



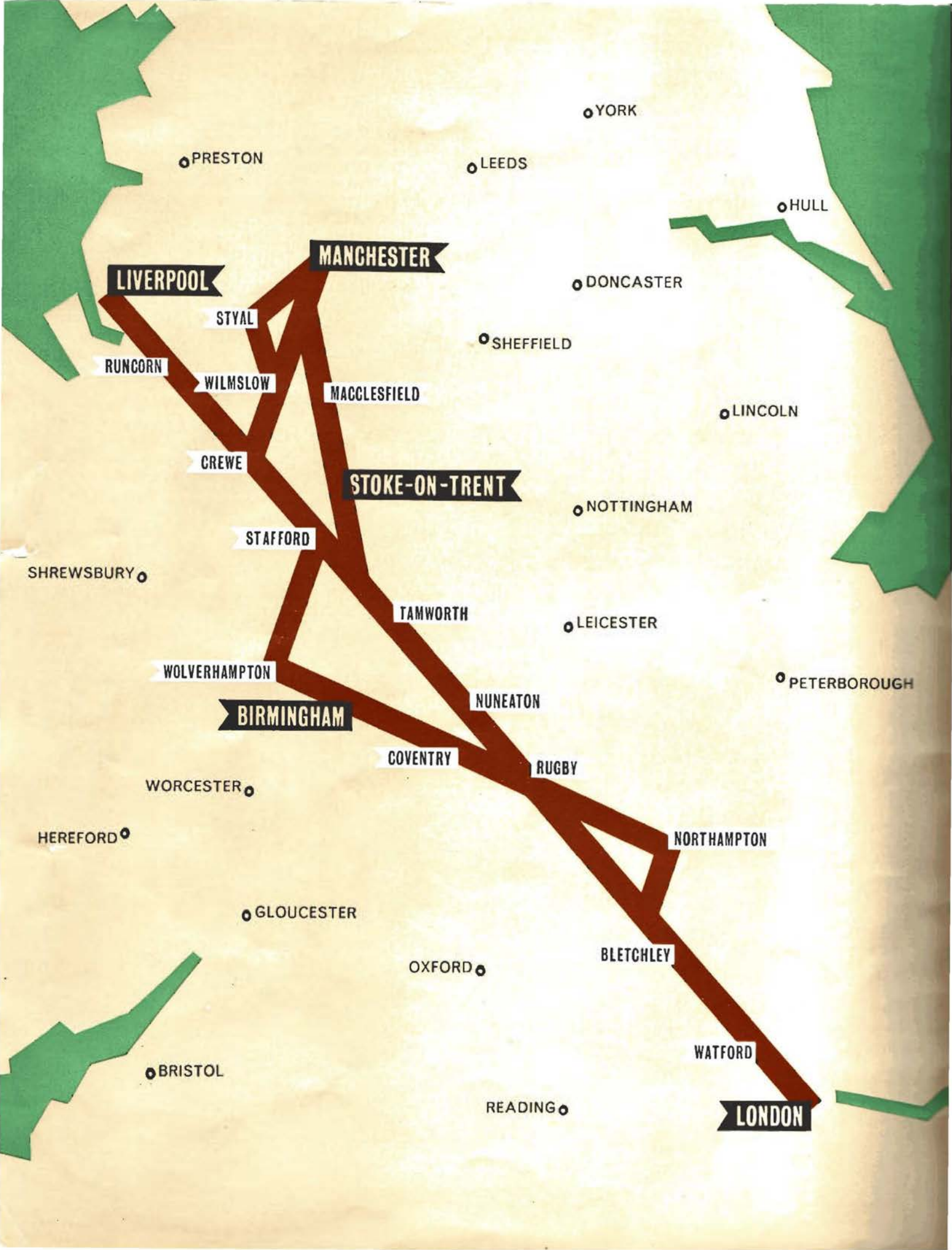
Your New Railway

LONDON MIDLAND ELECTRIFICATION

April 1966

Two shillings and sixpence





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Your New Railway



Foreword

by S. E. Raymond, Chairman, British Railways Board

From the train just south of Rugby you can see, side by side within a few yards of the track, the whole story of inland transport since the industrial revolution. Alongside the railway flow the narrow waters of the Grand Union Canal – just beyond stretch the concrete lanes of the M1 – and overhead sweep the glistening new conductor wires of railway electrification.

Ever since Birmingham began to exploit local coal and iron, ever since Liverpool began to replace Bristol as the principal westward-facing port, the trade route south-east to London has carried the densest traffic and attracted the biggest investment in transport. Today it serves an area without equal in this country in resources of population and industry. Here are England's four biggest cities – Liverpool, Manchester, Birmingham and London – and the conurbations of South Lancashire, the Midlands and the South-East. At either end of this area the country's two

biggest ports, on the Thames and the Mersey, handle well over half our foreign trade, and the route which connects them is the main artery of the nation. Continued through a Channel Tunnel it could form part of the main artery of Europe, for along a line drawn from Manchester to Milan there is a greater concentration of industry than anywhere else. This is the background of our investment in 25 kV electrification – a change that will enable this vital railway line speedily and reliably to meet all the demands that British and European industry may make of it. The task of effecting the change to electrification has not been easy. While still running trains, the Region has had to lay new track, introduce a new signalling system and build many new stations, as well as carry out the more obvious work of construction and installation. From start to finish this transformation has taken less than a decade. The result is: Britain's New Railway.

What makes the trains go faster?

British enterprise plus the skills of railway electrification engineers plus planning and installation 'know-how'.

When British Railways embarked on their ambitious scheme to electrify the world's busiest main line, from London to Liverpool and Manchester, the decision of the London Midland Region to entrust the overhead electrification work to the BICC Group meant that the engineering success of the project was assured.

For this scheme the BICC Group has been responsible for the planning, design, manufacture and installation — completed ahead of schedule — of nearly 1500 track miles of overhead equipment and hundreds of miles of telecommunication cables.

To enable existing timetables to be maintained much of the work was done at night and during weekends. Not only has electrification cut the 200 mile journey from Euston to Liverpool to about 2½ hours with speeds of up to 100 m.p.h., but it has given long-distance travellers a new experience in fast, smooth, reliable and efficient rail services. The BICC Group has over fifty years' experience of railway overhead electrification. It has successfully carried out the construction of more than 6000 track miles of overhead equipment in Britain and in countries as far apart as Australia, Brazil, India, Poland and South Africa.



BICC GROUP

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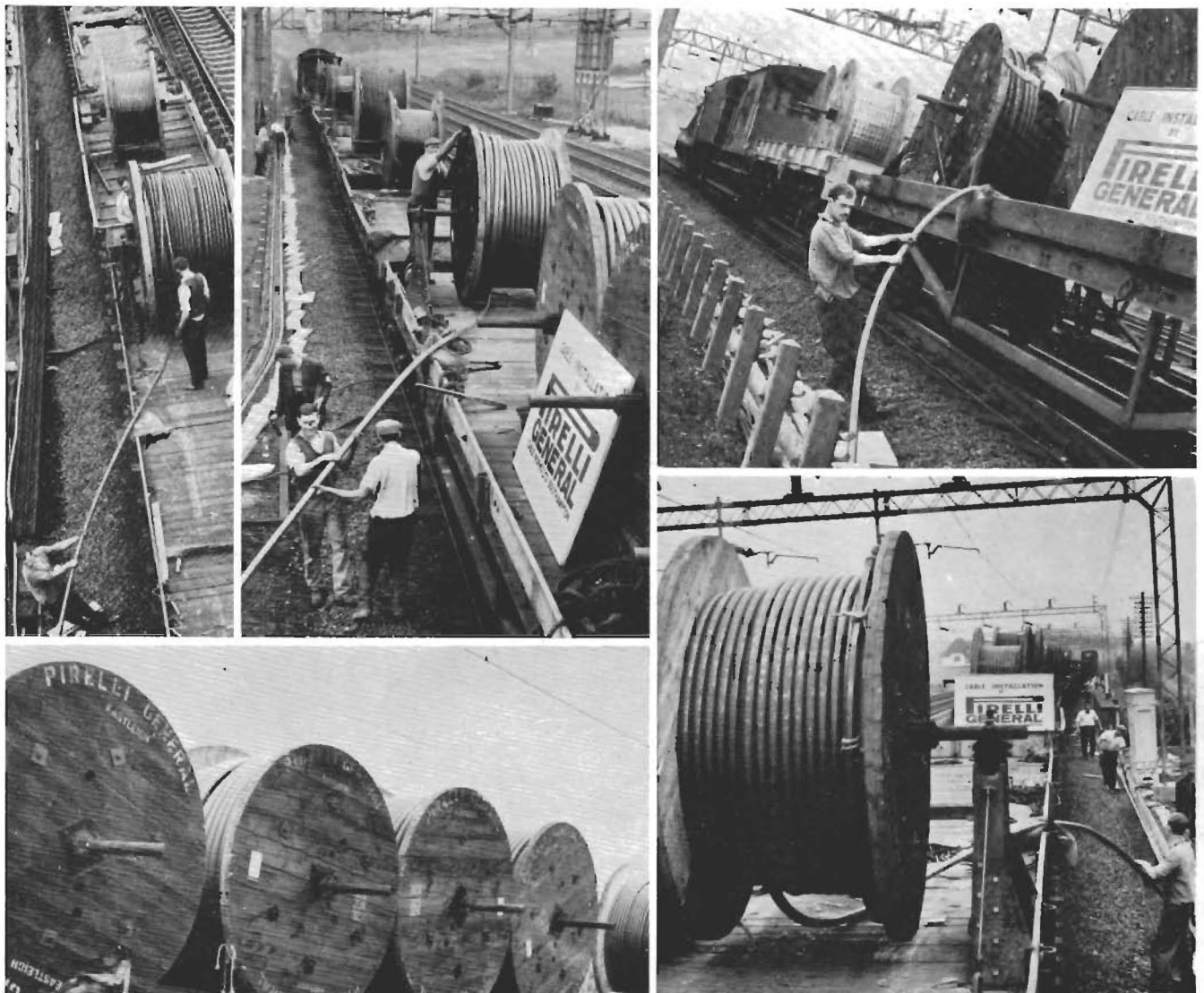


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Contents

FOREWORD	1	S. E. Raymond, Chairman, British Railways Board
INTRODUCTION	7	H. C. Johnson, CBE, General Manager, London Midland Region
BRITAIN'S NEW RAILWAY	7	Colin Jones
FASTER THAN THOUGHT	10	
FIVE CITIES AND THE FUTURE:	15	
LIVERPOOL	16	Robert McKinnon
MANCHESTER	18	Bryan Morgan
STOKE-ON-TRENT	20	Owen Webster
BIRMINGHAM	22	Harry Miller
LONDON	24	Josselyn Hennessy
YOUR ELECTRIC FUTURE:		
PASSENGER	26	Paul Ferris
FREIGHT	31	Charles F. Klapper
POINTS OF DEPARTURE	33	

