Table 3A
Other LPTB rehabilitated cars

Car No (1939)	ex	Date of Rehabiln	Met Stg No	Carr	Motors	Depôt at 11/45	Date wdn	Notes
Former Croydon Corporation cars								
376		12/36	780	WT 32Q*	TH	2/45		F
379		12/36	6183	WT 32Q*	TH	1/52		
380		11/36	6974	WT 32Q*	TH	1/52		
398		11/36	6121	WT 32Q*	TH	1/52		
ex-LCC class HR/2 cars								
1884		12/36	6635N	MV 109	CW	4/52		
1885		11/36	727	MV 109	CW	4/52		
1887		12/36	1889	MV 109	CW	4/52		
1890		12/36	3626	MV 109	CW	4/52		
ex-LCC class HR/2 cars repaired after 9/40 bomb damage								
127		1941	11003N	MV 109	CW	10/51		
1893		1942	6164N	MV 109	CW	4/52		

NOTE: * motors made by GEC.
Other notes as Table 3.

By autumn 1938, the North London conversion programme was sufficiently advanced for a tentative programme to be drawn up for South London; it would start in 1940, and be completed in autumn 1944. At this news, the trades unions insisted that all cars due to remain in South London service after the end of 1938 should be given windscreens. The ensuing discussions extended this to autumn 1939 and, to ensure completion by the target date of 7 October 1939, Charlton works increased its output to six cars per week. By 26 May 1939 the screened-car stock stood at 818, with a further 96 still to be done. In the event, the war intervened, and a few open-fronted cars could still be seen in traffic during 1940 and early 1941, while awaiting their turn for works attention. *(to be concluded*

"Rehab" 802 at Charlton works in January 1936. This was one of eighteen such cars which later exchanged numbers with higher-numbered cars; it became 1614" in December 1938. The former 1614, now 802", was withdrawn in 1940 but returned to service in 1944 and lasted until 1951. (London Transport

Tramway developments in Hong Kong

1965

T. V. RUNNACLES

Part 2: Hongkong Tramways Ltd

Introduction

IF a trip on the Peak Tram is obligatory for every visitor to Hong Kong, the same must now be true of the electric street trams which ply the north shore of Hong Kong Island. Not that this was always true; once the tall British-type double-deckers would hardly have commanded a second glance from the average visitor. However, the passage of time has rendered these narrow-gauge four-wheel double-deckers unique (1), and Hong Kong's trams are as much symbols of the city as are red double-deck buses in London or cable cars in San Francisco. Hongkong Tramways now recognises that its fleet is rather special, and has helped to promote the image of its trams. Thus riders can opt to use ordinary trams or ride on an open balcony tour-car, or even take a *"dim sum"* (buffet) tour on a particularly ornate semi-open-top tram.

Company history

The original proposal for a tramway system was formulated in 1881 (2). We have seen how nothing came of these plans apart from the eventual construction of the Peak tramway. However, a second tramway Bill was introduced in 1901 by J.Dalziell and, following the repeal of the original Ordinance of 1883, the new Bill passed into law as the Tramway Ordinance of 1902, which remains in force today, with some modifications, as Chapter 107 of the Laws of Hong Kong. In February 1902, the Hong Kong Tramway Electric Company Ltd was incorporated in England. Before the year was out control passed to the Electric Traction Company of Hongkong Ltd. In 1906, the original company was liquidated and tramway operation was taken over by the Electric Traction Company, which changed its name to the Hongkong Tramway Company Ltd in 1910. In 1922, a new company was formed to take over and operate the system under the present name of Hongkong Tramways Limited (HKT). Although nominally an independent company, its articles of association stipulated that the Chairman of HKT should be the Chairman of the great trading house of Jardine Matheson and Company, and in practice the link between the companies was strong. This remained the case until December 1973, when HKT became a wholly-owned subsidiary of the Hongkong & Kowloon Wharf & Godown Company Ltd (which changed its name in 1986 to the Wharf (Holdings) Limited). Today, HKT is but part of the company's Transport and Terminal Group, which also includes the "Star" Ferry, the Cross Harbour Tunnel, the Hong Kong School of Motoring, the Ocean Terminal and interests in container terminals, container haulage and the air cargo terminal.

The development of the tramway

Tracklaying began in May 1903 to a gauge of 1067 mm (3 ft 6 in), and the tramway opened to traffic on 30 July 1904. Initially services ran from Causeway Bay westwards to Arsenal Street and eastwards to Shau Kei Wan; a branch line served Happy Valley. Shortly afterwards, upon completion of complicated drainage works at Arsenal Street, the service was opened westwards to Kennedy Town. This network is substantially the same today. The only subsequent additions comprised lengthening of the Happy Valley branch in 1914 and its further extension to form a loop in 1922. Finally, in 1929, the Shau Kei Wan terminus was relocated from the junction of Shau Kei Wan Road and Chai Wan Road to the former's junction with Kam Wah Street. Since 1929 the operational network has hardly changed at all, although turning loops have come and gone, as has a depôt (at North Point), whilst the single track with passing-loops that characterised the line east of Causeway Bay was all doubled between 1924 and 1948. In recent years, road works and metro construction have necessitated many temporary and some permanent track

diversions; of the latter the most notable have been the provision of a reserved track along Queensway in 1975, the realignment of tracks on the west side of Happy Valley from 1978 to 1982, the relocation of tracks in King's Road in 1982, and the provision of a new link along Kornhill Road (replacing a section of King's Road at the crest of Tai Koo Hill) opened in 1986.

It is hard today to imagine the character of the tramway in its early years. The main centre of population was the colonial city of Victoria, now simply known as Central District. Other settlements along the route were little more than fishing villages, connected by the tramway in a narrow, almost rural, road along the seashore. Today the entire route is densely built up, the roads are wide and, except for a short stretch at Belcher's Bay, the sea has migrated far to the north through the process of reclamation.

The original service was provided by 26 single-deck cars comprising ten first-class combination cars and 16 third-class cross-bench cars. This fleet provided a basic 15-minute headway on each of three services which overlapped to provide a seven- to eight-minute service between Western Market and Tin Lok Lane. The average daily ridership in 1906 (the first year for which such records survive) was about 19 200 passengers.

The growth of the tramway reflected the development of Hong Kong. By the fall of Hong Kong to the Japanese occupation in December 1941 the fleet comprised 112 double-deck cars (4), and patronage had risen to over 197 000 trips daily. During the Japanese occupation the tramway deteriorated badly and, when British Forces recaptured the colony in August 1945, only 15 cars were being operated and only 35 could move. A power-supply failure immobilised services completely in September, but by October 40 cars were in service. However, it was not until 1948 that the full pre-war service standard was reinstated over the system as a whole.

The 1950s and early 1960s were a good period for HKT. With the influx of refugees from mainland China the population was growing rapidly, and so did tramway traffic. A new tram design had been developed in 1949 and the fleet was expanded with additional cars of this type, whilst all existing trams built up to 1949 were rebodied in the new style. In fact tram construction continued until May 1964, when the fleet totalled 162 passenger cars and a works car. By then the tide was turning, however imperceptibly, against the trams. After continuous traffic growth since 1946, HKT's "high noon" was reached in 1963, when over 523 000 boardings were recorded daily. From that year on there was an overall decline in traffic, and tramway development was soon to come to an end for nearly two decades.

The 1960s and 1970s: studies and uncertainties

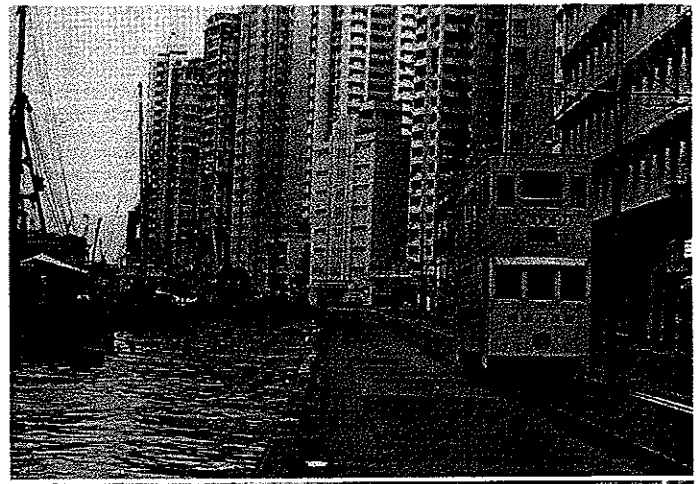
Several factors caused the gradual erosion of HKT's patronage. Most obviously, the growth of bus services on parallel routes was diluting traffic. Buses had operated on Hong Kong Island since about 1921, the first operator being the Hong Kong & Shanghai Hotels Ltd, and the second HKT itself, from 1928 until 1933, when the China Motor Bus Company Ltd (CMB) was awarded an exclusive franchise for buses on Hong Kong Island. Nonetheless, for many years there was enough traffic for both buses and trams to share sustained growth, but by the early 1960s the situation was changing. In 1963 CMB purchased its first double-deck bus, and in little more than a decade virtually the whole fleet had been double-decked, and greatly expanded as well (5). The growth in bus services reflected another change. Until the 1950s most residential development on the Island was along the north shore, adjacent to the tramway. However, this corridor was nearing development saturation, and most new housing was now being provided in other parts of the island beyond the tramway's reach. Thus, not only was the north shore population density declining, but population elsewhere was increasing, and for travel purposes this population was "bus captive". Moreover, the suburban buses also ran parallel to the tramway for part of their routes and, during the off-peak hours in particular, they were diluting HKT's traffic. The buses were faster too, even if somewhat more expensive to ride, and arguably both attributes appealed to the "upwardly mobile" young adults of the time. Increasing road traffic was also impeding tram operation, and the HKT tram, never amongst the fastest of vehicles, was achieving running speeds as low as 4 km/h through Central District by the mid-1960s.

None of these problems was unique to Hong Kong. Other cities had seen their tramways affected by such vicious spirals, but generally many years earlier than in Hong Kong. As it was, the decline was gradual, and perhaps the most surprising feature was that so many people did remain loyal to the trams; even today, a quarter century after the year of peak ridership, travel in absolute terms is still heavy enough to justify the claim that this is the busiest tram system in the world in proportion to its size (6).

The growth of bus services and suburban housing were not to be HKT's only worries. In 1967, the Cultural Revolution in neighbouring China precipitated rioting in the city. Bus crews came out on strike that summer, as briefly did some tramway staff. The lack of public transport encouraged van drivers to offer rides (7). When the troubles ceased, the vans did not go away, and by 1969 they were legitimised as Public Light Buses, seating 14 passengers each. When a halt was imposed on their growth in May 1976, some 1100 of the 14-seat buses were (and are) at work on the Island, and most were running on HKT's corridor. HKT was so concerned about this that as early as 1968 the company wrote to the Commissioner for Transport seeking permission to run its own minibuses, but this request was fruitless, as was a subsequent one seeking compensation for revenue lost by the advent of the minibuses.

Given that road passenger transport was expanding, it would be reasonable to question why HKT did not seek to expand as well. Of course, to a limited degree it did, with the acquisition of 22 single-deck first-class trailers between 1964 and 1967. Nonetheless, major constraints had appeared with regard to depôt capacity, stop capacity and track capacity. Furthermore, questions were being raised about the future of the trams, and the company had doubts about its security of tenure and its profitability.

It was evident that the tramway was almost fully stretched in the 1960s. The Sharp Street depôt housed 162 motor trams, a works car, and (by 1967) 22 trailers. This fleet fitted so tightly that much marshalling had to be done every night to accommodate all the trams. Out on the line the peak period frequency through Central was 124 cars per direction per hour, *ie* one car every 29 seconds (8). As cars were spending up to 47 seconds at stops, the yardstick that headways should equal or



Above: Car 120 is the 1949 prototype of the fleet that has served Hongkong Tramways (HKT) for the past four decades. It is seen here in March 1988 on Kennedy Town Praya, the last section of tramway beside the sea.

Below: Construction work for the Mass Transit Railway put surface transport into some tight spots in the late 1970s. On a dull December afternoon in 1978, HKT 29 tows a trailer over a plate deck in Des Voeux Road Central, followed by a convoy of buses. The trailers were withdrawn in April 1982.
(T. V. Runnacles

exceed dwell time was clearly not being met. Fortunately most loading islands were long enough to enable two or more trams to pick up and set down simultaneously, but the flow of trams could still exceed junction and stop capacity, and it would take only the slightest traffic perturbation to cause trams to back-up into long queues (9). The capacity of stops was a problem for the passengers too; loading islands were necessarily narrow, and any increase in tramway capacity would have required these islands to be widened. It was therefore evident that, in its existing mode of operation, HKT had virtually reached its capacity limit (10).

The security of tenure issue echoed some of the problems faced by British tramways built under the 1870 Tramway Act, notably Bristol. The Tramway Ordinance of 1902 had awarded a 25-year mandate to the tramway, which was later extended to 50 years, but this had expired on 23 May 1952. Section 30 of the Ordinance provided (and still provides) for Government to purchase the tramway at five-yearly intervals after the expiry of the mandate, given six months notice of its intention to do so. At first, this clause presented no threat to HKT because the system was considered to be indispensable. A 1946 report by the Vice-President of the Institute of Transport had dismissed any idea that the trams should be replaced by trolley-buses but, as time went on, the wisdom of retaining the trams came into question. In 1958 G. Charlesworth, a visiting British traffic expert from the Road Research Laboratory, concluded that:

> *"On balance it seems to me that the evidence is against retaining the present tramway system and I recommend that steps should be taken to replace it. Probably the simplest way would be to substitute trams by trolley or diesel buses. It might, however, be worth considering whether the interest of the community might not be better served by the construction of an underground railway system"* (11).

Such sentiments, coupled with concern about its position under the Ordinance, obviously worried HKT, and by 1962 the company was already doubting whether it had a future. Government reassured the company in this regard but, in the early 1960s, a report on the "Central Area Traffic Complex" recommended two schemes, one of which would have required the removal of trams. To examine the feasibility of doing this, a report was made in 1965 by the Traffic Engineering Division of the Public Works Department on "The Future of the Hong Kong Tramway System" (12). This concluded that bus replacement was feasible, but not desirable. Factors affecting this conclusion included the pressure on kerbside space to accommodate additional buses and the cost to Government of terminating HKT's operating rights, as well as the advantages to the users of the tram service.

Two years later another Road Research Laboratory report by E. Dalby (13) confirmed these findings by observing that:

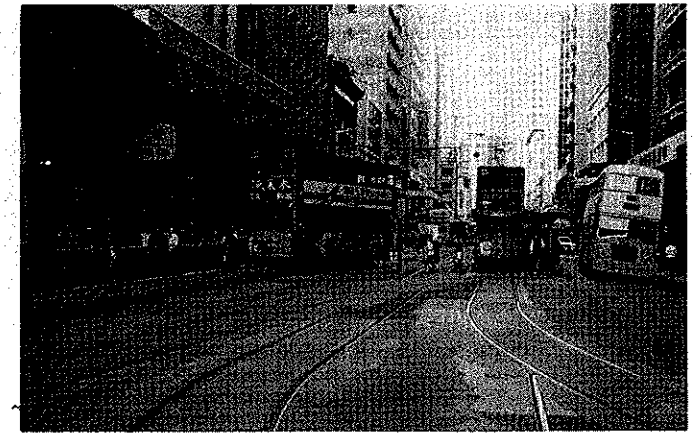
> *". . . the service provided by HKT is better than that given by any other form of transport on the Island, when judged in terms of service provided for a given land use".*

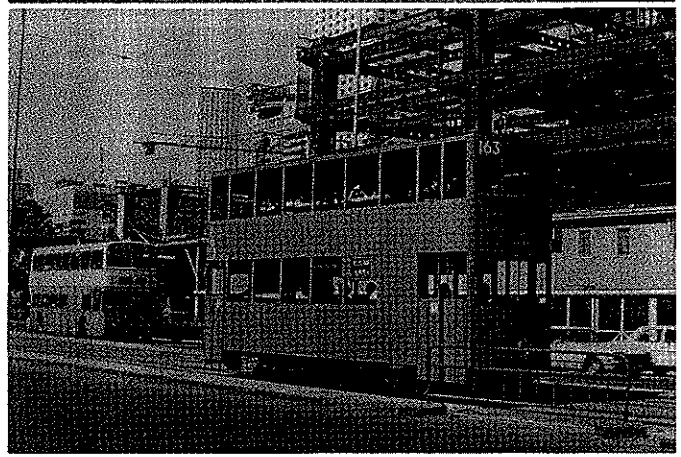
The report recommended several improvements to the tramway, although the only recommendation visibly carried out was the restoration of the turning loop at Causeway Bay (which had been removed in 1953 when a loop was built at North Point). On the future of the trams, the report concluded that they be retained, *"at least until the proposals of the Mass Transit report are implemented"*. The report also suggested tramway upgrading on the European model to increase its capacity.

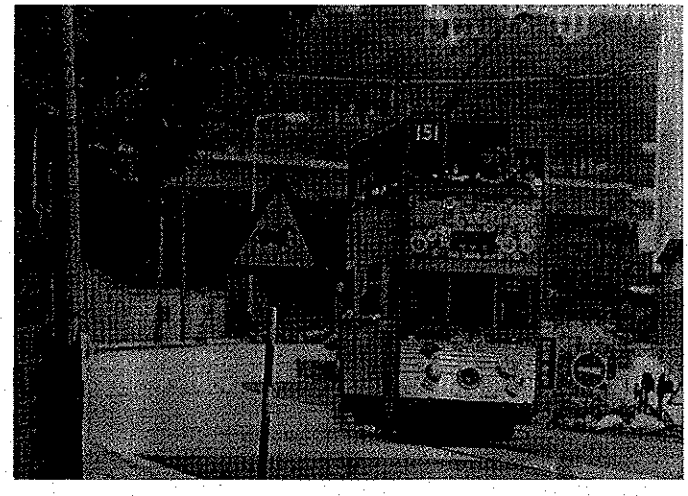
Later that same year, 1967, the "Hong Kong Mass Transport Study" was published (14). This examined three future "systems"; the first comprising expansion of surface transport, the second providing for an elevated/subsurface metro system on urban routes, and the third for a comprehensive network of rapid transit and suburban electric railways throughout the Colony. Systems 2 and 3 did not specifically include trams at all, but System 1 provided for a tramway extension to Chai Wan, a subway through Central District and the relocation of tracks from Johnston Road to Hennessy Road. These were perspicacious recommendations that were destined to re-emerge over a decade later. However, the Mass Transport Study recommended a modified version of System 2, called System 2A, comprising a network of four metro routes in the Metropolitan Area. One of these routes would serve the north shore of Hong Kong Island, and from then on the fate of HKT was in doubt, and remained so for almost two decades.

The 1967 Mass Transport Study was followed by the "Mass Transit Further Studies" of 1969 (15), which identified both "initial" and "full" mass transit systems. The initial system (itself later modified) did not include an Island Line, so for the time being the tramway was not under threat, though a shadow still hung over its long term future.

Meanwhile, HKT was suffering the impact of competition and congestion, and faced the prospect of becoming unprofitable. To offset this, Government agreed that from 1 January 1972 the annual royalty fee should be waived, whilst the abolition of the third-class 10-cent







Above: Metro construction caused many tramway diversions in Des Voeux Road Central. Fossilised rails litter this December 1978 scene.

Centre: The surprise of 1979 was the creation of car 163 from the remains of trailer 1. The new car heads west along Queensway in early November 1979, immediately after entering service.

Below: The Happy Valley loop serves the racecourse, enabling this juxtaposition of tram and road-sign in Wong Nei Chong Road.

(T. V. Runnacles

fare in the lower saloon of trams followed on 1 July that year (16). This not only meant that all passengers now paid the 20-cent first-class fare, but that a conductor could be saved as well, once the trams had been modified to accommodate a conductor's desk at the rear entrance. Although patronage had been declining, the company was still examining ways of making improvements, and studied several proposals from 1970 onwards for the purchase of new or secondhand cars, although all such plans foundered for technical or other reasons.

Up to now, a number of transport studies had been carried out on a piecemeal basis to address individual problems, but in 1973 Government commissioned consultants to undertake a "Comprehensive Transport Study (CTS)" (17). This was published in 1976 and had much to say about the trams and the "Island Corridor" generally. It judged that the existing tram system could achieve a 50% increase in both capacity and speed with extensive improvements to both track and vehicles. The improved system would handle peak directional demands of about 15 000 passengers per hour, but at speeds much lower than those regarded as the criterion for light rail transit status, which would require much more segregation from road traffic.

The CTS developed three options for the Island Line in the 1991 "design year", including both trams and metro, an extended tramway, and a metro with no trams. The Island Corridor was described as presenting "some of the most challenging transport questions in all of Hong Kong" because of its mix of modes and limited road space. All else apart, the Study recommended that no public transport improvements could be carried out without the construction of new bypass roads, including one from Causeway Bay to Eastern District. This recommendation turned out to have an important bearing on the eventual decisions. In concluding its assessment of the Island Corridor, the Study judged that surface transport could cope with the 1991 situation, although it could be greatly improved by construction of the Island Line metro; if this was built, the study concluded that trams could still attract significant ridership *"due to the unique service features of this mode"*. As it turned out, these conclusions proved to be amazingly accurate but, even so, another eight years of studies and arguments were to follow before the situation stabilised.

1977-80: Prospects for tramway upgrading

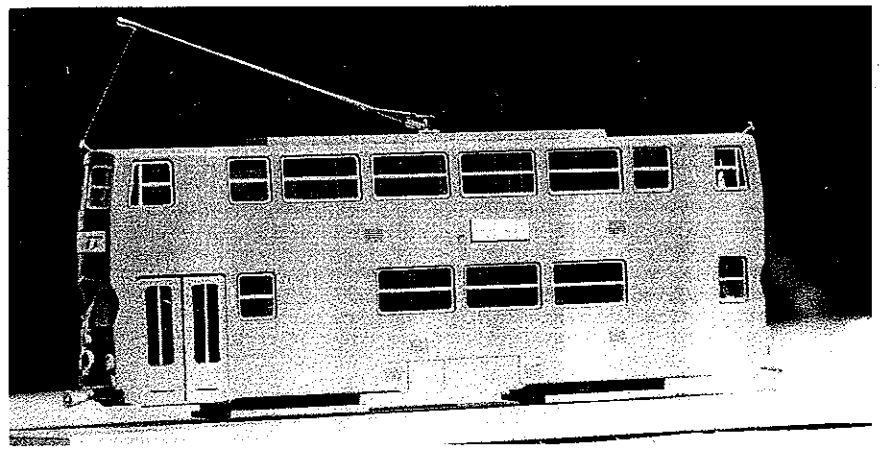
In March 1977, Hongkong Tramways submitted a modernisation plan (18) to Government which would have improved upon the tramway improvement suggestions of the CTS. The plan argued that tramway capacity could be doubled and that an improved system could meet travel demands beyond 1991. The core of the plan was the proposal to replace the existing fleet within three years by 112 new bogie double-deckers, designed for HKT by Duewag of West Germany. By 1991, another 14 cars would be needed, plus 23 more if an extension to Chai Wan could be realised. To achieve a requisite commercial speed of 16 km/h, HKT requested additional tram priorities, and by 1991 priorities were demanded wherever directional flows would exceed 30 trams per hour, as well as traffic signal pre-emption. The plan also proposed the upgrading of the power distribution system and the replacement of Sharp Street depôt by new depôts at Kennedy Town and A Kung Ngan. To protect its risks, HKT sought a 25-year franchise, renewable for two further 25-year periods.

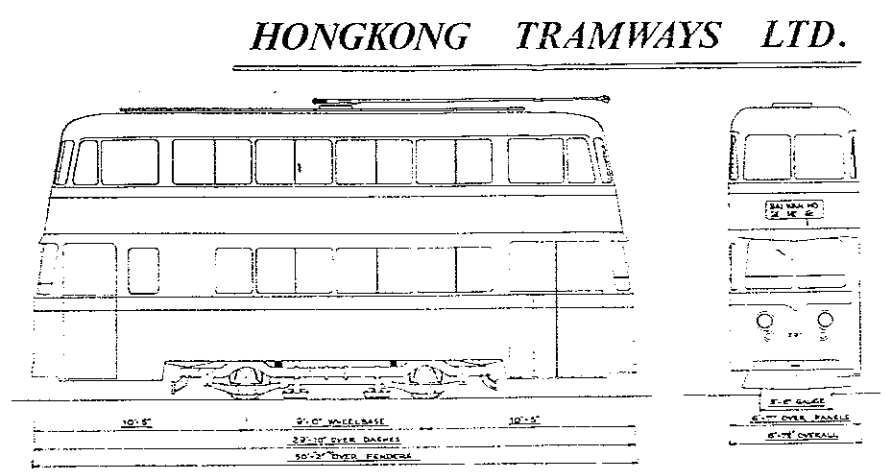
Faced with the non-specific recommendations of the CTS, Government meanwhile commissioned an "Island Corridor Study (ICS)" (19) in April 1977 using staff from its Traffic and Transport Survey Division and advice from Martin and Voorhees Associates. This study investigated HKT's new plan along with three other options, including the Island Line metro, a pre-metro light rail line from Kennedy Town to Chai Wan, and a combination of metro from Central to Kennedy Town and light rail from Shau Kei Wan to Aberdeen (via Central) supported by an express bus network.

The ICS recommended the third of these options, namely that the tramway should be upgraded to LRT standards. It also recommended that the Mass Transit Railway Corporation (the autonomous body established by Government to build the metro system, whose construction by this time was well advanced) should take over the line from HKT. This was because tunnel operation was proposed in Central District, and there was an intention ultimately to place the whole line underground in a progressive implementation of the Island Line. The main features of the proposal included:

- the phased implementation of a light rail transit system and a complementary bus system;
- the first phase would comprise the upgrading of the existing tramway system by early 1981 with about 90 new single-deck LRVs and additional track segregation;
- services in this phase would terminate westwards at Whitty Street, but a track connexion to Kennedy Town would remain, where a new depôt would be built;
- the Happy Valley loop would be abandoned, and in Wan Chai tracks would be relocated from Johnston Road to Hennessy Road;
- in the second phase, by 1984, there would be surface traffic segregation, and a subway would be built from Hennessy Road to Des Voeux Road Central with a cross-platform interchange to the Mass Transit Railway at Admiralty station;
- the line would be extended eastwards, partly in tunnel, to Chai Wan where a new storage depôt would be built;
- the capacity of the line would now be 20 400 passengers per hour per direction;
- the third phase, as and when required, would provide an underground route throughout from Whitty Street to Chai Wan.

Many other features were proposed, including conversion to pantograph operation, raising the voltage from HKT's 500 dc to 750 dc, and the provision of self-service fare collection. Vehicle design parameters were specified, and would have been broadly satisfied by such cars as the Hannover 6000, Bruxelles 7900, and *Stadtbahnwagen M8* types. It was proposed that variable step heights would be provided for low- and medium-height platforms. The 1067-mm gauge would be retained, even into





Above: A model of the austere but rather stylish double-decker designed by Duewag for HKT's abortive 1977 modernisation plan. (T. V. Runnacles

Below: A copy of a poor print of the elevation drawing of a new two-axle tram design for HKT, dated 20 August 1970. Little is known about this proposal, which echoes British streamlined cars of the 1930s, except that "car 201" was never built. (Hongkong Tramways Limited

the fully underground phase (the MTR is 1432-mm or standard gauge). The overall cost of the scheme at 1977 prices was estimated to be HKD 1232.5 million up to 1983, and a further HKD 157.3 million by 1996, mainly for additional cars.

One of the main challenges of this proposal would have been its implementation, including the traffic segregation and additional traffic management measures planned for Phase 2. The technical design of the system also required deeper study. In the early summer of 1978 the Executive Council (Hong Kong's policy making cabinet) agreed to the proposals in principle, subject to more detailed studies of its implementation. Accordingly, further analysis began in October 1978 with the "Island Corridor Strategy Implementation Studies (ICSIS)" (20). This consultancy study was a complex exercise and continued until November 1979, and included two study visits to Europe. The study had two clients, comprising the Highways Office of Government's Public Works Department and the Mass Transit Railway Corporation (MTRC). The final report was a document of eight volumes, and the recommended strategy included several important differences from the earlier ICS. These included the deletion of the Kennedy Town depôt proposal and the provision of a counterclockwise loop on Connaught Road West and Des Voeux Road West in the first phase. This phase would also have a tunnel under Central, with its western portal on Connaught Road Central near Western Market. The Chai Wan link and depôt would also have been provided in the first phase, and Chai Wan would be served, initially by a spur, and ultimately by a single-track clockwise loop on an alignment previously reserved for the proposed HKT extension. One particular problem caused during the study was the deferral of a decision about the bypass road in Eastern District; this meant that the traffic management measures and track alterations had to be planned on the presumption that the new road would not be available, and this undoubtedly placed the credibility of the proposal under some strain.

One of the more controversial innovations proposed by ICSIS was that the tramway should be regauged to 1432mm, to permit the operation of 2.65-metre wide LRVs and to be compatible with the MTR system. This would have meant that much of the tramway would have been relaid with mixed-gauge track; even though mixed operation by HKT cars and LRVs was not proposed, the track would have to be relaid to allow for an overnight changeover from the existing to the future form of operation. In fact, the first phase would have been carried out in stages, with the HKT cars retreating westwards as light rail operation advanced from Chai Wan. Even the HKT cars would have had to undergo certain changes in their final years, including modification to full double-ended operation. Initially, consideration had been given to the provision of pantographs or bow-collectors on HKT cars to enable their interim use of the new overhead wiring proposed for the light rail operation, but the final report recommended retention of the tramway wiring underneath the LRT wiring, where necessary, until the conversion night.

Car designs for the light rail operation included various options for eight-axle or six-axle articulated units, or four-axle cars operating as twin-sets, and ultimately reinforced by trailers. Initially, trains would have been about 56 metres long, comprising two articulated units or four bogie cars, but by 1991 the expected maximum hourly directional demand of 28 000 passengers would have warranted 85-metre long formations of three eight-axle or four six-axle articulated cars, or trains of six four-axle cars. Ultimately, were the entire line to be placed below ground, trains of LRVs up to 146 metres long were proposed, though by then conventional metro stock would be sharing the service and would eventually have displaced the light-rail stock altogether.

Phase 1 of the scheme was expected to start operation in 1983 with 56-metre trains. Phase 2 was timed for 1991, when demand was expected to warrant the provision of more cars to provide the 85-metre trains. There was much debate about the likely date when the completely-underground Phase 3 would be needed, and estimates ranged from 1998 to 2010; though, if traffic did not grow as expected, it would not have been necessary at all.

When work on ICSIS concluded, it was quite obvious that converting a very traditional narrow gauge tramway into the world's most capacious and possibly fastest in-street light rail system (21) would pose challenges quite unmatched anywhere—especially as this was proposed amongst the world's highest urban densities and appalling traffic congestion (22). Whilst the scheme's advocates had no doubt that it could be achieved, many observers remained sceptical. Worries were expressed about the need to co-ordinate everything from utility diversions to the relocation of costermongers, not to mention the concern that the track alterations in Eastern District would now have to proceed before the bypass road was built. The MTRC, though a client for the project, was also troubled, not only about all these problems, but also because it feared that population growth would occur more rapidly than predicted (23) and so accelerate

the need for a completely underground line. Thus, even before the final report had been issued, the MTRC began separate studies of a conventional metro on the Island. At first this was conceived as a "short" island line from Sheung Wan (Western Market) to Tai Koo.

