UNDERGROUND

THE JOURNAL OF
THE LONDON UNDERGROUND RAILWAY SOCIETY

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THE CHANDOS PAPERS

Some time ago the assistance of members was sought to enable the Society to have part of these archives copied on microfilm for the benefit of our students of railway history. But as there have been a number of new members come into the Society recently, it is proposed to repeat the information given previously so that everyone in the Society is in the picture as well.

The Wotton Tramway, which later became the Oxford and Aylesbury Tramroad and later still the Brill Branch of the Metropolitan Railway, was built by the Duke of Buckingham and Chandos and opened in 1871; it was constructed to serve the Duke's own estate, and having been built entirely on land owned or leased by the Duke no Act of Parliament was needed or obtained. As a result of this lack of Parliamentary documentation, the line has always been a very difficult one to research - and quite a large minority of Society members have great interest in it.

Some time after the death of the last Duke, the family archives were sold to America, and are now in the Henry E,Huntington Library and Art Gallery at San Marino, California. It is known that there is a considerable body of material in the Library relating to the building and early operation of the Wotton Tramway, and it is this part of the Chandos Papers which the Society seeks to have copied. An Appeal was launched, aimed at that section of the membership interested in the line, for the necessary funds in donations of not less than £5, and this has had considerable success - the target of not far

short of £100 has come within reach - and now a member has offered to lend the Society the balance required so that an order may be placed immediately.

The Committee has gratefully accepted this offer, so it should be possible to have the copies we want very soon now - but in the meanwhile, to reduce the burden on the lending member, it has been suggested that some members who were interested in the project - but not sufficiently interested to donate £5 or more - might like to make smaller donations. These are now sought, but it must be explained that those who have donated £5 upwards have been promised in return that they may use the copies obtained for their own research purposes before they are made generally available to all members; this privelege cannot, however, be extended to those making small gifts (for this would be unfair to those who have contributed the larger sums).

So, if you would like to help in this very worthwhile project - which is enabling the Society to make a positive contribution to Railway History - please send your donations to the Editor at 62 Billet Lane, Hornchurch, Essex, RM11 1XA, as soon as possible; to save expense, gifts will not be acknowledged unless a receipt is requested.

Further information on the progress of this scheme will be published in Society Notices in future issues of the Journal.

WHITBREAD AND ALDERSGATE

A member has raised an interesting point about the excellent poster of David Knight, which was on display at Underground stations some two or three years ago. This advertised Whitbread's beers and depicted a train in what appeared to be the present Inner Rail Circle Line platform at Aldersgate (now Barbican), with Metropolitan Railway steam loco No 4 at its head facing the Moorgate direction.

To all appearances, therefore, this painting depicts wrong road running, and we have been asked if anyone can provide an explanation, or whether there is no real significance in the seemingly odd situation.

There are, of course, various possible explanations, but what our correspondent wants is, of course, evidence to substantiate whichever is the right answer. Any ideas?

ASPECTS OF UNDERGROUND RAILWAY DESIGN AND EQUIPMENT

Desmond F. Croome

Being the President's Address for 1968

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(5) (continued)

(d) The Level of the Booking Hall

Stations are very often at road junctions, so that a booking office at street level may involve several flows of passengers in crossing a road before arriving at the station. However, once in the station, the passengers should be able to use an escalator for the whole distance from street to platform level.

Subsurface (i.e. "mezzanine") booking offices, with stairwells at the various street corners, allow the safe crossing of roads, but in most cases make the passenger complete the street/booking hall journey by stairway, so that the escalator or lift does not span the whole vertical distance. (In Milan, there are escalators from booking hall to street, coming up into the open air). Another aspect of this question is that such a booking hall acts as a pedestrian subway, and it may be the only possibility in central areas which are fully built up.

With "outside" platforms, the subsurface booking hall can also act as the bridge between the access points for the two directions of travel, so this type of layout is common on shallow lines. However, as the booking hall must come between the tops of the trains and the underside of the road surface, the tracks may have to be deeper at a station than is desirable between stations, which would result in station "dips" instead of humps.

