

THE JOURNAL OF THE LONDON UNDERGROUND RAILWAY SOCIETY

Issue No. 87

Volume 8 No. 3

March 1969

OFFICIAL OPENING OF THE VICTORIA LINE

The Victoria Line will be officially opened by Her Majesty the Queen on Friday 7th March at 11.00. Her Majesty will drive to Green Park Station where the opening Ceremony will take place at about 11.20 following an inspection of the station; a special train will then convey the Royal party to Oxford Circus Station, which will also be toured, after which the train will take the party to Victoria where a Reception will be held ending at about 13.00.

THE PRESIDENCY 1968/69

At the AGM our present Vice-President, C.R.L.Coles will become the new President of the Society. Mr. Coles is a very well-known railway photographer, and his name is prominent not only in railway enthusiast circles, but in the photographic world as well. During a life-time devoted to his hobby he has gone into filming as well as taking innumerable still photographs, so that in him we have a real expert in an aspect of our interests which is of great importance to us all and a personal interest of many.

To fill the vacancy in the Vice-Presidency we have been fortunate in obtaining the services of Norman E.W.Fuller - about whom it is difficult to write very much because he, and his work for the Society, are so well known to our members. Also a keen photographer, and an expert on District Rolling Stock, it was Norman who first thought of the idea of a Society in 1961, was its first Secretary, is now Librarian and has been continuously a Committee member or an officer (or both!) since the inaugural meeting.

THE LONDON UNDERGROUND RAILWAY SOCIETY
REPORT OF THE COMMITTEE FOR THE YEAR 1968

The Society has had another successful year, marked by some especially good papers read to the meetings at Hammersmith, some from members and others from outside speakers. The number of visits has been kept about the same as in previous years and the policy of including an occasional out-of-London visit has been followed again during the year under review. Library Evenings have continued throughout the year and have proved popular; our gratitude is extended to Norman Fuller, who as Librarian has regularly thrown open his house once a month for the benefit of members.

The year has been marked by an unusual number of changes in Committee members, Officers and Assistant Officers; to all those who have devoted their time and energy to the furtherance of the Society's aims the Committee would express their thanks, at the same time welcoming those who are new to office.

Financially, 1968 was a much better year than 1967, and it will be seen that the excess of income over expenditure for the year was about £27, despite an increase in the total costs of Journal production and despatch. This result has been achieved principally by a considerable increase in the profits achieved on sales and reflects considerable credit on all those concerned; an additional service first made available to members during 1968 was the supply of photographic film and recording tape at reduced prices; it is expected that as this service becomes better known it will add yet more profits to the sales results.

Membership remained almost static during the year, which is a matter of some regret to the Committee, as with an increased number of members better facilities could be provided.

By Order Of The Committee

J.P.Wirth, Secretary.

NOTICE OF ANNUAL GENERAL MEETING

NOTICE is hereby given that the Annual General Meeting of the Society for the year 1969 will be held in the Lecture Room, Museum of British Transport, Clapham, London, S.W.4. on Saturday 29th March 1969 at 14.00 for 14.30, for the following purposes:-

- To have Read the Notice of Meeting and the Report of the Auditors.
- To Receive the Report of the Committee for the year 1968.
- To Receive the Accounts for the year 1968.
- To Confirm the Election of C.R.L.Coles as the President of the Society.
- To Confirm the Election of Norman E.W.Fuller as the Vice-President of the Society.
- To Elect Five Members of the Committee.
- To Elect Auditors.
- To Conduct Any other Business.

17, Garth Road,
Sevenoaks,
Kent,
29th January 1969.

By Order of the Committee
J.P.Wirth
Secretary

Further Notes on the AGM

Nominations to the Committee Nominations should be sent to the Secretary at 17, Garth Road, Sevenoaks, Kent, to reach him by 15th March; before nominating please ascertain that the member nominated is willing to serve. There are five places to be filled this year; J. Brook Smith, P.R. Davis and S.E.Jones retire by rotation in accordance with Rule 5, and J.M.Crowhurst and K.A.Harris, who were co opted to the Committee during the past year, retire in accordance with Rule 6, All these members are willing to stand for re-election, except J. Brook Smith.

Report and Accounts. The Report of the Committee for 1968 appears in this issue of the Journal, but

Accounts will not be circulated to save expense; they will, of course be available at the Meeting in accordance with the Rules.

Admission to the Meeting. To gain admission to the Museum without payment, present your current (1969) membership Card at the barriers at any time after 13.45; membership cards must be shown again to enter the Lecture Room where the meeting is to be held.