LONDON MIDLAND ELECTRIFICATION
April 1966

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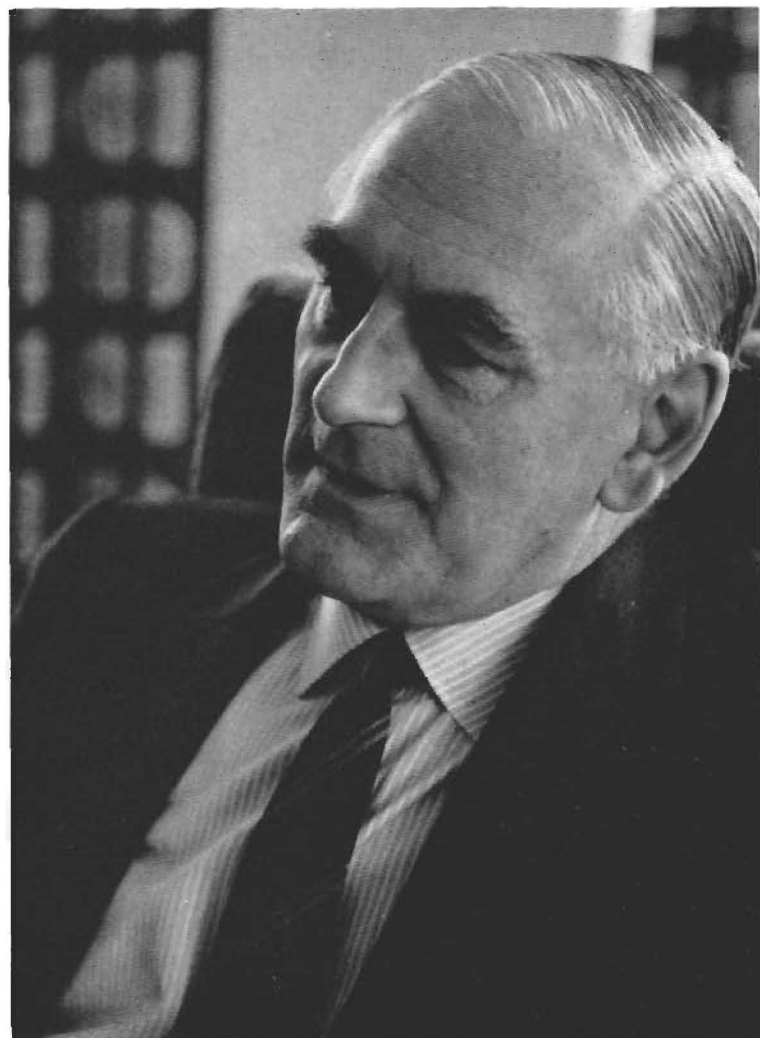
**Introductory Message from
Mr H. C. Johnson
General Manager, London Midland Region**

A fast, modern highway for passengers and freight, running through the industrial heart of the country, is the result of eight years' hard work by railway civil, electrical and signal engineers.

The completion of the electrification of the main line between London and Manchester and Liverpool and, later, to Birmingham, brings these great cities closer together and facilitates the interchange of both passenger and freight traffic in a way which has only been equalled by the railways' replacement of the stage coach well over a century ago.

The new services which we on the London Midland Region will be able to operate will give very fast journey times between the cities, and I am confident that this new era in passenger travel and freight transits will attract the support from traders and the public which it deserves.

The London Midland Region is determined to tailor its services to the needs of its customers, and to regain the traffic which the railways can handle best. With the completion of electrification we are out to get the business.



Britain's New Railway by Colin Jones

When the decision was taken to electrify the 412 route miles of main line between Manchester, Liverpool and London, by way of Crewe, Stoke, Birmingham and Tamworth, this 2½ per cent slice of the then national network fetched in a tenth of the entire system's passenger and freight earnings and a sixth of its parcels traffic.

The justification for this £175 million electrification scheme was as simple as that. Steam was going out and diesel was coming in. If any one route in the country had a sufficient density of traffic to make modern, high-speed railway electrification economic, the London-Birmingham-South Lancashire route was it. In practice, of course, it was more scientific than that. Calculation showed that electrification would pay, and pay well, especially after one had taken into account the fact that many millions of pounds would have had to be spent anyway on rolling stock replacement, renewal of associated depots, track improvement, and modern signalling to make the route fit for today's needs, whether the motive power was steam, diesel or electric.

Of course, there was never any question of replacing steam traction with steam traction on this or any other line. The steam engine was expensive to run, its availability was poor, it needed a lot of servicing, and it used a lot of manpower. The only choice was between diesel and electric traction. Both offer a form of locomotion that is modern, fast and clean. Both are expected to achieve a high standard of reliability, have good acceleration, a uniform standard of performance, and since they require much less servicing and maintenance, they both offer the chance of very high utilization rates. As well as providing a better service to customers, they give the railways much lower train-mile costs.

Between diesel and electric traction there was not a very great deal to choose financially. Electrification required overhead conductor wires and clearance that had to be provided under the route's six-hundred-and-forty-nine bridges and in twenty-seven tunnels. A dozen feeder stations had to be provided for the electric power supply, fifty-eight track section cabins, and a hundred-and-nine relay rooms. The opportunity

was also taken at the same time to remodel, reconstruct, or refurbish eighty-nine stations, including the main terminus at Euston. All this, too, was bound to disrupt train operations over the line during the years the work was in hand. On the other hand, complete diesel working on this route would run up a bigger bill for rolling stock and would not yield such large overall benefits. On balance, it was reckoned that although electrification would cost more to install, its extra profitability, from cost savings and a slightly higher revenue, would amply justify the additional outlay.

Subsequent events – changes in costs, railway charges, and traffic patterns – have not altered this prospect of economic viability. Indeed in several important respects they have considerably enhanced them. Electrification becomes more advantageous, and cheaper in terms of overall unit costs, the denser the traffic. Moreover, once the basic engineering work on track, structures, power supply, and signalling has been done, traffic capacity of the line can be raised for a proportionately lower additional capital outlay than with diesel traction. Thus the outline plan for the development of railway trunk routes*, can envisage concentrating all traffic between London and Glasgow, London and South Lancashire, and between London and Birmingham on the West Coast route. It should not be forgotten too that the first five Freightliner services, selected to cater for the heaviest flows of merchandise freight traffic, run on this route, between London, Liverpool, Manchester, and Glasgow. These services will be attracting back to rail a good deal of traffic lost to the roads over the years or never carried by rail before, and south of Liverpool, Crewe, and Manchester these trains will now be hauled by fast electric locomotives.

There are other, less quantifiable, ways in which the economics of electrification have been enhanced by the passage of time. It requires a greater capital outlay than dieselization to set going but incurs a smaller wage bill to run. The capital will soon have all been spent, but the wage bill has to be paid year after year. It is therefore a better hedge against inflation than a diesel system, especially as the railways intend to become a more highly-paid, highly-specialized industry operated by a smaller staff. It is also better to have one's eggs in more than one basket: the London Midland electrification scheme preserves a wider element of competition among the railways' suppliers, both in equipment and in fuel. And one should not ignore the advantages to manufacturers of main-line electric rolling stock of a home market on which they can base their exporting efforts in a period when so many railway systems in Europe and elsewhere are electrifying.

Choosing between electrification and dieselization was only the first task. A choice had also to be made of the type of electrification. At the time – the mid-1950's – there were two principal railway electrification systems in operation in Britain. Both were direct current systems; one at various low

voltages with power collection by third rail and the other at 1,500 volts with power collection by overhead conductor wire. The capital cost of the third rail system is lower but its running costs are higher, particularly on routes carrying heavy freight traffic. An electrified third rail makes track maintenance and working in the yards more tricky for the railway staff, moreover, and it is less reliable during severe winter weather.

But experimental work by French Railways had revealed the considerable advantages to be gained by adopting a new system altogether – the 25-kilovolt alternating-current 50-cycles system with overhead collection. A special investigation of this system by the railways' electrical engineers, with the London Midland scheme specifically in mind, showed that the capital costs of the 25 kV, ac system would be about 5 per cent lower than for the 1,500 V, dc system, and that running costs would be about 8 per cent lower. Fewer substations would be needed alongside the track to feed the power supply in and the overhead equipment of a 25 kV system would be much lighter, and therefore much cheaper. Moreover, there appeared to be much greater room for technological development of an ac system, and trends in electrification overseas pointed to a considerable export potential for ac traction equipment and locomotives. Great strides have been made, for instance, in miniaturization of signalling equipment thanks to the electronics industry, and in reducing the cumbersome size of parts of the overhead equipment by drawing upon new materials.

Once the choice of system had been made and the decision to go ahead was given, the real headaches then began. Never before in Britain has a new railway been built on top of an existing one carrying so much traffic at a time when that traffic still had to be moved. The planning and organizational problems were huge. Just consider what all this involved. Nearly 1,500 miles of track had to be provided with electric power, clearance had to be provided for the overhead equipment at, as already mentioned, nearly 700 bridges and tunnels, which meant inviting all the local authorities who had the intention of some day widening the bridges involved to consider dovetailing this work, and the associated road schemes, in with the railways' construction programme. In the design of overhead equipment provision had also to be made for future road schemes – such as new motorways – and for future overhead property development.

Deliveries of all the supplies and equipment needed for this colossal task had to be programmed to arrive in the right quantities, at the right time, to the right place, over a period of seven years along 412 miles of route. Thus room had to be found in a timetable that was already suffering from a substantial reduction in capacity due to the construction work for a very large number of works trains bringing men, equipment and supplies without exacerbating the diversion of traffic to other lines and inconvenience to the public. A good deal of the disruption to existing services could be confined to the

* *The Development of the Major Railway Trunk Routes*, British Railways Board, 1958.



weekends, when commercial traffic is much lower, but service diversions and timetables changes had to be worked out well in advance.

All this made the London Midland electrification scheme pretty well unique as a construction project. There have been bigger civil engineering jobs over an even longer number of years but none as large as this has had to be undertaken without ceasing production. It was rather like keeping an old dam going while building a new one on precisely the same spot. Or putting up a new car factory around the existing assembly line. The special nature of railway working meant other pecu-

liar features, too. For instance, the detailed planning of work and the organization of the labour force had to allow for the safety of the hundreds of men that might be working on the track at any one time – a necessity that also meant drawing a large number of experienced look-out men from a skilled labour force.

A sound administration organization had to be developed to provide for simultaneous consideration of traffic and constructional problems, for detailed forward planning to take place at the same time as day-to-day control of current projects, for departmental needs to be brought together, and to provide efficient and prompt communications between headquarters and the field.

It had to be sufficiently flexible to allow for labour difficulties and delays in material supplies. Good use was made of the latest planning aids – such as network techniques. Major advances in mechanization helped considerably, too; for the boring of foundations for the overhead line equipment, for instance. Special concrete trains and special troughing trains were developed, to give speedier installation of overhead equipment and shorter track occupation times. Techniques were evolved to deal with bridge raising – jacking up bridge superstructures, casting concrete arches over the old arches which were then blown from underneath and dragged on to old railway wagons, and the extensive use of pre- and post-stressed concrete units.

The whole scheme, originally scheduled for completion in the early 1970's will now be in full operation by early 1967. Commercial services between Crewe and Manchester began as far back as five years ago and between Crewe and Liverpool nearly four years ago. A year later, in January 1963, these were extended southwards to Stafford and farther south to Rugby in November, 1964. By mid-July 1965, three-quarters of the track over the whole route had been energized. In September freight working was extended as far south as Willesden. Full services from Euston in new timings are planned to begin in April 1966. Twelve months later will see the completion of the Birmingham section, between Stafford and Rugby by way of Coventry and Wolverhampton, and of the Stoke section, giving a more direct route to Manchester by way of Macclesfield.