(e) Layout with Lifts or Escalators

The earlier London tubes were kept within the limits of the public highway above; with lifts as the means of vertical transport this usually meant that it was impossible to convey passengers for the whole vertical distance between street and platform. There were two reasons for this. Normally, because of the need to keep beneath the highway, two station tunnels could not be splayed out

enough to make room for lift shafts between them (there were exceptions where the stations were below railway property). Secondly, a lift shaft between the station tunnels would break surface in the middle of the road, so a subsurface booking hall with approach stairs would have been the only possibility. In practice, many of the early tube stations were in side streets, slightly away from the alignment of the lines, so that the lift shafts ended at a lower landing at about tunnel-top height, with passengers and stairways to each platform (or, more commonly, one passageway to the platforms and one from them).

With the more liberal grant of easements to build the tunnels beneath private property, and the introduction of escalators, there was a much greater scope to convey the passenger from street to platform, as the escalator shafts did not have to be parallel to the station tunnels, but could be at any angle, provided that they cleared the tops of the tunnels. Incidentally, Stockholm has some "diagonal-shaft" lifts, parallel to the escalators, for elderly people who dislike escalators, and for mothers with babies.

(f) Interchange Facilities

From the passenger's viewpoint, the ideal method of interchange is cross-platform, either across an island platform or via cross-passages in tunnel stations. In London, the new examples of this facility on the Victoria Line will be familiar to all members, but earlier examples occur at Acton Town, Hammersmith, Barons Court, Mile End, Stratford, Greenford, Queens Park, Kennington, Holborn, Barking, Finchley Road, Wembley Park and Moor Park. At Paddington (suburban) this facility was lost when the tracks were rearranged to isolate the LT trains. Stockholm has a "reverse-direction" interchange at its "T-Centralen" station, so that passengers from the north-western branch can proceed direct to the north-eastern branch.

Cross-platform interchange is practical where the two lines are routed in the same general direction, but to provide such facilities on lines crossing at right-angles would involve substantial additional mileage.

Stairs and passageways provide the alternative, and more usual, method of interchange. These have served well for many years on many systems, and are satisfactory when direct and short. Passengers using the longer interchanges can be helped by escalators or horizontal "moving pavements" (steel-reinforced rubber belts). These indirect means of interchange have the advantage that, during a holdup on one line, passengers can be prevented from gaining access to the platform for that line, to avoid dangerous overcrowding. Also, the compilation of statistics on passenger routeing and interchange flows, and spot-check ticket inspection, are easier where the flows are physically constrained.

Naturally, the more lines that serve a station, the more complex and lengthy become the interchange subways. The planners of the Milan system worked on the basis of a maximum of two lines at any station, but one can envisage there being a traffic objective that is so important that two access lines would not suffice.

Fully-integrated interchange facilities between the rapid-transit line and the road feeder services are essential if public transport is to offer a viable alternative to the private car, but, unfortunately, examples are rare in the United Kingdom. Desiderata include covered interchange without crossing roads, through bookings, and the minimum amount of stair-climbing. Good examples occur in Toronto, Rotterdam and Hamburg, the latter having (at Wandsbek Markt station) a bus dispatcher to synchronise bus departures with train arrivals.

(6) Station Decoration

"Beauty is in the eye of the beholder", and, as in all matters artistic, there is scope for endless discussion on the merits of different decorative schemes.

In making comparisons between the decor of the London stations and that of overseas systems, it is well to bear in mind two effects of the past and present pinch-penny attitude of the authorities towards London's underground. The need to reduce costs and increase revenue has resulted in the construction of small-diameter tube tunnels and

stations, and the allocation of much space to commercial advertising. Striking murals and bold decorative schemes can be impressive in larger stations, but in small stations they can be oppressive. Commercial advertising needs a neutral background , so that comprehensive schemes of station decoration call for the banning, or severe reduction, of advertising. Furthermore, the curved walls of a tube station tunnel would not be receptive to decoration by mural, and the lack of spare space on the platforms precludes the addition of a false wall of modern material, as in the famous Louvre station of the Paris Metro. The need to choose vandal-proof and easily cleaned materials is another factor that tends towards uniformity, and what Anthony Sampson of The Observer has called the "Late lavatorial style" of the Victoria Line. Both he and the architecture correspondent of the Financial Times draw attention to the unhappy results of decorating on a financial shoestring.