ASPECTS OF UNDERGROUND RAILWAY DESIGN AND EQUIPMENT

Desmond F. Croome

Being The President's Address For 1968

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(3) The Alignment Of The Lines

(a) Traffic Objectives

The word "alignment" embraces two concepts - the traffic objectives between which the line shall run, and the precise routeing of the tracks between the major objectives. The former is decided largely by the traffic planners, on Jeremy Bentham's principle of "the greatest happiness of the greatest number" whilst the latter is largely a question for the civil engineers, although in planning a line, there must be continuous consultation between the two sections.

It is unusual to plan a rapid-transit line in "Virgin Country" although some instances have been known, e.g. in the southern suburbs of Stockholm, where town planning went hand-in-hand with railway planning, or on the northern half of the Piccadilly Line Cockfosters extension, or the Northern Line Edgware extension, where it was hoped that private enterprise building would follow the railway. In such cases, it is basically a question of calculating the prospective population and estimating how much traffic this will generate, so that the line stops at the "boundary of viability" and each station has

enough traffic, but not too much.

However, a more typical case is where the city has already developed, and a rapid transit line must be fitted into the existing pattern.

As with the southern half of the Cockfosters extension, or the Manchester rapid transit line, a good guide to passenger needs is the relative volume of bus or tram traffic along the possible alternative alignments, although it must always be borne in mind that passengers on public transport are obliged to choose from the facilities that exist. Planning the first line of a rapid transit network may seem a relatively simple exercise, but there are many factors to be considered. It may be necessary to conduct an "Origin and destination" survey of bus and car passengers to supplement the evidence of bus loadings and car counts; the correct spacing of stations is of vital importance, and will be discussed later; good interchange facilities are essential, both with buses, cars and the main line railways; a suitable depot site must be found within reasonable proximity of the proposed line; a tentative plan for the whole rapid transit network must exist, so that the first line will fit in with later construction with the minimum alteration; planned highway improvements and anticipated population movements must be known, and their effects assessed.

Where a new line must be grafted on to an existing rapid transit network, the exercise becomes even more complex, because the likely effect of each alternative routing on each existing line must be assessed so that the new line will help the whole system to move towards the elusive ideal of "not too much, not too little traffic" on each section. Engineering factors are more important, as the new line must be threaded between the existing ones, so that cross-platform interchange may be possible at some stations but not at others.

Finally, how much traffic is needed to justify a rapid transit line at all? Traffic flow can be expressed in various ways - passengers per peak hour, per day or per year. In 1925, when the Cockfosters extension was being considered, Frank Pick thought that a daily traffic flow of 85,000 (both directions added) gave good grounds for building a tube railway. In 1961, addressing the International Union of Public Transport, Mr. B.H. Harbour, then a member of the London Transport Executive, suggested that the potential rate of passenger movement during the heaviest half hour of the peak, on the central section of the line, should approach the capacity of a modern rapid transit railway for reasonably comfortable travel, i.e. at least 32,000 passengers per hour in each direction.

(b) On-Street Or Off-Street Alignment

When the broad traffic objectives have been decided, there remains the question of the detailed alignment, and particularly whether, in built-up areas, the line should run beneath the streets or should cut across the street pattern.

As mentioned above, a "shallow" line must normally follow the street alignment to avoid extensive interference with property, but with deeper lines (tubular, or those built in rock) there is greater freedom to be independent of the streets, allowing shorter routes between the main traffic objectives, and better opportunities to keep the dimensions of the sharpest curves and steepest gradients within acceptable limits. In established cities, the major streets have frequent bus or tram services: if the aim is to replace these completely on particular streets, the shallow line following the street alignment, with frequent, convenient stations, is the

best choice. In London, most deep level tubes followed the street alignment to avoid the expensive and difficult negotiations that would have been needed to secure "easements" to run under private property. The unhappy results of rigidly adhering to this policy can be seen in the sharp curves (such as those of 330 feet radius east of South Kensington) and the stations where the platforms are on different levels, in order to keep the station tunnels within the limits of the street above. In recent years, with greater experience of the negligible effect of deep level tubes on buildings, and a more benevolent attitude from the legislature, new London tube lines have cut across the street pattern, with the consequent benefits of lower tunnelling costs for the shorter route, and reduced journey times. The Victoria Line exemplifies the ultimate development in this direction.

In partly developed areas, it might be possible to fit in new shallow construction away from the street pattern. This would have the advantages of greatly reduced interference with road traffic and service pipes, which would be encountered at right angles instead of parallel to the route.

