manner in which they are compiled, and to require the compilation of such statistics and returns as are, in the opinion of the Minister, necessary, with a right of inspection.

(c) *To Safeguard the National Interests.*

The railways should be required to submit for approval their proposals involving capital expenditure and also their plans for raising capital required.

It is necessary in view of the fact that the State is to provide machinery for adjusting rates intended to produce a certain net result, that the State should approve, and, if necessary, have power to require, adequate reserves for depreciation and renewals to be made before dividends are issued. This again should be subject to a right of appeal to the prescribed tribunal.

LIGHT RAILWAYS

It is proposed to exclude light railways from the grouping arrangements. Light railways must rely largely for their prosperity and development upon the goodwill and assistance of the main-line companies in whose districts they lie. It is essential that the main-line companies should have no grounds for fearing competition from any ambitious light railway company, or combination of light railway companies. It should, therefore, be provided that where a group railway can prove to the satisfaction of the Ministry of Transport that the light railway is changing in character and is, in fact, becoming an ordinary railway, or is competing for main-line traffic, the group company may absorb the light railway on fair terms, and make it a part of its own system.

In so far as traffic for which transport facilities are required justifies the provision of standard gauge lines operating more or less under the same conditions as lines owned by main-line companies, the Minister should have power to insist that the group companies should provide the lines which are necessary. Different considerations apply to light railways, i.e. lines of much lighter construction with less onerous conditions of operation attached to them, constructed wherever possible along the verge of roads and subject to less stringent regulations than in the case with regard to normal railways.

The construction and management of light railways of this description should be in the hands of separate undertakings.

If this means of transport is to be developed for the benefit of agriculture and other industries, the State must encourage private enterprise or local authority enterprise by some financial assistance in the construction and development of light railways throughout the country. The policy of grouping light railway systems so far as possible as a means of securing economy in management, maintenance, repairs, etc., is considered wise, and experience has already shown that this can be done successfully.

It should be the policy of the Ministry to stimulate the development of light railways constructed, equipped, and worked on the cheapest possible lines. It may be found that the present procedure under the Light Railway Acts, by which powers to construct light railways are sought and granted, may require to be modified.

DOCKS

The Government have no present intention of altering the status of the dock undertakings of the country, but some of the temporary powers conferred upon the Minister of Transport by the Ministry of Transport Act, 1919, in connection with non-railway owned docks, should, in their opinion, be retained and extended to railway-owned docks.

CANALS

The future of canals involves questions of great difficulty and complexity. The best advice available is being sought, and the whole subject is about to be investigated by a Committee which has been set up under the chairmanship of Mr. Neville Chamberlain, M.P., and pending the receipt of the report of this Committee, the Government feel that they are not in a position to formulate a policy.

A.D. 1921

APPENDIX VII

RAILWAYS ACT, 1921

SCHEDULES

Sections 1
and 66

FIRST SCHEDULE

1 Groups	2 Constituent Companies	3 Subsidiary Companies
1. The South- ern Group.	1. The London and South Western Railway Company; the London Brighton and South Coast Railway Company; the South Eastern Railway Company; the London, Chatham and Dover Railway Company; the South Eastern and Chatham Railway Companies Managing Committee.	1. The Bridgwater Railway Company; the Brighton and Dyke Railway Company; the Freshwater Yarmouth and Newport (Isle of Wight) Railway Company; the Hayling Railways Company; the Isle of Wight Railway Company; the Isle of Wight Central Railway Company; the Lee-on-the-Solent Railway Company; the London and Greenwich Railway Company; the Mid Kent Railway (Bromley to St. Mary Cray) Company; the North Cornwall Railway Company; the Plymouth and Dartmoor Railway Company; the Plymouth, Devonport, and South Western Junction Railway Company; the Sidmouth Railway Company; the Victoria Station and Pimlico Railway Company.
2. The West- ern Group.	2. The Great Western Railway Company; the Barry Railway Company; the Cambrian Railway Company; the Cardiff Railway Company; the Rhymney Railway Company; the Taff Vale Railway Company; and the Alexandra (Newport and South Wales) Docks and Railway Company.	2. The Brecon and Merthyr Tydfil Junction Railway Company; the Barry Port and Gwendreath Valley Railway Company; the Cleobury Mortimer and Ditton Priors Light Railway Company; the Didcot Newbury and Southampton Railway Company; the Exeter Railway Company; the Forest of Dean Central Railway Company; the Gwendreath Valleys Railway Company; the Lampeter, Aberayron and New Quay Light Railway Company; the Liskeard and Looe Railway Company; the Llanelly and Mynydd Mawr Railway Company; the Mawddy Railway Company; the Midland and South Western Junction Railway Company; the Neath and Brecon Railway Company; the Penarth