April of this year sees an entirely new pattern of high-speed, regular interval, passenger services from Euston. The impact upon freight working will be even greater, for electric working forms part of a wider revolution now taking place on this side of the railways' business. Traffic is being concentrated in full train loads, rather than wagon loads, and moved at high uniform speeds along the nation's main trade arteries.

In this way, the railways can exploit their inherent advantages over road transport and, by providing fast, reliable, bulk transport they can best serve the needs of the nation. It is in this context of a modernized, efficient, and eventually profitable railway system, that the London Midland electrification scheme comes fully into its own.



Faster than Thought

Behind the lines that carry the new electric trains are the lines that carry the messages. For the high speeds and frequencies of electric traction, only the lightning impulses of electronics and electricity have the automatic accuracy and speed to match the train movement itself. For control, colour-light signalling wherever introduced has reduced the number of signalboxes, eased staff shortages, and cut down operating costs. In communication, telegraphy, television and tele-printing are giving office work the same speed and certainty of contact throughout the busiest rail network in Europe.

From the individual signalbox to the traffic centre humming with action, electricity and electronics are increasing efficiency, lightening physical and mental labour, throughout the newly-electrified network. To communications and control they bring speed, power and precision.

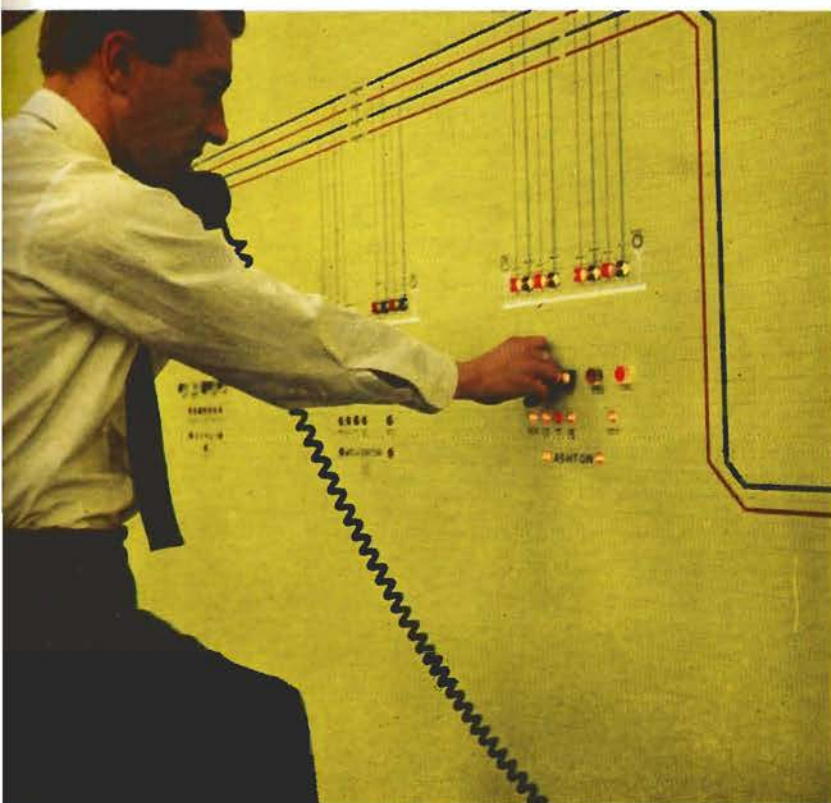
The signalling and telecommunication equipment installed as part of the electrification programme is closely linked with the faster, more frequent train services themselves and has made possible a much higher productivity in transport. Colour-light signalling, for example, controlled from a smaller number of large signalboxes, has superseded the old manually-worked semaphore signalling controlled from a large number of small ones. These old mechanical boxes were unevenly spaced because their siting originally depended on the position of stations, junctions and level crossings, and this had an irregular effect on line capacity. The new signals,

regularly spaced, give even and adequate headway to all classes of trains. With their high beam-intensity and their greater proximity to the eye-level of the driver, they also guarantee much better sighting, particularly in bad weather.

Linked with these well-sited, powerful colour light signals, goes the automatic warning system of train control which indicates, by electronic impulse to the driver in his cab, the clear/caution indication of all signals along the route. The help given to the driver by this modern equipment means he can concentrate more on his main job – getting good running from his locomotive or multiple unit.

Fewer Boxes : More Control

Along most of the electrified routes the new signalling is controlled from large, architect-designed signalboxes. Some of the areas so controlled place a larger single-track mileage under one regulator than ever before on British Railways. These large areas speed and simplify overall regulation of traffic so much that decisions to move trains from track to track can be taken at much shorter notice and with maximum efficiency. Track diagrams covering large areas in each of these modern power signalboxes indicate the routes set, the exact positions of trains, and their descriptions throughout the whole area. Routes are set up on miniature track diagrams simply by operating a plunger at the entrance to the signal section and another one at the exit. In a matter of seconds the



Willesden Power Control Room

whole route can be set up and the signals cleared.

High-speed, time division multiplex equipment for remote control, linking parent signalboxes with remote interlockings has made possible this extension of control areas at very little extra cost. Continuously scanning electronic equipment, using plug-in printed circuit cards, allows up to 750 code messages a second to pass through the one pair of telecommunications cable conductors. The same kind of equipment, using frequency division instead of time division, has been widely used for signalling control and indication circuits. Up to 50 frequencies can pass over one pair of signalling conductors.

All forms of remote control equipment, by reducing the number of signalling cables, have lowered the total cost of installations. 'Geographical' techniques in signalling control and interlocking circuits in signalboxes and relay rooms have helped to standardize the complicated requirements of this busy and varied system. Standard relay units, used with standard inter-connecting cables, are saving time, money and labour. Miniaturized plug-in relays have cut costs in almost all signalling circuits. Made to BRB specifications these relays guarantee maximum interchangeability between differing installations and the various relay racks supplied by manufacturers.

To give signalmen and regulators easily-identifiable information about the types and descriptions of trains in their signalbox control areas, digital indicators have been pro-



vided. These 'in-line' indicators display the standard alphanumerical train description code in the actual train berth position on the illuminated diagrams and panels used.

A system of static switch interlocking is being tested, in series with the conventional route setting interlocking equipment, in one of the newly installed signalbox areas. It employs small tape wound nickel alloy cores as the basic switching elements to replace relay contacts. This equipment, if successful and applied generally, will replace the conventional signalling relay with moving parts and contacts.

Telecommunications

The improvement in contact and control, its much greater speed, frequency, and accuracy, has gone far beyond those in direct charge of trains. It extends to every element of railway work. The administrative office as well as the traffic operation.

Maximum use of transistor techniques has made possible very high-speed operation of communication equipment in the minimum space. In telecommunications, transistorized, multi-circuit carrier telephone systems and multi-channel telegraph systems, have greatly increased the number of telephone and telegraph circuit services. A fully-automatic electronic teleprinter switching centre, located at Crewe, links 75 substations throughout the Region by automatic routing of messages. It uses 300,000 semi-conductors.

The future : more speed, more precision

The improvement of all forms of contact, of communication and of control is a continuous process. It will continue to raise the productivity of rail transport by making it possible to speed, regulate and to increase the movement of electric trains.

The scale and complexity of this revolution in communications – is yet another reflection of the significance of Britain's new railway – the safest, and the fastest large-scale provider of transport for goods and people in the country.

GLOSSARY

TRACK CIRCUIT

Presence of trains is indicated to the control-panel operator when a small electric current passed through the running rails is short-circuited by the wheels and axles. This action may also be used to control signals directly.

RELAY

An electro-mechanical device consisting of contacts operated by an electro-magnet. The circuit which energizes the magnet can be operated from a remote position.

INTERLOCKING

Mechanical or electrical process which prevents a signalman from simultaneously clearing signals permitting conflicting movements. In mechanically-operated boxes signal levers themselves are interlocked and cannot be moved until the corresponding point-levers have been pulled.

RELAY INTERLOCKING

The interlocking of points and signals is effected electrically by means of relays. The actuating circuit is connected via the contacts of other relays which must be open or closed according to the particular conditions before it can respond.

ROUTE SETTING

At the instant of operating the route-setting switch on the control panel a complete sequence of events is set in motion. All track points are set for a train movement providing it is safe to do so, followed by the clearance of the necessary signals. A visual check of the route actually set is given by white lights appearing on the diagram panel.

Advanced electric and electronic techniques have provided better communications, better signalling (and consequently a more reliable train service) and a high standard of safety. They have also reduced the number of staff required.





Five Cities and the Future
 Liverpool by Robert McKinnon
 Manchester by Bryan Morgan
 Stoke-on-Trent by Owen Webster
 Birmingham by Harry Miller
 London by Josselyn Hennessy



Five Cities and the Future

The new railway runs through five divisions of the London Midland Region, based on London, Birmingham, Stoke-on-Trent, Manchester and Liverpool. Five writers look at these five cities, and the divisions based on them, to find out what electrification will mean to the local population and industries.



Liverpool

In April when British Rail introduces its electric services between London and Liverpool, the country's first port will be just over 2½ hours by rail from the second.

This, in an age when man has got pictures back from the surface of the Moon, may seem quite unremarkable. But the possibilities offered by the new railway are immense. On the one hand, freight services will be more competitive than ever with road transport. On the other, passenger services will be as quick, city centre to city centre, as those provided by the airlines – and more comfortable and reliable.

At the Liverpool end of the new system, these advantages have not gone unnoticed. Helped by an intensive public relations campaign, the Liverpool Division has attracted a great deal of interest in the new services, both among the public at large and among businessmen in particular. And among the local railwaymen the interest in many cases can accurately be said to border on excitement. There is a general feeling, at all levels, that this means a new lease of life to rail transport.

It is a feeling helped by the nature of the market itself, for if ever a place offered great opportunities for swift and efficient transport it is Merseyside, and in particular Liverpool and Birkenhead. Here is the gate through which pass more than a third of Britain's total exports and a substantial part of her imports, traffic which in 1964 amounted to more than 26 million tons. Here too is a thriving and expanding centre of manufacturing and processing industries – food, chemicals, cars, engineering, oil refining and a host of others – a British economy in microcosm.

All these activities, moreover, are growing and will continue to grow. The docks, for instance, are handling 85 per cent more tonnage than 15 years ago. Vauxhall have come to Ellesmere Port on the south side of the Mersey and Ford to

Halewood. A vast new extension to the north side of the docks is planned. New industries are envisaged and established, factories expanded. Here is a seller's market for transport in all its forms.

From its earliest beginnings, Liverpool's name has been synonymous with trade and commercial activities. Granted a charter by King John in the year 1207 for the purpose of creating a supply base against Ireland, the townspeople were quick to see the advantages of other forms of trade, and there steadily developed a thriving traffic in Irish linen bought with the proceeds from local salt and coal.