Overseas, the Moscow and Leningrad Metros are in a class of their own, and are in effect combined stations and art-galleries. The decoration at each station illustrates a theme, often based on the station's location, e.g. sport is the theme at the Moscow Dynamo station, and the poet Pushkin at Pushkin Square in Leningrad. Marble from all over the Soviet Union has been used, in shades of light grey and pink, dark red with white veins, or pale yellow. Lavish use has been made of porphyry, granite, bronze and ceramics, whilst decorations include gold-leaf, statuary, bas-reliefs, mosaics, and luminous panels of onyx or stained glass. Embossed false ceilings and chandeliers are common. On recent construction there has been a tendency to adopt a more functional approach.

Stockholm has some effective decorations with more modest expenditure. At T-Centralen station, commercial posters have been banned at platform level, and the whole wall space devoted to the station nameplates and decorations in the ceramic tiling. Elsewhere, advertising is closely controlled, and materials used for wall covering include glazed Dutch bricks, porcelain-enamelled steel (with a 470 ft mural at one station) and glass tiles, whilst pillars of coloured concrete are etched by sand-

blasting. Sculptures, bas-reliefs and wrought-iron gates are also incorporated at various stations.

Montreal is another system where each station has completely different architectural treatment. Rosemont station is quoted as having "vertical columns of red and orange tiles, and end archways of bright green concrete, upholding a charcoal-grey ceiling, with hanging, greenish spotlights". There are bold plans for murals of stained glass or enamel, and for paintings and sculptures.

Milan has a different colour scheme at each station, with rubber flooring in a black and blue pattern.

Members will be familiar with the recent accounts of Paris Louvre station being rehabiliated. It is decorated with reproductions of the sculptures, reliefs and paintings which are in the museum above, whilst the false walls and niches are faced with a veneer of Bourgogne stone.

On these systems, one wonders whether the commuter's daily contemplation of art and good design serves to instil a better standard of artistic appreciation and greater civic pride. Perhaps London Transport could include a bold decorative approach in its financial estimates for the Fleet Line, and see whether they qualify for the 75% grant!

Conclusion

There are many other aspects of underground railway design and equipment which have their own fascination - rolling stock design, operation, signalling, power supply, ventilation, lifts and escalators, and finance - but, as mentioned in the introduction, I have selected those aspects which particularly interested me, and I am grateful to the Society for the opportunity to put them on record.

MODERNISATION AT VICTORIA

London Transport announced in April that the old ticket hall at Victoria, used by more than half a million

District and Circle Line passengers each week, is to be modernised to bring it into line with the adjoining Victoria Line hall.

The work, which includes alterations needed for the installing of automatic fare collection, will be carried out without halting the operation of the station. The preliminary work has already begun and the job is expected to take a year to complete.

Structural alterations include the removal of the stairs to the arcade - which runs between Victoria Street and Terminus Place at street level above the hall - to give an unobstructed area in the ticket hall, and the widening of the present narrow stairway from Terminus Place.

The ticket hall layout and arrangements will change as work progresses. The two passimeter ticket offices will be removed and a new office will be built in the position of the present season ticket office in one corner of the hall. Access to and from the platforms will be reversed; passengers going to the trains will use the present exit stairs near the east end of the platforms and passengers leaving will come up to the ticket hall by the present down stairs nearer the west end of the platforms. Two separate banks of automatic ticket gates are to be installed in the ticket hall for incoming and outgoing passengers.

When the work is completed the stairs at the extreme western end of the platforms leading to Terminus Place near the Shakespeare public house, at present used as an exit in rush hours only, will be closed permanently.

A contract for this work has been awarded to the company who carried out the finishing work for the Victoria Line section of the station, Y.J.Lovell (London) Limited, and the cost will be about £60,000.

NEW LT COMPUTER ORDERED

After consulation with John Hoskyns & Co. Limited, London Transport has ordered from International Computers Limited, a new ICL 1904E computer and associated equipment

at a cost of almost £½m.