The MTRC Board met in March 1980 and supported the metro proposal, noting that it could be ready almost as soon as the light rail scheme and could be built in bored tunnel (rather than cut-and-cover) to minimise disruption. Moreover, its cost could be offset, as on the initial MTR line, by property development. At first the Government still preferred the light rail option, and fought a rearguard action by developing its own "short light rail" scheme which would have involved, initially at least, a surface standard-gauge LRT line from Chai Wan to Central, where it would make an end-on interchange with HKT's trams. This scheme was soon heard of no more and, as 1980 advanced the arguments about the preferred system were batted to and fro. Ideas came and went, including, briefly, a variation on HKT's upgrading plan; this stimulated a proposal from HKT itself in August 1980 for tramway modernisation with standard-gauge single-deck cars, although by the following month the company was back to 1067-mm gauge proposals using 2.2-metre wide single-deckers. The length of the Island Line varied too, and "short", "long" (Sheung Wan to Chai Wan) and "full" (Kennedy Town to Chai Wan) options were all debated. Eventually, and after more detailed analysis, the light and heavy options were presented to the Executive Council on 23 December 1980. The respective costs of the schemes were almost HKD 7000 million for the Island Line from Sheung Wan to Chai Wan and HKD 2400 million for the light rail line from Whitty Street to Chai Wan. However, the light rail scheme would also have involved additional costs, equal to half the basic project estimate for traffic management and road construction work; conversely, the Island Line was expected to recoup almost half its costs in land development premia. These factors closed the gap between the two proposals, and it was not unexpected when the Council ruled in favour of the Island Line, and ordered that construction of the section between Chai Wan and Admiralty be accelerated by 12 months for completion in mid-1985. Ironically, at the same meeting, construction of the Island Eastern Corridor Road (now, in 1988, called the Eastern Expressway) was authorised.

Thus, after, years of debate and study, the light rail scheme was abandoned, and construction of the MTRC's Island Line was authorised. It will never now be known whether the light rail proposals would have been workable or not, although, ironically, certain elements of the surface priority proposals were shortly to be applied to the HKT system, not perhaps so much to help HKT as to assist traffic management and promote road safety. But, for Hongkong Tramways, the Island Line decision clouded the future of the system as never before. The four years from the autumn of 1980 to the autumn of 1984 were to be the bleakest period in HKT's postwar history. *(to be continued*

References and notes

(1) The last comparable narrow-gauge two-axle double-deck cars were operated in Birmingham, which abandoned its tramways in 1953. The last two-axle double-deckers in regular service outside Hong Kong were in Barcelona, where they ceased operation in 1963. Today Hong Kong has the only all-double-deck tram fleet in the world, and Blackpool is the only other operator which runs double-deckers in regular commercial service, though purists may argue that Detroit's solitary ex-Burton and Ashby car also qualifies.

(2) The main source of historical background is "Hongkong Tramways" by Atkinson and Williams (*op cit* ref 1 in Part 1). However, another history is provided in Barnett, M., "Tramlines: the story of the Hong Kong tramway system", (South China Morning Post Publications, Hong Kong, 1984). Readers are cautioned that, though this contains some interesting additional material, its analysis of recent years is certainly inaccurate, and this must cast some doubt on the veracity of the book as a whole.

(3) For a detailed history of the present parent company see Hutcheon, R., "Wharf, the first hundred years" (The Wharf (Holdings) Limited, Hong Kong, 1986).

(4) Appendix I of "Hongkong Tramways" by Atkinson and Williams implies that there were 109 cars in 1941, but letters from HKT's General Manager, written just after the liberation of the Colony in 1945, state specifically that there were 112.

(5) At the end of 1963, CMB had 327 single-deck and 31 double-deck buses. By the end of 1975 the fleet comprised 50 single-deck and 579 double-deck vehicles. The fleet as at the end of March 1988 consisted of 1015 double-deck buses and two single-deckers.

(6) According to "Jane's Urban Transport Systems 1986" the Dalian system in China was busier, with 104 cars carrying 600 000 passengers daily over 14.8 km of route. However, evidence from visitors to the Dalian system makes it difficult to believe that Dalian is anywhere near as busy as the HKT system.

(7) These were dual-purpose (passenger and goods) motor vans. In practice they were used mainly in the passenger mode. Many had been operating illegal passenger transport before 1967 in rural areas; these were colloquially known as "New Territories Taxicabs", but in practice they ran fixed-route minibus services.

(8) Published figures for HKT headways between Western Market and Tin Lok Lane vary from 24 to 34 seconds. In detail, HKT service patterns are complex, the basic schedules being overlaid with extra cars according to traffic demand: see Blee, I., "The Hong Kong Beat", *Modern Tramway* Vol 42 No 497, May 1979.

(9) For excellent colour photography of this and other HKT characteristics see Jones, M., "Tram Jam: the Hong Kong Tram Collection" (Presstram, Hong Kong 1984).

(10) Former HKT General Manager John Salmon half-seriously suggested to the author that tram loading-islands should be double-decked, and that the trams should have entrances and exits on both decks to speed boarding and alighting (as is the case with most of Hong Kong's ferries).

(11) Charlesworth, G., "Report on roads and traffic in the urban areas of Hong Kong, June 1958" (Road Research Laboratory Research Note RN/3296/GC, August 1958 (unpublished)). Charlesworth recommended that the trams be replaced by AEC "Routemaster" motor buses or 70-seat double-deck trolleybuses of the type then operated by London Transport.

(12) Traffic Engineering Division, Civil Engineering Office, "Report on the future of the Hong Kong Tramway System", Public Works Department, Hong Kong, October 1965 (unpublished).

(13) Dalby, E., "The Hong Kong Passenger Transport Survey" (Road Research Laboratory, Hong Kong, 1966).

(14) Freeman Fox, Wilbur Smith and Associates, "Hong Kong Mass Transport Study" (Hong Kong, 1967).

(15) Freeman Fox & Partners, "Mass Transit Further Studies Final Report" (Hong Kong, 1969).

(16) Price, J. H., "One class trams: rationalisation in Hong Kong" (*Modern Tramway* Vol 36, No 424, April 1973).

(17) Wilbur Smith and Associates, "Hong Kong Comprehensive Transport Study" (Government Printer, Hong Kong, 1976).

(18) Hongkong Tramways Limited, "Proposal for a modernised tramway system", March 1977 (unpublished).

(19) Traffic and Transport Survey Division, "Island Corridor Study, Final Report", Data Record No LC43, December 1978.

(20) Martin and Voorhees Associates, "Island Corridor Strategy Implementation Studies", Final Report (Hong Kong, 1980).

(21) If green-wave signal programmes could be applied successfully, the design speed would have been 25 km/h, including stops.

(22) The traffic congestion factor was a matter of serious concern by late 1979, especially on King's Road in Eastern District.

(23) At this time Hong Kong was experiencing a massive influx of illegal immigrants from China and refugees from Vietnam. Some end of century projections predicted 12 million people in the Territory. The tide of illegal immigrants was stemmed shortly afterwards and much more modest population forecasts now apply.

Heritage Column

J. H. PRICE

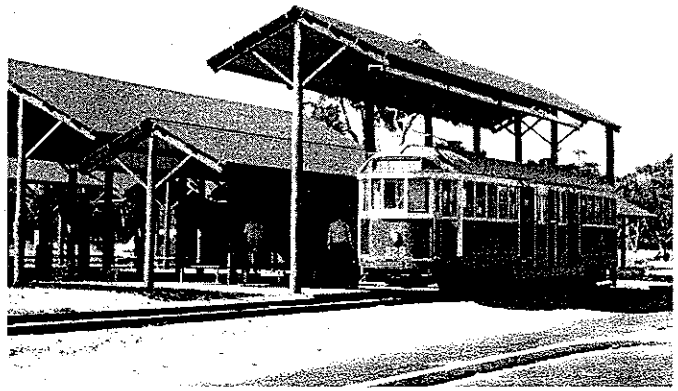
WHITEMAN Park, near Perth in Western Australia, is a huge 2630-ha country park northeast of the city, created by the State Planning Commission for conservation, education and family recreation. It takes its name from stock-breeder Lewis Whiteman, former owner of the land, who built up a collection of antique farm machinery and opened up the area for family picnics and farm visits, prior to sale. The new owners are creating a nature trail, cycleways, a Leisure and Trades village with craft workshops, a farm education centre and a bus museum, plus archery, shooting and two proposed golf courses.

Most of Whiteman Park is closed to cars. Visitors are expected to leave their vehicles at the 1500-car park inside the main entrance at Youle Dean Road, Caversham. Once inside, they can walk, cycle or take a tram. The tram links the entrance with the Trade Village and the Central Station, where they can change to a 610-mm gauge steam train for a 4.6-km trip through the bush or a 1.3-km ride to the Mussel Pool picnic area. The tramway is 2.5-km long, with a separate branch to the depot shared with the railway. A longer 12-km train ride will be offered when the park is fully developed.

The tramway, built and funded by the Commission with assistance from federal government unemployment relief funds, runs on Saturdays, Sunday and public holidays all the year, and daily during school holidays. Midweek operation is by (paid) park employees, but at all other times the line is run by volunteer members of the Perth Electric Tram Society, which owns the cars and paid for the depôt, workshop and car restoration, helped by private benefactors. Cars run every 15 minutes from 09.30 to 16.30, returning from Central until 17.15 hrs.

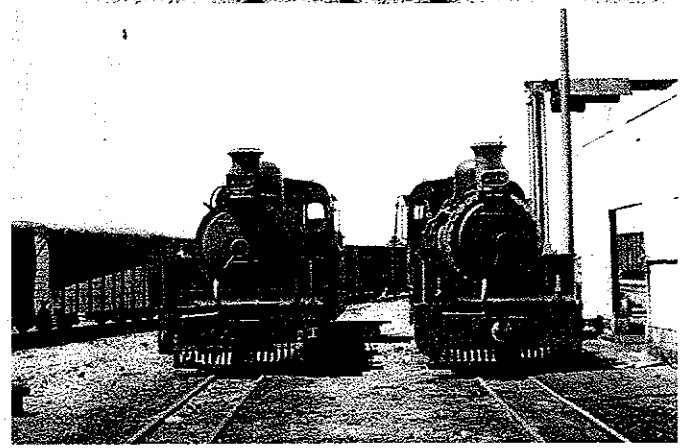
Tramway preservation in Perth began in 1974 and was described in our issue of March 1980. Western Australia's three electric tramways (Perth, Fremantle and Kalgoorlie) were of 1067-mm gauge, like the railways, but the park tramway is standard-gauge so as to use equipment from Melbourne. The group's first storage site was at Castledare Boys Home, but it suffered from vandalism, and the society was happy to join the Whiteman Park project in 1982; a depôt was built in the park and the cars moved to it in August 1983. The running line was built in 1985, and electrified by mid-1986.

The working fleet consists of four Melbourne cars, **W2** type 329, 368 and 393, and **W4** 674; a Melbourne works car was acquired as a source of trucks and parts for Fremantle 29. The sixth working tram is Ballarat 31; there are five other car bodies (three Perth, one Fremantle and one Kalgoorlie) awaiting restoration, if and when required, and Perth's sister city in Japan, Kagoshima, has generously donated two pairs



Above: Melbourne 329 (type W2) at the main entrance to Whiteman Park, Western Australia, on 30 December 1986. (M. R. Taplin

Centre: Central station, Whiteman Park on 30 December 1986, showing the tram on the right and the twin tracks of the 610-mm (2-ft) gauge railway. (M. R. Taplin



Below: The narrow-gauge railway at Whiteman Park, Western Australia, has two former South African 2-8-2 engines of class NG 15 (SAR 118 and 123). The 17 engines of this class, two of which are seen here at Port Elizabeth (Humewood Road) shed in 1978, were built by Henschel and Franco-Belge (La Croyère) in batches between 1939 and 1957. (J. H. Price

routes on 30 September 1950. The intention was that, as each depôt was converted, the best cars would be transferred elsewhere and the oldest survivors withdrawn.

It quickly became clear that no such respite was to be given to the "Rehabs"; indeed, 839 and 947 were specially drafted in to serve as the last cars in Croydon and Streatham respectively, to ensure that the regular cars remained undamaged for re-use. 35 of them were withdrawn in stage 1; of these, 32 were burned and three became staff canteen and cloakrooms at Penhall Road (1727 and 1730/62). "Rehab" 1656 was the first to be burned, on 2 October, apart from two cars incinerated previously to satisfy the fire brigade. Another 25 went in stage 2, 38 in stage 3, seven in stages 4/5 and all the rest (31 of them) in stage 6 in January 1952, together with the last 45 unrebuilt E/1 cars. By February the class was extinct, even though London's trams still had five months to run.

The "Rehabs", when newly overhauled after the war, were considered by some to be the best-looking and perhaps the most comfortable cars in the fleet. Their simplicity of design, together with their robust form of construction counted in their favour, and they were an excellent example of how the traditional British double-deck tram could be economically but effectively rejuvenated to stand comparison with more modern vehicles, including the trolleybus and bus. In terms of numbers, they were far more significant historically than the updated cars in Leeds and Liverpool or the isolated examples elsewhere. Charlton's 1935 achievement deserved to be commemorated but, although George Cohen and Sons were quite willing to sell trams from Penhall Road yard, no offers were forthcoming and it seemed until recently that the class would be represented only by photographs and models.

Today, the members of the LCC Tramways Trust are working hard at Bonwell Street workshop in East London to recreate a "Rehab" from the surviving parts of standard London E/1 tram 1622. This car was withdrawn in June 1940 from Poplar depôt and spent the war stored in Hampstead, until sold in 1946 for use as a garden summer-house near Haslemere. Critics have said that, since 1622 was never rehabilitated, it is wrong to make it into a "Rehab" now, but a study of the fleet list accompanying this article will show that many numbers in the 1600 group were carried by rehabilitated cars, and this suggests that if the original 1935 plan to rehabilitate 250 cars had been completed, 1622 could have been eligible, either directly or through the renumbering process. If so, it can be argued history is simply being implemented, if a half-century late.

The authors have, as far as possible, ensured that the information in the text and tables is correct, but will be pleased to know of any errors or omissions. Particular thanks must go to Mr A. J. Wills for the great help that he has given in searching out some of the more obscure pieces of information, to Mr G. W. Morant for the use of his late father's notes, and to the East Anglia Transport Museum, the Public Record Office, the British Museum Newspaper Library, the London Transport Museum and the Greater London Record Office. Others who have assisted include Messrs G. E. Baddeley, J. B. Barrie, R. Elliott, F. P. Groves, I. Ross and C. S. Smeeton, with some additional information and notes kindly supplied by Messrs J. H. Meredith, J. H. Price and W. J. Wyse. To anyone whose name has been inadvertently omitted, we tender our apologies and offer our thanks for their assistance.

Tramway developments in Hong Kong

T. V. RUNNACLES

Part 3: Hongkong Tramways Ltd (continued)

Ebb tide — 1980-4

IN late 1980 Hongkong Tramways Limited faced an uncertain future. It was already two years since the Island Corridor Study had recommended that the system should be upgraded and taken over by the Mass Transit Railway Corporation. Whereas the tramway itself would have survived in modified form, Hongkong Tramways would no longer be operating it. Consequently HKT reduced maintenance to the essential minimum and turned its attention towards the proposed new system in Tuen Mun, negotiations for which had begun with HKT's parent company in April 1979.

But as 1980 drew to a close it was evident that the creation of an LRT system from the Island tramway was unlikely to be adopted after all, and this was confirmed in December by the Government's decision that the MTRC's Island Line should be constructed. The Island Line was to pose several problems for HKT. Whereas initial traffic forecasts suggested that there would be enough traffic to justify all modes in the Island Corridor, there was soon a suspicion that there would be a surplus of capacity. If this was to be the case, two rail systems in the same corridor looked unnecessary, and suggestions surfaced that the tramway should be abandoned once the Island Line opened. Even so, in the meantime travel demand was increasing rapidly and there was an urgent need to provide all possible capacity in the years up to 1985, when most of the Island Line would open. This meant that HKT had to keep going until then, even if there was no call for the trams afterwards.

In the autumn of 1980 both HKT and Government had considered modernising the tramway, the proposed Island Line notwithstanding. However, the Government did not pursue this issue when the Island Line was considered in December. But HKT clung to its proposals to modernise (1), and in January 1981 the Chairman of the parent Wharf Company, Sir Yue-kong Pao, demanded that Government should reach a decision on a modernised tramway within six months, adding that, if his proposals were not accepted, he was not prepared to keep the system going up to 1985.

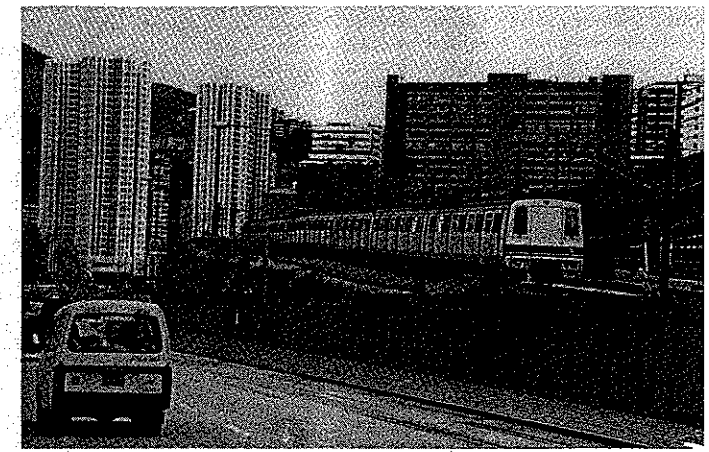
January 1981 was to prove a difficult month for HKT. Reference has previously been made to the chaotic traffic congestion that plagued King's Road on the island corridor to the east of Causeway Bay. In an endeavour to alleviate the short term problem the Government's Transport Department had developed a bold scheme to provide both kerbside bus lanes and centrally-located tram lanes in each direction almost throughout from Causeway Bay to Shau Kei Wan. Stage 1 of this scheme had introduced short stretches of bus and tram priorities at Quarry Bay in August 1980, but the implementation of the full scheme (stages II and III) on 30 December 1980 actually worsened a situation that was already dire. General traffic was effectively reduced to one lane in each direction, and this made journey times much longer than before. The buses in their bus lanes suffered too, being trapped by traffic on the offside lane. With westbound morning peak bus flows of up to 212 double deckers per hour, travel to Central District had never been slower. Only the trams benefitted as they glided past the strangled traffic. But it was a pyrrhic victory; a celebrated helicopter trip over the King's Road by Alan Armstrong-Wright, the (then) Commissioner for Transport, left him antipathetic towards the trams. Looking down upon the chaos below, he was unconvinced that the apparently empty tram lane was being efficiently used, even if it was carrying 10 000 passengers an hour or more. It came as no surprise that the scheme was soon reduced in scope, and that the tram suffered the most.

HKT was not helping itself during this difficult period. Its ageing equipment let the system down on the evening of Friday 16 January 1981 when rotting feeder cables set off a gas explosion in North Point. The following Saturday morning eastbound trams were turned back at Causeway Bay, and observations showed that King's Road traffic was moving faster without the trams. The Commissioner for Transport immediately sought in-house studies of permanently truncating tram services at Causeway Bay or North Point. With Hong Kong about to receive its first 170-passenger 12-metre-long double-deck buses, he also initiated a study to see if the trams could be replaced entirely by *trolleybuses*. Metro-Cammell-Weymann obligingly offered a trolleybus version of its 12-metre leviathan. The studies (2) rejected tramway truncation or abandonment, as bus or trolleybus replacement would not be economic for the five years up to the opening of the Island Line. Moreover, the inadequacy of kerbside loading space would render the absorption of additional buses impractical. Bus or trolleybus operation on the tramway formation was also considered, but buses would have been far too wide to make the idea feasible — for once the slim profile of the HKT car was to be a virtue rather than a capacity-constraining curse!

After considering Sir Yue-kong Pao's January ultimatum, Government rejected his modernisation proposal in May 1981, having braced itself for a possible pull-out by HKT with the idea of having the trams operated by an MTRC holding company. However, HKT softened its stand, and agreed to rehabilitate the system and the cars, though Government required that there should be no outward evidence of modernisation. The curious result was that the tram fleet was refurbished almost to the exact appearance of thirty years earlier. No such strictures applied to the rival China Motor Bus Company Ltd, which was acquiring large numbers of motor buses with full Government encouragement: these comprised both secondhand "Fleetlines" from London Transport and new vehicles, including the first batch of 12-metre MCW "Metrobuses". It was evident that the different treatment of the two companies in the pre-Island Line period inherently *presumed* that HKT's future was limited. The company had as much as said so itself, and most other development schemes made little or no reference to trams after the mid-eighties. By way of example, the Station and Transport Integration Committee for the Island Line rejected direct access between tram platforms and mass transit stations, whereas the MTRC's own schemes for property development above Causeway Bay station showed no tramway.

At the end of 1980 HKT had sought a general fares increase, and this was eventually authorised to take effect from 1 August 1981. The 30-cent adult fare introduced in December 1975 soon became a bargain with inflation, and traffic had been growing for several years. However, the increase to 50 cents drove many tram passengers either to walk or to use the buses. As a result, patronage fell from 459 700 boardings a day in July 1981 to 382 000 boardings a day in June 1983, when another 10 cents were added to the fare with a similarly unwelcome effect.

Having obtained HKT's agreement in principle to rehabilitate its system, in October 1981 Government sought to enshrine this in an amendment to the Tramway Ordinance and a memorandum of agreement. At the same time, detailed investigations began of a complicated land exchange deal



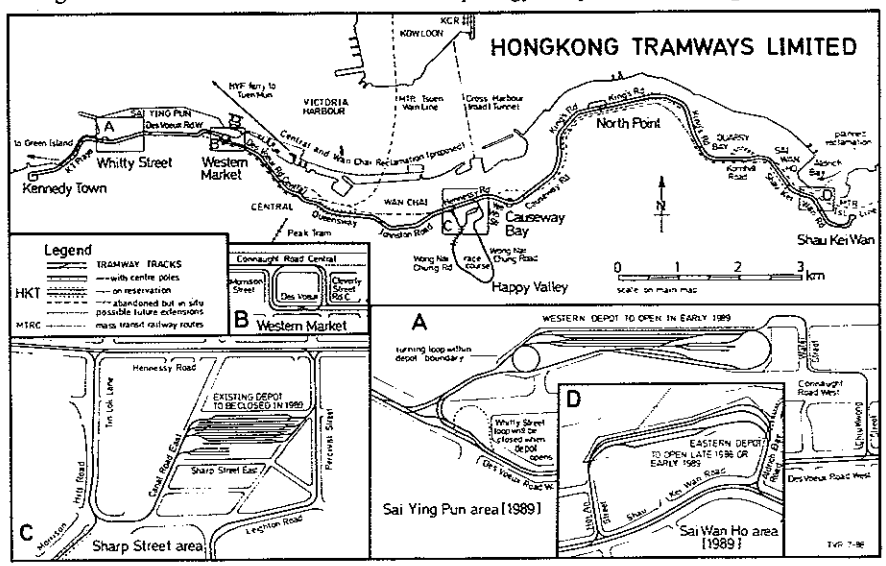
A train on the MTR Island Line emerges into daylight as it approaches Chai Wan on 5 July 1988. The Island Line thwarted HKT's aspiration to reach Chai Wan, but did little to harm the traffic on the existing tramway.
(T. V. Runnacles

which would have ceded HKT's Sharp Street depôt to the Mass Transit Railway Corporation in exchange for the South Camber Site in Kowloon where the Wharf Company sought to build a pier for ferries to China. It was the enticement of this which had earlier tempted the Wharf Company to climb down on its modernisation plan. In the event, discussion about both the Tramway Amendment Bill and the land exchange deal was destined to drag on into early 1984, and neither came to anything. Nonetheless, even without a memorandum of agreement, HKT put its rehabilitation into effect in the form of a three-year programme from 1982 to 1985. Although intended merely to prolong the life of the system up to the mid-eighties, in effect it was to render the tramway fit for a longer future, if necessary.

Despite rehabilitation, the system saw its first significant rolling stock withdrawals in April 1982, when the fleet of 20 Metal-Sections trailers was condemned *en bloc*. They were broken up at Sharp Street in July that year, and caused Transport Department to query whether HKT was abiding by an undertaking it had given not to reduce capacity. The company responded that the trailers actually impeded tram speeds, and that their withdrawal would increase capacity by increasing average speeds. HKT was correct, as the 36 trams equipped to haul the trailers had never been provided with the more powerful motors originally intended for them. The scrapping of the trailers also saw the demise of HKT's last conductors, most of whom had been redeployed or dismissed during the 1977 one-man conversion scheme.

As the trailers awaited dismantling, Government began a study of how to develop an integrated transport system after the opening of the Island Line. "Diptrans IV" was this study's name (3), and work began in June 1982 by a team of Transport Department staff and seconded consultants. Diptrans IV confirmed that the Island Line would create a surfeit of capacity, and its task was to determine how best capacity could be tailored to demand. When the study results became available in April the following year it emerged that capacity could best be balanced by closing the tramway or curtailing the activities of public light buses. The study argued that the CMB bus network should not be reduced — indeed, additional routes were recommended to feed the new underground railway. Whereas the study took no sides on the issue of tramway closure, and was at pains to point out that social and other issues would have to be addressed, its overall tenor did nothing to suggest that trams would have a viable future in the post Island Line era. Indeed, it forecast that HKT would probably lose 30% of its traffic on the opening of the Island Line, equivalent to a loss of 116 000 trips a day.

But in 1982 these findings were still in embryo. During that autumn, the residents of North Point were presented with the curious spectacle of a third tram track being laid along King's Road. This was to comprise the latest version of the public transport priority scheme which had failed so ignominiously early the previous year. This time it was thought out more rigorously, and featured a quasi-gyratory scheme for general traffic



using King's Road westbound and Java Road eastbound. This would leave just buses and trams using a key length of King's Road eastbound. To provide the requisite westbound traffic capacity, the original westbound tram track was abandoned; westbound trams henceforth were to use the eastbound track and a new track was laid for eastbound trams. The whole process took several months to complete and involved some night possessions to enable new junctions to be laid to and from North Point terminus. For a system which apparently had only three years left to run, the amount of new construction involved was remarkable; moreover, it was being done at Government's expense. The new scheme was completed in December 1982 and proved highly successful.

By the autumn of 1982, "closure scenarios" were already emerging from the Diptrans IV study, but other studies had viewed matters differently. A study of transport requirements for the Central and Mid-Levels (4) favoured tramway retention and recommended that tram frequencies through Central should be increased. This study also recommended an *H-Bahn* type suspended monorail on a loop line through the Mid-Levels, but this was soon rejected because of its cost. Meanwhile, consideration was being given to a second "Harbour Crossing" over the eastern approach to Victoria Harbour at the Lei Yue Mun Gap. This is now being built as a road and MTR tunnel, but at this time it was conceived as a bridge to include a light rail or other intermediate capacity transit type link. The policy-making Transport Branch of the Government Secretariat suggested, *inter alia*, that the light rail link should be built to 1067-mm gauge to enable through running over HKT tracks between Shau Kei Wan and Quarry Bay. Indeed, this was but one of nine options explored in a discussion note on the future of HKT which ranged through total abandonment, truncation or retention of the existing system, and upgrading or expansion (5). Whereas nothing came of these ideas as such, they did indicate a wider range of options than the binary choice of "retain or abandon" that was all the Diptrans IV Study had the resources to address, and arguably laid the foundation for more positive attitudes later on.

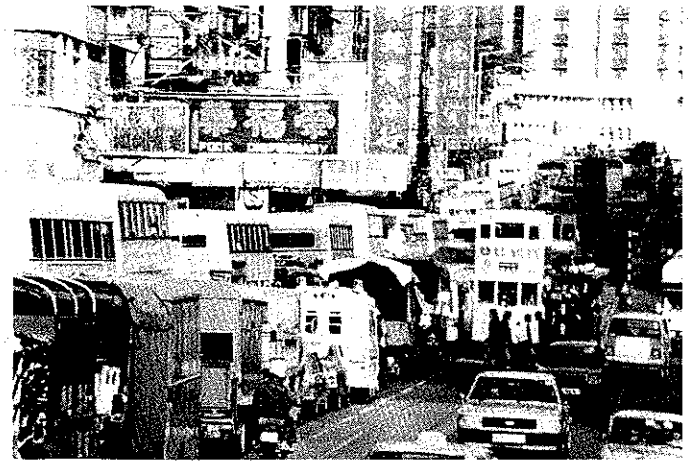
When the King's Road traffic management scheme was implemented, the former westbound track was left *in situ*, and remains largely intact to this day. Nonetheless, section 56 of the Tramway Ordinance requires that within eight weeks of the tramway or any part of it being abandoned, the rails should be removed and the road restored (6). This requirement now troubled HKT, as the company envisaged that special provision would have to be made for track removal in its next fare revision. The company had first identified the need for a fare increase as early as February 1982 and judged that an adult fare of 70 cents would be necessary. Eventually the Government agreed to a 60-cent fare on the understanding that, if the tramway did have to close as a result of the Island Line opening, the cost of reinstating the roads would be borne by Government. The fare revision came into effect on 1 July 1983, and, although it increased the revenue yield to HKT, it did nothing to arrest the decline in patronage that had been precipitated by the previous fare increase in 1981.

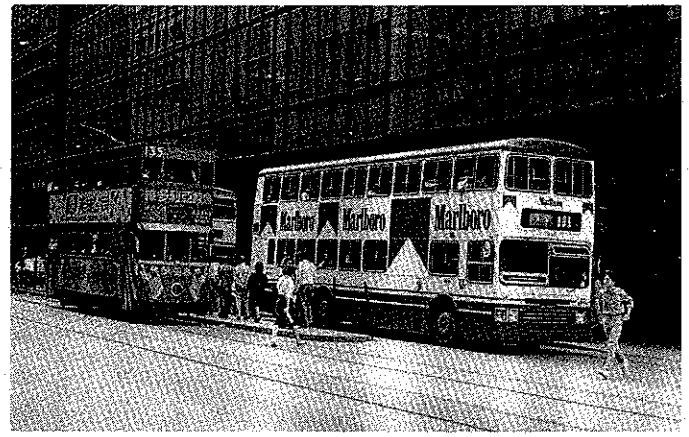
By now the results of Diptrans IV were available and HKT was considering how best to face the future. Its immediate reaction was to dispute the forecasts and to state that it would endeavour to keep going, albeit with a reduced fleet. Government also addressed the question of the tramway's rôle after the Island Line was opened, and on 19 February 1984 the (then) Secretary for Transport, the Hon Alan Scott, announced that HKT was free to continue operating the tramway so long as it judged that it was commercially viable (7). HKT immediately cautioned that the future was still uncertain (8). The company was becoming alarmed at its loss of traffic and envisaged that if the Diptrans IV predictions of a further loss of 116 000 rides a day proved true, there would be little point in carrying on. HKT's despondency culminated in an assessment in July 1984 which concluded that there was no financially viable future for the tramway system in either the short or long term, and that no purpose would be served by prolonging the life of the system beyond the opening of the Island Line. By this time traffic had dipped to 348 600 boardings a day, and was to further slump to 316 000 by the year's end.