Thereafter, in the words of one writer, 'nothing much happened for 450 years'. Then, in the middle of the seventeenth century, there began the thriving sugar trade with the West Indies, followed by trade in Virginian tobacco. Other products followed, including corn, oil seeds, iron ore and, in the nineteenth century, cotton and rubber. These laid the foundation of Liverpool's many processing industries whose products are known today all over the world.

But Liverpool was beginning to boom long before this. The tonnage handled at its docks grew from 77,000 in 1780 to 331,000 in 1800. Goods came in, and goods began to flow out – textiles from East Lancashire, salt from Cheshire, coal from South Lancashire and the products of local craftsmen, glass-blowers, metal workers and potters. Inevitably, ship building became another local industry, and the men of Mersey built good ships, whether for privateering, slaving or more ethical activities.

It was the railway network which gave Merseyside its second great boost. The historic Liverpool and Manchester Railway was completed in 1830 and other lines were added in the years that followed, all of which had the effect of

raising the total export trade of the area to no less than 45 per cent of the United Kingdom total at that time. The effect on the town's numbers was to raise them from just over 70,000 in 1800 to 685,000 at the beginning of this century. Today, the population of Liverpool and its immediate environs is put at one and a half million. However, taking into account that Merseyside is also the main port for Lancashire, the West Riding and much of the Midlands, it claims – and it is a reasonable claim – to serve some eighteen million people.

'God has given us this ease' was the motto adopted by Liverpool in the halcyon days of the Industrial Revolution (halcyon, that is, for the merchants and the entrepreneurs). There was little evidence of the hand of Providence when the depression came after the Great War. Liverpool, with most of her economic eggs in one basket, was hit as badly as Glasgow, Jarrow or South Wales. She took the point of her suffering. After the last war, Merseyside set about diversifying its economy by setting up trading estates. First came the estate at Speke where 350 acres were set aside for industry. A second estate followed at Aintree and a third, and largest, at Kirkby. These have prospered, and to the traditional skills of the area new ones have been added.

Today, then, three main economic activities contribute to the buoyant economy of Liverpool and its contiguous areas. There is shipping with all its attendant activities, ship-building, insurance, dock maintenance and transport. Second are the traditional processing industries, glassware, pottery, paper products, foodstuffs, textiles, milling and compounding, rubber and many others, including of course chemicals and oil. Names like Nestlé, Dunlop, John Summers, ICI and Shell underline the way in which the group of industries has grown in importance.

Third are the industries that have grown up as a result of diversification plans. Today, the list of products – cables, cardboard boxes, cars, clothing, electronic equipment, elevators, matches, telephone components, textile machinery, refrigerators, biscuits, paint, pharmaceuticals and so on and on – reads like another Birmingham.

Linking all this activity in an area that has been described as 'an island surrounded by equal parts of Lancashire, Cheshire and the sea' is an intensive network of railway, roads and waterways, leading to the docks of Liverpool and Birkenhead. On the Liverpool side of the Mersey the seven miles of dock yield thirty miles of quayage, and there are a further ten miles of quayage at Birkenhead. The dock lines of the railway link up with British Rail's system at various points. Altogether, more than two million tons of general cargo are moved to and from the docks by rail every year.

This, all too briefly, sketches the importance of Liverpool to the British economy, but it indicates the chances for British Rail in this port whose harsh vitality contrasts with the friendliness of its citizens. It is an opportunity of which Mr H. A. Mugliston, British Rail's divisional manager at Liverpool, is probably more aware than anyone.

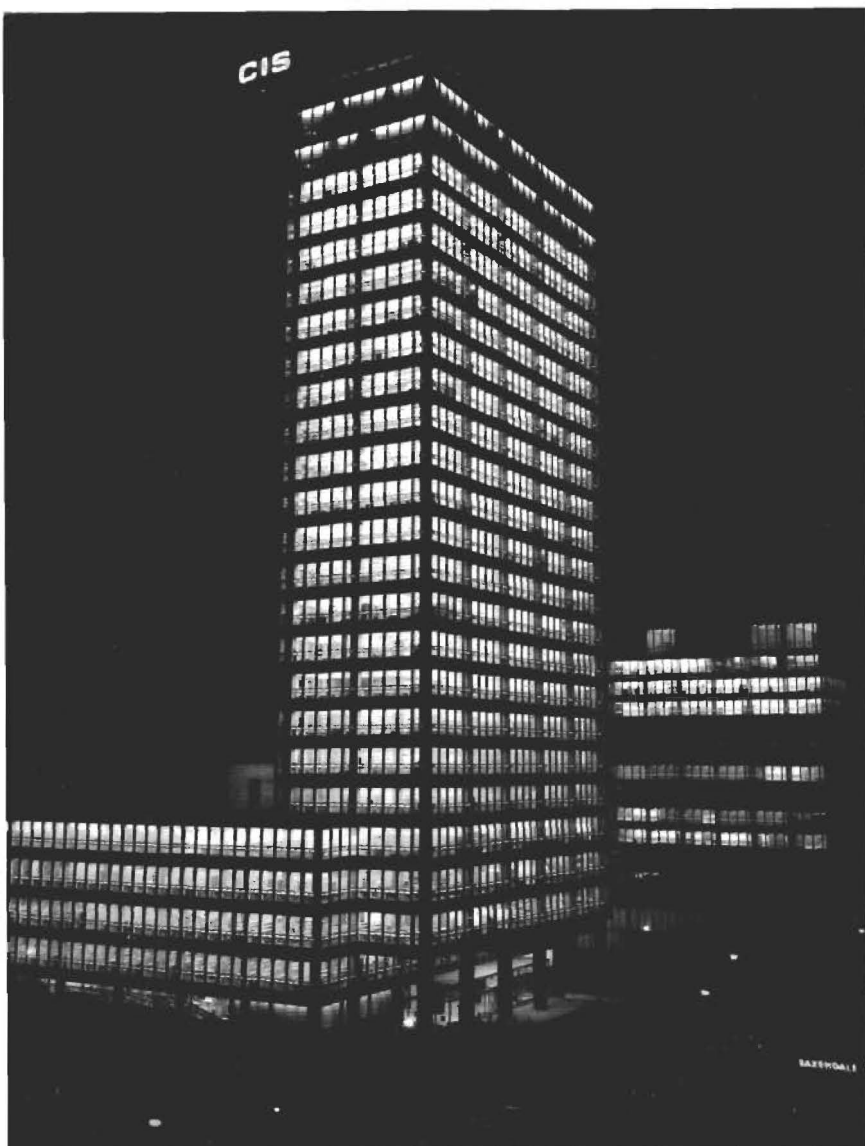
'Already,' he pointed out, 'the electrification of the line between Manchester and Crewe has boosted the number of passenger journeys by 25 per cent. Apply this example to the case of Liverpool to London, and don't forget that it is on long hauls that the railway hopes to make its greatest gains, and you can see the tremendous potential that exists.'

Mr Mugliston is responsible for a division which employs 12,000 people and produces a freight and passenger revenue running currently at £18 million a year. Highly efficient local electric train services ply between Liverpool and Merseyside's commuting districts. Another transport pattern comprises the division's special factory-to-dock services which today extend beyond the Pennines, in particular to the works of the steel makers in Durham, Yorkshire and Lincolnshire. To the south, this traffic embraces the ICI works 25 miles away at Northwich in Cheshire from which about 100,000 tons of chemicals are brought by rail to the Mersey docks and John Summers steelworks at Shotton, to which about 1½ million tons of iron ore are carried a year.

But it is on the Lime Street to Euston route, which carries the heaviest density of traffic of any railway track in Europe, that Mr Mugliston sees the most dramatic progress. On the new electrified track, Freightliners travelling at express speeds will link Liverpool with London and, by stages, other centres throughout the country, offering a most viable commercial alternative to road transport. And with a staff of highly trained salesmen to help him, Mr Mugliston is more than confident that British Rail will not only keep old customers but win new ones, as they did when car manufacture came to Merseyside.

A similar optimism exists in the case of passenger travel. Businessmen will be able to travel from one city centre to the other in conditions of extreme comfort and in just over 2½ hours – to be precise, the new electric trains will cover the 194 miles from Lime Street to Euston in 155 minutes. It will thus be possible for an executive to leave Lime Street, say, on the early morning Pullman, do the greater part of a day's work in London and return home in the evening in time for his favourite television programme. There will be eight trains each weekday in each direction between Euston and Lime Street, operating a basic two-hourly service but with increased frequency during the morning and evening peak. The fastest train at present between the two cities takes 3 hours 30 minutes.

Business travel apart, Mr Mugliston is also confident that the new services will attract increasing numbers of tourists bound for Northern Ireland, Dublin and the Isle of Man. He also looks forward to the day when the Channel Tunnel is a reality. 'Liverpool' he explained, 'is our nearest port to the USA, so freight coming from America to Europe could arrive two days sooner if it were shipped through here and carried by British Rail to the Continent. This may not happen for ten years but we're not going to ignore the possibility of it happening.'



Manchester

'I have been looking forward to this very much. It will make all the difference to the businessman to be able to get to London and back comfortably in one day. And I believe it will produce a great improvement in freight handling too, if only because everyone concerned will know that this is Britain's cleanest and most modern means of transport . . .'

The speaker was William L. Mather, chairman of a leading general engineering company and president of the Manchester Chamber of Commerce. His subject was the electrification of the London Midland trunk railway lines, including that from London to his own city. The name of Manchester has many connotations of industrial history and the arts, of sport and commerce, of science, entertainment and (perhaps unjustly) bad weather. But the railwayman sees less a city than an operating division – one which embraces about 2,000 square miles, over 170 stations, and more than 1,000 track-miles of railway. It includes proudly independent industrial centres such as Ashton-under-Lyme, Bolton, Bury and Oldham; residential areas like Glossop, Sale and the rapidly developing

dormitories towards Crewe, and the splendid Pennine countryside around Peak Forest, Buxton, and the Hope Valley. Nearly five million people live in it – farmers and bankers, insurance men and publishers and television producers as well as those concerned with manufacturing, and of this tenth of England's population all rely indirectly and most directly on the services of the railways. But primarily it forms part of the great workshop of Britain with freight traffic within its boundaries out-valuing passenger traffic by approximately £12m to £6m a year. This two-to-one ratio is above the national average, but still low for a producing area. For – contrary to the popular view of non-Mancunians – this has never been a city or even an area of massive industry and its consumption of the coal which is brought across the Pennines is comparatively moderate. Since its emergence from comparative obscurity in the eighteenth century, there has always been an element of heavy manufacture, and today it is represented largely by electrical engineering. National groups such as AEI, BICC and Ferranti have their local factories in the area – and, suitably enough, are all suppliers of electrical equipment for the railway modernization programme. There is also a certain amount of general and precision engineering. But the Manchester Division's only really indigenous 'heavy industry' has been defined as 'digging up Derbyshire' – the mineral trade in limestone, gravel, cement, which is responsible for an annual rail revenue of over £1½m, of which the limestone alone would fill Manchester's – and Europe's – largest building seventeen times over.

More than seventy years ago Mancunians set up the world's first industrial estate at Trafford Park, near the Ship Canal which has made this inland city Britain's third largest deep-water port. In both enterprises the railway companies which had grown up with Manchester were keenly interested parties, and today about £½m of the division's annual revenue comes from work for the Manchester docks with their own extensive railway system, while £¾m worth of traffic originates from the 200 rail-connected factories on the Trafford Park and similar estates and another £½m is earned by deliveries to these complexes which make plastics and detergents and foodstuffs and electronic components.