(c) Curves

Sharp curves on rapid transit railways are an unmitigated evil. They cause permanent speed restrictions to be imposed, thus increasing the journey time and tending to cause more trains to have to be used to maintain the same frequency of service. They cause heavy wear on rails and wheel flanges, and entail greater current consumption because of the greater tractive resistance. Tunnels on sharp curves must be larger than on the straight, to allow for the swing over of the cars, with consequent delays and complication during construction. For many years new construction in London has used curves not sharper than 1320 feet radius on the main running lines; In Paris the normal minimum on urban lines has been 246 feet, but there is an exceptional

curve of 131 feet. In other cities, Hamburg has adopted a minimum of about 600 feet on new construction, Stockholm 656 feet and Moscow 984 feet.

(d) Gradients

As with sharp curves, steep gradients are best avoided. In London, the desirable standards aimed at are, for main running lines, a maximum of 1 in 100 for lengths of over a quarter of a mile, and 1 in 60 for under a quarter of a mile. For stations and sidings, the maximum is 1 in 350.

Steep gradients cause similar complications to sharp curves: increased power consumption; the need for rolling stock with extra reserves of power and braking capacity; greater wear on brake blocks, wheels and rails; wider signal spacing downhill, with a consequent reduction in line capacity.

An exception to the need to avoid steep gradients is the practice of building stations on "humps" so that the up gradient approaching a station helps the train slow down, and the down gradient leaving the station helps the train accelerate. Greathead used this system wherever possible on the City and South London Railway, and, in ideal conditions, it was used at nearly every station on the Central London Railway, with a 1 in 60 decelerating gradient, and a 1 in 30 accelerating. Later London tubes have used this principle where possible. A variation is the "sawtooth" profile with a continuous gentle climb from the foot of the accelerating gradient to the next station. This largely avoids the difficulty with "hump" stations of a train that is halted by signals outside the station having to restart on an adverse gradient. At the conference on "Performance of Electrified Railways", held on 14-18 October 1968. Mr. A.W.Manser, C.M.E.(Railways), London Transport, stated that the extra cost of providing hump stations

(where possible) on the Victoria Line was £5,500, but roundly £14,000 per annum was saved in reduced fuel costs, plus consequential savings in ventilation costs, (because less heat is emitted by the trains).

The gradients of shallow underground railways are more closely governed by those of the surface, but if the surface gradients become too steep to follow, a "deep" section can be constructed, as occurs in the hillier parts of Paris. Of course, even a deep level tube must roughly follow the surface levels, so that tunnel stations are not too deep; in the six miles from Victoria to Finsbury Park, the Victoria Line rises 136 feet.

To Be Continued.....

BAKER STREET - STRAND SECTION OF FLEET LINE

London Transport announced on 18th November 1968 that it is seeking Parliamentary powers for the construction of another new cross-London Underground line - the Fleet line. The new Victoria Line runs generally in a north-east to south-west direction across London. It is planned that the Fleet Line should run broadly at right angles to the Victoria Line, i.e. from north-west to south-east.

A petition for a private Bill to obtain powers for the construction of the first section of the Fleet Line from Baker Street to the Strand, and for the acquisition of land and subsoil on the line of route, will shortly be deposited in Parliament, and notices are being sent to property owners informing them that their properties may be affected if Parliamentary powers are granted. Maps will be available for inspection at the offices of the Westminster City Council and at County Hall.

If powers are granted for the line, the construction will depend on the necessary finance being

made available. It is hoped that Government approval for this new Underground link to go ahead will be received in time for construction work to start early in 1970, following the completion of the main civil engineering work on the Brixton extension of the Victoria Line.

The Fleet Line would take over the Stanmore branch of the Bakerloo Line at Baker Street and the first section would provide interchange with seven other lines on the Underground map. Apart from Baker Street (Bakerloo, Metropolitan and Circle Lines), it would also serve Bond Street (Central Line), Green Park (Picadilly Line and Victoria Line), and a combined station at Trafalgar Square/Strand (Bakerloo and Northern Lines). It is planned to extend the line later via Aldwych, Ludgate Circus and Cannon Street, to Fenchurch Street and under the Thames into south-east London. Detailed plans for the extension are under discussion.

The Fleet Line would make travel to many parts of London and the suburbs simpler and quicker. The first section is designed to relieve serious overcrowding and congestion on the Bakerloo Line north of Oxford Circus and to permit peak services on both the present Finchley Road and Queen's Park branches of the Bakerloo Line to be increased if necessary, which cannot now be done. When extended to Fenchurch Street and beyond, the Fleet Line would also bring considerable relief to many other parts of the system.