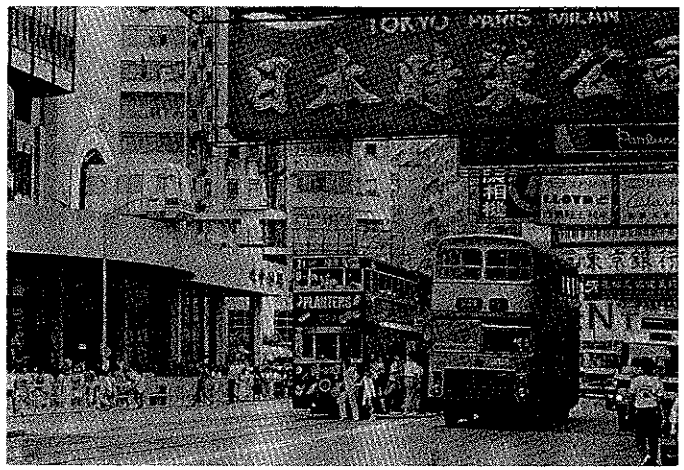
The Government was not ready to accept HKT's forecasts and preferred to await the opening of the Island Line in 1985 before agreeing to any closure of the system. On the other hand, John Carey had arrived in July 1984 to take over as manager of HKT; fresh from success in building up bus services in Saudi Arabia, he was determined to keep the system going and improve its image (9). It was from this point on that HKT's prospects began to improve.

The tide turns: 1984-8

The first evidence that HKT was thinking more positively about the future came in October 1984, when the company began discussions with Government about the possibility of relocating its depôt. There had been proposals to build over or replace the Sharp Street depôt site since the mid-1970s, but up to now nothing had come of them. HKT now proposed to construct two new



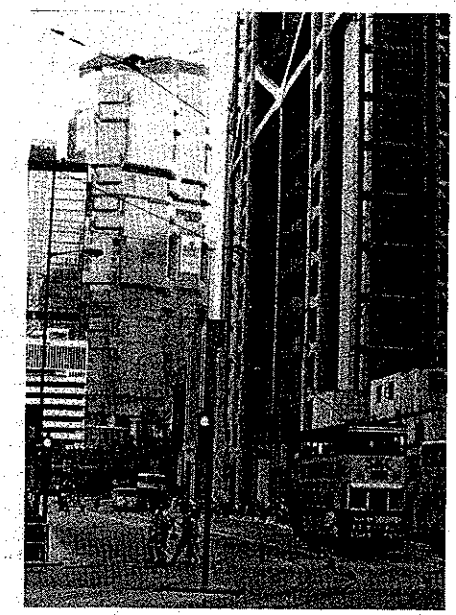


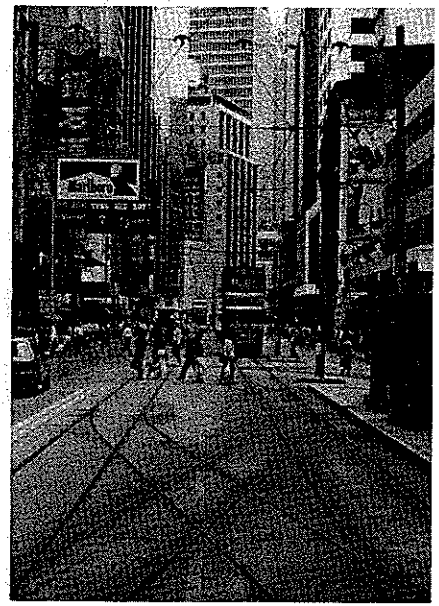


Above: Shau Kei Wan Road in Sai Wan Ho on 2 January 1981 at the outset of the ill-fated public transport priority scheme. The trams fared quite well but other traffic, including buses, was paralysed, and the scheme was largely abandoned soon afterwards.

Centre: The advent of the 12-metre three-axle bus in 1981 posed a temporary threat to HKT when consideration was given to replacing the trams by trolleybus versions of these monsters. This 1985 scene contrasts a KMB Cross-Harbour service bus with HKT 135 in Des Voeux Road Central.

Below: It was widely believed that HKT would not long survive the opening of the MTR Island Line. On the left, a replica MTR car celebrates the opening day, 31 May 1985, over the entrance of a Causeway Bay department store, whilst car 21 and a CMB bus tout for surface traffic.
(T. V. Runnacles





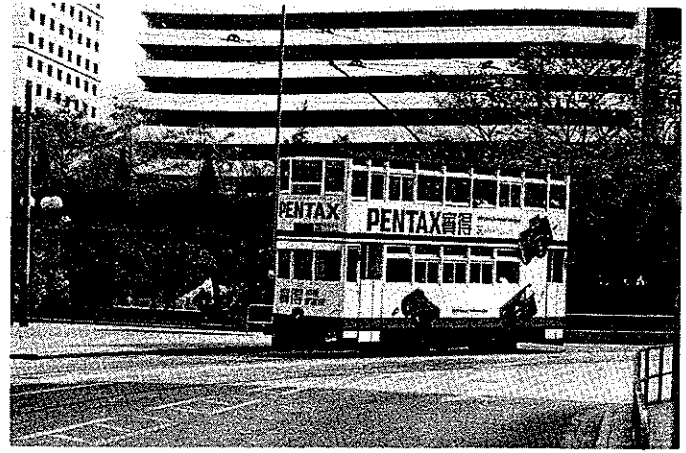
Above: Hong Kong provides a unique contrast between traditional trams and ultra-modern architecture. Here car 11 is dwarfed by the HongKong Bank (right) and the Bond Centre (left) in early 1988.

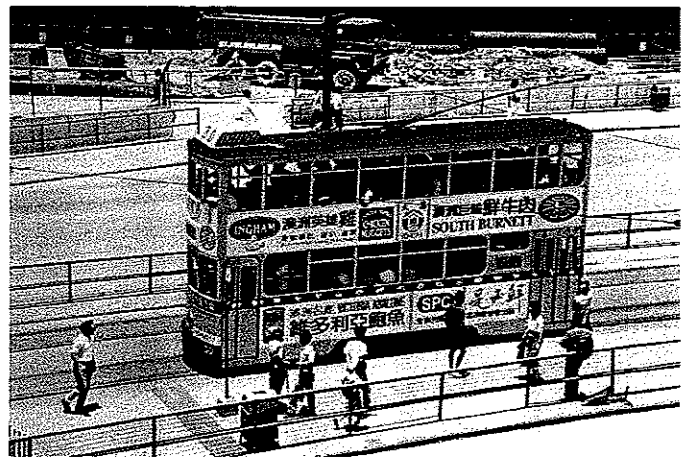
Below: Road reconstruction at Western Market prevented trams from terminating there from September 1985 to January 1987. When reopened, the layout featured HKT's first scissors crossover, seen here at Des Voeux Road Central. (T. V. Runnacles

depôts, one at each end of the line, and to close and redevelop Sharp Street. Not only would this realise the major potential value of the depôt site in the commercially important Causeway Bay area, but it would also reduce running costs by eliminating "dead mileage" early and late in the day. Government gave its support to the proposals, although they had a rather difficult passage through the local government bodies of the Eastern and Central & Western District Boards. Both of these Boards were wielding their "democratic teeth" (10) on environmental matters, and were fuelled by contemporary protests by Tsuen Wan residents who objected to wheel-squeal at the MTR depôt there. In order to pacify the district boards, HKT undertook to provide a host of environmental protection measures at the new depôts and to freeze its fares until at least the beginning of 1989. Eventually the depôt proposals received the assent of the Executive Council in July 1986. Construction began in March 1988, and should be completed in about February 1989. The "Western depôt" is on reclaimed land near the Whitty Street terminus in Sai Ying Pun, and can accommodate up to 120 trams and the workshops, whilst the "Eastern depôt" is under the Eastern Expressway at Sai Wan Ho and can stable 60 trams. Details of these new depôts may be found on the accompanying map. When the new depôts are in operation, Sharp Street will be closed and redeveloped as a multi-storey commercial complex to be called "Times Square".

On 31 May 1985 the first section of the Island Line of the MTR opened to traffic between Chai Wan and Admiralty. HKT greeted the occasion by laying on a circular feeder route from Causeway Bay to Happy Valley and back. However, it was withdrawn the following September as part of a general service reorganisation. The impact of the Island Line on tram services as a whole was negligible, and the predicted large-scale abstraction of passengers failed to materialise. HKT's patronage dropped only by 6% in June 1985 when compared with the "base" situation in March that year. By July patronage had almost returned to the March level and, despite a slight fall again in August and September, traffic began to rise above pre-Island line volumes in October and November (11).

On 16 September 1985 tram services were reorganised because the turnback loop at Western Market was lifted to allow roadworks associated with the construction of Sheung Wan MTR station and a scheme to raise the overall level of Des Voeux Road Central. The project was not completed until January 1987. The new layout includes HKT's first "scissors" crossover; this was installed at Transport Department's behest to facilitate





Above: Car 113 was involved in a serious accident in 1983 and was rebuilt with a modified top-deck. It is seen here in Central in April 1988. Consideration is being given to exporting this car to the Municipal Railway at San Francisco.

Centre: The first car to be modernised in the current programme was 143, seen here on 4 February 1986, a few hours before being "launched". The livery is "British Racing Green" and the car still carried lifeguards at this time.

Below: One of the most recently completed HKT cars is No 30, seen here at Queensway on 6 July 1988. This is the first car to have platform doors instead of gates. Like all other new and rebuilt cars it is in overall advertising livery.
(T. V. Runnacles

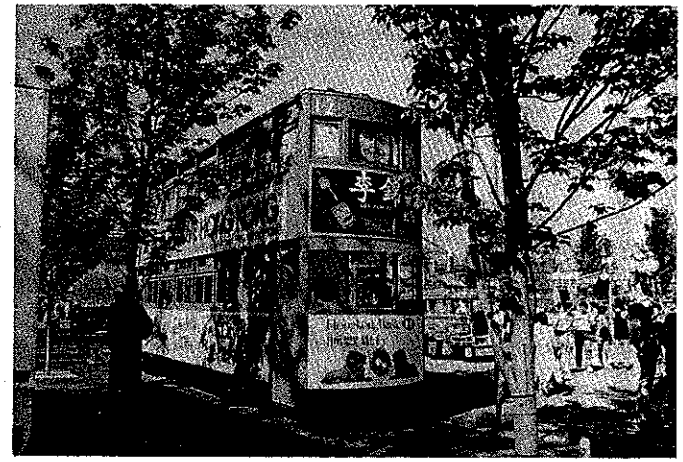
the turning of a suggested feeder service from the west. In the event HKT had other ideas, and the turnback facility to and from the west only carries one scheduled movement a day.

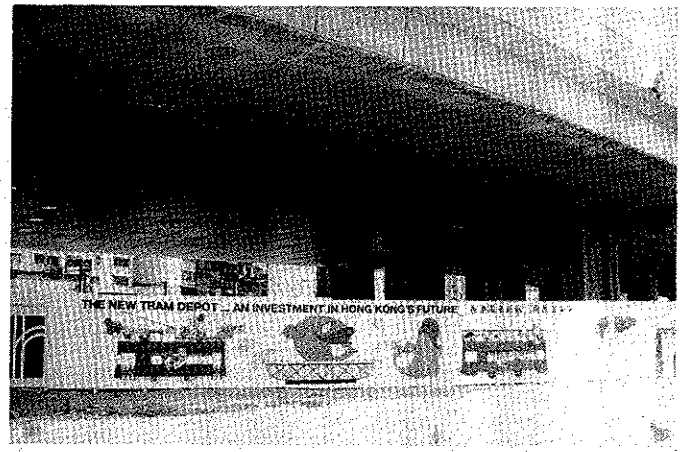
The autumn of 1985 witnessed other evidence of HKT's new optimism. The company had been catering for private hirings since the 1970s, and these were proving ever more popular. Every evening several trams would tour the system for "tram parties"; this is a uniquely Hong Kong institution characterised by tram loads of the expatriate "Hooray Henry" brigade and their Cantonese equivalents. Such tours are lubricated by beer, wines and spirits, and often feature curry dinners and loud music. To make such functions even more attractive, HKT stripped down car 119, renumbered it as "28" (12) and converted it to open balcony condition. In late October this as yet incomplete car made its first trial run, but it was not until 4 February 1986 that it was officially "launched" by the (then) Secretary for Transport, the Hon Ian Macpherson. The car was soon to be operated on a regular tour service throughout the day at an HKD 5 fare; this fare was later reduced to HKD 2, and has consequently proved extremely popular, even with ordinary riders as well as tourists. The car is in green and white livery with yellow lining, and most of the metal trim is polished brass. In April 1987 a second special car was added to the fleet when car 59 became No 128 by an exchange of numbers. The car was rebuilt in a condition best described as "semi-open top" and recalls the erstwhile double-deckers of Frederiksberg in Denmark. The workmanship on this car is extremely fine and its appointments are luxurious. The livery is red and cream with gold lining, and the car is named "Victoria" (sometime after 128 was commissioned, car 28 was also christened "Albert"). Although intended purely for private hire, car 128 has also found its way into regular service of a sort, as it now runs "dim sum" tours which include a buffet meal and bus and ferry transfers as part of the total package (13).

The two "vintage" trams have done much to promote publicity for HKT, but other forms of publicity have helped as well. In November 1985 car 12 was shipped to Vancouver, where it was an exhibit at Expo 86. Publicity of another sort came in February 1986 when a tram was decked out in the fictitious markings of the Shanghai undertaking for a rôle in the film "Shanghai Surprise", featuring the American rock singer Madonna. Shanghai, of course, never had any double-deck cars, but an undiscerning audience for what was critically panned as an egregious movie was probably none the wiser!

The ceremony which launched the first of the vintage trams in February 1986 was significant for a more important reason. Once it had become apparent that HKT still had a rôle to play in the Island Line era, the company considered the possibility of refurbishing and restyling its fleet. Some exeriments had been carried out whilst car 115 was in the workshops in the autumn of 1985, but the car was returned to service in standard condition and it befell 143 to become the prototype of the refurbished fleet. Externally and internally the car had been tidied-up: notable features included modified fenestration, a repositioned rear staircase, fluorescent internal lighting, fibreglass seating with greater leg room, wooden cladding on the bulkheads, more headroom on the upper deck, and the repositioning of the resistors from the rear platform to the roof at the front of the car. 143 was painted dark green (14) for its launching and looked very smart; a statement by the company announced that the whole fleet would be refurbished over the coming three years. In the event the task proved unexpectedly demanding, and it was decided in 1987 to scrap cars completely as they were due for overhaul and to acquire new bodies and underframes from local industry. The first vehicle to emerge from this revised strategy was a new car "12" in June that year. The car which had gone to Vancouver had been mounted on the truck of former works car 200, which had been scrapped in February 1984. It was therefore possible to re-use the spare truck (15) and equipment in a new car. The kit-form body of the new 12 was provided by Full Arts Limited and the underframe by W. J. Brown Engineering Limited, both of Hong Kong. Contracts were placed for 150 similar cars, all of which would acquire trucks and equipment from the cars they replaced. The present rate of construction is approximately three to four cars per month, and the fleet situation in early July 1988 is given in the accompanying table. It is not possible to list all of the detailed variations in the space available, as almost every one of the new and rebuilt cars is slightly different. During the programme the seating materials and layouts have been changed, window details altered, and the lifeguards have been removed from all new (and old) trams and replaced by deep fenders fore and aft. Car 88 had experimental trafficators and car 30 has full height platform doors instead of the traditional gates. The full-drop windows have been made of perspex to resist breakage, but the material has not worn well, and safety-glass counterbalanced panes are now being tested.

The new fleet has incorporated a number of refinements hitherto untried by HKT. None-





Above: HKT car 12 was sent to Expo 86 in Vancouver, where it is seen on display in May 1986. A new car with the same number was built in June 1987 to replace it.

Centre: Catchick Street in Kennedy Town became part of pre-war Shanghai on 12 February 1986. "Shanghai Tramways No 22" poses amidst veteran cars during the fiming of "Shanghai Surprise".

Below: A decorative fence indicates that work is in progress on the Eastern Depôt in Sai Wan Ho. The structure over the site is the Eastern Expressway, which provides a ready-made roof.

(T. V. Runnacles

Hong Kong Tramways Ltd

Services (from 26.01.87)

Shau Kei Wan to Kennedy Town	13.5 km,	38 cars
Shau Kei Wan to Happy Valley	8.1 km,	14 cars
North Point to Whitty Street	8.0 km,	24 cars
Happy Valley to Kennedy Town	7.9 km,	26 cars
Causeway Bay to Western Market	4.3 km,	29 cars
Shau Kei Wan to Western Market	10.6 km,	28 cars

Maximum peak period car allocation (some interworking between routes): 155 cars

Route details

Total route length (km):	16.3
Single track running line (km):	30.73
Track in Sharp St depôt (km):	1.824
Track gauge (mm):	1067

Stopping places

Number of stopping places	114
Average stop separation (m)	272

Patronage

Boardings per day:	1980:	434 926
	1981:	439 567
	1982:	393 797
	1983:	359 159
	1984:	334 705
	1985:	331 044
	1986:	334 918
	1987:	352 540
	1988:	*356 311

* = Jan to Jun only

Vehicle specification (1986)

Length (m)	8.89
Width (m)	1.981
Height to trolley plank (m)	4.58
Wheelbase (m)	2.951
Weight (unladen) (t)	12.24
Motors (kW)	2 x 25
Supply (V, dc)	500
Seats/standing	49/93

Fleet details (7 July 1988)

15 refurbished cars (04.02.86 to 27.06.87) numbers: 6, 36, 39, 41, 46, 80, 88, 89, 121, 127, 139, 141, 143, 144, 159

33 new cars (with recycled equipment, 13.06.87 on) numbers: 3, 5, 8, 12, 13, 20, 24, 25, 29, 30, 40, 48, 51, 54, 61, 66, 68, 69, 70, 72, 75, 83, 85, 92, 124, 129, 140, 142, 153, 155, 156, 161, 162.

1 open-balcony car (ex 119, entered service 04.02.86): number 28

1 semi-open-top car (ex 59, entered service 29.04.87): number 128

113 cars of 1949 series: all cars numbered 1-163 other than those listed above

NOTES: Trailer 22 scrapped 1978; trailer 1 to motor 163 in 1979; trailers 2-21 scrapped 1982; works car 200 scrapped 1984; original car 12 exported to Canada in 1985.

theless, the cars are still wooden-pillared two-axle vehicles incorporating trucks and equipment up to a half a century old. HKT can defend its position eloquently enough by pointing out that trams of such simple design and materials seldom suffer breakdowns, are easy to repair after accidents, and are relatively cheap to construct and maintain.

For a short-haul service aimed at the lower end of the market, too much sophistication would spell financial suicide and eliminate HKT's competitive edge as the cheapest mass carrier in town. All that said, the company will soon have to address the matter of providing additional cars. It is one thing to recycle equipment from one generation of cars to the next, but it will not prove easy or cheap to acquire brand-new trucks and equipment to the designs of five decades ago. Nonetheless, the present renewal programme seems destined to run its full course, and by about 1991 the angular design introduced in 1949 will have disappeared. Even so, some cars may survive the demolition team; the original car 12 is now preserved in British Columbia, and HKT has stated that it intends to keep prototype car 120, possibly restored to its original 1949 condition. One car, or at least one body, is likely to go to the Museum of History's transport collection, and the vehicle in question is likely to be either 122 or 163. There is also talk of exporting one car, possibly 113 (16), to the Municipal Railway of San Francisco for use on the "Trolley Festival" route, though this would depend on Muni's ability to find a suitable standard gauge truck and equipment.

HKT's future is now secure; despite the extension of the Island Line from Admiralty to Sheung Wan in May 1986, tram patronage has

Westbound car 44 loads at Queensway on 6 July 1988. Note the deep fender which has replaced the lifeguards on nearly all trams in the last two years.
(T. V. Runnacles

been rising since 1986 as the 60-cent fare was regarded as more and more of a bargain; moreover, economic recovery from the recession of the early eighties has encouraged people to travel more. Track renewals are making good the deficit of past neglect, and even the network has been slightly modified by the opening of the Kornhill Road cut-off at the end of 1986. With the fleet itself presenting an increasingly smart and colourful appearance (17), the attitude of the public towards the tramways seems to be changing too, and seldom now does one hear calls for "old-fashioned" trams to be scrapped. Indeed, far from being an anachromism in an aggressively modern city, HKT provides a fine example of a short-haul cost-effective peoplemover that other communities might instructively follow.

The future

The development of HKT has not come to an end with the renewal of its fleet and the construction of new depôts. Several ideas now being discussed could see the system both extended and modernised in the years to come.

HKT's last extension was in 1929. Few systems anywhere can have been stable for so long. Nonetheless, as development expands away from the tramway, it could be argued that extensions should be contemplated to tap new markets. Whereas past planning has tended to emphasise the rôle of buses (and latterly the MTR) in serving new developments, three recent schemes have all admitted the possibility of tramway expansion to serve new coastal reclamations. The most imminent of these is the reclamation of Aldrich Bay near Shau Kei Wan, which should house 40 000 people by the mid 1990s. HKT has proposed a single track loop about 1 km long to serve this development, and this was discussed and noted by the Secretary for Transport's Transport Policy Co-ordinating Committee in May this year. A less definite and more distant scheme comprises a massive reclamation along the Central and Wan Chai waterfronts. Little development is likely before 2001, but amongst several rail schemes now being evaluated by the consulting engineers is a new tramway which would parallel the existing system from Western Market to a terminus north of Wan Chai. The most distant of these projects is a proposal to reclaim the sea around Green Island, which commands the approach to the Harbour to the west of Kennedy Town. No firm proposals have yet emerged from the consultants, but the brief requires them to study a tramway extension amongst other means of serving the development. HKT is sufficiently keen to evaluate these various schemes that it is engaging the MVA Consultancy to examine the options in more detail.

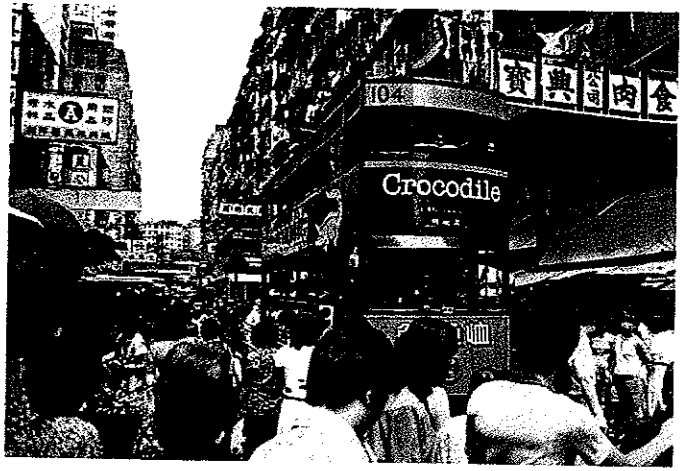
Existing operating practices in HKT are coming under increasing scrutiny, and the years to come may well see some interesting changes. One change that is quite certain is that manually operated points will soon yield to electronic modernity. The advent of the new depôts will significantly increase the number of junctions along the line (see map), and one of the Government's requirements is that turnouts can be operated by motormen and that traffic signals can be "called-up". Accordingly, all trams will soon be fitted with transponders, and detection loops will be provided at junctions.

Other future developments are more speculative, but recent discussions with HKT point to some possible directions. In recognition of the trams' short-haul rôle, HKT wishes to introduce shorter services to more closely match supply and demand (18). To achieve this, additional turning loops were sought in Central and Wan Chai, and modified or replacement loops were proposed in Causeway Bay and North Point. For various reasons these proposals have either been rejected or indefinitely deferred. To meet HKT's objective, Government has encouraged the company to consider acquiring double-ended trams which could reverse on any crossover. Although HKT's cars look double-ended, they are unsuited to reverse operation, and would require quite extensive modification to equalise the end-platform lengths and reposition staircases and doors. As a related measure, double-ended cars would probably be equipped with pantographs to overcome the hazard of reversing the trolley pole in heavy motor traffic. As yet HKT has reached no decision on these matters, and may well be seeking advice on them from its consultants. In any event, the consideration of a modified tram design may become imperative very soon, as the Board of HKT's parent company has instructed that 10 new cars should be added to the fleet in 1989 to accommodate increasing traffic. Completely new two-axle cars would have to be custom-built, so one may speculate that the company may opt for a long double-deck bogie car. This would make sense for other reasons, as labour is increasingly difficult to recruit and retain, so a higher ratio of passengers to staff would be helpful.

The coming years will see other developments too. Government has plans to reconstruct King's Road, Des Voeux Road Central, Des Voeux Road West, Kennedy Town Praya and Catchick Street, most of which will give additional tram priorities and generally improve conditions for traffic and public transport alike.

Conclusion

Hongkong Tramways has been through troubled times in the last two decades. However, it has emerged from its difficulties to demonstrate that there is a place in the



HKT's worst bottleneck is in Chun Yueng Street on the approach to North Point terminus. Plans in hand to resolve this problem should put an end to scenes like this where 104 creeps forward through crowds in the local street market.
(T. V. Runnacles

transport hierarchy for "low technology light rail". Progressive thinking naturally concentrates on high speed and technologically sophisticated rail systems, whether they be light or heavy. However, there is often a transport gap at the bottom end of the market unsatisfied by contemporary systems (19), and HKT demonstrates that the classic British tram can actually satisfy this demand very well (20). The fact that HKT's fortunes have been undented by the advent of the MTRC's Island Line shows that there can be two quite distinct markets for rail travel in the same corridor. Of course, the island corridor of Hong Kong is a prime example of a densely developed linear city. Where settlement is more diffuse, a case emerges for modern LRT; Hong Kong's Tuen Mun system exemplifies this, and we shall address this in the remainder of these articles.

(to be continued

References and notes

(1) South China Morning Post, "Tram plan challenges Island Line", 23 December 1980.
(2) Transport Department, "Tramway replacement by trolleybuses", unpublished paper, 23 February 1981, Hong Kong.
(3) Transport Department, "Diptrans IV Study; development of an integrated public transport system for Hong Kong Island", February 1983, Hong Kong.
(4) Peter Y. S. Pun & Associates, "A Study of the Transportation Requirements of the Mid-Levels and Central District, Phase 1 Report", prepared for the Highways Office, Hong Kong, August 1983.
(5) Transport Planning Unit, "The future of Hongkong Tramways; short and long term planning issues", Transport Branch, Government Secretariat, unpublished, 20 August 1982.
(6) This stricture applied only to lines abandoned by HKT. Where tramway abandonments were caused by re-routeing at Government's behest the situation was more ambiguous, and rails have been left *in situ* for many years afterwards.
(7) South China Morning Post, "Trams can roll on after 1985", 20 February 1984.
(8) South China Morning Post, "Trams' future still uncertain", 22 February 1984.
(9) John Carey replaced John Harris who had steered HKT through the troubled waters since John Salmon left in 1978. Mr Carey described his determination to revive HKT's fortunes in a speech to the Hong Kong Branch of the Chartered Institute of Transport on 4 December 1986 under the title "Hong Kong transportation — the view from the Wharf".
(10) The district boards had been established in 1982, and included a majority of appointed and a minority of elected members. From April 1985 their composition was changed to a balance of two elected to one appointed members and their chairmen were also henceforth to be elected. This meant that they became organs of popular opinion rather than government policy.
(11) Transport Department, "Impact of MTR ISL opening on other public transport modes", Public Transport Planning Division situation reports 4/85, 5/85, 7/85 and 8/85.
(12) The renumbering was in deference to the Chinese delight in homophones. 28 in Cantonese is *"yee sap baat"* which sounds similar to the phrase which translates as "easy to make money".
(13) The introduction of tour services was not covered by the Tramway Ordinance, and this was amended in February this year to specifically permit the operation of tour cars and charters at non-standard fares.
(14) HKT livery policies have vacillated in recent years. The dark green livery, described as "British Racing Green" was an attempt to recall the Brunswick Green livery which had been applied until the late 1960s, although the latter colour was almost a glossy black. A few trams appeared in racing green, but afterwards repaints reverted to "Tramways Green", a springleaf shade applied since 1978. The question of standard liveries is almost academic as over 100 cars are now in all-over advertising colours, including all of the rebuilt and new cars.
(15) It may not necessarily be assumed that the new car 12 rides on the truck of its predecessor, as trucks are sometimes exchanged during overhauls and fleet renewal.
(16) Car 113 was severely damaged in an accident in 1983 and was rebuilt to a non-standard design with more headroom in the upper saloon and additional glazing on the end windows and the hopper vents. It is arguably the most handsome of the pre- modernisation cars.
(17) See the remark about advertising cars in note (14) above.
(18) Oddly enough, HKT introduced its *longest* service on 26 January 1987, when for the first time it became possible to ride from Kennedy Town to Shau Kei Wan without a change of car.
(19) "Transport gaps" were discussed by the writer in a previous article; Runnacles, T. V., "The case for an 'aid to pedestrian movement' ", *Modern Tramway*, Vol 34, No 404, August 1971.
(20) The various options for light rail, with special reference to developing countries, are discussed in Runnacles, T. V., "Light Rail Transit in the Developing World", in "Developing World; Land Transport", edited by Margaret J. Heraty, Grosvenor Press International, London, 1987.

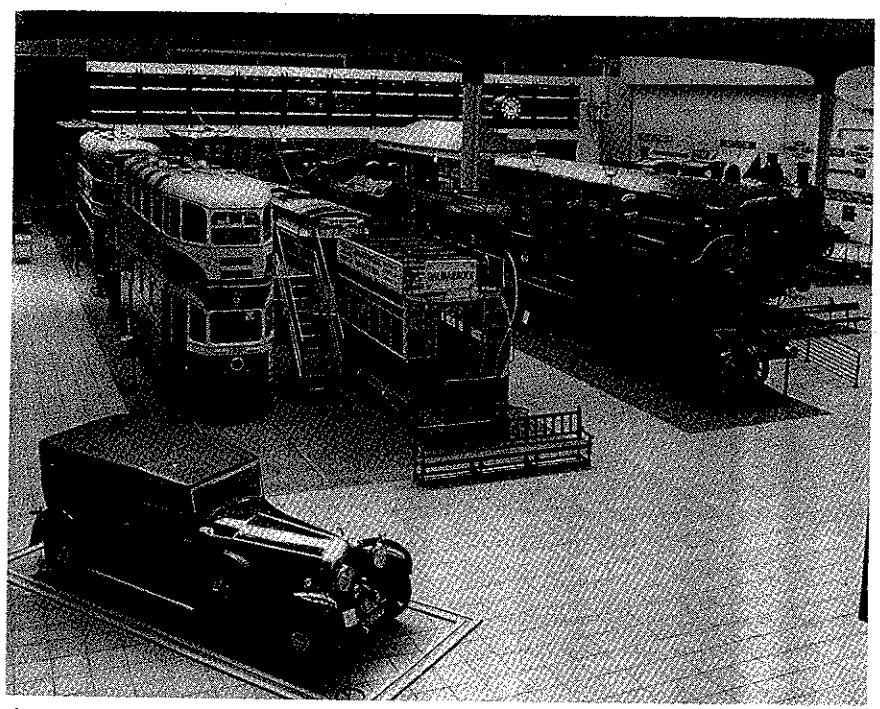
Heritage Column

J. H. PRICE

ON 21 April, Glasgow's outgoing Lord Provost opened the city's new Museum of Transport, with public access from the next day. Despite the counter-attraction of the Garden Festival, it attracted 100 000 visitors in its first four weeks (against 280 000 in a year at Coplawhill) and a quick visit (minimum two hours) soon shows you why.

Glasgow's last tram routes (closed in September 1962) ran along the Dumbarton Road, passing between two famous buildings in Kelvingrove Park, the Art Gallery and the Kelvin Hall. Until the opening in 1985 of the Scottish Exhibition and Conference Centre on the Queens Dock site, the Kelvin Hall was Glasgow's main exhibition hall. Among the events it housed were an electrical (and tramway) exhibition in 1901 and (more recently) successive Scottish commercial vehicle shows.