But the concept of a trading estate is only one of the ideas which shaped the modern world yet originated in one corner of one English county. Another is the co-operative movement whose shrine is Rochdale. Today the CWS is one of the more important of the railways' 640 major customers for entrepôt work alone, and also manufactures numerous branded products within the division.

Yet a third example is the mail-order service associated with such companies as Littlewoods and Gussies. Although such facilities are appreciated throughout the country, they generally originate from northern warehouses, these often being former textile mills which, together with their staff, have found new work. And though they became important only some five years ago, they rely on the railways to such an extent that the current 'parcels' revenue of the Manchester

Division – itself over £4m, an increase of more than 15 per cent in twelve months – substantially derives from these small but well-grouped items.

Wherever there is freight on the move there are also men on the move, and so Manchester has long been a rail passenger centre second only to London. Blackpool, Southport and even Windermere – 80 miles away – are within the commuter catchment area of its diesel multiple-units; and from it regular through business services, supplemented by seasonal holiday trains, serve not only London and the cities of the Midlands and West Country but North and South Wales, the major centres of northern England and Scotland, Ireland by two routes, the Continent via Harwich, and the Yorkshire complex.

Communication with the latter made an important advance with the establishment of the Trans-Pennine services in 1960; but this is only one of many examples of modernization to be met with in the division. The passenger terminals which were the legacy of five independent companies have been simplified and Piccadilly (formerly London Road) virtually rebuilt with a large car park. Mayfield station has been converted to a parcels depot and will eventually be connected by conveyor-belt to a new post office; other depots have been turned over to or completely rebuilt for specialization in such commodities as coal; and customer co-operation has led to such installations as the rail-connected silos of the Blue Circle cement group. Some 60 company trains run every week, handling such commodities as imported flowers and fruit to copper and bacon; and these alone handle nearly three million tons of freight a year and do the work of nearly 600 large lorries every day.

There have been other freight improvements in the Manchester area to the benefit of ICI with its eight trains a day each carrying 700 tons of limestone, or to Kellogs Ltd, to the Wallpaper Manufacturers Association group or to Guinness – who, after a trial period, found that the shipment of 10,000 gallons weekly by rail from London saved 65 per cent in handling costs, guaranteed more reliable deliveries and helped their stout to arrive in perfect condition. But for corresponding improvements in passenger traffic it was necessary to await the completion of the most important modernization of Britain's railways for 40 years.

For what is involved is no mere saving of a few minutes but the reduction of the even time over the 190 odd miles from Manchester to London from about three-and-a-half hours to 2 hours 40 minutes. Seventy-odd mph is good but not exceptional running for a single train over such a distance, even with at least one stop for the benefit of those who live in Manchester's south-western suburbs. But there is no other conventional railway in the world which works a clock-face service of ten or so passenger expresses a day at this speed over a track otherwise densely occupied.

To do so means power in reserve; and those who travelled regularly over the line in recent years came to know the surge as, at Nuneaton or wherever, a blue electric locomotive

backed on and proceeded to make up for some of the time lost through track works by loping through the Pennine Gap at 90 mph or more.

Meanwhile, the North-Western line had its competitors. Some travellers braved the traffic jams at either end of the motorway. Others used air transport, though airline operators accept that for inter-city journeys of less than 200 miles, flying must be regarded as a slow means of travel, and BEA itself had announced that, with a rail transit time of under three hours between city centres, it would have to reduce its own services by at least a half. Others again appreciated the working of a diesel Pullman over the tough Midland route to a schedule 20 minutes faster than the best pre-war timings – but also recognized that this was exceptional. For the moment, the passenger (and, to a lesser degree, the freight) lifeline between Britain's two greatest cities was less than ideal.

The fact was patiently accepted, and independent and influential opinion in Manchester has now enthusiastically hailed the completion of the electrification works. Typical, for instance, are the views of an industrial correspondent of the *Guardian*. He confidently predicted that, as the advantages of the new service became known, there would be 'a general increase of industrial freight travelling by rail', his argument being that a road vehicle could not travel from Manchester to London and back within one eight-hour shift and was hence effectively tied up for two days.

On the passenger side, he suggested that the reduction of travelling time to less than 2½ hours meant far more than a gain of 1½ hours, for 'you can now have a morning and an afternoon appointment, and so save a day'. Manchester has now been brought within the critical radius where real business commuting was possible; and this would improve liaison between north and south.

Some of these points may be novel even to railwaymen. But there are other Mancunians who see the electrification of the London Midland main line in a still wider context. For them the completion of the scheme far from forming the end of a story, is only a major incident in one. Behind lie the years when Manchester became the terminal of perhaps the world's first freight-carrying canal (1760), its first public railway (1820), a suburban electric service older than London's (1915), and the first route to be electrified primarily for freight (1954).

Before are new challenges such as the extension of trunk-route electrification towards Scotland, the building of a continental freight yard which will underline the fact that Manchester belongs in a golden belt of commerce and industry which reaches to Milan, and a scheme for an underground link between Piccadilly and Victoria stations which will not only relieve the choked roads of the city centre but also carry main-line through traffic.

It was a Manchester railwayman, Sir Edward Watkin, who envisaged his city as becoming a major link in a system of direct communications extending from Glasgow to Paris and beyond. In 1966, with the coming of London Midland electrification, his dream moved a stage nearer reality.



Stoke-on-Trent

The last echoes of an old outcry will be finally silenced with electrification of the Stoke Division. The outcry began when the old North Staffordshire Railway was first linked to a national rail network and the main line between London and Liverpool by-passed the Potteries to become part of a major junction at an obscure village called Crewe.

Thus, the industries that had grown upon one of the richest mineral deposits of Western Europe – the coal, clay, and iron of North Staffordshire – were encouraged to remain largely supporting one another in their own enclave with little diversification. Today, the industrial picture is still predominantly an enlargement of that of a century ago: coal, iron and steel, potteries and their ancillaries, such as salt and lead for glazes. Most of the clay for the potteries is carried by rail from Cornwall nowadays, but their enormous output spreads all over the world and ranges from the finest of dainty bone china teacups to sanitary ware and huge hand-made insulators for power stations.

The railway has always played an active role in these industries for some years past. A recent sales campaign to build up the amount of pottery and sanitary ware carried by rail was so successful that export traffic reached 600 tons a week by the end of 1965. Yet only in 1962 virtually none of this traffic went by rail. The development has been achieved by

competitive pricing and intensive selling of the Portex scheme, with its guarantee of next-day dockside delivery.

The division's biggest customer is the National Coal Board and its dozen collieries within the boundaries. Distribution of domestic coal has been streamlined by the replacement of numerous small depots with concentration depots at the main centres.

Iron ore by block train from the counties of Northampton and Oxford is delivered to another big customer, the Shelton Iron and Steel Company at Etruria, where the very latest plant has been installed to increase output of finished steel. The new works are designed for direct loading to rail.

Another important local product is silica sand, the chief raw material for the glass bottle industry and household cleaner manufacture in South Lancashire. British Industrial Sand Limited of Oakamoor send a quarter of a million tons a year by rail, in block trains of 25-ton hopper wagons which work in circuit between Oakamoor and Port Sunlight.

In the Cheadle area, gravel pits supply aggregate for ready-mixed concrete. Block trainloads in 21-ton hopper wagons carry gravel from the Hilton and Croxden Gravel companies to Manchester and Liverpool. Increases in this kind of traffic are confidently expected.

The British Soda Company and Murgatroyd's Salt and



Chemical Company, both at Sandbach, are increasing their rail despatches. From British Soda they are mainly salt in bulk in trainloads to Staveley in specially-constructed hopper wagons. Murgatroyds send to South Wales ever-increasing quantities of chlorine in their own bogie rail tankers.

Late in 1965 a through train was introduced to bring china clay from Devon and Cornwall to the Longport and Longton depots, specially laid out to receive this material. This regular service and a competitive price have already transferred clay transits from road to rail and more will follow.

Stoke Division was among the first to introduce station managers and seems likely to be the first to complete this administrative change. The men in the new posts are expected to exploit their new responsibilities to the utmost with electrification, when freight journeys will be so much faster and – just as important in its way – empties can also be returned more quickly.

Although the benefits of electrification are not to cover the entire division, Mr George Dow, the Divisional Manager, expects to be free from steam locomotion by the beginning of 1968. At present the operation of three kinds of traction at five locomotive depots is unnecessarily uneconomical. Most of the division's passenger traffic comes from Stoke, Stafford and Crewe, travelling to London, Manchester, Liverpool,

Birmingham and the Lancashire and North Wales coasts. With electrification, Stoke will have an express to Euston every two hours in the day time, with a journey time of just under two hours. The best trains from Crewe to London will take two hours and from Stafford 1 hour 50 minutes. Passengers along the main line between Crewe, Stafford and Nuneaton will have the full benefit of the electric service to and from London, Manchester and Liverpool from April 1966. The North Stafford line itself will not be electrified until March 1967, but until then passengers from Stoke will have a greatly improved service to London by changing at Stafford with journey times of 2 hours 20 minutes.

The effects of these passenger services, Mr Dow anticipates, will not be without some new problems. Many motorists living in the division will no longer want to drive to the big cities with all their parking difficulties and will in consequence create a heavy demand for car parks at their local stations. At present Stafford and Stoke are the only stations with adequate car parks but several new car parks are planned, all fully automatic.

For non-motorists the service will be further improved when bus and rail are brought closer together by the development of adjoining bus and rail stations. This idea is now projected for Stafford and may follow at Uttoxeter. One of the problems, of course, is that created by rail stations which are some distance from town centres.

With the stimulus of electrification, the entire programme of rationalization – closures of redundant lines and the creation of concentration depots for different kinds of freight – should bring a greater diversity of trade to the division and with it a stabilizing of railway revenue no longer subject to the fluctuations which can be caused by over-dependence on a narrow complex of industries.

'But the real financial advantages of the change,' Mr Dow explained, 'will come as much from reducing working costs as from getting new business. And we still have a long way to go towards reducing costs.'

To this end, the concentration of freight depots has been one of the biggest reorganization programmes for the division. When it was created, there were 98 freight depots of various kinds. These have now been reduced to 33, including installations catering for a general load, for sundries, for agricultural traffic, and for a single specialized traffic, such as coal, oil, limestone and cement, and agricultural fertilizer.

Sundries traffic is concentrated at Stoke, Crewe, Nuneaton, Tamworth and Uttoxeter; there are six fertilizer depots, three on the main line and three off it; 15 coal concentrations, including two private sidings; a livestock depot at Stafford; three depots for seed potatoes, and so on.

The division is clearly prepared for progress with major changes, some foreseen, others still uncertain. 'My own feeling,' said Mr Dow, 'is that these electric services will revolutionize the London Midland Region between London, Manchester, and Liverpool to a greater extent than the Southern electrification transformed Kent and Surrey.'