This is part of a plan to extend considerably the work already handled by computers at LT. At present, the Board uses two computers, an ICL 1902 and an ICL EMIDEC 1100. The latter is to be gradually phased out and replaced by the 1904E when it is installed at the Baker Street offices early in 1970. The Board will then have a dual processor system comprising the 1904E and 1902 processors together with magnetic tapes, exchangeable disc drives and input/output periphals, probably including a document reader; the peripheral devices will be shared by the processors to give flexibility in the development of advanced operating systems.

The new installation will permit a considerable extension of the work at present being done by computer. Current projects planned include an extension to the complex payrolls calculations for the staff of 70,000 and an advanced system for inventory control and re-ordering of stock using an exponential smoothing technique for forecasting demand.

A large proportion of the Board's costing and management accounting data will be obtained from the computer as direct by-products of the stores and payroll procedures. Further developments in data capture and in linking with banks and giro are also envisaged. Substantial economies will result from this programme of development, together with benefits resulting from the production of more comprehensive and up-to-date management information.

MODELLING POLICIES AND PROPOSALS

R.J.Greenaway
Modelling Secretary

Having just taken over the job of Modelling Secretary, I feel that there are two main objectives for which I should work. Firstly, I would like to foster an active modelling section, which should help the second objective - to increase membership.

In order to get started, I would like to know what are the activities of individual members in the L.T. modelling field. To do this, there is a questionnaire enclosed in this copy of the Journal. I would like all members to complete the answers even if they have no interest at all in model railways, and to return them to me without too much delay. Only with background knowledge such as I hope to gain from the questionnaire, can I begin to know what is wanted by the Society's members.

Just over a year ago (March 1968) Joe Brook Smith published in this Journal a request for people to help with a Society layout. The response was extremely poor. However, I am convinced that a working model of some kind for display at exhibitions, will give impetus to the modelling section, and be an admirable advertisement for the Society. I feel that if any progress is to be made in L.T. modelling by us as a Society, rather than as individuals, then we must have both short and long term aims. The short term aim I would suggest is to produce by whatever methods are quickest, a small working layout capable of display, to attract attention at exhibitions. Longer term aims would be twofold: namely, to produce a larger layout of some kind, and to manufacture parts for L.T. rolling stock models, and thus help those who are not prepared to scratch-build. This last point is not as difficult as it sounds, and as I have indicated in the questionnaire, a process is now available, of which I have some experience - and success - of moulding plastic parts easily, cheaply and without any costly equipment. By myself, I can only hope to produce parts for L.T. rolling stock slowly, but with a small team of helpers working together, a fairly wide range of parts for L.T. models could be produced reasonably quickly for sale through the Society. This would, I believe, have a dramatic effect on the "productivity" of L.T. modellers, and would also help to swell Society funds.

Further points which may help to encourage activity in the modelling field are as follows:

1) Circulation of the questionnaire to non-members and ex-members known to have some interest in L.T. modelling, in an attempt to get them interested in the Society.

We cannot afford to wait for prospective members to come to us if we can encourage them to become members by personal advertising in this way. Therefore, I would be most grateful to receive names of any non-members interested in L.T. modelling.

2) Production of up-to-date list of
   (a) items available suitable for use on L.T. layouts;
   (b) drawings published of L.T. stock;
   (c) published articles concerning L.T. modelling.

3) Publication of modelling articles in future editions of the Journal. Conversions of production items or building techniques of specific cars or locos would be invaluable.

I look forward to receiving your comments on the above proposals. Please answer the questionnaire, and write, phone (01-567 1347) or contact me personally at Society meetings if you have any other ideas or suggestions. If this appeal fails, as the previous one did, then regrettably I shall have to assume that T.L.U.R.S. modellers are not interested in collective activity. IT'S UP TO YOU!

METROPOLITAN SIGNAL BOXES IN THE ELECTRIC ERA

E.D.Chambers

This is, quite simply, a draft list of the prefix letters carried by semi-automatic signals controlled from various signal boxes (and ground frames). Members may care to submit further details in amplification.