A.D. 1921

1 Groups	2 Constituent Companies	3 Subsidiary Companies
2. The Western Group — <i>contd.</i>		Extension Railway Company; the Penarth Harbour, Dock and Railway Company; the Port Talbot Railway and Docks Company; the Princetown Railway Company; the Rhondda and Swansea Bay Railway Company; the Ross and Monmouth Railway Company; the South Wales Mineral Railway Company; the Teign Valley Railway Company; the Vale of Glamorgan Railway Company; the Van Railway Company; the Welshpool and Llanfair Light Railway Company; the West Somerset Railway Company; the Wrexham and Ellesmere Railway Company.
3. The North Western, Midland, and West Scottish Group.	3. The London and North Western Railway Company; the Midland Railway Company; the Lancashire and Yorkshire Railway Company; the North Staffordshire Railway Company; the Furness Railway Company; the Caledonian Railway Company; the Glasgow and South Western Railway Company; the Highland Railway Company.	3. The Arbroath and Forfar Railway Company; the Brechin and Edzell District Railway Company; the Callander and Oban Railway Company; the Cathcart District Railway Company; the Charnwood Forest Railway Company; the Cleator and Workington Junction Railway Company; the Cocker-mouth Keswick and Penrith Railway Company; the Dearne Valley Railway Company; the Dornoch Light Railway Company; the Dundee and Newtyle Railway Company; the Harborne Railway Company; the Killin Railway Company; the Lanarkshire and Ayrshire Railway Company; the Knott End Railway Company; the Leek and Manifold Valley Light Railway Company; the Maryport and Carlisle Railway Company; the Mold and Denbigh Junction Railway Company; the North and South Western Junction Railway Company; the North London Railway Company; the Portpatrick and Wigtownshire Joint Committee; the Shropshire Union Railways and Canal Company; the Solway Junction Railway Company; the Stratford-upon-Avon and Midland Junction Railway Company; the Tottenham and Forest Gate Railway Company; the Wick and Lybster Light Railway Company; the Wirral Railway Company; the Yorkshire Dales Railway (Skipton to Grassington) Company.

A.D. 1921

1 Groups	2 Constituent Companies	3 Subsidiary Companies
4. The North Eastern, Eastern, and East Scottish Group.	4. The North Eastern Railway Company; the Great Central Railway Company; the Great Eastern Railway Company; the Great Northern Railway Company; the Hull and Barnsley Railway Company; the North British Railway Company; the Great North of Scotland Railway Company.	4. The Brackenhill Light Railway Company; the Colne Valley and Halstead Railway Company; the East and West Yorkshire Union Railways Company; the East Lincolnshire Railway Company; the Edinburgh and Bathgate Railway Company; the Forcett Railway Company; the Forth and Clyde Junction Railway Company; the Gifford and Garvald Railway Company; the Great North of England, Clarence and Hartlepool Junction Railway Company; the Horncastle Railway Company; the Humber Commercial Railway and Dock Company; the Kilsyth and Bonnybridge Railway Company; the Lauder Light Railway Company; the London and Blackwall Railway Company; the Mansfield Railway Company; the Mid-Suffolk Light Railway Company; the Newburgh and North Fife Railway Company; the North Lindsey Light Railways Company; the Nottingham and Grantham Railway and Canal Company; the Nottingham Joint Station Committee; the Nottingham Suburban Railway Company; the Seaforth and Sefton Junction Railway Company; the Sheffield District Railway Company; the South Yorkshire Junction Railway Company; the Stamford and Essendine Railway Company; the West Riding Railway Committee.

APPENDIX VIII

TERMS FOR EXCHANGE OF STOCKS IN ONE OF THE NEW GROUPS

To the Proprietors and Debenture Stockholders.