Birmingham

Birmingham was making woollen cloth and tanning hides as early as the fifteenth century, abounded in smiths 'that used to make knives and all manner of cuttynge tooles' by the sixteenth, and supplied 15,000 sword blades to the Parliamentary forces in the Civil War. Firearms manufacture soon followed and the metal working industries grew in variety and

prosperity. Enterprise encouraged invention, and by the eighteenth century Birmingham had added distinguished names to the nation's industrial roll of honour – Matthew Boulton and James Watt, pioneers of the steam engine, Murdoch, of gas lighting fame, Joseph Priestly, discoverer of oxygen. From the Industrial Revolution onwards, Birmingham has had a diversified pattern of trade, light and heavy industry developing side by side. The city still makes jewellery in the traditional cluster of street, it is still a production centre for buttons and brassware; but Cadburys have made it a nucleus of confectionery manufacture, Austin Motors of cars, Dunlop of tyres, Joseph Lucas of car accessories, GEC of industrial and domestic electrical equipment. Birmingham produces machine tools and mattresses, bicycles and lawn mowers, paints and kitchenware. 'City of a thousand trades' has long been out of date: the list is well over 1,500.

As industry multiplied, so did population, but the city's growth was amorphous not organic. It topped the million mark and leapt to its present size without acquiring shape or character. Now has come the awakening. A civic centre with dignified public buildings is nearing completion. The hub of the city is being encircled by a £25 million ring road bordered with some of the most sophisticated commercial architecture in the country. The Bull Ring Centre, a spacious shopping and recreational precinct carved out of an old congested market area, is the most advanced project of its kind in the world, not excluding the USA. Gaps and hoardings elsewhere in the city mark the sites of fresh stages in the Birmingham renaissance.

Situated in the geographical centre of England midway between South Lancashire and London, and itself the capital of one of Europe's major industrial regions, Birmingham is a natural focus of communication. A railway line to Liverpool was built in 1837 and the link was extended to London the following year. Inevitably, the Birmingham Division is today the fulcrum of the electrification scheme which is transforming that main artery serving the country's four largest concentrations of population and wealth. From its headquarters in Smallbrook, Ringway, the division is responsible for the sector between Wellington and Banbury, taking in Wolverhampton, the Black Country and Leamington Spa, stretching eastwards to Coventry and westwards to Kidderminster.

The division is undergoing changes which are not simply a facet of the electrification scheme. 'As far as Birmingham division is concerned,' says Mr C. A. Galley, Assistant Divisional Manager, 'the electrification of the line is only one part of a wholesale rationalization. It provided the context within which we had to plan the future structure of the division. The outcome has been a large-scale rationalization designed to exploit the benefits of the electrified system.'

The first step in the rationalization was the abolition of dual control in the division. Since January 1963 it has come under the single authority of the London Midland Region. Snow Hill station is to be closed and all traffic channelled

through New Street. To accommodate the increased and accelerated traffic New Street station is being completely rebuilt on lines which will conform to civic modernization as well as communications. The new main entrance from Smallbrook will give access to 12 through platforms designed for the utmost flexibility of working. Platforms will be connected by escalators to a service deck, surmounting which will be a third tier comprising restaurants, cinema, dance hall and other recreational facilities. The City Corporation intends to erect a 21-storey block of flats over the parcels area.

A striking contribution to architecture as well as transport is the new power-operated signal box and telecommunication centre, replacing 34 manually operated boxes. New signal installations at Coventry, Walsall and Wolverhampton, new rail connections at Bordesley and Leamington, at Wolverhampton to integrate the High Level Station (now being reconstructed) with the Low Level Station, and a reinstated Galton Junction, are further efforts towards concentration.

The effect of all these changes will be most directly apparent in the passenger services. By 1967, when electrification will be complete and the new timetables in full operation, London and Birmingham will be linked by an hourly service, dividing at Crewe to give a two-hourly service to Manchester and Liverpool. In addition, hourly local services will link Birmingham with Coventry, Wolverhampton and Walsall. Saving of time on the express services will be substantial. The fastest time for the 115 miles between Euston and Birmingham will be cut from the present 1 hour 52 minutes to 1 hour 34 minutes. The business run between Birmingham and Manchester or Liverpool, now 2 hours 25 minutes, will be reduced to 1 hour 35 minutes. Top speeds will reach 100 mph and the average will be about 70.

Business travellers in particular should respond to the new pattern of service which should encourage a more frequent interchange of executive level visits.

Freight is less directly concerned with saving of time between terminals but very much concerned with the timing of the whole process of distribution. This is where rationalization will help – the clearing of bottlenecks, concentration of depots, and efficient redistribution from the terminals. The Birmingham Division is a voracious consumer of materials. It handles three million tons of traffic a year, of which 1 $\frac{3}{4}$ million is steel, brought in block trainloads mainly from South Wales, Scunthorpe and Sheffield. Two-thirds of the steel goes into the motor-car factories and engineering workshops in the division. For several years the steel carried has been increasing at the rate of 10 per cent a year and now amounts to 35,000 tons a week.

Other bulk freights include 80,000 tons of iron ore from the division per four-weekly period, cement for the rebuilding programmes, coal converging on 20 depots, reduced from 180 and planned for further concentration when through trains have been organized from colliery to depot. About three million gallons of oil are brought into the Birmingham

area daily. Esso sends 2,000 tons a day in 52-wagon oil trains from Fawley to Bromford Bridge, and Shell is building a new oil terminal at Rowley Regis.

An increasing block-train traffic in motor-cars – as many as 1,000 cars a week from Longbridge alone – moves outwards from Birmingham, and the division is hoping to arrange a two-way working with London's motor industry. An express freight service is building up from the Midlands to the Continent; there is an inland customs clearance depot at Aston for outward traffic, and similar facilities for inwards traffic are in hand.

The most challenging freight, and one with big potential, is composed of the thousands of miscellaneous products into which the Birmingham industrial region processes its vast intake of raw material. Much of it is 'smalls' traffic intended for widely scattered distribution. 'We look to British Railways for two services,' says Mr Edward Baker, Transport Manager of British Industrial Plastics. 'First, quick transit from A to B, and here the electrification and other projects will certainly help. Second, and even more important, swift and dependable transfer of goods from B to customers in the locality.'

BIP supply moulding powders, laminating plastics, and resins for use in a variety of trades including textiles, paint, paper and cement. A quarter by weight of the annual output is exported. 'The essence of success,' says Mr Baker, 'is co-operation between the customer and the carrier. We tell British Rail what our problems are and ask what they can do for us. They have proved very willing to work in this way and have got the traffic geared up at both ends to ensure delivery on time. This traffic started early in 1964 with overnight delivery to Southampton, was soon extended to London and other ports will follow. We are thinking in terms of an annual export total of 10,000 tons.'

In one respect Imperial Metal Industries presents a similar problem. For instance, 75 per cent of its domestic traffic is in consignments of less than a ton; and here, says Mr D. G. I. Macdonald, Transport Manager, 'road has the edge, apart from dock traffic, though next day delivery through the new railheads should improve the position for rail. If British Rail can organize door-to-door delivery and the rates are right, they will capture the smalls business.' The picture is different for exports, about 45 per cent of which travel by rail. So does most of the imported raw material, a traffic that increased 150 per cent in 15 months of 1964-5. 'British Rail went all out to give us favourable service and terms, in the form of trainload movement from the docks into the station and competitive rates for the job,' says Mr Macdonald.

The railways do not yet serve all of Birmingham's 1,500 trades, but the list is growing even before the completion of the rationalization of the division. Perhaps the most hopeful sign for the future of this vital area is the coherence of the city's progress as conurbation, industrial metropolis and railway nucleus.

London

The South-East is a problem. Of Great Britain's 51 million inhabitants, 18 million (35 per cent) live in the South-East, within a line from the Wash to Dorset. Britain's population is expected to rise by seven millions by 1981. Three-point-five million will be concentrated in the South-East. This presents formidable difficulties in providing housing, jobs, and transport for what is the most rapidly expanding part of the UK.

The South-East is essentially London. Within a 40-mile radius of Charing Cross live 12.5 million people and 75 per cent of the increase in employment in the region since 1956 has taken place within the metropolitan area. In ten years from 1951, the population of Britain increased by 6 per cent, but in the South-East it was 7.7 per cent. And over two-thirds of this was concentrated in the metropolitan area.

The forces responsible are powerful. London is the centre of finance, insurance, national and international commerce, government and law. It is the UK's biggest port and the focus of national communications by road, rail, and air. More than 30 per cent of UK manufacturing employment is in Greater London (including light and heavy engineering, paper, printing, food, drink, tobacco, vehicles, clothing, chemicals, metal goods, precision instruments).

Government controls to divert manufacturing have slightly diminished its rate of growth in the South-East, but it is impractical to prohibit it completely. The growth of service industries cannot be limited, because they are tied to the population that they serve. Of all industries, the services (construction, gas, electricity, water, transport, communications, distribution, entertainment, insurance, banking, the professions, government) are growing faster than all others, and 64 per cent of employment in them is in the South-East.

The growth of the services, added to mechanization which enables manufacturing industry to produce more and more goods with fewer workers, means more clerical staff and more offices. By 1963, there were 140 million square feet of office space in central London compared with 87 million square feet before the war.

If the birth rate and employment continue to rise as expected in London, the South-East will become a chaos of housing shortages, road and rail bottlenecks, and soaring costs. The Ministry of Housing's *The South-East Study: 1961/81*, accepted by the Government in March 1964, does not seek to impede the growth of the South-East. It does, however, seek to relieve congestion by drawing residents (and jobs as far as possible) away from the London conurbation, by expanding six existing towns and building three new cities within the South-East outside the metropolitan area.

The vital role the new electrified railway will play in all this can be grasped when it is realized that the town planning authorities envisage expansion of existing and building of new towns within the area north of London now within com-

muting distance to accommodate an additional 340,000 or more people, and substantially greater expansion for the future 'outer suburban' area beyond this.

At present, the limit of commuting to central London is regarded as roughly 47 miles, e.g. Bletchley, now 83 minutes from Euston. But electric trains will bring distances of up to 120 miles within commutable distance of Euston. A new ring of 'outer suburbs' will include Wolverton (53 miles), Northampton (66 miles), Long Buckby (76 miles), Rugby (85 miles) and even Coventry (97 miles) and Birmingham (116 miles).

Development of areas north of London will reach their peak in the 1970's. Since railway electrification is more than five years ahead of this building schedule, the railways will make a major contribution to its achievement, because without transport new towns and industries could not be brought into existence at all.

According to the Region's London Divisional Manager, Mr L. W. Leppington, the new timetables will turn the areas into 'a businessman's and commuter's paradise'. Businessmen with interest straddling London, the Midlands, Liverpool, and Manchester, will find rail times faster than present air schedules, and the railway hopes to capture a large part of the traffic now air-borne by offering high-speed, there-and-back journeys easily accomplished within the working day.

Electrification will provide luxury travel for passengers, because higher speeds allow greater frequency of trains and therefore more accommodation, while long-welded rails will offer smooth effortless running (but enthusiastic railway 'fans' may regret the passing of the days when they could calculate the speed of their train by counting the rhythm of the rails against their watches). All-electric signalling incorporating the latest electronic devices and other controls will maximize safety by minimizing the margin for human error and will increase reliability by allowing high speeds in fog or poor visibility.