After considerable debate, Glasgow decided to divide the Kelvin Hall and use the front part as an indoor sport and recreation complex and the rear as a Museum of Transport, the two sharing a cafeteria. The former transport museum at Albert Drive—part of Coplawhill car works—was too small and too crowded, and was housed in a



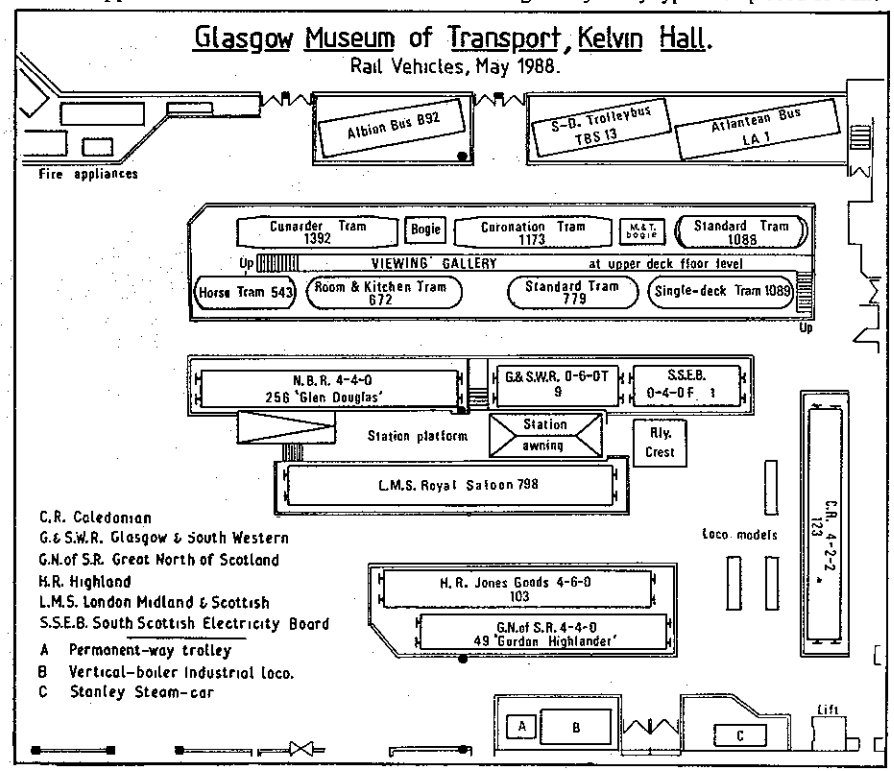
A general view of the rail exhibits in the new Kelvin Hall transport museum in Glasgow, as seen from the balcony. The seven Glasgow trams are electric cars 672, 779, 1088, 1089, 1173 and 1392, and horse car 543.
(Glasgow Museum of Transport

deteriorating building. It was also in a part of town lacking other attractions, whereas Kelvingrove is a cultural zone like London's Greenwich or South Kensington.

The amount of space available for transport displays is roughly 1½ times that at Coplawhill and permits new exhibits, new displays and better spacing. However, the tram display is quite similar to that at Coplawhill, with two lines of Glasgow trams on 1416-mm gauge track; one track housing cars 1392 of 1952, 1173 of 1938 and 1088 of 1924, and the other track with horse car 543 of 1894 and electric cars 672 (1898), 779 (1900, in 1908 condition) and 1089 of 1926. On the other side of 1392/1173/1088 are Albion bus B92, single-deck trolleybus TBS 13 and the first Glasgow Atlantean bus, LA1 of 1958. Car 672 has been turned to show its better side, the horse car's green route-colour has been changed to white (appropriate to the Dalmarnock—Finnieston service portrayed) and all the electric cars now have ac mains wiring and brighter, safer illumination. There are three tram models, and one model of the Bennie railplane at Milngavie, plus tickets and badges. As before, a viewing gallery allows you to see into the upper decks.

The Underground exhibit is again based on Merkland Street station, with a new annexe for the 1927 battery locomotive. Cars 1 and 39T have been joined by half of No 4 in bright red and cream 1935 livery, with a mirror to give the impression of being an entire car, and there is a cutaway model of the cable power house. The mainline railway section benefits greatly from the better spacing, and the seven steam locomotives ("Glen Douglas", "Gordon Highlander", the Jones Goods, Caledonian 123, G&SWR 9, SSEB fireless No 1 and the Chaplin vertical-boilered shunter) are now grouped around a splendid new attraction, LMS saloon 798 from the 1941 royal train, on loan from the National Railway Museum. It stands alongside a short station platform permitting easy interior viewing, below the station clock from Dumfries.

The car section is much enlarged, with the popular makes displayed showroom style, and the horse-drawn vehicles, cycles, motor cycles and fire appliances also benefit from a more spacious layout. The Clyde Room of ship models is quite breathtaking, fully deserving the award it gained, and representing nearly every type of ship used or built



on the Clyde from the "Comet" of 1812 to the "Norsea" of 1987. There is also a photographic display of how the exhibits were moved from the old museum to the new.

I have left until the last the principal new feature: Kelvin Street. This is an indoor sett-paved side street as it might have existed in Glasgow's busy West End fifty years ago. To be precise, on the evening of 9 December 1938, this being the date of the papers displayed at the news-stand ("Four hurt in tram-bus smash"—"Evening Citizen"). The street has a post office, a chemist, a bar, a cafe, a baker's shop, a bank, a camera shop, a fishmonger, a pram, cycle and toyshop, an ironmongers, a grocers, a fashion shop, an electrical showroom, a small 49-seat Regal cinema, and the tiled entrance to Merkland Street subway station. The effect is completed by street furniture and by parked vehicles, and the choice of period is excellent—just within older visitors' memory span. This is the feature that will stimulate return visits.

This article was written after a guided tour with John Clayson, Assistant Keeper, Department of Technology, and it is a pleasure to thank him for background information, floor plan and photograph. The transport museum at Kelvin Hall (1 Sunhouse Road, Glasgow G3 8DP) is open 10.00-17.00 hrs on weekdays and 14.00-17.00 hrs on Sundays, with free admission. Buses run along Dumbarton Road, and Kelvinhall underground station is only five minutes walk away. There is a good shop, a fine new catalogue, good natural light, and a gallery from which photographers can obtain excellent shots of the rail section, including the trams.

Museum News

Beamish (GB). The new passing loop at Foulbridge was brought into use at the end of May, allowing an equal interval service to be run with two trams. Blackpool 31 (ex works tram 754) was tested under power on 4 June and is expected to enter service for the summer holiday peak. From 28 March normal traction supplies have been provided from a new 150-kW silicon transformer-rectifier set, but the 1937 motor generator is retained for standby and demonstration use. (L. J. Brunton

National Tramway Museum (GB). Admissions in the early part of the season were 14% over the budgetted figure. The trucks and switched reluctance equipment from GEC tram 651, which operated briefly in Blackpool, have been acquired. The body has been acquired by Blackpool Transport Services Ltd. Negotiations to provide an operating tramway at the 1990 Gateshead Garden Festival are continuing with the Festival Company. It is envisaged that four trams would be used; Gateshead 5, Newcastle 102, Gateshead 52 and MET 331 (which was Sunderland 100). A leaflet on wildlife at the National Tramway Museum has been prepared for the TMS by the Derbyshire Wildlife Trust. (TMS

Innsbruck (AT). The truck of Hall trailer 101 is to be used as the basis for a replica summer trailer 16. (HOV

Athenai (GR). At least two cars of the former Piraeus—Perama tramway have been put on display in local parks. One is in the company's own kindergarten between Neon Faliron and Moschaton, and another at Kallithea near the former terminus of trolleybus route 1. Three Piraeus trams are displayed in the recently-enlarged Athenai railway museum. (M. J. Russell, SLS

Amsterdam (NL). Agreement has been reached with NS for a 1.2-km extension of the EMA museum tramway to Bovenkerk, where a reversing triangle will be installed. The new city transport museum will be housed in the ornate former horse tram depôt at the corner of Koniginneweg and Emmastraat, using the same initials (AOM—*Amsterdamse Openbaarvervoer Museum*) as the original owner of the building, *Amsterdamse Omnibus Maatschappij*. (OR, TS

Hellevoetsluis (NL). The move of the RTM steam and diesel tramway forecast in our February article was confirmed at a recent press conference. By 1990 it is planned to build a car shed, workshop and short running line at De Punt; the Hellevoetsluis line will then be lifted. Stage 2 will extend the new line southwards across the Brouwersdam to a new holiday village "Port Zelande" being built at Kabbelaarsbank. De Punt can be reached by ZWM bus 104 (Spijkenisse—Vlissingen). (TS

Nijmegen (NL). Kassel motor tram 224 operated with a generator trailer along tracks at the Royal Dutch Paper factory on 7, 8 and 12 May. (OR

Cincinnati (US). The Transit Historical Society has restored Cincinnati Street Railway Car 2435 of 1922-3 and placed it on display at the Union Terminal station. (P. F. Henry

Galveston (US). The 7.5-km historic trolley line linking the city centre with the beach was due to be opened on 4 July. (J. Wolinsky

San Jose (US). Restored car 129 inaugurated service at the San Jose Historical Museum in Phelan Avenue on 11 April. (LTI

Pretoria (ZA). The former tram depôt on the corner of Schoeman/Van der Walt Streets, used by the Electricity Departments as a workshop and stores and complete with track, pits and overhead, is to be converted to a speciality shopping mall. (D. V. W. James

Reviews

Thomas Cook Railpass Guide, 1988, *edited by Brian Baker. 32 + iv pages size A5. Published by Thomas Cook Publications and obtainable by post from the Thomas Cook Timetable Publishing Office, PO Box 36, Peterborough PE3 6SB, price £1.65 (£1.90 by post in UK, £2.20 by post in Europe, and £2.65 by overseas airmail). ISBN 0-906273-36-6.*

Last year's pilot issue presumably having been a success, this is the first definitive production. Though the number of pages is the same, there are fewer advertisements and therefore more information. As we said in the September 1987 issue, this is a very necessary book for travellers going abroad (and for visitors to the UK) who want to use public transport, and we hope that as many readers as possible will support it by buying a copy — it will certainly pay for itself. Having firmly recommended it, a few minor niggles are in order in the hope that it will become even more useful.

Our impression is that it is more professional in presentation, though some omissions suggest a lack of firsthand experience, but there is still a real need for

Tramway developments in Hong Kong

T. V. RUNNACLES

Part 4: The Tuen Mun—Yuen Long LRT system

From concept to construction—1972 to 1985

FIVE minutes' walk from the Pedder Street tram stop in Central is Blake Pier, from where hovercraft depart every ten minutes for the 38-minute journey to the new pier at Tuen Mun. At Tuen Mun's pier head is the main terminus of the new LRT network. Opened this year, this system is arguably the most remarkable of any developed since the light rail renaissance began some ten years ago. Whereas most new LRT systems started with only a single route, the initial Tuen Mun system provides not only a corridor line between the towns of Tuen Mun and Yuen Long but also a comprehensive urban network within Tuen Mun itself.

Apart from its curiosity value as the most complex of the second generation light rail systems, the Tuen Mun—Yuen Long network is significant because it is the first "tramway type" system to be built on British-administered soil since the Khartoum tramways were opened in 1927 (1). As Hong Kong will revert to Chinese rule in 1997, it is also likely to be the first modern light rail system in China. Moreover, it is the first such system in mainland Asia.

The legal title of the Tuen Mun/Yuen Long system is the "North-west Railway". Operationally it is the Light Rail Division of the Kowloon—Canton Railway Corporation (KCRC), whereas for publicity purposes it is known simply as "the LRT" or, in Cantonese, *"Hing Been Tit Lo"*, which rather nicely translates as a "small and convenient passenger-carrying railway".

General descriptions of the system have already appeared in these pages (2) and elsewhere (3), so this essay will concentrate on the development of the LRT proposals. This could be instructive, given the present spate of such schemes in Britain and elsewhere, as well as the new emphasis on private sector participation (4). As the following account shows, the passage from initial concept to a working system in Tuen Mun was anything but easy. If the difficulties are highlighted, it is in the hope that other potential operators may recognise some of the planning and political issues that a new system can face. However, before describing these matters, a few words should be devoted to the built environment, as it is notable that the community served by the system is itself a creation of the last few years.

Tuen Mun and the North-west New Territories

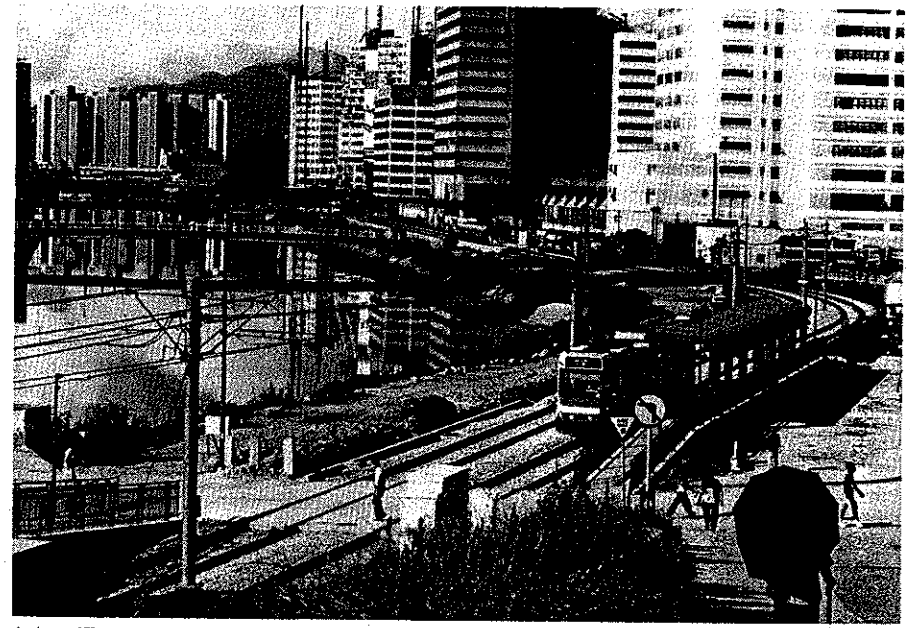
Tuen Mun is the most recent of Hong Kong's first generation "new towns"; fifteen years ago it was a fishing village of 21 000 people, but now it is a still-growing city of over 300 000 people. The new towns programme is part of the Hong Kong Government's housing drive to cope with rapid population growth and squatter re-settlement (5). Although inspired by the British new towns movement, the programme was initially confined to creating the "industrial satellites" of Kwun Tong and Tsuen Wan in the 1950s. In 1960 Tsuen Wan was redesignated a "new town", whilst feasibility reports for the new towns of Castle Peak (Tuen Mun) and Sha Tin were approved in 1965. After some years of stagnation, new impetus came from the 1973 "10-Year Housing Target Programme". This changed the thrust from mere dormitory settlements to free-standing towns with massive high-rise housing blocks and a full complement of social, commercial and employment facilities. In addition to the three designated new towns, three existing rural market towns (Yuen Long, Fanling/Sheung Shui and Tai Po) were to be expanded, and in 1978-9 these were also categorised as new towns. In 1980 a seventh new town was designated at Junk Bay in the eastern New Territories (6). In the same year, a private developer proposed a city of 535 000 people at Tin Shui Wai in the North-west New Territories, but this scheme was later modified to become a joint venture with Government, and its scope was reduced to an initial target population of 148 000.

The North-west New Territories thus contain three new towns. Tuen Mun is now well-advanced; much of the town is on land reclaimed from Castle Peak Bay. To British eyes it is very different from such new towns as Stevenage or Runcorn, being much more populous and compact. Both housing and industry are high-rise, with residential accommodation largely in 30- to 40-storey public housing estates. Yuen Long retains its market town core, although even this is relatively high-rise; at its fringes are new multi-storey housing estates. Work on Tin Shui Wai is only just starting, and this too will be high-rise. Connecting Tuen Mun and Yuen Long is the Castle Peak Road "corridor", which is a dual carriageway avenue shaded by eucalyptus trees, flanked by a rather muddled assortment of individual houses, horticultural plots and motor vehicle scrapyards. The advent of the light railway has already obliterated some of these eyesores, and eventually Castle Peak Road may become just another urban street.

The origins of the light rail proposal

The first recorded proposal to link the Castle Peak area by rail was in 1961 when the Chairman of the Yuen Long District Rural Committee recommended that the Kowloon—Canton Railway should build a branch line via Yuen Long to Castle Peak. The KCR rejected the idea, but in 1969 a plan for Castle Peak included a KCR reservation; this was changed in 1971 to a "mass transit" (metro) reservation. Subsequently the KCR link was revived with a view to serving a container port planned at Tap Shek Kok to the west of Tuen Mun. The container port scheme perished, though not before a commitment had been made in 1979 to the LRT alignment at Siu Hong, where the tracks rise to cross a non-existent railway!

The origins of *light* rail proposals date back to 29 August 1972, when Hongkong Tramways Limited wrote to Government suggesting that "modern tram systems" should be built in both Tuen Mun and Sha Tin. The former was envisaged as a standard-gauge circular route worked by single-deck trams. However, Government replied that these schemes were premature, as the final plans of the two new towns remained undecided. Nonetheless, just under twelve months later, the Transport Department received agreement that an "exclusive and segregated right-of-way for public transport vehicles" would be incorporated in Tuen Mun layout plans. The choice of mode was undetermined, but the "exclusive public transport right-of-way" (or "EPTROW") first appeared on the town's



A view of Tuen Mun, looking south along the Nullah (river) from a point above Choy Lee Bridge LRT stop. Multi-storey factories line the river's right bank, and Butterfly Estate is visible in the far distance. In this view taken on 16 July 1988 a tram approaches on driver-training duty. (T. V. Runnacles

Outline Development Plan in 1974; the accompanying plan shows this in its 1977 version.

Planning begins in earnest; 1977-9

In 1976, the New Territories Development Department decided to make a study of local transport in Tuen Mun to complement the "Hong Kong Comprehensive Transport Study" which had been published that year. Scott Wilson Kirkpatrick and Partners were appointed as consultants early in 1977, with specialist public transport assistance from London Transport International. A wide range of modes was initially screened, ranging from minibuses to buses or trolleybuses on busways, street trams, LRT, automated guideway systems, conventional metros and elevated monorails. The choice quickly narrowed to two strategies. "Strategy 1" comprised buses operating both in mixed traffic and on dedicated bus lanes, whilst "Strategy 2" involved LRT, mainly on reserved track, complemented by feeder buses. The bus option emerged as financially more viable in the short run than LRT, but in their draft final report in April 1978 (7), the consultants recommended that "Strategy 2" should be adopted. Although light rail emerged only marginally as the better long term investment in financial and economic evaluations, it possessed several intangible advantages, including its independence from oil fuel, better quality of service and greater environmental compatibility; it would also help to promote the image of the new town. The study envisaged that with prompt agreement the first routes could be running in 1980, as depicted in the accompanying plan.

The Tuen Mun New Town Transport Study (TMNTTS) recommended a light rail network of 17.8 route-km, laid mainly on lateral roadside reservations, to be worked by 53 double-deck cars. The study also recommended an extension northeastwards to Yuen Long, which would require another 17 cars. A link to Tsuen Wan was also proposed for the 1990s but, because of the difficult coastal topography, it was recommended that this should be built as an Alweg monorail.

Immediately after the draft final report was issued, the TMNTTS Steering Group agreed to seek the views of parties interested in pursuing the light rail strategy. By August 1978 the parent company of HKT, the Hongkong & Kowloon Wharf & Godown Company Ltd (KWG) expressed its formal interest in initiating and operating the system. Events then moved forward quite rapidly. In October 1978, both the New Territories Development Progress Committee and the influential Transport Advisory Committee endorsed the light rail strategy. In the same month, work began on a transport study for Yuen Long (8), and this took the Yuen Long light rail link as an assumption. In March 1979, the Project Manager (Tuen Mun) formed a Transport Plan Implementation Group (TRAPIG), whose duty was to ensure the requisite infrastructure for the LRT in Tuen Mun. In the same month, Government ordered that negotiations should begin with KWG (9). The first formal meeting with KWG occurred in late April, when it was hoped that negotiations could be concluded in nine months. This was decidedly optimistic; indeed, KWG engaged consultants only in August, four months into the negotiation programme. KWG's consultants were Electrowatt Engineering Services Ltd of Zürich.

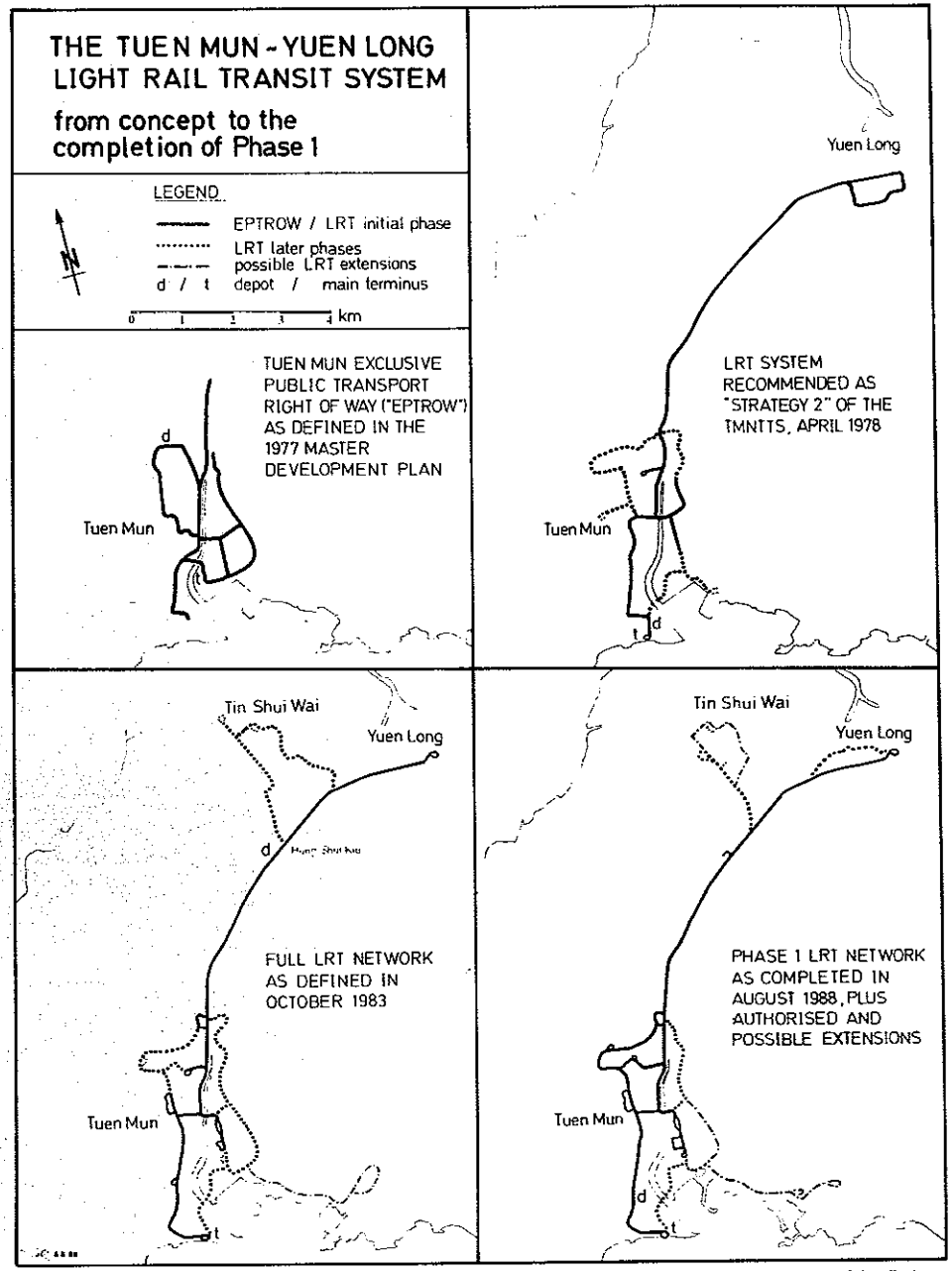
The vehicle debate

Electrowatt's first task was to determine the most appropriate car for the system. The TMNTTS had eschewed contemporary practice by recommending a high-capacity double-deck car; this derived from London Transport International's input to the study. Prompted by a TRRL review of electric traction's rôle in British cities (10), in April 1977 London Transport's Planning Office analysed possible light rail applications in London (11). These have recently re-emerged and been developed as a series of proposals for further study (12). However, the original London study recommended double-deckers for on-street applications. This arose after comparing a "Feltham" tram with modern cars in a parametric analysis. The "Feltham" showed-up surprisingly favourably, suggesting that a double-decker could be very competitive if lengthened and given improved performance. A full description of these arguments appeared in *Modern Tramway* in 1978, and need not be rehearsed here (13). It is sufficient to note that the TMNTTS prescribed a double-deck car, 16.5 metres long and 2.65 metres wide, with a capacity of 135 seated passengers and up to 112 standees.

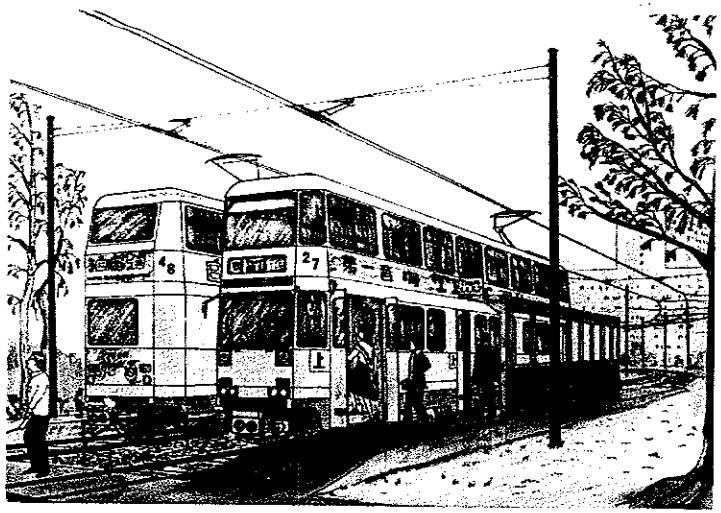
The TMNTTS stressed the importance of using such a vehicle, and initially KWG concurred with this view. However, even before Electrowatt began its work, KWG appeared to be changing its mind. In November 1979, Electrowatt produced its vehicle evaluation report (14). Four operational concepts were considered:

(a) an 18.85-metre four-axle single-decker;
(b) as above, with multiple-unit pairs on busier routes;
(c) a 27.55-metre articulated six-axle car;
(d) an 18.12-metre four-axle double-decker.

All the conceptual vehicles were single-ended and based broadly on Swiss practice. The consultants concluded that a four-axle single-deck car with multiple-unit capability would best serve the system's needs. Electrowatt's analysis was wider-ranging than that of the TMNTTS and subordinated cost-per-place criteria to operational issues. The evaluation



These maps show four stages in the evolution of the LRT system; over the years there have been dozens of detailed variations during the system's planning.

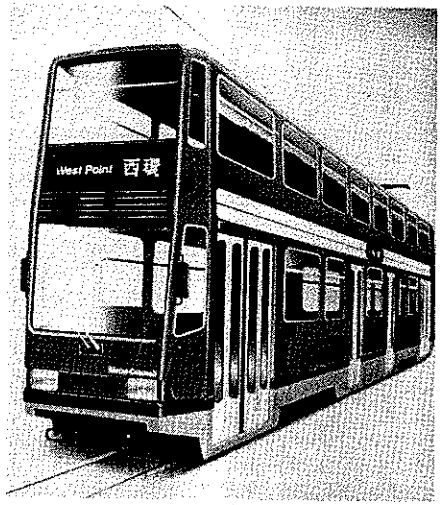


An artist's impression of the TMNTTS conceptual double-deck cars at work in Tuen Mun. (Transport Department

method involved the identification of 24 criteria, each of which was weighted according to the consultants' judgement of importance; each of the four vehicle concepts was then scored from one to four and the scores were then factored by the weightings. The concept with the lowest overall index was ranked the best.

Whilst Electrowatt was examining vehicle design, the Transport Department did so likewise, and in November 1979 circulated a report (15) which refined the TMNTTS's conceptual double-decker and confirmed its superiority over six representative single-deckers. Given these conflicting findings, Government made a policy decision that, as KWG was taking the commercial risk, it should be free to determine the design of car. Nonetheless, KWG was asked to consider and respond to the Transport Department report.

KWG formally rejected the double-deck option in March 1980, and in April the Government accepted its proposal for single-deckers, but ruled that nothing should be done to frustrate the eventual use of double-deck cars. Transport Department nonetheless continued to examine double-deckers as a matter of contingency. In November 1981, the Department produced another report (16); this reworked Electrowatt's analysis by substituting "real values" for "scores", and concluded that the double-decker ought to have been marginally victorious. In January 1982, yet another study (17) used predicted operating patterns to evaluate vehicle design, and this time it was concluded that smaller-capacity cars, either single-deck or double-deck, would be preferable in the initial years, whilst large double-deckers should be added later to accommodate increasing patronage. In the course of this work a variety of double-deck concepts emerged, including short and long variants and a drop-centre twin-set. In view of these findings, KWG was once again asked if it would reconsider double-deckers, but the Company adamantly re-affirmed its belief in single-deckers. After that, double-deckers were heard of only twice more; when the KCRC conducted its own initial feasibility studies in January 1984, it rapidly dismissed them. More recently, a review of cars for the "urban links" was undertaken by consultants for the KCRC; once again they looked at

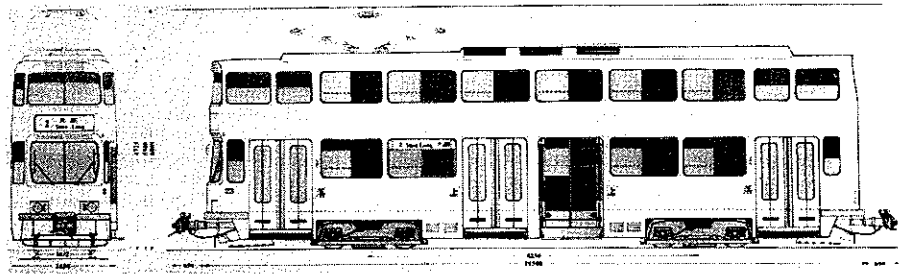


An artist's impression from Metro-Cammell Ltd of the TMNTTS car. Judging by the slim gauge and destination there seemed to be some confusion with the HKT system on Hong Kong Island! (Metro-Cammell Ltd

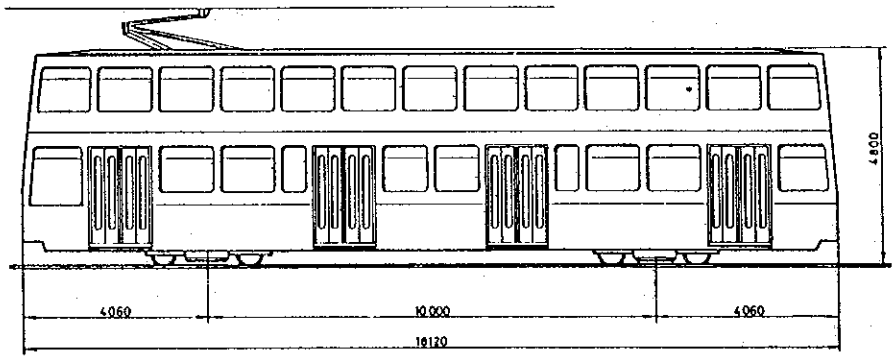
double-deckers, and once again they were rejected (18).