DEAR SIR (OR MADAM),

NORTH WESTERN, MIDLAND, AND WEST SCOTTISH GROUP

I AM instructed by my Directors to inform you that since the issue of their circular letter of the 17th March last, announcing that a Provisional Agreement had been entered into with the Directors of the Midland Railway Company, under which, subject to the approval of the Proprietors and Debenture Stockholders, the two Companies were to be amalgamated into a new Company as from the 1st January, 1923, further Provisional Agreements have been come to between the Boards of the London and North Western, Midland, Furness, Glasgow, and South Western, and Highland Railway Companies, under which these five Companies will, with the consent of the Proprietors and Debenture Stockholders of each Company and the approval of the Amalgamation Tribunal, be amalgamated into a new Company, as from the 1st January, 1923, the name of which will be subsequently decided upon.

These arrangements, if approved, will obviate the necessity of submitting to the Amalgamation Tribunal a separate scheme for the amalgamation of the London and North Western and Midland Companies as intimated in the third paragraph of the circular letter of the 17th March, the intention being to formulate one scheme embodying the London and North Western, Midland, Furness, Glasgow and South Western, and Highland Companies in a preliminary scheme of amalgamation under Section 8 of the Railways Act, 1921, which, *inter alia*, provides that before any scheme is submitted to the Amalgamation Tribunal it shall receive the approval of the Proprietors and Debenture Stockholders of each Railway Company concerned.

The terms on which the several Stocks of the five Companies will be exchanged for Stocks in the new Company are as follow—

<i>London and North Western Railway Stocks</i>					<i>Relative Stocks of the Amalgamated Company to be issued in exchange</i>	
For each—		£	s.	d.		
£100 3% Debenture		75	0	0	4% Debenture.	
£100 Consolidated 4% Guaranteed		100	0	0	4% Guaranteed.	
£100 Consolidated 4% Preference		100	0	0	4% Preference.	
£100 4% Preference (1902)		100	0	0	4% Preference.	
£100 4½% Redeemable Preference (Redeemable able 30/6/1925)		100	0	0 4½%	Redeemable Preference (Redeemable 30/6/1925).	
£100 5% Redeemable Preference (1916) (Re- deemable 30/6/1926)		100	0	0	5% Redeemable Preference (Redeemable 30/6/1926).	
£100 Consolidated		100	0	0	Ordinary.	

*Midland Railway Stocks**Relative Stocks of the
Amalgamated Company to
be issued in exchange*

For each—		£	s.	d.	
£100	2½% Debenture	62	10	0	4% Debenture.
£100	2½% Consolidated Perpetual Guaranteed Preferential.	62	10	0	4% Guaranteed.
£100	2½% Consolidated Perpetual Preference	62	10	0	4% Preference.
£100	Preferred Converted Ordinary	62	10	0	4% Preference (1923).
£100	Deferred Converted Ordinary	68	0	0	Ordinary.

*Furness Railway Stocks**Relative Stocks of the
Amalgamated Company to
be issued in exchange*

For each—		£	s.	d.	
£100	3% Debenture	75	0	0	4% Debenture
£100	4% Consolidated Guaranteed	100	0	0	4% Guaranteed.
£100	4% Consolidated Preference	100	0	0	4% Preference.
£100	4% Preference "A"	100	0	0	4% Preference (1923)
£100	4% Preference "B"	100	0	0	4% Preference (1923).
£100	4% Preference (1894)	100	0	0	4% Preference (1923).
£100	4% Preference (1899)	100	0	0	4% Preference (1923).
£100	Consolidated Ordinary	30	0	0	Ordinary.

*Glasgow and South Western Railway Stocks.**Relative Stocks of the
Amalgamated Company to
be issued in exchange.*

For each—		£	s.	d.	
£100	4% Debenture	100	0	0	4% Debenture.
£100	St. Enoch Station 4% Rent Charge	100	0	0	4% Debenture.
£100	4% Guaranteed	100	0	0	4% Guaranteed.
£100	4% Preference	100	0	0	4% Preference.
£100	4% Preference No. 2	100	0	0	4% Preference.
£100	4% Preference (1888)	100	0	0	4% Preference.
£100	4% Preference (1891)	100	0	0	4% Preference.
£100	4% Preference (1894)	100	0	0	4% Preference.
£100	3% Preference	75	0	0	4% Preference.
£100	2½% Preferred Ordinary	62	10	0	4% Preference (1923).
£100	Deferred Ordinary	34	0	0	Ordinary.
£100	Deferred Stock, entitled to participate in the excess beyond 5% of Ordinary Dividend.	3	0	0	Ordinary.