Although London is a great industrial centre, it receives by rail more than it despatches, because a substantial part of its freight traffic consists of local deliveries within the metropolitan area. Nevertheless, the many freight forwarders from London will also benefit by greater speeds, frequency, and reliability.

Some outstanding names among LMR's innumerable customers on the electrified routes, who at present despatch freight to the Midlands, the North-West, and Scotland, include Woolworths (supplies to their branches), Lyons (mainly tea), Peek Frean (biscuits, etc.), Metal Box (containers), Whitbreads (beer), Johnnie Walker (whisky), Heinz (food-stuffs), United Rum Merchants (drinks), Gallahers (tobacco), Marks and Spencers (supplies to their branches), Union International (imported and cold store meat), AEI and English Electric (cables and other electrical equipment),



Bowater (paper), John Dickinson (stationery), Rugby Portland Cement and Tunnel Portland Cement (cement in bulk and bagged), and many others.

Electrification will have far-reaching effects on the production schedules and distribution times of Britain's biggest London-based industry – newspapers and periodicals. Indeed, the growth of the industry to national scale would have been impossible without rail transport. As far back as 1847, W. H. Smith and Sons were using nine special newspaper trains. Train departures have rigidly set the times at which the various editions of daily and weekly newspapers go to press. The new train schedules will slice over an hour off present times between London and Liverpool and London and Manchester, and proportionately at intermediate centres. This will relieve present production pressures on earlier editions and allow final editions to be run off later.

A striking recent development in press-railway co-operation has been the distribution of the coloured supplements of *The Sunday Times*. Electrification will ease pressures on the distribution of these supplements, which is at present spread

over the week, beginning on Mondays to Ireland, and culminating on Thursdays in bulk deliveries to Manchester for distribution in the north and in Scotland. Of LMR's London area receipts of about £1,000,000 a year from newspaper traffic, as much as 65 per cent can be apportioned to despatches over the electrified routes. That a group of circulation managers, representing all national daily and Sunday papers recently spent a day inspecting key points on the electrified routes suggests the importance that Fleet Street attaches to the new schedules.

Industrialists and businessmen will benefit from electrification not only as travellers but also by a speed-up in their correspondence. Today, some 22,000 bags daily of letter mail – outward and inward – travel by LM. It is estimated that electrification, besides reducing carrying time and increasing frequency of despatches, will appreciably raise the totals carried. GPO parcels' traffic, at present averaging 30,000 bags daily in both directions through Kilburn depot, as a temporary measure, will eventually be routed through Euston once more, and again, increased volume is expected.



Your Electric Future

Passenger

by Paul Ferris

I once wrote a novel in which was made what turned out to be an oddly significant comment on railway journeys. A market-researcher stopped the hero at a station (it happened to be Waterloo) and asked him various questions about travel. The interview was one of those blatant devices used by novelists to impart information about their characters – the book really had nothing to do with railways – but at one point the conversation on the platform at Waterloo went like this:

‘Could you tell me in one sentence what you like most about railways?’

‘Being able to go and wash my hands without inconvenience.’

‘And dislike most?’

‘The feeling that I’m powerless – that I’m in someone else’s keeping.’

Months after, I was talking to Dr R. A. Taylor, Passenger Manager of the London Midland Region, about the prospects being opened up by electrification. He was describing the need on all services, and on the electrified routes in particular, to ‘look on passengers as customers, each one of whom has to be induced – or seduced – to come on the railways’.

He went on: ‘One of the greatest things we have to overcome is the anxiety built up in passengers, because they feel unable to control what is happening to them. You can see this with the old lady who asks three porters if it’s the right train, then finds her seat and immediately asks the person next to her. But this has been shown by research to be much more common than just an anxiety of old ladies.’

A concern with passengers who feel, without realizing it (any more than I realized it when I wrote my novel), that they are ‘powerless, in someone else’s keeping’, may seem a long way from the simple benefits of fast electric trains from London to Manchester and Liverpool. But the London Midland Region sees electrification as an unparalleled opportunity to remake the railway image for passengers.

At present speeds, the fastest train to Manchester is three hours and ten minutes from London; Liverpool takes nearly half an hour more. Under the new 1966 timetable, both cities are just over two and a half hours from London, and it’s claimed that on a centre-to-centre basis, rail will be consistently faster than air. The estimated air time from London to Manchester (centre to centre) is two hours forty-five minutes, which will give the train a small but useful edge.

Your Electric Future: Passenger

From London to Liverpool air time is put at three hours and ten minutes, giving rail a substantial saving of more than half an hour. When the Birmingham line is electrified, by 1967, the London rail journey will take one hour and thirty-five minutes, against an estimated two and a half hours by air, centre to centre. Trains on all the routes served will be more frequent and more reliable.

The problem for the passenger department is to find best means of exploiting these pleasing statistics, as the new blue and grey trains run fast, clean and smooth on long-welded rails, bearing businessmen and sightseers (not to mention old ladies) to their destinations.

Believing that 'we are in the travel business, not the train-running business', Dr Taylor expects the railways will take custom from airlines and also from long-distance coaches with the new services. 'Competitors will find it difficult to live with us.' At the same time, he attaches more importance to the additional total travel the services will generate both among regular businessmen, and among 'casuals', by encouraging them to develop personal contacts and see things





New suburban multiple units





for themselves. 'Our success,' he says, 'depends on our hitting the right level of fares, and doing the right kind of publicity.'

Linked with the electrified services (and ultimately with other trains in the Region) will be improved arrangements for reserving seats, making it possible to book at intermediate stations. The Region wants to see a more sophisticated kind of service and more sophisticated facilities provided at stations, so that the air of affluence doesn't come to an abrupt end when the 100-mph electric trains draw in. Inter-city trains will make 'peripheral stops' - for instance Watford (for London) and Stockport (for Manchester) so that long-distance travellers won't be confined to journeys between city centres. Facilities for parking cars at stations will be improved. A little later it is hoped to introduce public address



Your Electric Future: Passenger

systems on trains, to make announcements about catering services available, station arrivals, train running details and so on.

An important innovation on the electrification agenda is the development of charter travel among people from the provinces who are potential theatre-goers, shoppers and exhibition-visitors in London. The bus companies run charter coaches for parties going up to London for the day. The railway can do exactly the same thing. If people charter space on the scheduled services, it can be cheap and attractive for them. Just as the businessman will find it possible to take an electric-hauled train from Manchester in mid-morning and attend an early-afternoon meeting in London, so the casual traveller will be able to use the faster timings to spend a full day there. 'Package-deal' trips can be arranged by travel agents, using charter facilities who will then be able to offer the public an all-in price which includes packed meals on the train and tickets or entrance fees to events.

There are social implications here, as there are in every aspect of travel improvement. The new services start at a time when British people (some years after the Americans) are coming to look on a high degree of personal mobility as a perfectly natural state of affairs. The large-scale advertising will be used to press home the appeal of services. Dr Taylor believes 'it is really no different to selling refrigerators or motor-cars. The notion that people will only travel if they have to, and that they *might* use rail as a means to do it, is really too naïve in these days of mass advertising'.

Probably the most striking social side-effect of electrification is going to be its attractiveness to a class of traveller that has been mobile for years: the London commuter. This hardy race tends to live south of the Thames, and the counties to the north of London have never been opened up as thoroughly as Surrey, Kent and Sussex. The hopeful phrase 'commuters' paradise' has been used of the area around Bletchley and beyond, and there seems no doubt that from the start of the electric services in April, even Rugby - more than eighty miles away, but then only sixty-five minutes from Euston - will come to be seen as potential commuter-land. Between the wars, the Metropolitan Railway's slogan, 'Live in Metro-land', attracted thousands of families to places west and north-west of London, and was responsible for much of the development of towns like Harrow and Amersham. The anticipated development of Bletchley and places north will be aided by the new services, which will themselves help to create a demand.

Altogether the new electric trains represent a revolution in rail transport that will be accompanied with a revolution in service and salesmanship. Behind all the devices that are planned is a hard-minded appraisal of a situation where no form of transport, however well entrenched, can afford to take things for granted. Those shining trains, bolting down the busiest main lines in Europe, will point to the future of Britain's railways.



Your Electric Future

Freight

by Charles F. Klapper

Half a century ago, several notable freight railway electrifications came into service, all distinguished by special needs and several by experimental and complex electrical systems. The Norfolk & Western in the United States introduced the new form of traction on a railway built primarily for shipment of coal, where 3,250-ton trains, with one electric locomotive hauling and one banking, instead of the two vast steam locomotives at the front, were lifted over a heavy gradient at 14 mph instead of 7½ mph. A little later, the sensational Chicago, Milwaukee & St Paul electrification over 440 miles of mountainous route in the Rockies of Montana and Idaho came into operation. Crossing the Continental Divide at Donald at a height of 6,322 ft, this piece of railway included 26 tunnels; one bank alone comprised 21 miles inclined at 1 in 50. Steam locomotives that had taken 12 hours to cover a 115-mile division with 3,000-ton trains were replaced by electric units which rolled through in eight hours.

Performances such as these by electric traction showed the solid worth of the new motive power to the world and between the wars and since 1945 the extension of electrified main lines in Switzerland, Italy, France, Germany and the Benelux countries has made the appearance of fast electrically

hauled trains of general freight a commonplace to the business man who has occasion to travel to the Continent. Now that after delays caused by a series of historical accidents the country that provided the world with its greatest electrified suburban system is at last to have an all-electric main line for all types of traffic, the trader may well ask himself what benefits he will derive, traffic-wise, from this vast scheme of galvanizing the London Midland main line from Euston and Camden northward into a new railway.

First of all, it must be said that the savings in time cannot be on the spectacular lines which appealed so greatly fifty years ago. Here we are dealing with what were sophisticated railways of high efficiency from the very start. The London & Birmingham, Grand Trunk and Trent Valley routes which comprise much of the electrified portion of the London Midland Region between Euston and the Irwell and the Mersey were, it is true, among the world's earliest large-scale railway projects. But what took the proud title of the Premier Line, the London & North Western Railway, was also superbly laid out with easy ruling gradients and an absence of sharp curves, so that if half an hour or so is knocked from a general merchandise train timing, it will probably be as much saving



of actual running time as can be expected upon the change-over from diesel to electric power.

The speed and reliability of any railway freight service are bound to rely to a great degree upon the good organization and efficiency of the terminal services to impart to it the qualities of a well-found, dependable and fast service. At the same time these are bound to be tremendously enhanced by the integrity and efficiency of the new signalling and motive power. As was set out in the British Transport Commission's statement of intention on electric traction in 1956, there has come about through electrification a complete re-orientation of operations on the London Midland main line, designed to speed up movement, to reduce its cost (a valuable safeguard against rising rates) and to provide direct transits for main streams of traffic.

The users of the railway freight services, of whatever sort, whether parcels, sundries, the new high-speed Freightliners, company trains or other bulk services, will have a further benefit from this year's new schedules of possibly later collections and earlier delivery times, provided agreement can be reached for handling traffics over an extended period of the day. A very real benefit for medium-distance traffic may well be same-day delivery, if arrival at, say, a Birmingham depot of a morning train can be fitted in with a delivery round departure.