The demise of Tuen Mun's potential double-deckers thwarted any hope that such vehicles might have become a serious option for new LRT systems, at least for the time being. In theoretical terms the double-deckers would have been most effective on a cost-per-place basis and in terms of seat-to-standee ratios, both of which were originally considered important in Hong Kong. Other aspects were debated at length, such as axle-loads, centres of gravity, door-width to passenger ratios, the locations of equipment, and the efficacy of air-conditioning. Perhaps all of these doubts could have been resolved, but the main objection was that neither KWG nor latterly the KCRC wished to be saddled with the development costs of a new high-performance double-decker. The rolling stock industry was also less than encouraging; no detailed engineering designs for a double-decker emerged from any of the manufacturers whose views were sought on the matter. Duewag initially expressed interest, but this soon turned to discouragement. Metro-Cammell produced an alluring artist's impression, but details never followed. Comeng produced some computer simulations but no design (19), whilst GEC produced an outline drawing as late as January 1984, by which time the KCRC, now the potential operator, had just rejected "non-conformist" designs. Other developers either proposed no double-deck option at all, or argued firmly against such a concept, as did UTDC of Canada.

If UTDC repudiated double-deckers, it did have another proposal which briefly flowered into a "new versus secondhand" debate. In March 1980, UTDC offered to procure, recondition and modify (for lefthand running) a batch of PCC-cars from the 200 which Toronto was then offering for sale. Coincidentally, a government engineer was recommending that the line between Tuen Mun and Yuen Long should be built on a median reservation rather than on a lateral one beside the road. Transport Department combined these proposals to recommend island platforms and median reservations throughout the system. This would accommodate the Toronto cars or any other righthand running cars with minimal modifications (20). These proposals were soon suppressed on the grounds that it was already too late to change the committed lateral reservations in Tuen Mun, and that secondhand cars would be unacceptable as a matter of policy.



The Transport Department's development of the TMNTTS car, now with four sets of double doors. (Transport Department



The Electrowatt double-deck concept, which lost out to the single-deck rival in the consultants' evaluation. (Electrowatt Engineering Services Ltd

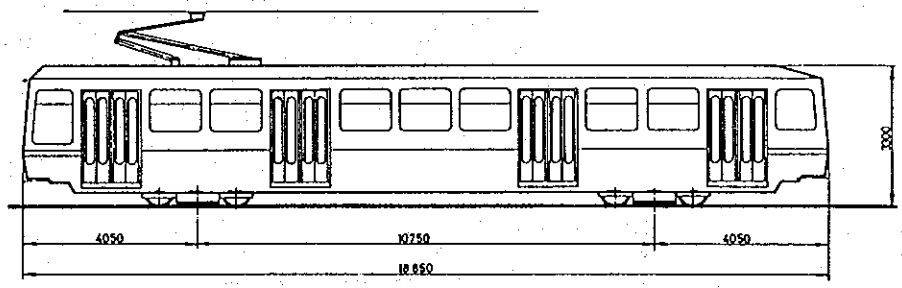
The negotiations in difficulty

With the car design debate occupying almost the first year of the negotiations between Government and KWG, it was obvious that they would be protracted. Nevertheless, there was some useful progress. In particular, TRAPIG issued its report in March 1980, defining the physical requirements for the system in Tuen Mun. Light rail reservations were already being safeguarded in the town, and the future On Ting stop was already under construction as the first tangible LRT structure. In other directions, a Technical, Legal and Administrative Sub-group of the main negotiating team was framing a code of practice for the light railway. This was inspired by the West German *"BOStrab"* regulations, and was arguably the first such comprehensive code for modern light rail transit in the English language. However, after an energetic start, even this process became diluted by other pressures, and the document finally appeared as "Planning Guidelines" in July 1982 (21). Although it never formed any subsidiary legislation to the system as now built, certain provisions were assimilated into other ordinances. Moreover, the system still largely obeys the standards established in the guidelines.

By the summer of 1980 it was evident that the negotiations were entering new areas of difficulty. These comprised the definition of a comprehensive and integrated transport system, the need for KWG to act according to prudent commercial principles and to preserve its "permitted return" under a profit-control scheme that Government required, and the need to consider property development rights. Realising that problems were developing, alternative proposals began to surface. In June that year Government first hinted at running the system by a Government-owned corporation, whilst in August some support emerged for an "Aerometro" suspended monorail; this was being promoted at the time and it was suggested that a line should be built from Tsuen Wan to Yuen Long via Tuen Mun. In the same month the Kowloon Motor Bus Company 1933 Ltd (KMB) expressed formal interest in developing the TMNTTS bus strategy instead of the LRT. All of these ideas were deferred in the hope that the negotiations would bear fruit, although similar alternatives were to re-emerge three years later.

So the negotiations continued, but all the time the inauguration date was being delayed. By October 1980 it had already slipped to July 1984, and a year later it was not envisaged before January 1986. These slippages were a blessing in disguise, as the pace of development in Tuen Mun was slower than had been envisaged. Indeed, if the LRT had started running in 1980 as the TMNTTS had proposed, most of the network would have served mere building sites!

There was uncertainty elsewhere too. A series of development investigations for the North-west New Territories had begun in November 1978, and these were advanced into a major consultancy study in 1980 which reported in August 1981 (23). The proposals catered both for a "base growth" scenario and the possibility of major growth west of Yuen Long to accommodate 680 000 people. The latter echoed a contemporary proposal of the "Mighty City Company", which had purchased land and prepared plans for a community of 535 000 at Tin Shui Wai. Mighty City's plan featured eight internal light rail routes, linked at two places to the Tuen Mun—Yuen Long line. However, the whole scheme was too ambitious, and was dropped in July 1981, only to be redesigned two years later on a much more modest scale. The revised project would be built as a joint venture with Government. The "major growth" option of the consultancy study was also shelved (although the base growth studies were later pursued in depth), and "strategic growth" is now being catered-for by reclamation schemes around the shores of Victoria Harbour. Obviously, the waxing and waning of population predictions in the area provided a difficult planning environment for



The successful Electrowatt concept of 1979. (Electrowatt Engineering Services Ltd

a private-enterprise LRT system, whilst related doubts about peak-hour factors and the strength of external commuting from Tuen Mun raised further forecasting uncertainties. The latter was a serious matter, as it was already evident that Tuen Mun was far less self-contained than the TMNTTS had been asked to believe. Arguably this should have strengthened the case for an interurban link to Tsuen Wan, but, even at the time of writing, no decision has been taken about this.

1981 therefore witnessed little substantive progress in the negotiations. Towards the end of the year, KWG was becoming worried about its desire to develop property over depôts and termini. KWG hoped to exploit property income (following the example of the Mass Transit Railway Corporation) because a predicted 30-year payback period for the LRT alone hardly appealed to a commercial company in Hong Kong's financial realities. However, Government wanted a linkage between fares and property income, whilst KWG regarded both transport operation and property development as being commercially risky, and therefore wanted them treated separately.

But 1981 did witness some progress. In September the Transport Department asked for an additional light rail reservation from the junction of Pui To and Castle Peak roads south-eastwards to So Kwun Wat, where proposed development might warrant a light rail route. In November a new post of "Chief Engineer, Light Rail Transit" was proposed and presaged the co-ordination of all regional matters concerning LRT infrastructure. In a related move, initial consideration was given to the apportionment of costs between the operator and Government, the latter assuming responsibility for the formation of the right-of-way and civil engineering structures. Another development was the Secretary for Transport's ruling in October that the term "tram" should no longer be used in association with the project. The intention appeared to be not only to emphasise the contemporary image of the new system, but also to dissociate it from the Island trams, whose future was shaky at this time and whose image was not then of the best. The taboo on the word "tram" has lasted to this day, though arguably it has backfired because some local residents see the LRT system and its "trains" as a threatening innovation rather than as a user-friendly tram.

The negotiations founder

In April 1982 the negotiations entered their fourth year. The Wharf Company and Government had still not reached a consensus over a variety of matters, including the property development issue and the need to provide for a higher peak-hour factor than the TMNTTS had assumed (23). However, by July it appeared that some concessions could be made towards KWG's position. KWG was clearly not yet totally despondent, as by then complete tender specifications had been prepared. Electrowatt had developed these in every detail; for example the car had by now been designed right down to the paint finish (24). However, in a late change of approach, KWG decided to build the system on a "turnkey" contract basis, rather than by the award of separate tenders. Accordingly, in August 1982, KWG sought pre-qualification tenders from six consortia, including:

(i) Leighton Engineering and Comeng;
(ii) UTDC of Canada;
(iii) GEC, MAN and Linke-Hofmann-Busch;
(iv) ACEC, CFM (La Brugeoise et Nivelles) and Balfour Beatty;
(v) Mitsubishi Corporation; and
(vi) Metro-Cammell Ltd.

In October detailed proposals were received from all of these except Metro-Cammell Ltd, which merely provided briefing notes. In the meantime, KWG had proposed a "modified initial system" in September, comprising only one route, from Yau Oi Estate to Yuen Long, with the rest of the network initially to be run by buses. This was an attempt to defray costs, but Government judged that such drastic pruning would lose a disproportionate amount of traffic. But now there were problems on the property front as well. In September 1982, the British Prime Minister, Margaret Thatcher, visited Hong Kong and China. During her talks with the Chinese leader, Deng Xiaoping, the latter made it clear that Hong Kong would revert to Chinese sovereignty in 1997. Hong Kong's booming property market abruptly went into recession, and for KWG this made an already marginal project even less attractive. In January 1983, KWG declared that it could not accept Government's terms, and although it later said that it would still be interested if Government were to modify its conditions, the January withdrawal in fact marked the end of KWG's involvement.

Rescuing the light railway

Government was now in a dilemma. Over 10 km of light rail reservation had already been formed in Tuen Mun, and since March 1982 a consultancy study had been designing the line between Tuen Mun and Yuen Long (25). On the other hand, late in 1982, it had been decided that the bus option should be reinvestigated. In mid-January the government engineer reported that it would be too costly to make the requisite modifications for buses, even though it would be feasible. In March, KMB produced a "Special Report"

(26) about bus operation on the LRT right-of-way, and predictably the bus company confirmed the feasibility of bus operation and affirmed the mode's superiority.

Meanwhile, the light rail proponents were assembling their forces. The first hint that a new initiative was afoot was implicit in Metro-Cammell's lukewarm response to KWG's call for pre-qualification tenders. Metro-Cammell doubted whether KWG would proceed, and therefore suggested to Government in October 1982 that the LRT scheme would be viable without property development, and that Metro-Cammell would be prepared to form a consortium to build and finance the scheme. With KWG's withdrawal, the other consortia said that they were also interested in making proposals. Accordingly, in May 1983 the Secretary for Transport, Alan Scott, wrote to the six consortia inviting them to submit proposals and cost estimates on a "without prejudice and without commitment" basis, including the financing of the system's construction and the financing by loans of the ultimate owner during the repayment period.

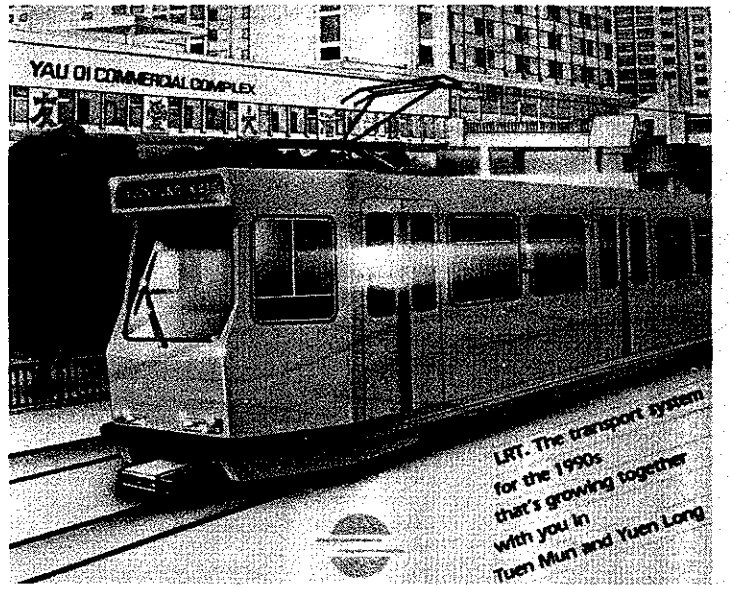
Another development in May included the definition of a scaled-down Tin Shui Wai, featuring a light rail loop which was henceforth to be regarded as part of the regional LRT system. In the following month, proposals emerged for urban rail links from the NWNT Base Strategy Studies (27), comprising either an LRT or an MTR link between Yuen Long and Tsuen Wan via a tunnel under Tai Mo Shan, the Territory's highest mountain (957 metres); of the two, the MTR link was the preferred option.

In July and August 1983, all of the consortia except Mitsubishi (which presented only written proposals) gave audio-visual presentations on their schemes to Government staff. Each consortium had its own opinions on the extent, phasing and financial aspects of the system, and all proposed four-axle cars, except the Belgian consortium which offered a six-axle car. Nonetheless, the Australian and Canadian groups, and also GEC/Linke-Hofmann-Busch, offered alternative six-axle cars. Most of the cars, four- and six-axle alike, were derivatives of existing production designs such as the Melbourne Z3, the Canadian Light Rail Vehicle and the Belgian-built cars for Manila. The Metro-Cammell/Duewag/Siemens four-axle car was an all-new design but, shortly after the presentation, this group recommended the use of a twin-set car derived from the Stuttgart S-DT8 type; however, Government considered that the twin-set would be too large for all services on the network.

In the months after the presentations there was much correspondence and discussion with the consortia to clarify their intentions. However, it was apparent that the submissions were incompatible with Government's needs, or with each other. It would not therefore be possible to select a single consortium to proceed with the project. However, some of the consortia had suggested that ownership of the system should ultimately be vested in a Government Corporation. This accorded with an idea which had been considered by Government for some time, the ideal candidate being the Kowloon—Canton Railway Corporation, which on 1 February 1983 had been vested as an autonomous Government-owned corporation. The KCRC was responsible for the mainline railway between Kowloon and the Chinese border, and this had just been double-tracked and electrified. Unlike the Mass Transit Railway Corporation, the KCRC was not burdened with huge loan repayments, meaning that it would be better placed to accommodate expansion.

Although new approaches to building and operating the LRT system were now taking shape, the alternative of using buses was still in contention. In the autumn of 1983, the New Territories Development Consultants reported that buses could cope; on the other hand, they recommended that the MTR extension from Tsuen Wan to Yuen Long (which they had proposed in their NWNT Base Strategy Studies) should be extended south to Tuen Mun by the later 1990s. Thus it could be argued that a bus option would ultimately be a bus-plus-MTR option, and therefore less attractive in overall terms than using the LRT as the core system. The "bus option" studies also addressed the Tuen Mun to Tsuen Wan corridor for the first time since the original TMNTTS Alweg monorail recommendation. The alternatives examined this time included conventional buses, *"O-Bahn"* guided buses and several LRT alignments (29). Meanwhile, a latecomer endeavoured to gain attention when the "Docklands Express" consortium made a presentation in October 1983 for a VAL automated metro from Tsuen Wan to Yuen Long via Tuen Mun (30). As this was non-compliant with the proposed LRT network, the consortium was unable to get its ideas accepted, although it continued to press its arguments for more than a year afterwards.

With proposals for both light rail and bus options, the administration was now in a position to seek final advice from the Executive Council on the future of local transport in the North-west New Territories. The decision was taken on 22 November 1983, and the KCRC was invited to take on the project as owner and operator, and to make its own assessment of viability; on the same day the KCRC issued a press release



The KCRC vision of its car in an early publicity brochure. The Corporation's car-design consultant was also involved in the Utrecht—Nieuwegein project, as is obvious from the styling. The brochure itself was inspired by one issued for the West Midlands LRT scheme. (KCRC

welcoming the decision. On 19 December, the Chairman of the KCRC formally accepted the invitation to consider the project, subject to its own viability assessment.

The KCRC takes over

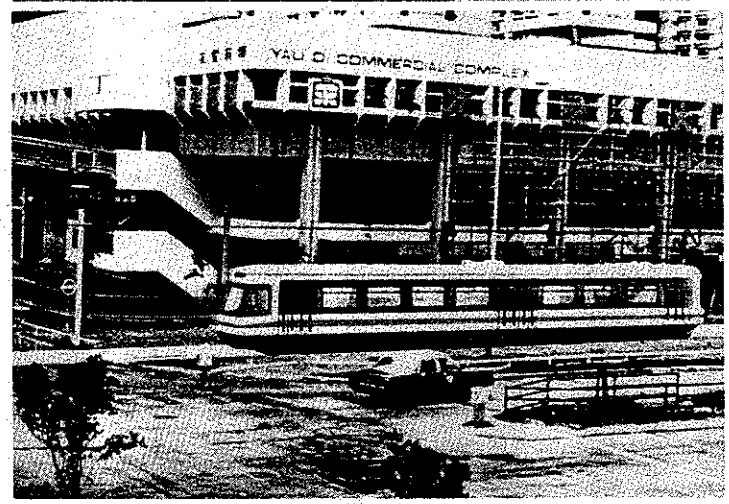
Having accepted the challenge to take on the light rail project, the KCRC moved quickly and appointed consultants to make a feasibility study in January 1984. The consultants were Scott Wilson Kirkpatrick and Partners (engineering), N. M. Rothschild & Sons (financial) and Parsons Brinckerhoff (Asia) Ltd (electrical and mechanical). A Light Rail Steering Committee, a Working Group and an Operations Task Working Group were also formed. Generally the planning assumptions remained the same as they had been during the KWG negotiations, although the depôt site was relocated from Hung Shui Kiu (halfway between Tuen Mun and Yuen Long) to southwest Tuen Mun (30). A decision was also taken to adopt an "open" ticket system with machines at stops and random inspection on the cars. As on previous occasions, there were also debates about the forecast patronage levels. These considerations were all addressed in a final report (31), together with the recommendation that the system should be built in phases, the first of which would comprise the greater part of the Tuen Mun local system and the Yuen Long link. Shortly afterwards, Government prepared a report on proposed restrictions on road passenger transport services in order to shelter the LRT from direct competition, as well as the development of LRT routes and their associated bus services (32). A related aspect of this report was a proposal to number all surface transport throughout the Territory on a zonal basis; this was never adopted, except by the KCRC, which accounts for the present route numbers in the 5xx and 6xx series for Tuen Mun and Yuen Long services respectively.

On 16 July 1984 the KCRC Board decided to proceed with the LRT project. In the following month the Corporation appointed consultants to conduct "pre-implementation studies", comprising Scott Wilson Kirkpatrick & Partners, Electrowatt Engineering Services Ltd and Citicorp. On the last day of August, the Secretary for Transport and the KCR's Managing Director gave a presentation to a joint meeting of the Tuen Mun and Yuen Long district boards (33); although generally welcoming the project, fears were expressed about the "monopoly" that the KCRC would secure in the region.

In September 1984, the KCRC called for pre-qualification bids from the interested consortia. One of the consortia had regrouped when Metro-Cammell amalgamated with GEC just prior to the call for pre-qualification bids.

This left Duewag and Siemens out of the bidding, and a last minute attempt by the Germans to re-enter the race failed, although Duewag at least was eventually consoled by becoming the bogie sub-contractor to the successful bidder. Having examined these pre-qualification bids, the KCRC confirmed

Above: An artist's impression of a Metro-Cammell single-deck car. (Metro-Cammell Ltd

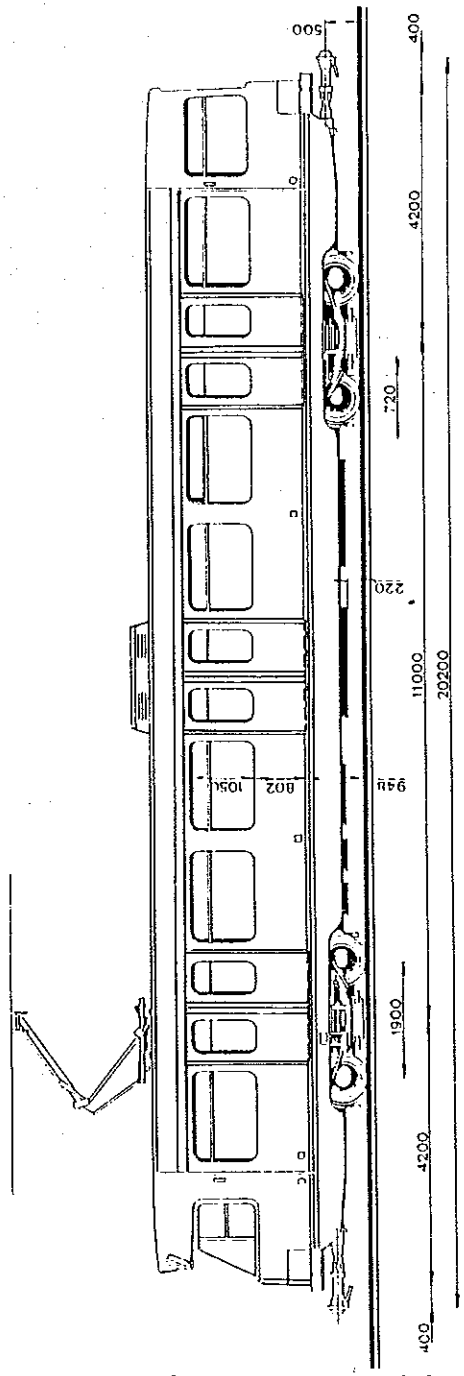


Below: An artist's impression of a UTDC car passing Yau Oi. (Metro Canada International Ltd

in November that it would award the contract as a "turnkey" project for Phase 1.

Other developments that autumn reflected the growing awareness of the LRT's inevitability. KMB, the bus operator, conducted meetings in Tuen Mun to persuade residents to support its renewed campaign for a bus-only option. At the same time, another campaign was mounted by a Tuen Mun interest group against the KCRC's alleged monopoly, resulting in the presentation of 12 000 signatures to the Secretary for Transport. Meanwhile, it was discovered that the KCRC was acting *ultra vires* in carrying out any work on the light railway at all, so at the end of November the KCRC (Permitted Activities) Order 1984 was gazetted to make such activities lawful. Despite these problems, the KCRC found favour towards the end of the year by deciding to adopt high platforms throughout the system, thus becoming Hong Kong's first mass carrier accessible to the disabled.

1985 was an eventful year. In January, the tender documents for Phase 1, together with Options for Phase 2, were issued. The next matter to resolve was that of Government's responsibilities. At the end of February, a contractual basis was provided for this when it was determined that Government should proceed with land acquisition and should assume the responsibility for preparing the track-bed and civil engineering structures. It was perhaps fitting that the resolution of these matters should have been Alan Scott's last duty as Secretary for Transport, as he had done much to keep the project alive in the uncertain years of 1982 and 1983. In the



An elevation of the Comeng car as built for the KCRC. (KCRC

following month, agreement was reached on the "block resumption" of land for the line between Tuen Mun and Yuen Long, including 164 000 m² of land, seven houses, and 710 temporary structures including 64 workshops. In Hong Kong, the Government's powers of resumption (compulsory purchase) are absolute, so public projects do not encounter such problems as derailed Birmingham's 1984 light rail scheme (34). Land resumption was unnecessary in Tuen Mun, where the reservations had been formed during the construction of the town, some of them back in the 1970s.

On 22 April tenders were returned from the five consortia. As in 1983, much clarification was needed, and a re-tender was issued in May which reduced the contenders to three: GEC, ACEC, and Leighton. On 15 July the KCRC announced that the contract would be awarded to the Australian consortium, which was now jointly led by Leighton Contractors (Asia) and the Metropolitan Transit Authority of Victoria (Melbourne). The contractors bid at a price of about HKD 1000 million (35), and were now required to complete Phase 1, including 23 route-km, 41 stops, and 70 cars, in 36 months. The contract was formally signed on 2 August 1985.

Despite the award of the contract, little tangible evidence of construction appeared in the first few months, and only after the ground-breaking ceremony at the depôt site in December that year did physical work really begin. The first track did not appear until November 1986, but thereafter progress was swift, with tracklaying and catenary erection proceeding almost simultaneously northwards and eastwards from the depôt area. However, as we shall see, even the construction and testing of the system encountered some unexpected problems, and at the end of the contract period one of these was sufficiently serious to defer the start of revenue service.

(to be continued

References and notes

(1) "Tramway type" as defined here means that the system operates in mixed traffic under manual control. In terms of this definition, the Tyne and Wear Metro and the Docklands Light Railway do not qualify.

(2) *Modern Tramway*, "The Tuen Mun Light Rail Project: Hong Kong's second urban electric tramway", Vol 51, No 606, June 1988.

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Runnacles, T. V., "The planning of a light railway for three new towns in Hong Kong". Proceedings of Seminar H, PTRC Summer Annual Meeting at the University of Sussex, July 1985.

Tomlinson, D., "Hong Kong's Light Rail Plans", Mass Transit, Vol XIII No 6, June 1986.

Above: Before becoming involved in the LRT project, the KCRC was purely a heavy-rail undertaking. A 25-kV multiple-unit train is seen here entering the temporary Tai Wai station in February 1986.
(T. V. Runnacles

Below: The ceremony to mark the start of tracklaying was held on 24 November 1986. The ceremony was held at the future Butterfly stop.
(T. V. Runnacles

Zimmermann, R., *"Das Neue Stadtbahn-System in Hong Kong", Der Stadtverkehr,* October 1986.

Wade, J., "Light Rail comes to Tuen Mun", International Railway Journal, Vol XXVII, No 10, October 1987.

Wade, J., "Why Hong Kong chose light rail", City Transport, December 1987/February 1988.

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Building & Construction News, "Tuen Mun LRT", LRT Supplement, August 8, 1988.

(4) See for example:

Modern Tramway, "Package deals", Vol 51, No 608, August 1988.

International Railway Journal, "British LR projects seek private funds", Vol XXVIII No 4, April 1988.

(5) Leung, W. T., "The new towns programme", in Chiu, T. N. and So, C. L. (editors), "A geography of Hong Kong", Oxford University Press, Hong Kong, 1983.

(6) The New Territories is the rural hinterland of Hong Kong that was leased from China for 99 years from 1 July 1898.

(7) Scott Wilson Kirkpatrick & Partners, "The Tuen Mun New Town Transport Study; Draft Final Report", Hong Kong, April 1978.

(8) Traffic and Transport Survey Division, "Yuen Long Transport Study—Phase II Final Report", Technical Report No 312, Hong Kong, 1981.

(9) Transport Department, "Tuen Mun light rail negotiations begin", *Modern Tramway,* Vol 42 No 502, October 1979.

(10) Kompfner, P., "Notes on light rail transit in Britain", TRRL Supplementary Report 482, 1979.

(11) The Planning Office, London Transport Executive, "An exploratory study of light rail transit and modern tramways in Greater London", unpublished, April 1977.

(12) London Regional Transport, "Light Rail for London", February 1987—see also, Wyse, W. J., "Will Croydon be the Manchester of the Southeast?", *Modern Tramway,* Vol 50, No 592, April 1987, and (same author) "Light Rail for Croydon: a step nearer", *Modern Tramway,* Vol 51, No 610, October 1988.

(13) Runnacles, T. V., "The double-deck tram: an irrational eclipse", *Modern Tramway,* Vol 41 No 490 and 491, October and November 1978.

(14) Electrowatt Engineering Services Ltd, "Tuen Mun/Yuen Long LRT Project—Vehicle Evaluation", unpublished, Hong Kong, October 1979.

(15) Transport Department, "Further Studies of LRV configuration", (LRT) Technical Note No 4, unpublished, November 1979.

(16) Transport Department, "Vehicle evaluation reconsidered", (LRT) Technical Note No 9, unpublished, November 1981.

(17) Transport Department, "Vehicle configuration reviewed", (LRT) Technical Note No 9, unpublished, January 1982.

(18) Huber, B. H., "The new light rail transit system in Hong Kong", unpublished typescript, 1988.

(19) Comeng did produce a double-deck design for Hongkong Tramway's existing system in November 1980, featuring a motorman's position on the top deck. This unsolicited concept was not pursued.

(20) Transport Department, "Prospects for 'wrong-sided' LRVs", (LRT) Technical Note No 10, unpublished, April 1980.

(21) Transport Planning Unit, "Technical, legal and administrative guidelines for the construction and operation of the Tuen Mun—Yuen Long light rail transit system", (LRT) Technical Note No 21, unpublished, July 1982.

(22) New Territories Development Consultants, "Development investigations of the North Western New Territories", Hong Kong, August 1981.

(23) Traditionally, travel on public transport in Hong Kong had been rather evenly distributed over the day, and the TMNTTS had been instructed to assume a peak-hour factor of 8% of daily travel. However, off-peak travel declined with the general adoption of television and air-conditioning in the home, and Government was now seeking that a 12% factor be catered for, with obvious implications on fleet sizes, costs and fares.

(24) As finally specified, the Electrowatt car would have closely resembled the contemporary Neuchâtel Be4/4 cars.

(25) Joint Engineers (Binnie & Partners (HK) and Scott Wilson Kirkpatrick & Partners), "Formation of a light rail reserve in the Tuen Mun—Yuen Long Corridor and associated structures", Hong Kong, September 1982. Note that a "Supplementary Report" was issued in June 1984.

(26) Kowloon Motor Bus Company (1933) Ltd, "Study of future public transport demand and feasibility of bus operation on LRT rights of way in Tuen Mun", unpublished, March 1983.

(27) New Territories Development Consultants, "Transport Plan for the NWNT", Working Paper No 56, unpublished, 1983.

(28) New Territories Development Consultants, "Tuen Mun—Tsuen Wan public transport reserve: specification of bus priority options and LRT system", (Bus Option) Working Paper No 5, unpublished, July 1983.

(29) In fact the first proposal for this system had been made by S A Matra in March 1981 under the title "VAL in the New Territories".

(30) The potential depôt site was moved on five occasions during the planning of the system.

(31) Kowloon—Canton Railway Corporation, "Tuen Mun—Yuen Long Light Rail Transit Feasibility Study—Final Report", unpublished, March 1984.

(32) Transport Planning Unit, "The public transport plan for the western New Territories, 1984-1996", unpublished "Special Report", May 1984.

(33) Scott, A. J., "The western New Territories light rail transit system: its attributes and rôle in integrated regional transport", unpublished, August 1984, and

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(34) Ballinger, M. and Skelsey, G., "None too Smart; problems with light rapid transit in Birmingham", *Modern Tramway,* Vol 49, No 580, April 1986.

(35) The Hong Kong dollar has been pegged to the US dollar since 1983, the rate being HKD 7.8 to USD 1.0. Exchange rates against the pound sterling vary, and at the time of writing were approximately HKD 13.3 to £1.00.

Note: this is far from a comprehensive list of reports on the Tuen Mun—Yuen Long LRT system, of which there are now approximately 200, apart from the contractor's own documents. Again, readers are respectfully discouraged from seeking to obtain unpublished documents referred to above; they are mentioned for the record only.

On-street LRT operation

PHILIP WEBB
(Research Associate, Centre for Urban Studies, University of Toronto)

THERE is always a strong reaction by people in a large city to its transit system. It is all-pervasive, and for many of them an essential part of life. They may see an underground railway as clean and efficient, or dirty and threatening; buses as reliable, or slow and unpredictable; new light rail projects are generally welcomed as elegant and

Editorial

Air lines

It was not quite unofficial news that the British government has approved in principle a new dedicated rail link between central London and Heathrow Airport. After all, London's second international airport, opened in 1946, has been served by a special railway service since September 1piS, perhaps the first such link anywhere. Abortive postwar plans for an international airport at Farlop in west London envisaged direct connection to the new Central Line of the underground. Heathrow itself, which in fact became the capital's premier airport after World War II, has been connected to central London since 1piS by an extension to the conventional Piccadilly Line heavy underground route. Finally, the third London airport, at Stansted, is shortly to be linked by a new branch to the electrified London—Cambridge main line.