Construction of the line would also enable much needed improvement at certain stations to be incorporated in the project. At Bond Street station, where there are at present only two escalators, the peak-hour congestion would be greatly eased by the provision of more escalators. At Strand station, the lifts would be replaced by escalators.

EQUIPMENT CONTRACTS FOR NEW TRAINS

All major equipment contracts for the 35 new six-car trains on order for the Hammersmith & City and Circle lines have now been let by London Transport. The orders, totalling over £2.5 million, are for traction motors, traction control equipment, motor alternator rectifier sets, brake equipment, car doors and door operating equipment.

The £3.5 million order, announced last May, for the bodies and bogies of 212 cars, making up 35 six car trains with spare cars for maintenance purposes, was placed with Metropolitan-Cammell Limited of Birmingham.

The new orders include:-

Traction control equipment	}	- Associated Electrical Industries Ltd. Trafford Park, Manchester, (£1,000,000).
Motor alternator rectifier sets		
Wiring and erection of traction control equipment		
Brake equipment		- Westinghouse Brake & Signal Co.Ltd. Chippenham (700,000).
Traction motors		- Brush Electrical Engineering Co. Ltd. Loughborough (£500,000).
Car door operating equipment		- G.D.Peters, Ltd. Slough, (200,000)
Car doors		- Dialoy Ltd. Cardiff, (£150,000)

Delivery of the new trains, which will be equipped for one-man operation, is due to begin in the spring

of 1970 and be completed in 1971. The cars have four sets of double air-operated doors on each side, wide double-glazed windows, both air and rubber suspension, and loudspeakers for announcements to passengers.

The rolling stock replaced by the new trains will be transferred to the District Line, releasing older cars which will be taken out of service.

THE NORTHERN-CITY LINE

Frederick F. Brown

What is happening to the Northern-City Line which formerly provided a direct service between Finsbury Park and Moorgate; is it going into a decline and where have most of its former passengers gone?

It will be remembered that in mid-October 1964 this line suffered the closure of its Finsbury Park to Drayton Park section in order that its existing platforms at the former station could be taken over and incorporated into the new cross-platform interchange planned for the Piccadilly/Victoria Line services. A special coach service was provided on the surface between Finsbury Park and Drayton Park stations, but this has been withdrawn as from 2nd September this year, the opening date of the first section of the Victoria Line between Highbury and Walthamstow Central.

Before the curtailment of the Northern-City Line route in mid-October 1964, its first and last trains were as follows:-

	From Finsbury Park		From Moorgate	
	<u>First</u>	<u>Last</u>	<u>First</u>	<u>Last</u>
Weekdays	05.38	23.48	05.45	23.55
Sundays	07.15	23.25	07.15	23.39

But from the closure of the Finsbury Park to

Drayton Park section at that time its service has been considerably reduced, especially as regards the early and late portions of the day; and the new times that have been in use up to 1st September this year are:-

	From Drayton Park		From Moorgate	
	<u>First</u>	<u>Last</u>	<u>First</u>	<u>Last</u>
Weekdays	06.47	19.50	07.00	20.07
Sundays	08.55	19.50	09.07	20.07

From the opening of the Victoria Line on 2nd September, the following minor adjustments have been made:-

	From Drayton Park		From Moorgate	
	<u>First</u>	<u>Last</u>	<u>First</u>	<u>Last</u>
Weekdays	06.46	19.52	06.59	20.07
Sundays	08.55	19.51	09.11	20.07

During the same three periods the frequencies of the non-peak services have successively been widened as follows:-

M.-F. mid-day period, from $6\frac{1}{2}$ to 8 and then to 10 minutes.

M.-F. evening period, from 10min. to no service at all.

Sundays to 14.00 period, from $8-8\frac{1}{2}$ to 12 and then to 15 minutes.

Sundays 14.00 to 20.00 from 10 to 12 and then to 15 minutes.

Sundays after 20,00 from 10 min. to no service at all.

The most significant of these service reductions though occurs during the M.-F. peak periods. Up to mid-October 1964 the service for these two portions of the day consisted of 6-coach trains running alternately at 3 and $3\frac{1}{2}$ minute intervals. i.e. 18 trains within the hour in each direction; but as from 12th October 1964 this service was replaced by one of

4-coach trains only, running at intervals of 5 minutes. Since 2nd September of this year this 5-minutes interval has been further increased to one of 6-minutes. This means that the service of 108 coaches per hour that operated before the Finsbury Park closure has now been reduced to one of only 40 coaches per hour.