Box	Letters	
	Original	Later
Circle Line		
South Kensington	L	OR then EF
Gloucester Road	K	OQ then EE
High Street Kensington		EC then ED
Edgware Road	B	OP
Baker Street	A then M	MB
Kings Cross St Pancras	C	OJ
Farringdon	D	OH

Aldersgate	E	OG
Moorgate	F	OE
Liverpool Street	G	OD
Aldgate	H	OB

Hammersmith Line

Hammersmith	H	OZ
Latimer Road		OV
Ladbroke Grove		OU
Westbourne Park		OS
Paddington (GWR)	(V)	-

Extension Line, including branches

Baker Street	A then M	MB
Lords		MC
Swiss Cottage (1964-)	-	ML
Finchley Road	C	MD
West Hampstead	D	-
Willesden Green	E	ME
Neasden South	F	MF
Neasden North		MH
Wembley Park	G	MG
Canons Park		MJ
Stanmore	Y	MK
Preston Road Contractors' Siding	GF (?)	-
Preston Road	-	MZ
Harrow South Junction	H	-
Harrow Station	J	JB
Harrow North Junction	N	-
Rayners Lane	P (?)	P
Eastcote	T	MS
Ruislip	U	MT
Hillingdon	V	MV
Uxbridge	W	MW
Pinner	G	JD
Northwood Hills (1961-2)	-	JE
Northwood (Engineer's Siding)	F	-
Northwood	E	JF
Moor Park	D	JG
Watford Junction	C	JJ
Croxley	B	
Watford	M	JL

Rickmansworth	K	JP
Chorley Wood		JS
Chalfont and Latimer		JT
Chesham		JV
Amersham		JW

DIAMETER OF LONDON'S TUBE RAILWAY TUNNELS - WHY THE FRACTIONAL FIGURE OF 11' 8¼"?

An Extract from an Address given in 1924 by the world-famous Consulting Engineer Basil Mott. Submitted by J.P.Thomas, F.I.E.E.

"Before leaving the subject of tube railways, there are one or two special points in connection with them that may be of some little interest and may not be universally known, as, for example, the question of size. Why are the main line tunnels 11' 8¼" in diameter? The original City & South London lines were 10' 2" and 10' 6" diameter, but this size was a great handicap to the Company, as it did not give really sufficient space for the accommodation of a satisfactory type of rolling stock, and in later tubes the internal diameter was made 11' 8¼" diameter. It is somewhat surprising what a very superior coach this comparatively small increase in diameter gives. There is no scientific reason why the diameter should be the curious figure of 11' 8¼". It arose in this way. In a later tube contract the drawings showed the internal diamater as 11' 6", but the engineers concerned were anxious as to the capacity of such a tunnel to take the rolling stock desired by the traffic department, after allowing for the error of line and level which inevitably occurs during construction. As the contract had been let, it was undesirable to increase the external diameter, and so increase the excavation, etc., and consequently the contract price. After careful consideration it was decided to reduce the depth of the flanges of the cast iron tunnel lining to a minimum. This reduction of the flanges increased the internal diameter to 11' 8¼", the outside diameter remaining the same. All other tubes have been constructed to this diameter as a standard gauge, though I hardly think it is generally realised why such a figure was adopted in the first instance. It reminds one a little of the reason why our standard railway gauge is 4'8½".

"This figure of 11' 8¼" applies of course only to the main line tunnels, and, in some cases, there are as many as eight tunnels and service passages below one street. The station, cross-over and junction tunnels, etc. are of varying sizes up to 30 feet internal diameter and for short lengths the diameter has reached 35 feet".

HAMPSTEAD HIGH-SPEED LIFTS

On Wednesday 18th September 1968, the high-speed lifts at Hampstead station, Northern Line, were taken out of service for what were described as "essential modifications" to be carried out. These modifications were, in fact, the replacement of the air-operated gates by electrically-powered ones. It was the latest event in a series which can be followed back to the tragedy of 18th August 1966, when a small child was trapped between car and landing gates, and was crushed to death as the lift started to go down. After this, the high-speed lifts were out of use for the best part of a year while the doors were modified so that they would not close completely if somebody was in the space between two sets of gates. Other refinements were installed while the lifts were out of use, such as a telephone from the lift car to the booking office, for use if the lift stops while travelling down the shaft. The "Emergency Stop" button was moved so as to be readily accessible while the doors were open.