You could even travel to some airports by tram, at least in the days when they were modestly sized affairs more conveniently sited close to the cities they purported to serve. One reads with a pinch of salt the advice in a 1935 guide book that one could travel to London's then international airport at Croydon, *"changing cars at North End, Croydon, and alighting at Waddon Station, thence 3/4 mile walk"*. The cars of South Metropolitan route 7 would have been a curious preparation for the latest form of travel, and the walk might not have been altogether convenient. The sort of people who flew in those days would have been more likely to ride in a hired limousine.

The justification for conventional metro links, despite their comparative slowness and unsuitability for travellers encumbered with luggage, is often the vast ancillary traffic generated by airports. Heathrow's 44 000 employees make it the employment equivalent of a modest city. But the remoteness of modern airports—Heathrow is 24 km from central London—together with the very substantial and concentrated traffic flows produced by large modern aircraft, demands high-speed, high-capacity transport links, usually by national railways.

What is significant about the British government's rather belated decision at Heathrow is that the choice of mode was the result of detailed and expert inquiry, a decision taken in the light of the most thorough evaluation of the alternatives. Improved and dedicated road links, people-movers, further metro extension, new technology systems and light rail were all examined. In the words of the official report: *"there is virtually unanimous support for a rail-based option, and no expression against it"*. Given the distance and type of traffic involved it comes as no surprise to us that light rail proved inappropriate in this particular application; we have never held it to be a panacea for all transport needs in cities. What does perhaps surprise us, bearing in mind the promotional energy that had gone into pressing the claims of a new technology system, is that the Government report is so positive and unashamed in its selection of a wholly orthodox rail system. A steel-wheel/steel-rail system, electrically operated, following existing rail routes for much of the distance, was found to be superior to the other options tested. As we know, there has been no shortage of unorthodox systems within the limited confines of airports themselves, including the new installations at Gatwick and Birmingham. But clearly the lack of experience of such systems in line-haul applications counted decisively against them in the recent study. An added reason, perhaps, follows the Government's decision that the new airport link will be funded from private sources rather than government loans or grants. To attract private capital, a project has to be seen to be practical and of proven performance, and there is no question of the superiority of conventional rail systems in this respect over the usually untested claims of less othodox proposals. However strongly they are commended by patentees and manufacturers, there is precious little evidence worldwide of the practicability of novel systems in large-scale applications.

There is, of course, a lesson here for those considering the more circumscribed requirements of urban transport. There, too, operators around the world have learned that the claims to be taken most seriously are those of such proven systems as light rail, with over a century of steady technological development behind it and with exciting new developments still to come. Of course the poor airline passenger may well long for the simplicity and unsophistication of Croydon in the 'thirties, and wish that he could reach his holiday plane as easily as citizens of Bremen, just by boarding the local tram.

Tramway developments in Hong Kong

T. V. RUNNACLES

Part 5: The Tuen Mun—Yuen Long LRT system *(contd)*

From ground-breaking to operation—1985 to 1988

ON 15 July 1985, the contract for Phase 1 of the light rail system had been awarded to Leighton Contractors (Asia) and the Metropolitan Transit Authority of Victoria. This consortium won on the basis of a cost effective proposal, its operational experience in Melbourne, and an attractive financial offer (1). Leighton Contractors (Asia) is a subsidiary of the diversified Australian construction and property group, Leighton Holdings Ltd. Although Leighton had the expertise to manage the contract within its own structure, many principal subcontractors still had to be identified, and this occupied the first three months of the 36 months contract. All of the preferred pre-tender subcontractors joined the contract, albeit only after some adroit political manoeuvring in some cases.

Finance played a major rôle in the contract, which had been let at a fixed price in Hong Kong dollars (HKD), and allowance had to be made for inflation and exchange rate fluctuations. An accounting unit was established to handle forward exchange contracts, export credit loans, cost control and other matters. "Soft loans" had to be arranged, and this took nearly five months to achieve, with the major participants being the Export Credit Guarantee Department of Britain and the Export Finance and Insurance Corporation of Australia.

With so much to organise, there was little initial evidence of construction. This effectively began with a groundbreaking ceremony at the depôt site on 18 November 1985. Whereas work then proceeded on the depôt foundations, elsewhere the major effort was dedicated to utility diversions and track-bed preparation, including the requisite clearances for the Castle Peak Road line to Yuen Long. The first tracks appeared in the autumn of 1986, and a tracklaying ceremony was held on 24 November at the future Butterfly stop, south of the depôt. By the spring of 1987, 3 km of track were laid between the Ferry Pier and Shan King Estate, and catenary erection had also begun. Even so, progress was understood to be behind schedule due to weather conditions and other factors. However, the pace of construction quickened perceptibly as time went by: in June 1987 the track stretched to 6 km, but less than a year later the complete 23-km system was in place, energised and open for test runs.

Whilst this work was going on in Tuen Mun, construction of the first car, No 1001, had been proceeding in Australia. By early 1987 the car was being tested on Comeng's special Dandenong test track near Melbourne, but progress was delayed when side panels buckled during strain tests. To provide more strength, fluted stainless steel cladding was adopted, using a form of construction employed on Melbourne's suburban electric multiple-units. The hapless 1001 was not sent to Tuen Mun, and was replaced at the very end of the delivery period by another car of the same number (2). The first car to arrive in Hong Kong was 1004, and this was unloaded from a lighter directly into the depôt on 5 October 1987. 1004 made its first trip on the system on 5 November, and on 10 December it was amongst those cars conveying invited guests and local residents around the Shan King loop in a "first ride" ceremony. The event was marked by speeches, a buffet, and the naming of 1004 as "LRT Pioneer".

By early 1988 testing and driver training had begun in earnest, and the available length of line and tram fleet increased month by month. After the controversy that had surrounded the project during its earlier years, it might have been wished that construction would have seen the system entering calmer waters. Such hopes soon vanished as new issues arose, including the

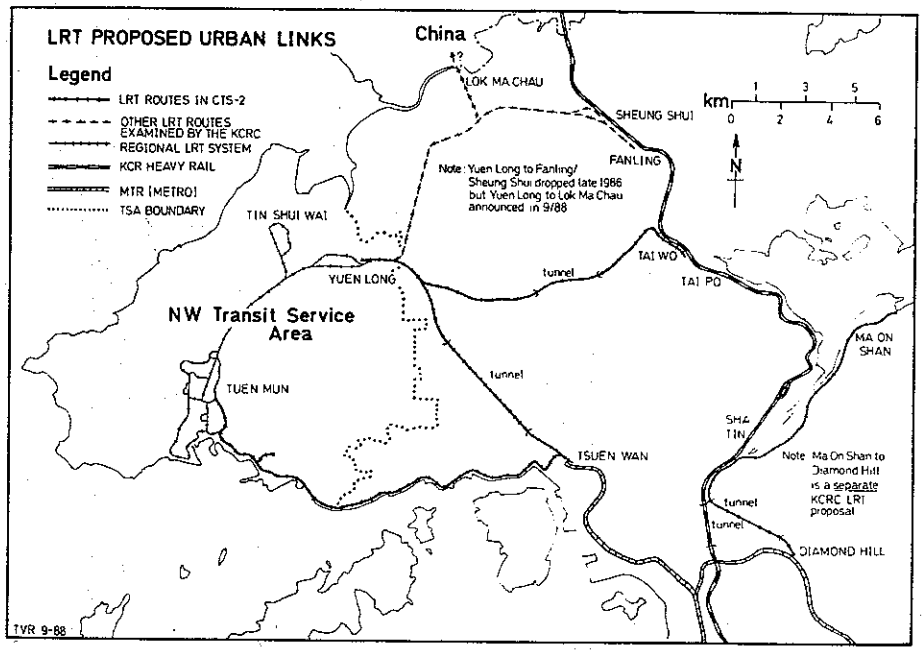
"monopoly zone" problem, the urban links debate, a geological difficulty, and, finally, a spate of accidents that called the safety of the whole system into question.

The Transit Service Area—a question of monopoly?

Even when the Tuen Mun New Town Transport Study reported in 1978, it was recognised that a viable light railway could not endure unbridled competition from road passenger transport. Although it was generally acknowledged that some form of "sheltering" should be afforded, the scope of such measures bedevilled the negotiations with KWG, and differing views on the matter between the company and Government had contributed to KWG's withdrawal from the project. By 1984 Government had prepared its own proposals for a Transit Service Area or TSA (3), and these formed the basis of discussions with the KCRC. Uniquely for Hong Kong, the 1984 report had recommended that competition should be fettered by the following measures within the TSA:

- the absorption of existing KMB bus routes wholly within the TSA by the LRT operator;
- the operation of these bus routes as LRT feeder routes, or as pre-LRT routes, subsequently to be replaced by tram services;
- the imposition of boarding and alighting restrictions on bus routes with one or both ends external to the TSA. Buses leaving the TSA could pick-up but not set down, and those entering the TSA could set down but not pick up; and
- diversions and restrictions were to be placed on public light buses within the TSA so as to minimise their local rôle (4).

When the proposals were announced to the Tuen Mun and Yuen Long District Boards in August 1984 there was some opposition to the proposed monopoly zone. District Board members argued for the public's right to choose amongst a variety of modes operating on the same route. Government argued that KMB's bus franchise effectively gave a monopoly already, so one monopoly would merely be exchanged for another (5). Nonetheless, displeasure was also expressed at the prospect of higher fares on the LRT system and its connecting buses, increases initially estimated at about 30%. This drawback was seen to be compounded by the KCRC's ability to set its own fares, unlike the franchised bus operators which required Government approval for any increase. Opposition to the monopoly proposal persisted, and a member of the Tuen Mun District Board was soon to advocate the establishment of a monitoring committee for LRT fares.



A map of the various urban links studied by the KCRC, most of which are now being studied by the Second Comprehensive Transport Study.

The arguments eventually subsided, but new trouble arose in April 1986 when KMB (the Kowloon Motor Bus Company (1933) Ltd) rejected Government's request that it should withdraw its local bus services from the TSA by mid-1988. This came as a surprise, as KMB had previously indicated a willingness to co-operate (6). However, at this time relationships between the KCRC and KMB had become soured by the KCRC's choice of an independent operator to provide free feeder buses to its suburban electric trains. In consequence, KMB rejected an overture to run pre-LRT and LRT feeder bus routes on contract to the KCRC. KMB engaged in intense lobbying for several weeks, but ultimately climbed down on 4 June 1986, when it accepted the proposed TSA (7). By this time Government was preparing to seek approval to amend the KCRC Ordinance to permit light rail operation and the establishment of the "North-west Transit Service Area". Further lobbying from District Board members and KMB (8) preceded the enactment of the legislation on 30 July (9), and influenced some last minute changes when the Bill was debated in the Legislative Council; in particular, the TSA would be valid only for 20 years after coming into effect, instead of continuing up to 2047 as initially proposed.

The passage of the legislation did not quite bring debates about monopolies and fare levels to an end. In October 1986 the threat made two years earlier was realised when a "Joint Working Group" was established by the Tuen Mun and Yuen Long District Boards to monitor the LRT. In the same month the KCRC announced that it would own and operate its own feeder buses, having calculated that it would be 15% cheaper than contracting the services out. The first KCRC bus on a pre-LRT route was launched on 4 September 1987 on former KMB route 59B in Tuen Mun. The same fare was charged as on the previous KMB service, and the new MCW-built double-deckers were warmly welcomed, despite their forbidding battleship-grey livery. However, a new row erupted in June 1988 when the fares for the LRT system and its bus feeders were disclosed. Legislative councillors and District Board members criticised the KCRC for charging fares on feeder buses, which they had believed would be free. Much as had been predicted long beforehand, the zone-based LRT fares were to average 28% more than prevailing bus fares. This was no surprise, but the public had expected that transfers to connecting buses would be free within any fare zone; however, the KCRC said that bus trips would be charged separately for all except users holding monthly season tickets. Such was the outcry over this matter that the KCRC very soon amended its fare proposals by offering free feeder-bus trips to all ticket-holding tram passengers (10).

One aspect of the "monopoly zone" was the provision in the amended KCRC Ordinance for KMB, the bus operator, to claim compensation from Government for any loss of its "permitted return" arising from routes closed within the TSA. KMB duly sought to exercise this right and put in a claim over three times higher than the Government's estimate. The matter had not been resolved at the time of writing, and seemed likely to go to arbitration (11).

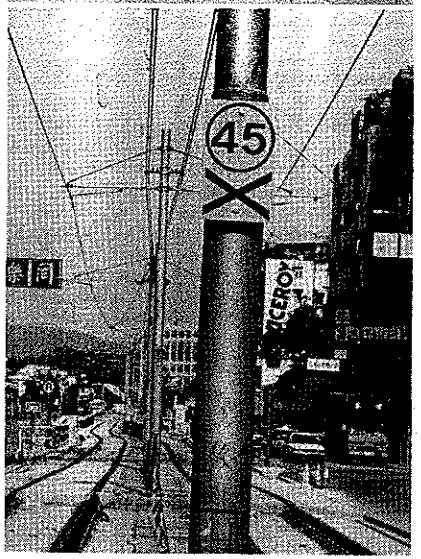
The urban link debate

The Tuen Mun—Yuen Long network is rare amongst tramways and light railways for its isolation. It feeds buses and ferries, but not other rail routes. This deficiency had been recognised since the TMNTTS of 1977-8. However, on the same day that the KCRC awarded the contract to build Phase 1 of the LRT system it announced that a study would be made of an "urban link" to connect the network to the Territory's heavy-rail system. In the spring of 1986 the consultancy was awarded to Scott Wilson Kirkpatrick & Partners, Wilbur Smith and Associates and Kennedy Henderson Ltd. When the report (12) was made public in March 1987, it emerged that four options had been studied:

- a 16.7-km coastal route between Tuen Mun and Tsuen Wan;
- a 12.5-km link, partly in tunnel, from Yuen Long to Tsuen Wan;
- a line from Yuen Long to Sheung Shui (13.5 km) or Fanling (14.8 km), and
- a 14.9-km line from Yuen Long to Tai Wo, just north of Tai Po, also partly in tunnel.

The first two of these would feed the MTR at Tsuen Wan, whilst the last two would interchange with the KCRC's own suburban electric railway. The KCRC favoured the Yuen Long to Tai Wo route which would cost HKD 1260 million at 1986 prices and carry an estimated 137 100 passengers daily by 1996. The second choice was the Yuen Long to Tsuen Wan link; this would be rather more expensive at HKD 1480 million but much busier, with an estimated 1996 daily patronage of 267 400. However, the Tai Wo link would have the advantage of feeding some 50 000 trips a day into the KCR main line, whereas many of the Tsuen Wan passengers would transfer to the rival MTR. The other two routes were eliminated at an early stage of the analysis.

The KCRC's preference for the Tai Wo route immediately fired a controversy; a Government official announced that the TSA would not be extended to cover any of the



Above: Getting the safety message across: the cover of one of the pamphlets issued by the Hong Kong Government's Transport Department. (Transport Department

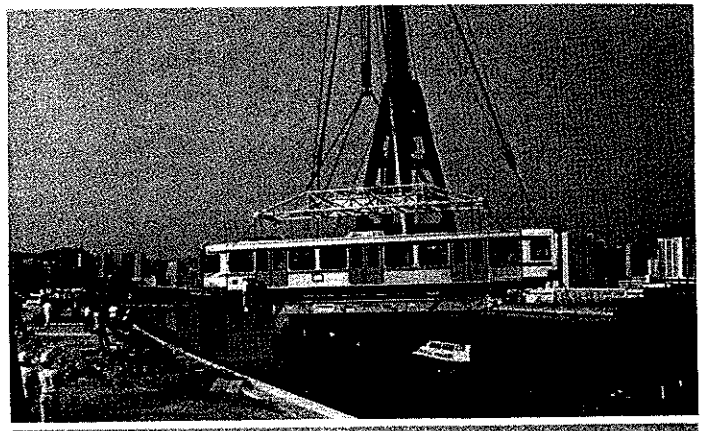
Below: A "speed marker" on a traction pole in Yuen Long tells motormen at what speed to approach the next road crossing. (T. V. Runnacles

new links (13), whilst Tuen Mun District Board members naturally preferred the Tuen Mun to Tsuen Wan coastal route (14). Even the KCRC's own Board was understood to be less than unanimous about the preferred route (15), whilst a legislative councillor reckoned that the Yuen Long to Tai Po link should be built, but as a heavy railway (16). After this initial outcry, the controversy subsided again, only flaring up briefly in October 1987. This was because the KCRC was persuaded to defer a decision on the urban link until Government had completed its Second Comprehensive Transport Study (CTS-2). As the CTS-2 was investigating all of the previous options except the Fanling/Sheung Shui line, and was also examining a heavy-rail alternative on the Yuen Long to Tsuen Wan route, it was considered prudent to determine the chosen link on the basis of overall transport needs. The CTS-2 recommendations are not due to be made public before early 1989 although, when asked on a television documentary in July 1988 if a link should be made to the KCR main line or the MTR, the LRT's director, Joe Wade, replied that "both" would be needed (17).

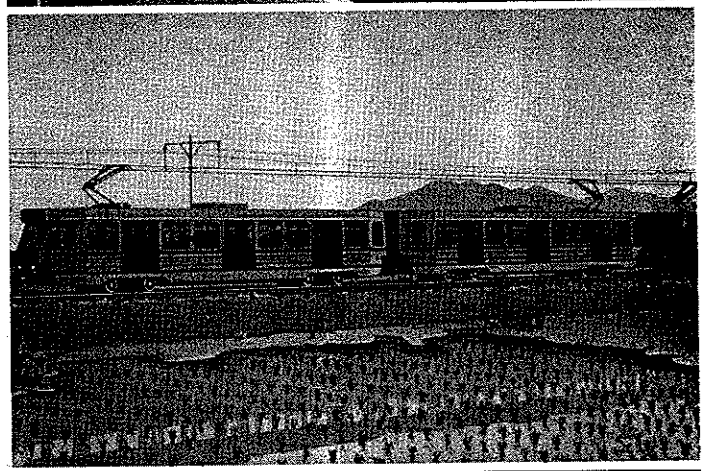
Geological difficulties

Problems of quite a different sort surfaced during the summer of 1987. Although the KCRC had initially evaluated the viability of the LRT without considering property development, an improving property market subsequently persuaded the Corporation to build over three prime sites, these being the depôt in Tuen Mun, the Ferry Pier terminus in Tuen Mun and the Yuen Long terminus. The proposal to build seven 25-storey residential tower blocks at Yuen Long encountered a serious snag when test borings revealed sink holes in the karst bedrock in the summer of 1987.

Leighton—MTA were sufficiently concerned at the potential safety risk threatened by placing heavy buildings atop these subterranean cavities that they withdrew from their HKD 96 million contract to provide the foundations for the site (18). The KCRC was anxious to proceed with the development, and called in contractors Bachy-Soletanche to assess the situation. On their advice, the KCRC concluded that construction could proceed, provided that the foundations were redistributed to avoid the cavities. At the end of May 1988, Government's Housing Department abandoned

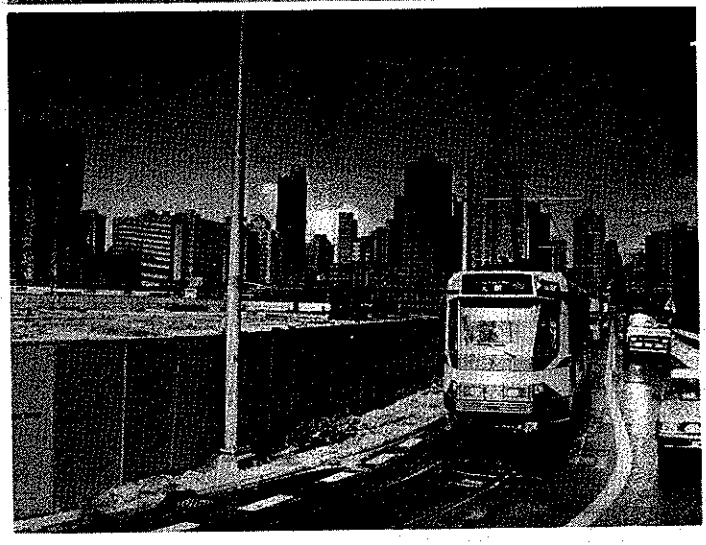


Above: Car 1004 is unloaded from a lighter directly into the depôt at Tuen Mun on 5 October 1987. (T. V. Runnacles



Centre: An artist's impression of the proposed light rail trains for the urban links to the regional Tuen Mun—Yuen Long system. (PROSE Ltd and Scott Wilson Kirkpatrick & Partners

Below: The fencing to the left of car 1014 conceals the site of the permanent Yuen Long terminus, on which work was suspended after the discovery of sink holes in the karst bedrock. Yuen Long is in the background, its appearance giving few clues to its traditional rôle as a country market town. (T.V. Runnacles



plans to build tower blocks for 27 000 people on a site adjacent to the light rail terminus (19), but nonetheless the Buildings Ordinance Office had approved the KCRC development shortly beforehand.

The impact of this hiatus on the LRT system itself was manifested in a temporary terminus at Yuen Long. This comprises three platforms to the southwest of the permanent terminus and a single-track loop around the site on paved track in a one-way road system.

Questions of safety

Although the monopoly zone, extension, and geological problems had created arguments during the construction period, the issues of safety eclipsed all other matters during the final weeks prior to what should have been the opening day. From the very beginning it had been intended that the light railway would offer faster transport than buses—indeed the original TMNTTS evaluation partly justified the system for this reason. A maximum speed of 80 km/h was specified for the trams, and at first no serious questions were asked about this. The guidelines of 1982 (20) specified only that trams should adhere to general (50 km/h) speed limits when running on street track. However, as the start of test running approached, increasing concern was felt at the prospect of trams proceeding across side road junctions at full speed. Accordingly, speed "markers" were erected at the approaches to all road junctions such that none could be crossed at more than 70 km/h, and many at considerably lower speeds. In effect this meant that the 80 km/h capability built into the cars would hardly be exercised, on the existing Phase 1 network.

A related safety matter concerned fencing. The consultants had conceived the system as a "user-friendly" high calibre tramway based on the contemporary European model. Fencing would have been minimal, and the public was credited with the sense to be alert to approaching trams and take appropriate avoiding action. This advice was challenged both by the KCRC and by Government. Before it was electrified, the KCR main line had suffered several fatal accidents when pedestrians used the railway as a footpath; memories of these fatalities were still fresh when the KCRC adopted the LRT project. Accordingly some KCRC experts initially sought two-metre high fences alongside the whole LRT network. Transport Department and other branches of Government were less insistent on the height issue, but nevertheless recommended fences wherever possible. It was argued that pedestrian densities greatly exceeded those in Europe, and that jaywalking was almost a way of life, particularly amongst the less sophisticated villagers who were still numerous in the North-west New Territories. These views prevailed, and virtually all unpaved sections of the system had been fenced before entering service, albeit with temporary fences in some places, and even the long street section in Yuen Long featured a central fence to confine pedestrian movement to specific signalled crossings.

Until test running began, these debates about speed and safety had been academic. Testing began in November 1987, and no initial problems were encountered, although pedestrians ambling across the tracks and motorists who refused to yield at crossings suggested that expressions of caution were not wholly misplaced. As testing extended across the network and the number of trams increased, it was inevitable that an accident would occur sooner or later. A derailment on 17 March 1988 caused by a faulty switch blade hardly counted as a "traffic" accident and passed almost without notice. Slightly more serious was a collision on 31 May between a tram and a taxi. Five incidents occurred during June, including two collisions between trams and lorries, and one between two trams. By now the press was aroused, and was taking a close interest in LRT safety. July saw more incidents, including the injury of a permanent-way man by a partly-detached tram skirting-panel on 1 July, and a collision between a tram and a car ten days later. On 13 July there was a collision with a taxi which injured both the taxi-driver and his passenger (21).

It was against this background that the KCRC was hoping to introduce trial revenue services, even before the official start date of 8 August. However, no passenger could be carried before the system had been passed by the UK Railway Inspectorate (22) in the person of Deputy Chief Inspector of Railways, Alan Cooksey. Mr Cooksey arrived in Hong Kong for his final inspection on 25 July and was expected to take five days to make his report. Unfortunately, on the day he arrived the light railway drew "first blood". That afternoon, tram 1032 was crossing Ping Ha Road southwest of Yuen Long when it struck a pick-up truck turning right across its path. The truck turned over, killing its driver's eight-year-old son. The accident made headline news in all newspapers and other media, and that same evening His Excellency the acting Governor, Sir David Ford, ordered that all LRT operation should cease pending an investigation of the accident (23). This action forced the postponement of the official opening of the system on 8 August, a date which had been set almost from the beginning of construction because of its auspicious overtones in Cantonese, where 8.8.88 sounds like "Money, money, money, money".

A collage of some of the press headlines and cartoons that appeared during the summer of 1988.

The temporary closure of the system was swiftly followed by an announcement from the KCRC that it would launch an HKD 1 million safety campaign. On 1 August some trams resumed slow-speed trials for Mr Cooksey's evaluation, and on 3 August the results of his enquiry were issued. It found that human error was to blame for the accident, on the part of either the truck driver or the tram motorman, or both (24). On 5 August full test running resumed, albeit limited to 50 km/h, and that same afternoon there was a minor accident in Yuen Long when a private car driver failed to observe a

The contract completion ceremony at the Tuen Mun depôt on 7 August. H. M. G. ("Gerry") Forsgate, KCRC Chairman, gives the opening address. To the right of his empty chair is Sir David Ford, His Excellency the (acting) Governor of Hong Kong, and next to him is Peter Quick, Managing Director of the KCRC. Light Rail Director Joe Wade sits beneath "Rail", and Leighton-MTA Project Manager and LRTA Vice-President Dudley Snell is at the far right of this picture. (T. V. Runnacles

new turn prohibition and struck a tram. To discourage jaywalking on the tracks, both the police and the KCRC's own squad of 30 wardens issued summonses and warnings; the latter were particularly vigorous, and reportedly issued 20 000 warnings in the week up to 23 August alone.

One consequence of the fatal accident of 25 July was the abrupt "downgrading" of the opening ceremony. This had been scheduled for 7 August, the day before the intended start of revenue service. However, shortly beforehand, guests were informed that the venue would be changed from the Ferry Pier terminus to the depôt, and that the event would be re-titled as a "contract completion" ceremony. Proposed rides on the system to Yuen Long and back were curtailed to a short post-ceremony run within Tuen Mun, and guests arrived, not by tram but by bus, and were immediately confronted by a picket of the "People's Committee on the LRT" demanding not only further monitoring of safety and fares, but also the publication of monthly reports on the system. The acting Governor presided over the ceremony, but with meticulous care he avoided any reference to an opening date and diplomatically refrained from riding on a tram afterwards. Tram 1008 had been decorated with bunting on its prow, and plywood dragons on its flanks, presumably as an inaugural car, but it lurked at the back of the maintenance hall and was noticed by but few of the guests. As a celebration, the whole event was an inhibited and doleful beginning to one of the world's most ambitious LRT systems (25).

Inspection findings

On 13 August Mr Cooksey's inspection report was issued (26); its key findings were that:

- stops were well designed generally but pedestrian routes at the Ferry Pier terminus were not clear;
- the trams were impressive, but emergency door release mechanisms inside some cars were unduly stiff;
- the two-aspect signals alongside the track were mainly well positioned, but some were to the right of the track rather than to the left;
- fencing was more extensive than on most LRT systems, but much of the permanent fencing still had yet to be erected;
- existing fencing needed to be extended to the sides of staircases and ramps to direct passengers to footpaths and pedestrian ways;
- there was excessive trespassing and jaywalking on the track;
- certain well-established pedestrian routes were now fenced-off;
- some passenger waiting areas at temporary bus stops were not fenced from the LRT tracks, offering a potential risk to waiting bus passengers;
- no technical defects could be found in the method of traffic signal control at junctions, but the provision and location of secondary road traffic signals could cause motorists to stop mistakenly on the LRT tracks;
- two minor side-road crossings were insufficiently wide for the traffic using them;
- uncontrolled road and utility works adjacent to the light railway could endanger users of junctions;
- certain unlit and unprotected pedestrian walkways across the tracks posed a danger to pedestrians at night;
- the solid white line and studs demarcating the paved track through Yuen Long were insufficient to deter motorists from swerving on to the tracks;
- in Tai Hing Estate the contra-flow tram lane (27) was insufficiently delineated;
- certain drainage channels left large gaps at junctions, posing a serious hazard to other road users;
- the revised motorman training programme which had been extended from four to seven weeks was now satisfactory. Despite pressure from the Tuen Mun and Yuen Long Joint Monitoring Group, there was no necessity for motormen to hold road vehicle driving licences (28) provided that steps were taken to ensure that they had greater awareness of other road users' behaviour;
- there was some concern at the relative lack of experienced operating personnel available at both managerial and supervisory levels; and
- none of the accidents which had occurred resulted from any critical flaw in the system, and that, as motorists and other road users became more accustomed to it, the risk of accidents should diminish.

Inspection recommendations

Accordingly it was recommended that:

- additional warning signs, marked pathways and fencing to guide pedestrians should be provided at the Ferry Pier terminus;
- the door release mechanism on some trams should be eased;
- where possible, LRT signals to the right of the track should be repositioned and all signals should have identification numbers to facilitate repair and maintenance;
- temporary fencing should be replaced by permanent fencing in areas of priority, and existing fencing should be extended to the sides of staircases and ramps;

- publicity should be intensified to educate the public about the dangers of crossing the tracks and the need for awareness and special care;
- additional signs should be erected in certain places to prohibit pedestrians from crossing the tracks;
- additional crossings should be considered on long-established pedestrian routes;
- temporary bus stops should be repositioned away from the tracks;
- the traffic signal layout at all junctions should be reviewed, and those with secondary signal problems should be modified;
- maximum tram speeds over the two inadequate minor road junctions should be reduced to 50 km/h;
- the phasing of traffic signals should be modified so that motor traffic should be allowed across the tracks in only one direction at a time;
- no road or utility works should be allowed within 50 metres of a light rail junction without prior agreement with the KCRC and the police about requisite additional safety measures;
- lighting should be installed at unlit pedestrian crossings;
- the existing "Junction Working Group" should continue to monitor the safe operation of junctions;
- a "rumble strip" should be installed in Yuen Long to delineate the track from the carriageway;
- a double white line should delineate the Tai Hing contra-flow tram lane;
- the drainage channels at certain junctions should be infilled;

Above: All dressed up with nowhere to go; tram 1008's prow reflects the glare of the noonday sun whilst guests assemble in the gloom of the maintenance shop to hear speeches marking contract completion on 7 August. This had been planned as the opening ceremony.
(T. V. Runnacles

Below: Car 1045 has just left Hung Shui Kiu on 29 August. A KMB bus (right) is still working route 63, which should have been replaced by trams as from 8 August.
(T. V. Runnacles

- specialist consultants should strengthen the operating staff of the system, and
- KCRC officers and senior police officers should develop procedures to ensure proper investigation and speedy reinstatement of services following accidents.

Mr Cooksey's report listed numerous specific locations where his recommendations should be carried out. These were categorised according to urgency, those in category A being needed before full-speed testing could recommence and those in category B being required before the start of revenue service. The remainder of the recommendations would need to be completed either within two months (category C) or as soon as possible (category D). At a press conference given to disclose the findings of the report it emerged that at least another four weeks would elapse before revenue service could begin.