These successive reductions in service seem to reflect a growing decline in passenger demand which may be of the vicious-spiral type in which a psychological reaction against widening frequencies of service-and possibly of increasing fares as well - results in passengers either finding other means of transport or ceasing to travel at all, if this can be avoided. Another factor which obviously reduces passenger demand is that this Line now has an isolated northern terminus at Drayton Park, having lost its former direct connection with the Piccadilly Line and British Rail trains at Finsbury Park. A somewhat peculiar feature of the latest timetable is that although the last arrival and departure of Victoria Line trains at Highbury on weekdays is 00.21 and 00.44 respectively with somewhat earlier times on Sundays, the Northern-City line connecting service, which connects also with the main Northern Line into South London, down to Morden, still closes down at about 20.00 each day.

The Victoria Line is without any doubt an essential new Tube service and one that is warmly welcomed by the public, but an impartial consideration of all the relevant facts will show that it could just as well have been constructed without disturbing the former Northern-City Line service in any way. The responsible factor causing the disruption of the latter Line and its useful service was solely the plan to provide cross-platform interchange at Finsbury Park for the Piccadilly/Victoria Line services.

It was by no means imperative that this type of interchange must be provided, or that the Victoria Line should serve Highbury; and if the normal type

of interchange between different levels had instead been constructed at Finsbury Park, the Victoria Line could then have followed a shorter route from there to Kings Cross, passing below Caledonian Road and Barnsbury Station (Hampstead and Broad Street Line) if connection with that Line had been considered necessary. This would have involved a curve of about 60 chains radius into Kings Cross.

In its resultant form, severed from its original main suburban feeding-point at Finsbury Park with an isolated northern terminus at Drayton Park and with Essex Road Station closed on Sundays, the Northern-City Line is now unlikely to attract any new custom and its main function will most likely be to become a feeder for the Victoria Line and a route from that Line into Central London. One can only wonder what the official policy regarding this Northern-City Line really is, but there is another aspect of the matter that merits serious attention. This remains as the only Tube line which terminates in the Central London area, and since there has long been a pressing need for additional rail services in South-East London, the possibility of extending it into this area should now receive serious consideration.

SALES NEWS

Under new management the Society Sales Department has now expanded to a total of 33 titles and over 300 books, plus many badges and other items. In addition to those shown in the January List, the following are also available; fuller details will appear with the May List:-

- "100 Years Of The District" by Charles E.Lee - 3s 6d
- "Mersey Rly, Electric Stock" by Cull & Prigmore - 14s.
- "L.T.Railways" (a Chronology) by Bennet & Borley - 10s.
- "Reg. Rly. History - Greater London" by H.White - 42s.

All books are available post free and promptly from

8 the Sales Manager, and a booksale will be held at every Hammersmith meeting.

The Society has already made a reasonable profit from Sales this year and with an increasing turnover more books are being made available. Lists will appear about three times a year, and news of new books and other items will be included in the Journal at all times. Present stock includes most books at present in print on Underground subjects; older books can often be obtained if enquiry is made. The Society and yourselves benefit from a profitable Sales Department, and arrangements have been made with nearly all railway book publishers to supply all transport books. N.M.Davies, 87 Woodland Drive, St. Albans, Herts. is Sales Manager for all enquiries.

THE TIMETABLE

Thursday 6 March 18.00 Library Evening at 62 Devonshire Road Ealing, London, W.5.

Friday 14 March 19.00 for 19.15 Monthly meeting at Hammersmith Town Hall - programme not yet finalised.

Sunday 23 March 10.00 - 17.30 Stand at Open Day, Museum of British Transport, Clapham. The Museum needs Stewards for this event; names of volunteers (who gain free admission and light refreshments, and are wanted for all-day duty) should be sent to the Editor at address below at once. If you can help, please do so as there is a shortage of stewards.

Saturday 29 March 14.00 for 14.30 Annual General Meeting in the Lecture Room, Museum of British Transport, Clapham, London, S.W.4. - see notice on Page 35

Thursday 3 April 18.00 Library Evening at 62 Devonshire Road Ealing, London, W.5.

Saturday 12 April Visit to Golders Green Depot. Names to S.E.Jones, 113 Wandle Road, Morden, Surrey. with sae.

Thursday 24 April 13.45 Visit to Johnson, Riddle & Co.Ltd., printers of London Transport Maps & posters. The works are at St. Mary Cray, and names should be sent to J.Brook Smith, 34 Barnehurst Road, Barnehurst, Kent, accompanied by a stamped addressed envelope.

Lithoed by The Celtic Bureau, 93-94 Chancery Lane, London, W.C.2. and Published by TLURS 62 Billet Lane, Hornchurch, Essex, RM11 1XA.