Since these first modifications, and until taken out of service last September, the lifts had been under manual push-button control from the landing or from the car. The latest modifications, which took about twenty weeks, have meant that the lifts can now operate under automatic control once more.

During the time the high-speed lifts were under the modification programme, passengers have had, once again, to use the older, slower, larger lifts. These take 55 seconds for the journey of 181 feet, as opposed to the 22 seconds taken by the others. Also the larger lifts take a long time to load and unload, thus adding to the delay and to the public's discontent. During rush hours there was no additional capacity available either, for the oldest of the 5 lifts is in a shaft on its own, making rescue work difficult if needed; therefore the lift is rarely used.

BOOK REVIEWS

John R.Day; The Story of the Victoria Line; 122 + vi pp + 16 pp plates, and with several plans and diagrams in text; London, 1969, London Transport Board; price 5/-. Obtainable from the Society.

This book, a companion volume to John Day's invaluable work "The Story of London's Underground", is as concise and erudite as might be expected from an author so well known in the realms of railway literature. Always an interesting and reliable writer, when he is writing on LT subjects he has the enormous advantage of working in the organisation and when the book is an official publication as well the advantages are all there! Needless to say, full use has been made of the opportunity offered to him, and Mr Day has produced an excellent account of the conception, planning and building of the new tube and its rolling stock and equipment. Strongly recommended.

Editor's Note The publication of the above book enables us to give an explanation for the dropping from this Journal's pages of the series "Victoria Line Progress Report". Knowing (but not being able to make public the information) that this book was planned, it was decided to quietly drop the series in these pages to leave the field clear for the expert!

London Transport Locomotives and Rolling Stock; 64 pp including 16 pp plates; London, 1969; Ian Allan; price 6/-. Obtainable from the Society.

"This booklet describes each type of stock used on London Transport Railways and tabulates lists of car numbers in unit formation, grouped by lines on which they work".

This, the first sentence of the foreword to the booklet, just about sums it up. Developed from what used to be called the "ABC", the 1969 edition gives all LT's rolling stock in coherent form together with a good selection of pictures - including some by our own member Ken Harris. The format and layout are both as the last issue, but the contents have altered considerably because of the inclusion of Victoria Line stock.

SOCIETY NOTICES

H.V.Borley Mr. Borley, a Past President of the Society, was elected an Honorary Member of The Railway Club recently. In congratulating him, the Society would place on record his remarkable services to that Club - a member since 1920, Honorary Librarian from 1962, Chairman of the Executive Committee since 1949, and a Trustee also.

London's Termini Another Society Past President, Alan A. Jackson, has written this book, to be published by David & Charles soon. The book contains a chapter on each terminal, notes on signalling and accidents, statistical appendices and a full bibliography. Fully illustrated, it will be reviewed shortly; meanwhile the book may be ordered from the Sales Manager, Norman Davies, 87 Woodland Drive, St.Albans, Herts - price 63/-.

Back numbers of the Journal Will members please note that back numbers of previous years are obtainable from the Sales Manager at the address above; back numbers for the current year are held by the Registrar, S.E.Jones, 113 Wandle Road, Morden, Surrey.

THE TIMETABLE

19.00 Friday 11th July Display of a Selection from the Society Photographic Collection, arranged by the Curator of Photographs, G.P.Jasieniecki. NOTE: DUE TO NO ROOMS BEING AVAILABLE AT HAMMERSMITH TOWN HALL FOR THIS NIGHT, THE MEETING WILL TAKE PLACE AT THE OFFICES OF PETER DAVIS AND PARTNERS, 138 PICCADILLY, LONDON, W.1. Nearest tube station - Hyde Park Corner; then follow the subways to Piccadilly; 138 is 1 minute's walk east of the subway exit.

10.30 Saturday 26th July Photographic Walk over the route of the Brixton Extension of the Victoria Line, led by John Crowhurst. Meet in the Victoria Line Booking Hall, Victoria station, by the commemorative tablet unveiled by the Queen.

Saturday 16th August Visit to Lillie Bridge Depot; names to S.E.Jones, 113 Wandle Road, Morden, Surrey.

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