Whereas with the steam locomotive the hours of availability for service are a fractional part of a week and the complex diesel-electric locomotive requires several refuelling periods and two-hour inspections (comparatively slow-moving diesel-electric shunters are remarkable for being able to spend long periods in traffic), the electric locomotive seldom requires to be rostered to go on shed for servicing. It is simple and there is little to go wrong; a four-hour examination every five days suffices and the record of mileage between involuntary stops on the road is remarkably good. The benefit of this reliability on the service given should be noticeable. It will be especially valuable in the tighter rostering of electric locomotives for fast and gruelling turns like the Freightliner where speed and regularity of operation will be able to show the business community that railway modernization has tangible advantages. The Maiden Lane-Crewe line covers the first and most important Freightliner routes.

Reliability, combined with quicker turnaround of wagons, and the haulage of heavier trains despite higher running speeds, should benefit the railway in reduced movement and system costs; this will enable more effective rate quotations to be made – thus adding to business and again reducing overheads with beneficial results to the trader.

The fact remains that many of the benefits of the new electrified service are imponderables. But having studied a score or more of electrifications over the years one can say with conviction that they invariably produce a tonic effect on the entire railway, leading with certainty to greater efficiency and to public satisfaction with the service.



Wolverhampton

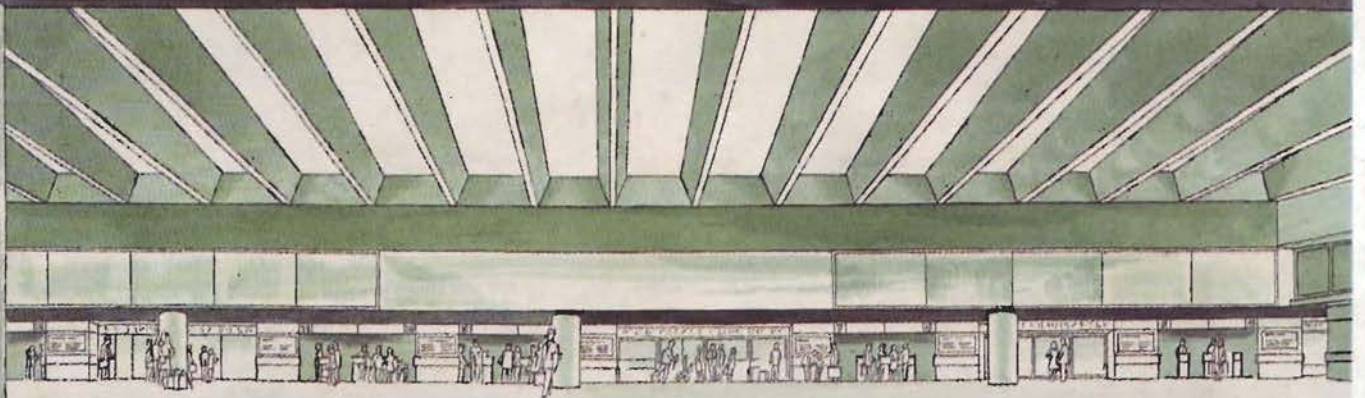
Two old stations, the High Level and Low Level, are being replaced by one new station.

Points of Departure

At the beginning and the end of the journey, the station provides the link between the railway and the city it serves. At the same time as the lines were electrified, nearly ninety stations have been remodelled, including four major reconstruction schemes.

From terminals in major cities to small suburban stations, the opportunity has been taken to provide the passenger with a standard of service and amenities to match that of the trains.

All Platform



The new Euston
An artist's impressions.





Points of Departure

Coventry

An exciting new station that expresses the renaissance of the city.

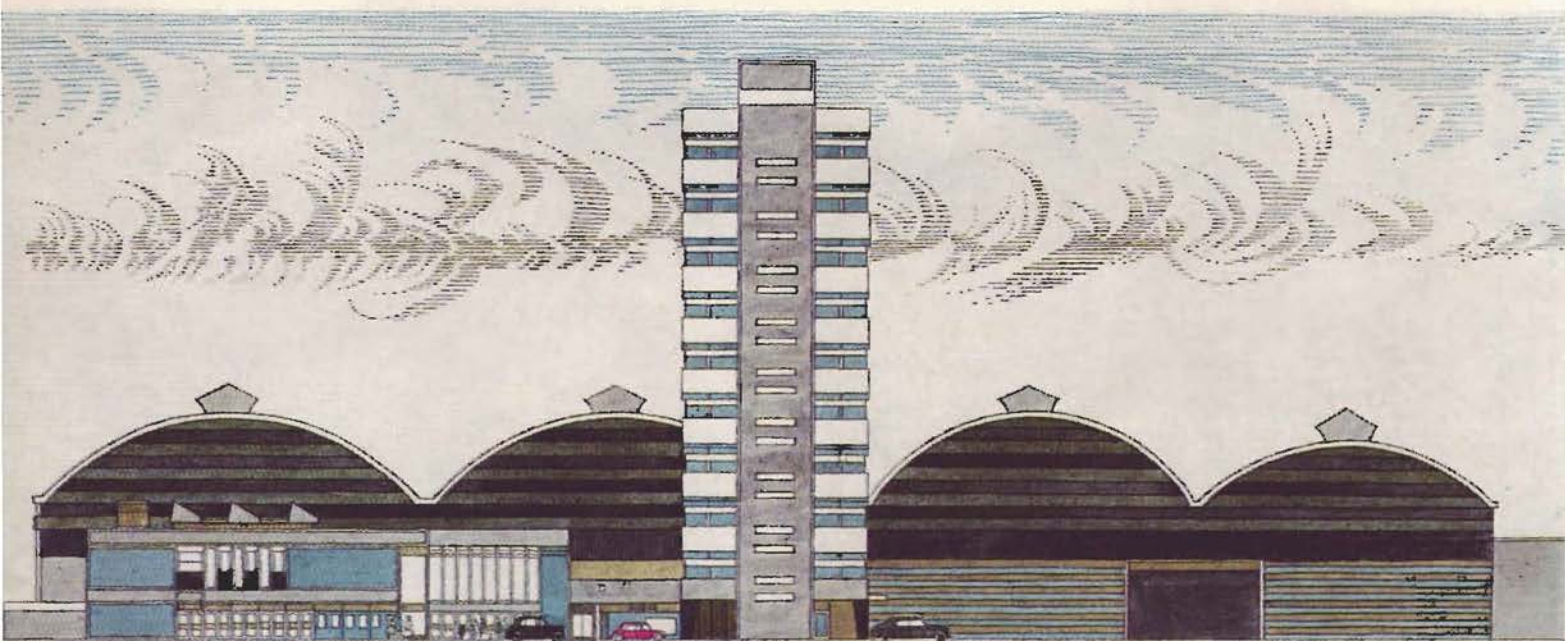


Smaller Stations

Some are being rebuilt using a modular system of prefabrication.



Where buildings are sound, minor improvements give them a useful life.



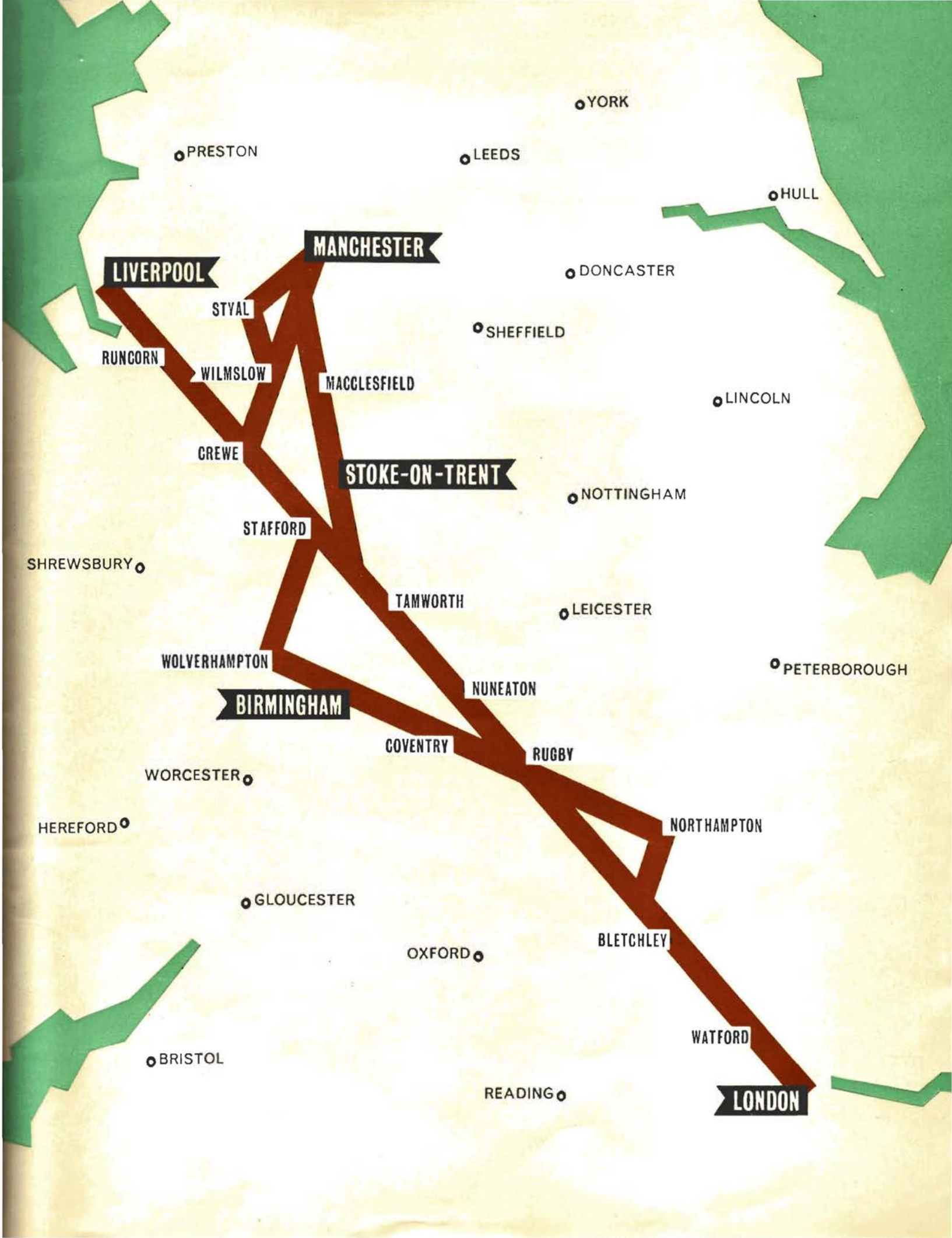
Manchester Piccadilly

The northern terminal of the electrified line.



Your New Railway

LONDON MIDLAND ELECTRIFICATION 1966



LIVERPOOL

MANCHESTER

STOKE-ON-TRENT

BIRMINGHAM

LONDON

PRESTON

LEEDS

YORK

HULL

DONCASTER

SHEFFIELD

LINCOLN

NOTTINGHAM

LEICESTER

PETERBOROUGH

SHREWSBURY

STAFFORD

TAMWORTH

NUNEATON

COVENTRY

RUGBY

WOLVERHAMPTON

WORCESTER

HEREFORD

NORTHAMPTON

GLOUCESTER

OXFORD

BLETCHLEY

BRISTOL

READING

WATFORD