Interim arrangements in August and September 1988

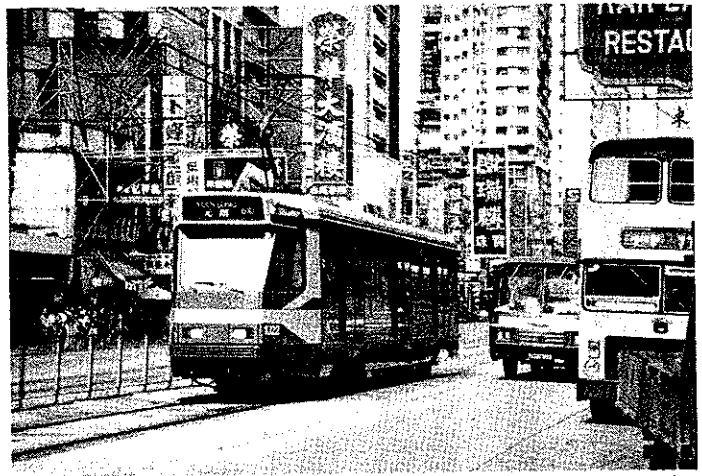
As the TSA was to come into effect on 8 August, the local KMB bus services operating within the area were due to be withdrawn from that day. This created a potential vacuum, and some quick thinking was necessary to cover the absence of tram services. Some KMB routes remained in operation, working on a temporary licence, but many bus drivers were due to take leave as from 8 August. The KCRC could muster sufficient of its own double-deckers, together with its newly-acquired Toyota midibuses (29), to cover other routes, but had also to hire some buses and coaches from independent (non-franchised) operators. This colourful armada of buses was arrayed in front of the tram depôt on the occasion of the ceremony on 7 August and epitomised the LRT's misfortunes. At first it was hoped that buses would have to deputise for only a fortnight, but the findings of the Railway Inspector's report saw this period stretched to between six and seven weeks.

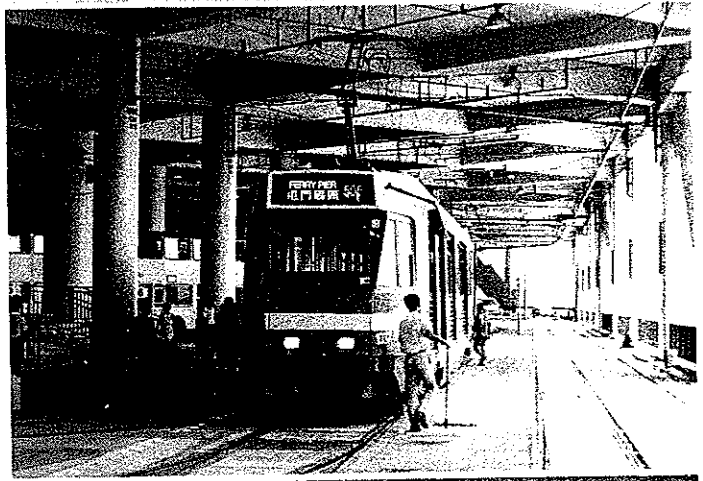
On 7 September the KCRC finally announced the programme for introducing light rail services. Instead of starting all seven routes simultaneously, a phased approach was now adopted. The three Tuen Mun to Yuen Long services, (routes 610, 611 and 612) would provide free rides on the afternoons of 14 to 16 September. On 17 September the system would not be open to the public, as Her Royal Highness The Princess Royal was due to make a visit in her capacity as Honorary President of the Chartered Institute of Transport. The first revenue service would begin on 18 September on the Yuen Long 6xx group of routes. In so doing the KCRC was able to regain some of the face lost by missing 8.8.88, as the new date was the eighth day of the eighth month of the lunar calendar, which is still preferred by many Chinese people. The local Tuen Mun services would start with route 506 from the Ferry Pier to On Ting on 22 September, followed by route 505 from On Ting to Siu Hong on 24 September. Routes 507 and 512 would follow in October and November respectively, the delay being occasioned largely by the belated arrival of residents for the new Leung King Estate in the northwest of Tuen Mun.

Some thoughts on the postponed opening

The ambitious Tuen Mun project seemed to be "jinxed" almost from its conception, but the safety issue was by far the most controversial. It was notable that none of the media reports could find a single favourable thing to say about the system. As often happens when the media take up an issue, public views soon reflected received opinion, and even informed observers threw objectivity aside in their condemnation of the "unsafe" light railway. In the "administrative no-party state" of Hong Kong the Government is ever-sensitive to public opinion, and this is why it was obliged to postpone the opening day when an objective assessment would have argued that accidents are an unwelcome but inevitable characteristic of any street-level transport system. It was unfortunate that hardly any comparisons were drawn with other public transport operators, especially when published statistics (30) showed that HKT was involved in one accident every three days, whilst franchised buses encountered 4.4 accidents daily. Even accounting for the relatively limited test operation on the LRT system, its record between November and August did not look so bad at all (31), especially for a completely new network in an area where residents were quite unfamiliar with trams of any sort, let alone high-performance ones.

It is perhaps plausible to suggest that the LRT system received such a bad press because everybody, including the KCRC, the Government and the public alike expected too much of it. As we saw in part 4, a directive had been issued in 1981 that the system should not be referred to as a tramway. The rigid insistence ever since that it was a railway operated by LRVs, or even "trains", naturally associated the system with the KCR main line and the MTR underground railway, both of which are completely segregated from traffic and have exemplary safety records. No street-level rail system can expect to compare in safety or speed with a fully segregated railway; indeed this is the requisite "cost" of providing a much cheaper, denser and more convenient network. There was an inevitable call from a transport guru for portions of the LRT system to be placed underground



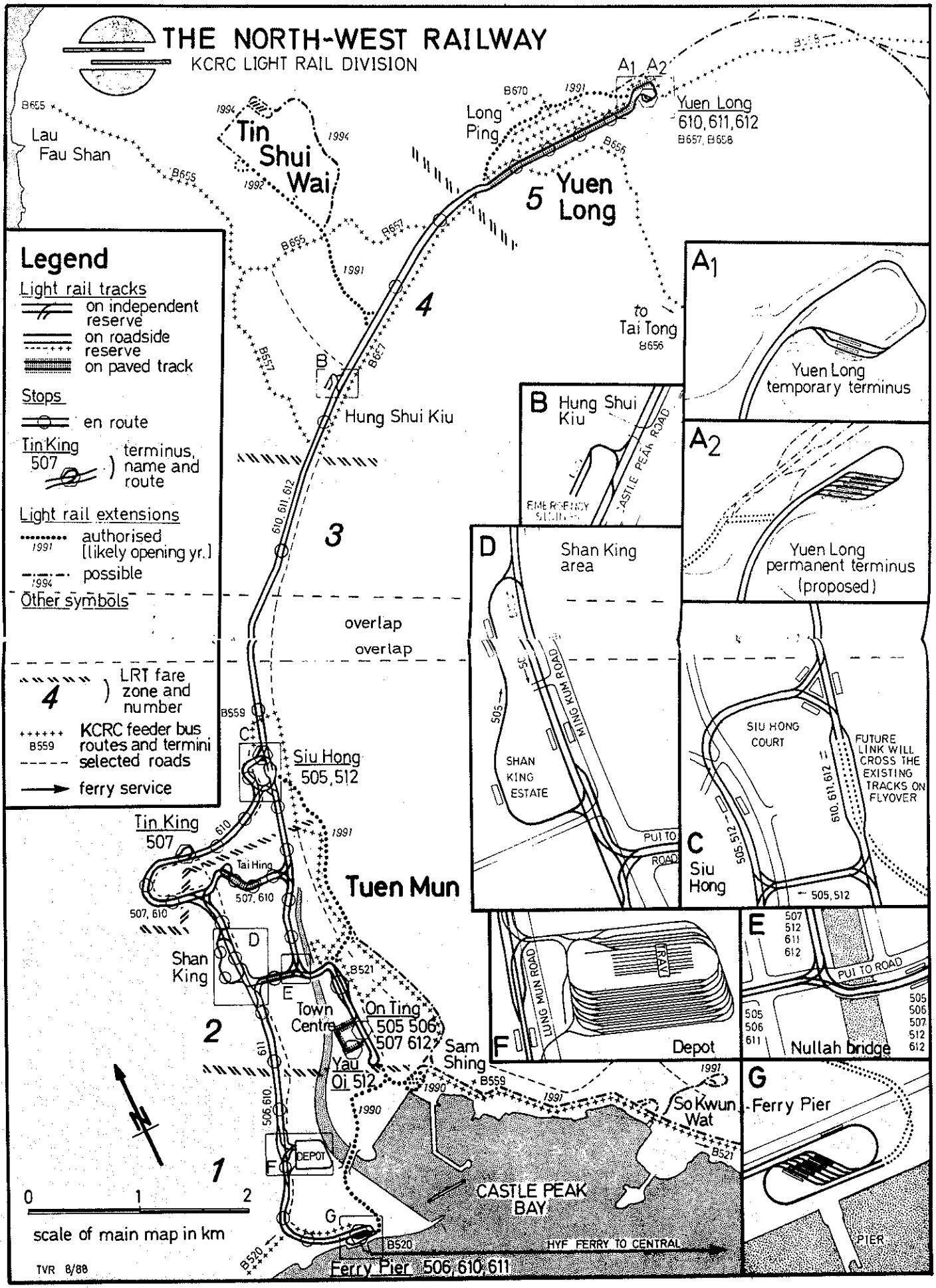


Above: Car 1022 in Yuen Long on 29 August. The Railway Inspector recommended a "rumble strip" to delineate this street-running section. Note the central fences to deter jaywalkers. The tram is paced by one of the coaches hired by the KCRC to cover services during the extended trial-running period.

Centre: The motorman of car 1037 sets his path with a time-honoured point-iron after a spot of transponder trouble at Tuen Mun's Ferry Pier terminus on 29 August 1988. Pedestrian jaywalking at this terminus was one of the problems identified by the Railway Inspector.

Below: Car 1023 accelerates north on Tuen Mun's only remaining LRT "race track" at it leaves the Pui To Road for the journey beside the Nullah. Flimsy temporary fencing of the type seen here was criticised in the Railway Inspector's report. The picture was taken on 4 July 1988.

(T. V. Runnacles



The Phase 1 LRT system together with proposed regional extensions and possible urban link connexions; KCRC bus routes are also shown. At Siu Hong, all southbound cars currently use the loop line to facilitate flyover construction for the future branch (see inset).

(9) Hong Kong Government Gazette, "Kowloon —Canton Railway Corporation (Amendment)", Ord No 56/86, 31 July 1986.

(10) South China Morning Post, "Free buses for light rail passengers", 9 July 1988.

(11) Hongkong Standard, "KMB wants arbitrator to work out recompense", 4 April 1988.

(12) Scott Wilson Kirkpatrick & Partners *et al*, "Light Rail Transit System Extensions Studies; Urban Links Final Report", KCRC Light Rail Division, Hong Kong, February 1987.

(13) Quoted on the ATV-Gold television channel on 15 March 1987.

(14) South China Morning Post, "KCR rail proposal comes under fire", 18 March 1987.

(15) Hongkong Evening Standard, "KCRC Board divided over light rail link", 19 March 1987.

(16) South China Morning Post, "Heavy rail 'best for New Territories'", 23 March 1987.

(17) Quoted on the Radio Television Hong Kong "Moneysense" programme broadcast on TVB-Pearl, 25 July 1988.

(18) South China Morning Post, "Huge cavities put Leighton off LRT deal", 6 October 1987.

(19) Hongkong Standard "Rock cavities end hopes for housing plan", 27 May 1988.

(20) See note (21) to Part 4.

(21) Hongkong Standard, "LRT's list of accidents", 26 July 1988.

(22) Section 2(1) of the KCRC Ordinance requires that an inspector should approve new lines prior to their opening.

(23) Hongkong Standard, "Death crash halts LRT; Ford acts after boy, 8, dies", 26 July 1988.

(24) A. Cooksey, "Report on the Investigation into the Causes and Circumstances of the LRT accident on 25 July 1988", report to the Chief Secretary, Hong Kong Government, August 1988.

(25) South China Morning Post, "Trains idle as LRT celebrates an opening before the opening", 8 August 1988.

(26) Transport Branch, Hong Kong Government Secretariat, "Summary of the United Kingdom Railway Inspector's Report on the Light Rail Transit System", 13 August 1988.

(27) Although the more familiar term has been used here, tram lanes on this system are called "rail lanes". On Hong Kong Island they are called "tram lanes".

(28) There had been calls from informed members of the public that LRT motormen should hold driving licences. This possibility caused some anxiety for HKT, which feared that such a requirement would also apply to the Island trams. HKT rapidly contacted other operators in several parts of the world to reinforce the case against such an imposition.

(29) For reasons of political sensitivity associated with the PLB trade, midibuses in Hong Kong are called "small coaches".

(30) Road Safety and Standards Division, Transport Department, "Road Traffic Accident Statistics (1987)", Hong Kong Government, May 1988.

(31) There were three more accidents in the month of August after test-runs recommenced, albeit all minor and none specifically the LRT system's fault.

(32) South China Morning Post, "New calls for LRT to go underground", 1 August 1988.

(33) Arguably the public's view was also moulded by opponents of the system, including KMB's early efforts and the more recent lobbying by the taxi trade.

(34) The interest shown in the system when the author has given talks about it in the UK and in the USA contrasts with the indifference shown in Hong Kong.

Heritage Column

J. H. PRICE

IF you studied our recent world list of museums, you will have noticed two new entries for Brazil. One was the *Museu do Bonde* in Rio de Janeiro, which has small exhibits only and is located next to the in-town terminus of the Santa Teresa tramway. The other is the *Museu CMTC dos Transportes Publicos* in Sao Paulo, which deserves a full article.

Sao Paulo's urban transport museum, which opened on 20 March 1985, is located in a former training school at 780 Avenida Cruzeiro do Sul, on the corner of Rua Pedro Vicente, about 0.5 km east of metro station Armenia (Ponte Pequena). It is run by the CMTC (*Companhia Municipal de Transportes Colectivos*) who run most of Sao Paulo's buses and trolleybuses, and consists of a main vehicle hall, a courtyard, three smaller rooms, office and library. Opening times are 09.00 to 17.00 Tuesdays to Sundays (closed on Mondays), and entrance is free.

To attract the passer-by, the entrance is flanked by a Brill 77E bogie in a flower-bed, and the courtyard has as its centre-piece a four-wheel tramway sand trailer, set among shrubs. Passing the trailer and the cloakroom (leave your bags) you meet a full-size wax conductor as you enter the vehicle hall. Behind him is a nine-bench Brill cross-bench tram, one of series 1-15 of 1900 (numbered 1, but actually ex-7) in cherry red and cream, showing the destination of the first electric route, Barra Funda, which opened on 7 May 1900. It was operated by the Sao Paulo Tramway Light & Power Co Ltd, a Canadian enterprise which was municipalised in 1947, and has an American-type fare register, still remembered locally by the Portuguese equivalent of "two-for-the-company-one-for-me" (*Dois Prá Light, Um Prá Mim*).

Apart from the Santa Amaro interurbans, all Sao Paulo's trams were of cross-bench type until 1926, but increasing

São Paulo 1539, built by Kuhlmann Car Company, USA in 1927. A sister car, 1531, is in the São Paulo tramway museum. (W. C. Stiel

road traffic made the conductor's job increasingly hazardous and all cars built or bought from 1927 were enclosed, though the last open cars were not withdrawn until 1966. The first enclosed cars (1501 to 1699) were classic North American closed single-ended cars on Brill trucks, and one of them, 1531, has been recovered recently from a college near Jundiai, who donated it. Restoration is well in hand in the museum, in full public view.

The third tram in the indoor display is "Centex" car 1789, one of 75 cars bought in 1947 from the Third Avenue Railway System in New York, though the caption does not say so. Of the 75 sold to Brazil, 25 were built in aluminium and weighed 14.5t; the others were steel and weighed 16t. 1789 is a steel one, used after abandonment as a transport enquiry office at the exhibition grounds. It has Brill 77 type bogies which, like the rattan seats, may have come from older New York cars. In Sao Paulo the Centex cars were known unofficially as "Gilda" after a Rita Hayworth film made in 1946.

The other full-size vehicles are two trolleybuses and a bus. Trolleybus 3134 is one of 75 ACF-Brill vehicles bought from Denver in 1955 after only seven years of service, and trolleybus 3159 of 1960 represents "the economic emancipation of Brazil", being the first type built locally (by Grassi and Villares under Westinghouse licence, with 85% home-produced content). The diesel bus is another example of this.

The small exhibits rooms include a model tramway, a model of Catumbi works in 1953, and lots of big photographs, including some of accidents. Sao Paulo evidently had two private saloon trams, the St Louis-built "*Ipiranga*" of 1906 with kitchen and dining-saloon, and a longer car with wicker armchairs and a bar. Other specialities portrayed are a postal tram, a mobile substation tram, and an abattoir tram. There are many items of equipment, not always used as their designers intended; for instance, the Johnson fare-box was introduced in the USA partly to facilitate one-man operation, but in Sao Paulo it was used with a seated conductor, perhaps to reduce the crime-rate. For the same reason (reducing assaults on staff) all CMTC vehicles have a locked fare-box today and a notice to say that only the depôt has a key, though the conductors do have a small float for change-giving. The Johnson box was given up in 1951 in favour of turnstiles midway down the aisle. Present-day operation is by no means overlooked, forming the main subject of one room.

Sao Paulo's transport museum is better than many in Europe, and differs only in that the usual hush is replaced by the music that follows you everywhere in Brazil. Photography indoors is difficult without a wide-angle lens, and officially not allowed, but that small difficulty was overcome by the gift of a Crich guide and some postcards. Future visitors should, I suggest, take items for the museum library; they are sure to be welcome. One further idea of Sao Paulo is worth copying elsewhere: CMTC buses on garage journeys and other non-passenger vehicles show "Visit the urban transport museum" on their blinds, instead of the usual "Special", "Private" or just blank.

To complete the story, I should mention that the CMTC museum resulted partly from pressure by the local enthusiasts, members of the APMTC (*Associaçao de Preservaçao de Material de Transporte Colectivo*) and particularly from an exhibition which they put on in 1984. It was a pleasure to meet them on my November 1986 visit.

Editorial

Bearing false witness

THIS issue marks, for the moment, the conclusion of our Hong Kong serial, and not least the trilogy on the Tuen Mun—Yuen Long system. Members from all parts of the world have reported that Tuen Mun represents much that we advocate. The author has striven to present an unbiassed story, but recent events have been so distressing that we must add our own comments.

Tuen Mun is one of the boldest of light rail ventures, but it seems unable to do anything to please anyone in Hong Kong. It is condemned for its accident record, its alleged lack of capacity, and other problems. So many committees are now investigating it that readers may ask what *is* wrong with Tuen Mun. Our answer is: very little. Tuen Mun is a comprehensive and well-integrated network without costly tunnels or automation. It has all the expected versatility of light rail: reserved track and street running, and both interurban and urban services. It stands beside such systems as Göteborg as a model light-rail system, and we are proud to welcome the first tramway opened on British-administered territory in 61 years.

Our view is that Tuen Mun's light rail system has been a victim of the media, whose heavily-biassed reporting seems to have sensationalised every difficulty. We are told that Hong Kong's citizens love their TV and are avid newspaper readers, so that these media shape public opinion; they have projected the light rail system as dangerous and trouble-prone. Being sensitive to public opinion, the Hong Kong government had to delay the system's opening after last July's accident. This started a chain reaction of driver resignations leading to insufficient capacity when services eventually began.

Accident reporting in the Hong Kong media seems short on comparative data. Before condemning the Tuen Mun system, reporters should quantify accidents on the buses and Hongkong Tramways and then work out how many would probably have occurred in the Tuen Mun area if the light rail system had not been built. That kind of objectivity would soon put matters in their proper perspective.

The Tuen Mun light rail system needs time to prove itself. Every new transport system encounters teething troubles, and this new system was so ambitious (opening a nearly complete system on "day one" rather than just a single route) that it was liable to more than its fair share. Other operators have found that difficulties recede as experience is gained, and this is happily already the case in Tuen Mun.

Perhaps we are being oversensitive in rushing to the defence of the newest light rail system, but we think it needs someone to speak out in its favour. We do not think that the Tuen Mun saga has damaged light rail's overall image; our detailed reporting of its misfortunes shows that we believe in its future. Contrary to hearsay and irresponsible journalism, Tuen Mun is an excellent example of contemporary practice. We wish it well.

Subscriptions to LRTA

This is not only to remind LRTA members who have not yet paid their subscription for 1989 that they will not receive the February issue until payment arrives, but also to make it known that voluntary LRTA staff handling subscriptions have three times as much work processing each payment that is late. Last year nearly one third of the membership had not renewed by the start of the calendar year, and that was an improvement over 1986-7. Will YOU please make a special effort to help us by paying before the end of the year? Thanks in advance.

Modern Tramway content

Every reader knows that nearly half of each of the last six issues covered important developments in Hong Kong. When the series started we had no idea how much space it would require (we expect a final part in a few months!) but our planned publishing schedules were continually rewritten. Readers who wondered if we were ever going to print Part 2 of the article on Northern Spain will find it here at last. Most other articles have been delayed. Our apologies to both authors and readers, but we hope you think it was worthwhile.

Tramway developments in Hong Kong

1968

T. V. RUNNACLES

Part 6: The Tuen Mun—Yuen Long LRT system (concluded)

Passenger services begin

A FATAL accident on 25 July 1988 deferred the LRT's inauguration from 8 August to the second half of September. Prior to revenue operation, free afternoon rides were provided from 14 to 16 September between Tuen Mun and Yuen Long. These were popular, but the press concentrated its attention at this time on two more accidents: one involved a schoolgirl pedestrian and the other a pick-up truck. In neither case was serious injury sustained.

A "royal opening"—of sorts

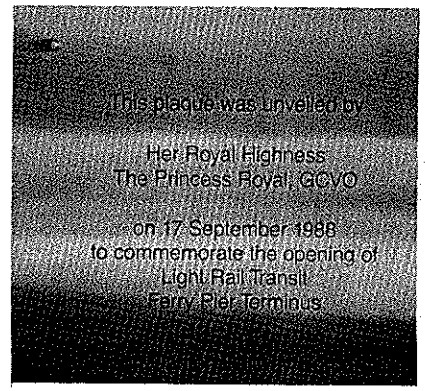
No public rides were offered on Saturday 17 September. Her Royal Highness The Princess Royal was stopping-over in Hong Kong *en route* to the Seoul Olympiad, and she spent the Saturday morning of her visit in Tuen Mun. After touring a Vietnamese refugee camp, Her Royal Highness was driven to the LRT depôt, where she was met by Peter Quick (the KCRC Managing Director) and members of the KCRC Board. After a briefing by LRT Director, Joe Wade, she visited the Control Centre and then boarded tram 1045. Sitting in the front right-hand seat, she made the short journey to the Ferry Pier. Unfortunately even this royal ride was obliged to reflect the low-profile imposed on LRT functions, and 1045 carried neither the royal coat-of-arms nor any other ornamentation.

At Platform 1 of the Ferry Pier terminus the Princess Royal was met by the Chairman of the Transport Advisory Committee, the Commissioner for Transport and other transport dignitaries; she then unveiled a plaque commemorating her opening of the terminus. The media reported that the Princess had opened the LRT system itself, but the plaque left no doubt that only the terminus had been commissioned. Nevertheless, in the absence of any other ceremony, the media's misinterpretation was forgivable.

After inspecting an exhibition of public transport photographs, Her Royal Highness was conveyed to Kowloon aboard a hovercraft. The event was given minimal advance publicity, and received scant coverage afterwards. Apart from those invited to attend, there were only four spectators at the LRT terminus.

Revenue service begins

Revenue service began on the three Tuen Mun to Yuen Long routes: 610, 611 and 612, on Sunday 18 September, all proceeds on this day going to charity. Again, "pomp and circumstance" were conspicuously absent. Indeed it was not absolutely clear which was the *first* car, given almost simultaneous departures from three termini. However, the honour probably belonged to car 1014, which left the Ferry Pier as the first on route 611 at 06.05 hrs. Considering the early hour, the load of 73 passengers was most commendable, but only five of them had arranged to catch this tram because of its place in history;



The plaque unveiled by HRH the Princess Royal. (T. V. Runnacles

the remainder were early-shift factory workers for whom this was just another day. 1014 set out as dawn lightened the eastern sky and 35 minutes later it reached Yuen Long, by which time the sun was up and the car was almost empty.

But the calm of early morning was short-lived. By 07.30 hrs the Yuen Long stops were thronged with passengers and northbound cars from Tuen Mun were packed. As the day progressed, patronage steadily increased, and the KCRC was evidently unprepared for such crowds, having deployed the Sunday roster of just 27 trams. Six more cars were added during the day, including one multiple-unit pair. Accurate patronage statistics for the first day are unobtainable, although it is known that 88 000 single tickets were issued, as well as 20 000 monthly season-tickets. Special commemorative tickets were also valid and, in the general confusion, some, perhaps many, passengers did not pay at all. Overall, it was reckoned that over 200 000 rides were made on the first day of revenue service, all on a fleet of 33 cars!

The passengers had come from near and far to joy-ride on the "trouble-plagued" LRT. Inevitably, the press distended various problems out of all reasonable proportion. Especially vitriolic was the 'Hongkong Standard' which had consistently criticised the system, and now reported that *"there is little about the $1 billion Light Rail Transit system to impress the commuter"*. It disparaged the system's complexity, its narrow platforms and badly-designed cars; the ticket machine was described as a *"Mensa IQ test"* and the route map resembled a *"diabolically coloured pasta meal"*. The 2.65-m wide cars were condemned as *"terribly narrow"* with little space for standing, and the LRT management was accused of trying to be egalitarian *"by ensuring passengers are equally uncomfortable standing or sitting"* (1).

Despite such jaundiced commentaries, most first day riders must have found the LRT to their liking. At lunchtime there was a live broadcast from the Tuen Mun Town Plaza to celebrate the LRT's opening. There were games, quizzes and a raffle, and the LRT Director, Joe Wade, gave a short speech; after months of torment, his face was at last brightened by a smile. By the late evening the crowds had dispersed, and the day's success could be measured in characteristic Hong Kong style by litter lying ankle-deep on the car floors.

The first day of service had been a Sunday. On weekdays less joy-riding might have been expected, but the LRT remained embarrassed by its own popularity. About 150 000 rides were being made daily, with unexpectedly high concentrations very early in the morning and in the late afternoon. Inevitably, there was criticism that trams were so packed that passengers could not board, resulting in overpopulated platforms and prolonged waiting times. This was not unjustified, as the recommended peak level of service required 46 cars per hour on the Yuen Long routes (2), whilst the actual allocation was only about 30. The shortfall resulted largely from two factors:

- only five two-car sets could be run instead of the recommended 18, and
- following the temporary suspension of operation on 26 July, 40 of the 140 motormen were so demoralised that they resigned, resulting in inadequate staff (3).

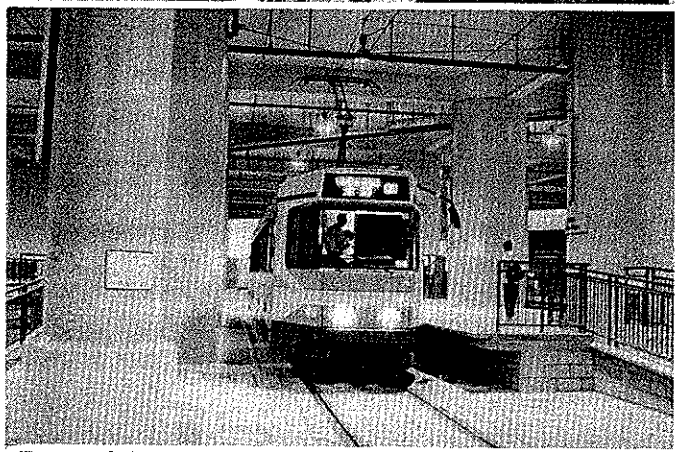
However, additional couplers had already been ordered to equip all the trams, whilst motormen were being recruited (or re-recruited) to resolve the staffing problem.

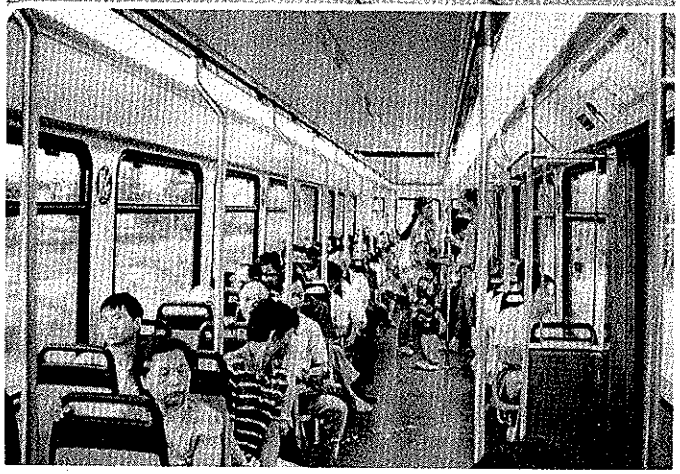
Before the first week was over, two of the local Tuen Mun tram routes had been commissioned: route 506 started on 22 September, and route 505 on 24 September. On Sunday 25 September, the full feeder-bus network was introduced and the remaining KMB local buses were withdrawn. The provisions of the North-west Transit Service Area were now in full effect, and only the remaining local tram routes 507 and 512 had still to be introduced.

A glittering success, but the tarnish lingers on

An "open" ticket system made it difficult to calculate precisely the number of LRT trips in the initial weeks. On 8 October, the KCRC Managing Director said that patronage already exceeded 200 000 daily. This may have been an overestimate, but the Yuen Long line was certainly carrying up to 14 000 passengers per hour. Compared with other new street-level LRT systems such patronage represented an astonishing achievement, even if it was slightly less than had been predicted (4).

But the system's achievements were of little interest to the media or the citizens. Unhappily all attention was on the accident record, and any hopes that this would subside with familiarity soon evaporated. On 29 September, a cyclist was run-over and killed by a tram at a minor crossing in Lam Tei. The media gave this relatively restrained coverage, as it was reasonably obvious that the unfortunate man had exercised no caution in crossing the tracks. However, aware of the political sensitivity involved, the Secretary for Transport ordered an accident report from the KCRC (5) and established a high-powered working group to look at LRT safety yet again (6).

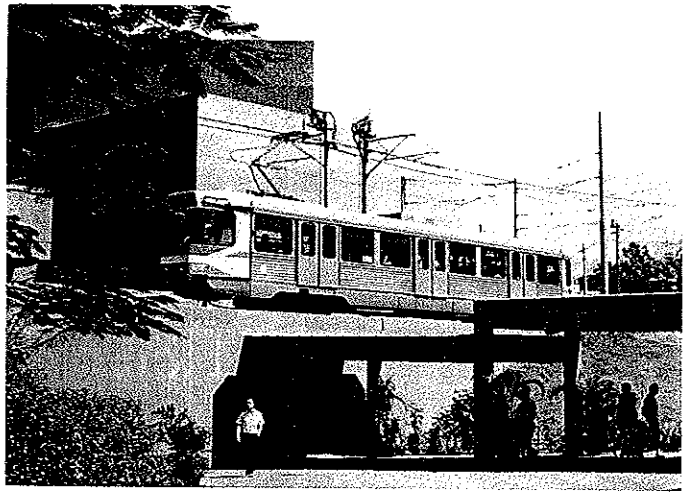




Above: Her Royal Highness the Princess Royal shakes hands with James So, Commissioner for Transport, at Ferry Pier terminus on 17 September 1988. TAC Chairman Maria Tam and tram 1045 are in the background. (KCRC

Centre: No way to open a light railway! At 06.00 hrs on 18 September, car 1014 waits to leave Ferry Pier as the first tram on the system in revenue service. (T. V. Runnacles

Below: The view inside car 1014 on the first farepaying trip as it headed towards Yuen Long. LRTA member Reiner Zimmermann and his wife, Helgard, are standing halfway down the car. (T. V. Runnacles



Integration with the community: 1017 rises above a pedestrian circulation area at Siu Hong Court on 16 October 1988. (T. V. Runnacles

The working group's first meeting was on 8 October, but it was preceded by a tour of the system on 6 October. This was joined by the Transport Advisory Committee Chairman, Maria Tam, who said afterwards that she wanted full segregation on future extensions (7). If heeded, this would mark a fundamental departure from the LRT system as conceived; in fact it is unlikely that segregation would now be possible, as the regional extensions are already designed and some track-bed preparation has begun.