*Highland Railway Stocks**Relative Stock of the
Amalgamated Company to
be issued in exchange*

For each—		£	s.	d.	
£100	4% Debenture	100	0	0	4% Debenture.
£100	4½% Debenture	106	5	0	4% Debenture.
£100	3½% Second Debenture	87	10	0	4% Debenture.
£100	6% Dunkeld Lien	150	0	0	4% Guaranteed.
£100	5% Nairn Preference	125	0	0	4% Preference.
£100	6% Nairn Preference	150	0	0	4% Preference.
£100	4½% "A" Preference	112	10	0	4% Preference.
£100	5% "B" Preference	125	0	0	4% Preference.
£100	4% Preference	100	0	0	4% Preference.
£100	3½% Preference (1897)	87	10	0	4% Preference (1923).
£100	3½% Preference (1898)	87	10	0	4% Preference (1923).
£100	Ordinary	32	6	8	Ordinary.

A meeting of the Proprietors and Debenture Stockholders will be summoned at a later date, when the proposed scheme will be submitted for their approval.

Yours faithfully,

R. C. IRWIN,

Secretary.

APPENDIX IX

TRAFFIC ORIGINATING ON CANALS IN GREAT BRITAIN¹

	1921	1922	1923	1924	1925	1926	1927	1928	1929
Railway owned—									
Coal, Coke, Patent Fuel, and Peat	901,425	1,042,042	1,119,586	1,135,815	956,568	593,955	752,129	638,418	648,765
Building Materials (other than Wood)	155,459	178,711	210,032	215,034	187,665	182,074	180,002	174,496	174,074
Manures	67,559	43,648	56,261	54,073	49,615	55,262	51,146	69,310	73,482
Wood	19,376	51,521	57,254	63,440	68,054	58,360	81,455	62,903	60,259
Machinery	1,870	1,502	2,083	2,219	1,928	1,253	3,013	3,516	3,638
Raw Materials	72,580	87,680	83,354	104,813	186,855	198,982	198,689	177,902	168,839
Industrial Products	129,597	224,718	208,628	253,017	215,588	195,593	240,734	251,966	218,511
Agricultural Produce and Foodstuffs	253,085	167,645	180,035	214,442	190,054	201,660	241,669	240,381	225,661
Liquids in Bulk	52,784	62,027	92,021	93,678	115,838	161,802	184,579	175,418	155,028
Unclassified	54,812	26,336	49,660	47,402	58,510	63,775	54,383	68,842	47,406
Total	1,708,547	1,885,830	2,058,944	2,183,933	2,030,675	1,712,716	1,987,799	1,863,152	1,772,633
Other than Railway owned—									
Coal, Coke, Patent Fuel, and Peat	4,718,950	6,266,159	7,087,880	7,192,540	6,599,190	4,652,972	6,314,271	6,105,640	6,102,579
Building Materials (other than Wood)	808,207	906,571	1,057,832	1,040,841	1,171,190	1,180,972	1,084,451	1,013,923	1,037,085
Manures	1,004,531	965,761	1,025,033	1,048,922	986,419	933,242	877,889	869,723	832,642
Wood	139,122	220,521	209,777	228,278	264,606	223,629	255,478	260,744	254,207
Machinery	40,959	41,775	37,508	31,419	40,944	30,051	28,685	37,477	40,209
Raw Materials	881,404	1,165,966	1,336,994	1,411,978	1,337,843	1,176,454	1,395,860	1,312,802	1,276,910
Industrial Products	762,403	1,066,837	1,112,015	1,235,517	1,192,937	1,127,483	1,257,564	1,231,977	1,313,628
Agricultural Produce and Foodstuffs	1,004,021	1,174,487	1,159,532	1,237,807	1,129,621	1,145,733	1,213,617	1,120,018	1,026,879
Liquids in Bulk	493,021	513,782	521,889	565,955	583,155	570,922	547,122	570,245	566,297
Unclassified	323,330	386,688	256,469	278,789	234,361	208,066	210,135	188,136	139,081
Total	10,175,948	12,708,547	13,804,929	14,272,046	13,540,266	11,249,524	13,185,072	12,710,685	12,589,517

¹ Excluding Manchester Ship Canal.

TRAFFIC ORIGINATING ON CANALS IN GREAT BRITAIN¹—(contd.)

	1930	1931	1932	1933	1934	1935	1936	1937	1938
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Railway owned—									
Coal Coke, Patent Fuel and Peat	651,062	536,406	506,647	462,717	415,099	452,763	515,527	492,286	453,120
Building Materials (other than Wood	180,798	176,740	128,169	127,302	146,274	170,125	172,962	160,329	120,689
Manures	63,518	67,212	64,706	55,917	59,273	49,941	57,806	54,701	49,772
Wood	48,271	58,824	60,471	64,059	59,645	59,772	70,080	63,969	55,519
Machinery	494	1,291	532	248	178	181	322	424	1,326
Raw Materials	139,556	163,869	69,024	54,421	60,867	64,184	32,073	32,062	23,517
Industrial Products	196,722	138,406	131,877	109,937	100,347	96,027	81,321	78,208	66,683
Agricultural Produce and Foodstuffs	229,676	255,608	239,004	210,910	214,640	218,397	225,947	205,585	170,857
Liquids in Bulk	155,354	119,701	107,451	104,527	119,274	159,149	186,278	167,836	168,883
Unclassified	28,454	21,104	16,214	60,612	11,831	12,400	3,677	2,643	1,710
Total	1,693,905	1,539,161	1,324,095	1,250,650	1,187,428	1,278,939	1,345,993	1,258,043	1,112,076
Other than Railway owned—									
Coal, Coke, Patent Fuel, and Peat	5,618,319	5,082,257	4,921,922	4,928,782	5,196,688	5,233,308	5,344,948	5,491,583	4,823,580
Building Materials (other than Wood)	1,017,095	1,242,035	871,281	881,026	861,613	843,244	850,844	894,153	912,634
Manures	775,156	705,571	580,350	576,476	543,194	552,375	547,471	531,237	367,695
Wood	234,111	210,181	190,826	235,281	284,317	275,587	318,314	317,175	267,817
Machinery	27,428	24,963	27,308	29,395	32,409	29,860	21,906	26,659	25,391
Raw Materials	1,019,255	840,375	796,235	833,308	936,695	963,232	996,539	992,247	736,692
Industrial Products	1,142,243	1,040,075	977,305	994,387	1,117,604	1,136,644	1,123,988	1,102,315	978,676
Agricultural Produce and Foodstuffs	1,028,801	1,091,520	1,066,624	1,059,490	1,086,863	1,040,962	1,105,316	1,094,074	1,071,675
Liquids in Bulk	555,972	544,957	553,792	591,450	607,887	662,080	717,338	806,234	863,499
Unclassified	123,499	84,520	73,184	54,259	60,001	54,312	57,902	60,253	35,355
Total excluding Lee and Stort Navigations	11,541,879	10,866,454	10,058,827	10,183,854	10,727,271	10,791,604	11,083,666	11,315,930	10,083,014
Total including Lee and Stort Navigations	0	0	0	0	0	12,513,785	12,890,043	13,100,277	11,839,670

¹ Excluding Manchester Ship Canal.

APPENDIX X

BRITISH CIVIL AVIATION—REGULAR AIR TRANSPORT (Internal, Continental and England—India, Singapore and England —Africa Routes)

Years	Aircraft Mileage Flown	Number of Passen- gers Carried	Weight of Cargo Carried Tons
1920	644,000	5,800	137
1921	225,000	5,260	19
1922	717,000	10,390	215
1923	943,000	15,550	328
1924	936,000	13,600	543

(Internal, Continental, and on the Empire and Bermuda, New York Routes)

Years	Aircraft Mileage Flown	Number of Passengers Carried	Passenger Mileage	Tons of Cargo Carried	Cargo-ton- Mileage
1925	806,000	11,030	2,645,000	550	148,000
1926	778,000	16,620	3,746,000	679	159,000
1927	789,000	19,000	4,296,000	615	153,000
1928	916,000	27,300	6,477,000	813	215,500
1929	1,189,000	28,500	7,147,000	927	345,500
1930	1,222,000	24,000	6,003,000	832	376,200
1931	1,354,000	23,800	7,009,000	769	415,400
1932	1,793,000	48,200	16,007,000	772	529,900
1933	2,638,000	79,100	21,601,000	913	733,000
1934	4,557,000	135,100	29,162,000	1422	1,119,900
1935	8,412,000	200,000	42,360,000	2612	2,080,100
1936	9,584,000	236,300	41,144,000	3124	2,552,200
1937	10,773,000	244,400	49,729,000	3961	4,678,100
1938	14,331,000	222,200	56,368,000	5980	11,085,900

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