At the working group meeting it was agreed to provide more footbridges and road flyovers, whilst barriers would be erected at pedestrian crossings to force cyclists to dismount. Furthermore, police presence along the network would be reinforced (8). However, inside 48 hours another accident dashed any hope that public confidence in the system might be restored. At 00.14 hrs on 10 October, car 1029 had just left On Ting stop when it collided head-on with southbound car 1018 turning into Yau Oi Estate. Six people on board, including the two motormen, were slightly hurt, but the two trams suffered damage estimated at HKD 1 million. Yau Oi is off-limits to trams after 20.00 hrs, so the motorman of 1018 had evidently taken the wrong route. Moreover neither tram braked before the impact, and 1018 was apparently travelling at 45 km/h through facing points, despite a 15 km/h restriction. Notwithstanding the late hour, a crowd soon gathered, clapping hands and exclaiming that, now the KCRC had wrecked its own rolling stock, it could no longer evade its safety responsibilities (9).

Inevitably the Yau Oi collision prompted calls for yet further investigations. A self-appointed residents' monitoring group immediately lobbied the Government's Transport Secretariat, calling for a full-scale review before embarking on the proposed system extensions. There were also calls to abandon the Transit Service Area and the alleged LRT monopoly. On its part, the KCRC said that it would increase tram frequencies and extend feeder-bus routes to reduce the need for interchange on short journeys; some busy stops would also be improved with additional pedestrian access and by relocating ticket machines away from the platforms to increase waiting capacity (10).

Soon afterwards the KCRC announced that the two remaining local Tuen Mun routes, 507 and 512, would not be commissioned in the autumn, and might not be introduced at all (11). In fact both routes are covered by other services, and the KCRC's intention was to concentrate its resources on the busy Yuen Long line. Meanwhile, a delegation from the influential "Office of Members of the Executive and Legislative Councils" (OMELCO) toured the LRT on 17 October. During the tour, the KCRC Chairman announced the creation of a seven-member working group to oversee all aspects of the LRT, with special emphasis on improving communications between the Corporation, the public and the Government. Furthermore, the Senior Executive Councillor said that she was aware that the LRT had failed to gain public confidence, and urged that it be brought into the Government's Traffic Accident Victims Assistance Scheme, which is a compulsory levy on all road vehicle owners (12).

In the same week of the OMELCO visit, other initiatives were made to review the system. The "People's Council on the LRT" and the Tuen Mun District Board turned to the public for advice with a questionnaire and a contest entitled "LRT problems through your eyes" (13), and the KCRC set up a three-man team to investigate the system's overall image (14).

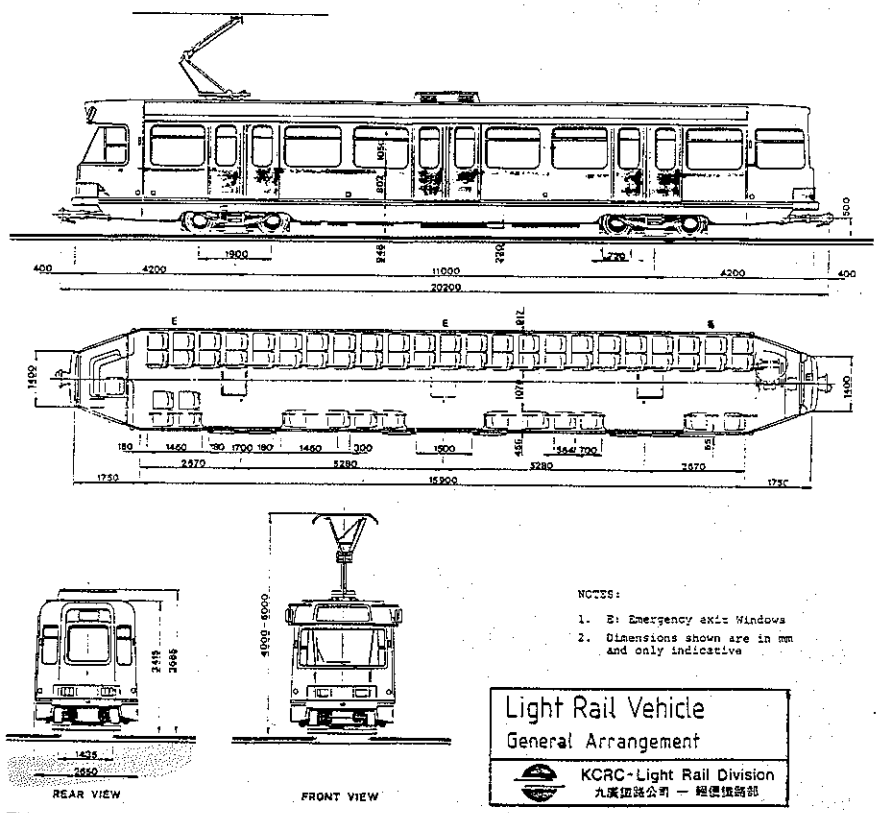
At the time of writing it seemed that arguments about the LRT would stretch well into the future, but there seemed to be reasonable hope that the numerous committees now studying the LRT would soon cease their criticisms and set about positively enhancing its image (15).

Technical features

Because the LRT system has already been extensively described elsewhere (16), many of its technical aspects are summarised in the accompanying tables. Nonetheless, certain features warrant narrative description, as set out in the following sections.

Rolling stock

The evolution of the Tuen Mun tram has been fascinating. Part 4 showed how the whole LRT system owed its existence to the UCC "Feltham" design of 1930. This had stimulated the study of double-deckers, and the first such design was based on the dimensions and running units of the Melbourne "Z" car. Coincidentally the present Tuen Mun car comes from the same manufacturer as the Melbourne "Z", and bears a family resemblance to it. Even so, the Tuen Mun car is longer, single-ended, and equipped only for high-platform operation. Its 19.4-metre length is exceptional for a rigid-frame car, and is surpassed only marginally by the Japanese-built cars for Buffalo. This apart, the most striking visual aspect of the



This dimensioned drawing shows side, rear and front elevations and a plan of the KCRC LRV. Note the unusual offside layout with 23 forward-facing double seats in "military" formation. (KCRC

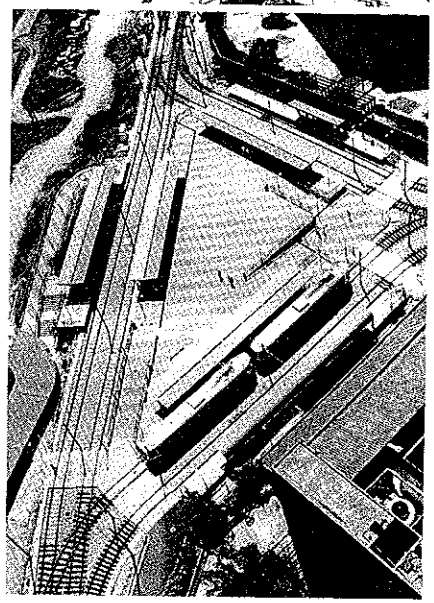
cars is the livery, or lack of it. With the mid-contract change to fluted stainless-steel panelling, it was decided to leave the car sides and roofs almost unadorned. In low sunlight the cars appear to effervesce with their own glow. Apart from orange "coach stripes", only the doors and fibreglass ends are painted, the former in orange and the latter in orange and white.

Internally the cars accommodate 60 passengers in a "2+1" layout of orange fibreglass seats, leaving space for 130 standees. The driving cab is separate, though bulkhead windows give a good forward view. Route information is displayed internally and externally, and information is also relayed by a public address system, albeit only in Cantonese. The cars are very quiet and smooth riding; indeed some critics consider them too quiet, although both an air-horn and a gong are fitted to give audible warning. The doors are sliders, externally hung and driver-operated. Emergency releases are available inside and at solebar level outside, but external buttons are omitted lest pranksters steal trams at termini! Despite these fears, all trams are in radio contact with the Control Centre, which continuously monitors their locations on the network.

Network features

Most of the system, both in Tuen Mun and along the corridor, is on roadside reservation with ballasted concrete-sleepered track. The major exceptions are in Yau Oi and Tai Hing estates, along Pui To Road in Tuen Mun, and also Castle Peak Road and the terminus approach in Yuen Long. In all these locations, paved street track is used. Even most of this is segregated by kerbs or demarcated by white lines to minimise mixed traffic operation. The Pui To Road section presents a vaguely continental appearance with its border of striped black and white interlocking setts and Belgian-style "Trief" kerbs.

Junctions abound in Tuen Mun, and seven feature double-track triangular formations. The most complicated single junction is at the confluence of Pui To, Tsuen Wen and Ming Kum roads. Here a straightforward triangular junction is modified by turning pockets *(Vorsortierung!)* and a second (single-track) triangular layout leading to Shan King Estate. Another concentrated area of special-work is at Siu Hong Court, where a Government-sponsored home-ownership scheme is surrounded by tracks, including three triangular junctions, one of which incorporates Siu Hong stop itself. Furthermore, construction has already begun on a flyover which will take trams in future to north-east Tuen Mun. A casualty of this was the southbound line from



Above: A general view of the complex junctions at the west end of Pui To Road in Tuen Mun. (T. V. Runnacles

Below: An overhead view of Siu Hong stop, showing the track layout inspired by the junction at Bellevue Platz in Zürich. Missing, however, is the very large, elegant and distinctive reinforced-concrete shelter that graces the triangular centre island in the Swiss progenitor, an architectural feature which made Bellevue famous. (T. V. Runnacles

Siu Hong, which was closed and stripped of its overhead even before revenue service began. All southbound cars now take the loop west of Siu Hong, and the layout has become a temporary "tramodrome" operated in the counterclockwise direction only.

The main terminus in Tuen Mun is at the Ferry Pier, where trams share accommodation with KCRC and KMB buses under the Pierhead Garden housing development. Trams enter from, and leave to the west. Trams set down at a single platform on the approach track before almost completing a circle to pull into one of the three departure platforms currently in use. Three more platforms await future expansion, as does a fenced-off track adjacent to the seafront promenade which will eventually be extended to the northeast. An unusual feature here is that trams on the future extension will observe right-hand running for some distance before being "rectified" on a diamond crossing in a manner reminiscent of Stockholm's route 120.

Not far from the Ferry Pier is the system's only depôt. This occupies six hectares and can accommodate 143 trams and the feeder bus fleet. Full maintenance and workshop facilities are provided, and the LRT headquarters and Control Centre are located here. In mid-contract it was decided to develop over the depôt, and ten 43-storey housing blocks (the Sun Tuen Mun Centre) are now rising on a podium over part of the site. This housing development caused the depôt layout to be modified by incorporating a traverser to give access to the body shop and main workshop.

In contrast to the complexities of Tuen Mun, the Yuen Long line is very straightforward and, apart from the three-track temporary terminus at Yuen Long itself, the only special-work north of Siu Hong is a crossover and a pair of emergency sidings at Hung Shui Kiu.

Almost the whole network is situated on an alluvial plain or on reclaimed land, and is therefore rather flat. However there are some undulating gradients on the lower slopes of Castle Peak in the west of Tuen Mun. The steepest gradient is 6.1% on the Shan King loop.

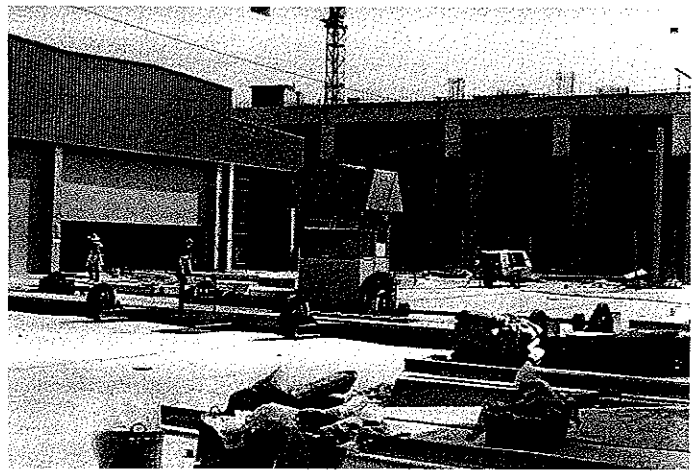
Trackwork

Most rail is UIC54 laid on concrete sleepers; this was chosen for compatability with the existing KCR main line. UIC54 rail is even used on several of the street sections, with an additional backing plate to keep the flangeways clear. Some Ri60 grooved rail is used, particularly for special-work in pavement. Paved track is set in mass concrete, as on HKT, but differs by being resiliently mounted.

Electricity supply

The system is electrified at 750 volts dc with a preponderance of catenary overhead suspended from concrete masts. Nonetheless, some ordinary trolley wire is also used; "fixed termination" trolley wire suffices where speeds do not exceed 45 km/h, and automatically-tensioned trolley wire is used for speeds up to 60 km/h.

The minimum wire height of 5.4 metres preserves Government's long-standing requirement that double-deck operation should not be frustrated (17), although it also allows for buses and other high vehicles to



The traverser in the depôt at Tuen Mun, seen here while construction was still in progress on 9 March 1988. (T. V. Runnacles

pass safely beneath the overhead at the many crossings.

Power is distributed via 11 rectifier stations which receive 11 kV from two infeed substations, which convert the 132 kV 50 Hz supply of the China Light and power Company's grid. The nearest power station is at Tap Shek Kok, west of Tuen Mun, and comprises one of the largest power complexes in Asia (18).

Stops

All 41 stops have high platforms; cantilevered steel canopies are provided, and ticket machines are positioned on the platforms. Where possible, platforms are integrated with adjacent developments, notable examples including On Ting, Leung King and Sham King (north and south). All stops are named.

Fares and fare collection

For the first time in Hong Kong, self-service fare collection is employed, and it remains to be seen how successfully this will resist fraudulent travel (19). Swiss-made Autelca B-8026 ticket vending machines are provided at each platform, and passengers obtain a ticket appropriate for their destination zone. At present there are five zones and three fare bands each for adults and children. The machines provide change and issue tickets stamped with the origin and destination zone numbers, machine number, time and date; further validation/cancellation is not necessary. All 181 ticket machines are linked to a computer terminal in the Operations Control Centre, and are checked every minute for faults.

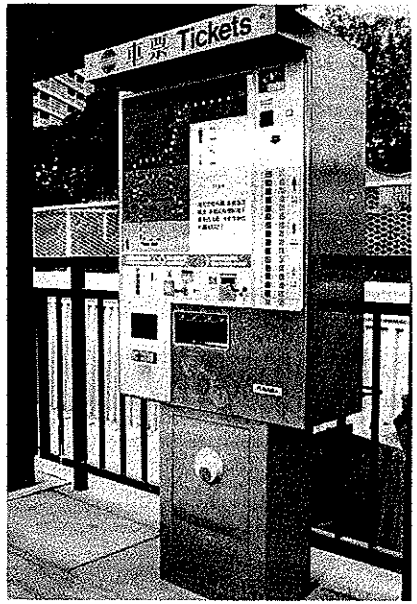
Single-ride tickets allow transfers from one route to another, including feeder buses, within the range of zones purchased. Regular passengers are encouraged to use monthly season-tickets, which are available for four zone-groups (Tuen Mun, Yuen Long, Central and All-zones). These tickets include the holder's identity-card number for cross-checking purposes. The monthly tickets are obtainable from concessionaires and LRT customer information booths. Unfortunately for the casual visitor, there is no one-day ride-at-will ticket.

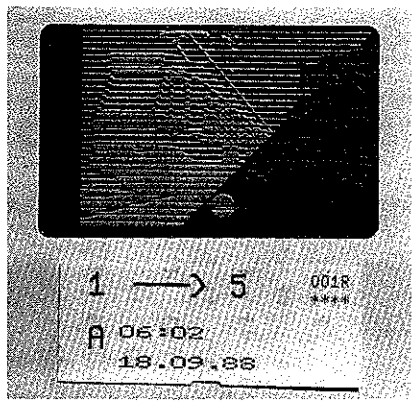
Tickets are checked by "wardens" who ride the cars, normally in pairs and dressed in plain clothes. Non-payment or over-riding is penalised by an on-the-spot surcharge of HKD 120 plus the possibility of prosecution and a HKD 3000 fine. Unfortunately the wardens must have a tough time passing through the cars, which are often so crowded as to inhibit internal movement.

The ticket machines are built to accept the magnetically- coded Common Stored Value Ticket (CSVT) used on the MTR and the KCR main line, although this facility is not available at present. The CSVT would be inserted in the machine to purchase a single ride ticket, the value of which would be deducted from the CSVT.

The traffic interface

In view of the controversy over accidents, attention has recently been focussed on the





Above: One of the Autelca ticket vending machines. (T. V. Runnacles

Below: A distinctive commemorative LRT ticket and one of the first tickets issued to a farepaying passenger on 18 September (reduction about ⅔ linear). (T. V. Runnacles

LRT's interface with road traffic. In addition to operating in-street over certain sections, the network includes 56 at-grade junctions with road traffic, of which 19 are classified as "minor" and 37 as "major". A particular difficulty is that some LRT "T" junctions are superimposed on major road "T" junctions. The lateral position of most of the LRT reservation is a complicating factor, and if the system was being designed today preference would doubtless be given to more highway median alignments.

Despite layout complexities, a high level of tram priority is afforded at 50 of the 56 road junctions, which are under vehicle-actuated control. Each tram carries a transponder with a unique identification; this is read by detector loops, one "upstream" of a junction and the other, a cancel detector, immediately "downstream". Any tram between these two detectors registers a signal to the traffic signal controller to demand a tram phase. To prevent successive trams interrupting traffic for too long there is provision for a maximum green time; this normally allows no more than two closely-following trams through a junction at a time. Similarly, an "inhibit" function is available to cancel tram priority if motor traffic builds up to unacceptable levels. The tram signals at road junctions comprise a red "T" for "stop" and a white arrow symbol for "proceed" which flashes on and off to provide the equivalent of an amber phase. Separate LRT-only signals with horizontal and diagonal white bars indicate route settings at rail junctions.

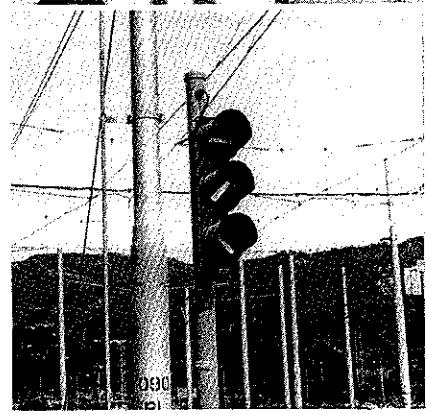
All along, it has been an objective to give as much priority to trams as possible without causing excessive delay to road traffic. This is fair, given the relative vehicle occupancies, but not all junctions can afford priority. A particular example is at the western end of Pui To Road, where a triangular LRT junction overlaps a busy "T" road junction. This location carries up to 96 trams/hour plus 1000 motor vehicles/hour on each approach, and needs six traffic-control stages. When tested on the Dutch FLEXSYT simulation program, it emerged that no priority could be given to trams if traffic delays of up to five minutes were to be avoided. However, delays to trams remained acceptable if a fixed time cycle was used (20).

Since the LRT has come into operation there have been complaints about confusion at some junctions, and the unfamiliarity of motorists with the new arrangements has undoubtedly contributed to some of the accidents of recent months. Some of the junctions along Castle Peak Road fairly bristle with traffic signals, a feature beloved of cartoonists in the daily press. There have been accusations of "intolerable" delays to motorists despite all the safeguards built into the traffic control arrangements (21), although whether such accusations are fully justified is open to interpretation. Nevertheless, all junctions are currently being reviewed, and some may warrant fine-tuning.

Apart from the traffic signals and point-setting indicators there are no other signals on the system, and trams are driven on sight.

Impressions

Hong Kong newspaper readers would have formed a very negative impression of the LRT system in recent months. Unfortunately this image is spreading, and perhaps our own review has done little to restrain it. It would therefore be instructive to stand aside from our chronicles of daily events and technical descriptions to consider how the LRT might be judged by a professional observer of the light rail scene.



Above: A light rail signal in Pui To Road displaying the red "T" symbol. (T. V. Runnacles

Below: Point-setting indicators near Siu Hong. (T. V. Runnacles

Our imaginary visitor would find the Tuen Mun—Yuen Long system remarkable in many ways. First impressions would be dominated by the complexity of the system and its high level of use. The mesh of tracks and wires in Tuen Mun suggests a long-established and elaborate tramway rather than the first phase of a new LRT system. Travelling further, the visitor would discover that the system is really three rather distinct entities. The "big-city" network in Tuen Mun gives way to a semi-rural interurban along the Castle Peak Road corridor and then becomes an almost self-contained street tramway in Yuen Long. The system's environment clearly reflects these transitions. In Tuen Mun the trams serve multi-storey housing estates, industrial districts and commercial centres; they cross a polluted river and border the shimmering sea, and are always in sight of the mountains that flank the town, including the precipitous Castle Peak (583 metres). By contrast, along the corridor, the trams pass villas, smallholdings and scrapyards, and the odour of pig manure fouls the air. In Yuen Long, the line is a pure street tramway passing shops and restaurants overhung with neon signs. Here the *ambience* recalls that of HKT on Hong Kong Island, and is used in much the same way, with passengers crowding on board, often just to ride one or two stops.

So much for first impressions. At a more technical level the visitor would notice the robust trackwork and the rather obtrusive overhead wiring, and would marvel at the sight of rigid-frame cars almost 20 metres long tackling curves of 25 metres radius or less. The cars themselves are most impressive, although there may be surprise at the relative lack of internal grab rails and poles, to the obvious consternation of standees as they lose their footing during sudden stops.

The stops present a generally favourable impression, and the universal use of high platforms, even on street, could set standards for other systems in future. Some of the stops are superbly blended into the neighbouring developments, and the general level of community integration is impressive. On the other hand, considering the crowds handled, it is a pity that the platform canopies do not extend the full length of the waiting area, which would surely be a desirable feature in a locality so exposed to scorching sunlight and tropical downpours. The ticket machines are good, but are in short supply at busy stops. As several seconds are needed to buy each ticket, long queues of passengers form, resulting in missed trams and frustration.

A visitor from tamer cities would marvel at the sheer volume of passengers being handled, and would note the many children in this essentially youthful community. Even a visitor might share the local grievance that trams, or at least motormen, are in short supply, and would wish for a more frequent service or more two-car trains. However, with any luck, these shortages will be history when these words are read.

Any camera-toting visitor would find the system a photographer's delight. The numerous junctions festooned with elaborate wirescapes, the gradients and curves, and the backcloth of soaring tower blocks, trees, watercourses and mountains all combine to provide scores of outstanding photographic locations. Any visitor should spend at least two days to give the system full photographic justice; moreover, it should be seen early and late in the day so as to get the best light.

The heritage factor

Most new LRT systems build on experience from elsewhere, and Tuen Mun is no exception. The Australian cars and the German equipment are clear to see, and there are more subtle Swiss, Belgian and British influences too. But the system has some less obvious legacies. The fact that the LRT owes its very existence to a London tram design of nearly 60 years ago is possibly its most astonishing ancestral feature, but how many users would know that "Pierhead Gardens" over the Ferry Pier terminus pays homage to Liverpool? Until the Tuen Mun District Board chose the name "Ferry Pier", the LRT terminus had been called "Pier Head" for planning purposes because of the first layout's similarity to the former Liverpool Pier Head tram terminus! Oddly enough, the KMB long-distance buses which share the terminus display "Tuen Mun Pier Head" on their blinds.

The Siu Hong stop was never called "Bellevue", but nonetheless the triangular platform layout there was consciously inspired by Zürich's stop of that name. This was seen as a solution to potential capacity problems with the "grand union" junction originally planned for this site.

There are links with other systems too, including the design association with London's Croydon area scheme noted in Part 4. There is also an interesting link with the Manchester project, whose temporary demonstration track at Debdale Park borrowed some of the overhead wiring destined for Tuen Mun. No doubt in future Tuen Mun's system will seed technology transfer to other LRT projects as yet in the planning phase or even unconceived.

LRVs for the North-west Railway

Specification: 4-axle/single-deck/unidirectional/rigid-frame/high-platform/air-electric vehicle.

Drive and braking systems: monomotor bogies with quill shaft axle drive; regenerative/pneumatic service braking, with emergency battery-fed magnetic track brakes, sand assisted. Bogie-centres offset 24 mm to compensate for externally-hung doors.

Lighting systems: (a) exterior: dual front, rear, brake and direction indicators; (b) interior: fluorescent.

Control systems: GTO thyristor chopper controls; capable of m u operation up to three cars. Rear-end back-up shunting control.

Development history: Order placed for 70 cars in July 1985; first car delivered in October 1987; contract for 70 cars completed in August 1988. Cars 1001-41 built at Dandenong; cars 1042-70 built at Brisbane.

Suppliers:

Developer	Comeng, Australia
Main contractor	Comeng
Body	Comeng
Bogies	DUEWAG
Propulsion equipment	AEG
Control equipment	Siemens
Brakes	Knorr
Interior fittings	Comeng
Seats (fibreglass)	DUEWAG
Doors	Stone Peters
Air conditioning (split type)	Sigma
Pantograph (type DR-23LA)	SMC
Couplers (10 cars initially; 60 more ordered in 1988)	Scharfenberg

Body specification:

Frame	steel
Exterior walls	stainless-steel ribbed panels
Interior walls	aluminium alloy
Insulation	"tuff-skin" fibreglass
Floor	stainless steel
Floor overlay	plywood & "Treadmaster"
Doors (externally hung)	sliding
Windows	Beclawat Design 14, with hopper vents
Heating	None
Flange lubricators	fitted to 14 cars

Vehicle performance:

Maximum velocity (km/h)	80
Steepest gradient capability (%):	
single car	12
coupled cars (one failed)	8
Service acceleration (m/s²)	1.3
Service braking (m/s²)	1.3
Emergency braking (m/s²)	>2.6
Emergency brake reaction time (s)	0.8
Maximum jerk rate (m/s³)	3.0
Min curve radius capability (m):	
horizontal	20
vertical (crest/sag)	300
Passenger capacity:	
seats	60
standees (6/m²)	130
standees (10/m²)	217
Noise (inside), on level, clean ballasted track	Li 70 dB(A) at 60 km/h
Noise (outside), tare load on level, clean ballasted track, at 7.5 m distance from car	La 75 dB(A) at 60 km/h

Dimensions:

Length over fenders (m)	19.400
Length over couplers (m)	20.200
Height of floor over rail (m)	0.948
Height of roof over rail (m)	3.415
Ht of lowered panto over rail (m)	3.785
Inside width (m)	2.588
Headroom in centre aisle (m)	2.187
Width of centre aisle (m)	1.078
Doorway width, minimum (m)	1.500
Doorway height (m)	1.900
Weight, empty (t)	27.032
Weight, fully laden (t)	37.862

Propulsion and braking:

Track gauge (mm)	1435
Bogie centres (m)	11.0
Bogie wheelbase (m)	1.9
Motors (monomotor drive), type	ABS 3322.2
Motor rating, per car (kW)	2 x 195 (cont)
Motor voltage (V, dc)	750
Gear ratio	5.556:1

The North-west Railway

Network:

Route length (km)	23.35
Roadside reservation (km)	20.00
Paved, segregated median (km)	2.25
Paved, street track (km)	1.10
Length of single track, excluding depôt (km)	46.00
No of road crossings (major)	37
No of road crossings (minor)	19
No of stopping places	41
Platform height (mm)	910
Platform width, usual (m)	3
Platform width, min/max (m)	2/5
Minimum design headway (s)	60
Passenger capacity/dirn/hour#	22 800

NOTE: # Based on two-car trains and standees at 6/m².

Routes and lengths

505 On Ting—Siu Hong (km)	*5.31/5.05
506 Ferry Pier—On Ting (km)	4.70
507+ On Ting—Tin King (km)	3.90
512+ On Ting/Yau Oi—Siu Hong (km)	*3.53/3.07
610 Ferry Pier—Yuen Long (km)	*13.50/13.20
611 Ferry Pier—Yuen Long (km)	12.80
612 On Ting/Yau Oi—Yuen Long (km)	10.37

NOTES: * alternative distances indicate different route lengths according to direction.
+ introduction of routes 507/512 deferred.

Rolling stock (No of vehicles):

Passenger cars (electric)	70
Unimog towing vehicles (diesel)	2
Unimog tower wagons (diesel)	2
Plasser & Theurer tamping machines (diesel)	1
Flat wagons	2
Well wagons	1
Ballast hoppers	1
"Span" railgrinder	1

NOTE: the last four categories are unpowered.

Trackwork:

Contractor	Henry Boot (Far East)
Flat-bottomed rail type §	UIC 54
supplier	British Steel
Grooved rail type	Ri 60
supplier	Thyssen
Track gauge (mm)	1435
Precast concrete sleepers @	F 27
No of points	142
Supplier (motors/controllers)	Hanning & Kahl
No of diamond crossings	29
Minimum curve radius (m)	23
maximum gradient (%)	6.1

NOTES: § with plating for some street track.
@ timber used for special-work.

Electrification:

Contractors:	
(overhead)	Balfour Beatty
(power)	Hawker-Siddeley Power Eng
No of infeed substations	2
No of rectifier substations	11
Voltage (V, dc)	750
Contact wire ht: (normal) (m)	5.6
(max/min) (m)	6.0/5.4
Wire type:	
catenary & trolley	hard-drawn copper
span wires	synthetic rope

Fare collection

No of Autelca B-8026 machines	181
zonal fares issued	Yes
monthly seasons issued	4 types
stored value tickets accepted	Not yet
Multi-ride tickets used	No
Free transfers	to LRT & KCRC buses
Fares (adult/child) 1-2 zones	HKD 1.50/0.80
3 zones	HKD 1.90/1.00
4-5 zones	HKD 2.40/1.20
Monthly seasons 1 area	HKD 90 /45
(adult/child) all zones	HKD 140 /70
Surcharge/no ticket	HKD 120
Fine	maxHKD 3000
Surveillance	pairs of wardens

The future

The LRT system is by no means complete yet, and agreement has already been reached to build six extensions as follows:

- (i) Ferry Pier to Yau Oi (2.3 km), August 1990;
- (ii) Yau Oi to Sam Shing (0.3 km), December 1990;
- (iii) Pui To Road to Siu Hong (2.3 km), June 1991;
- (iv) Tin Shui Wai section 1 (1.4 km), September 1991;
- (v) Yuen Long Northern Bypass (2.1 km), December 1991; and
- (vi) Tin Shui Wai section 2 (0.7 km), June 1992.

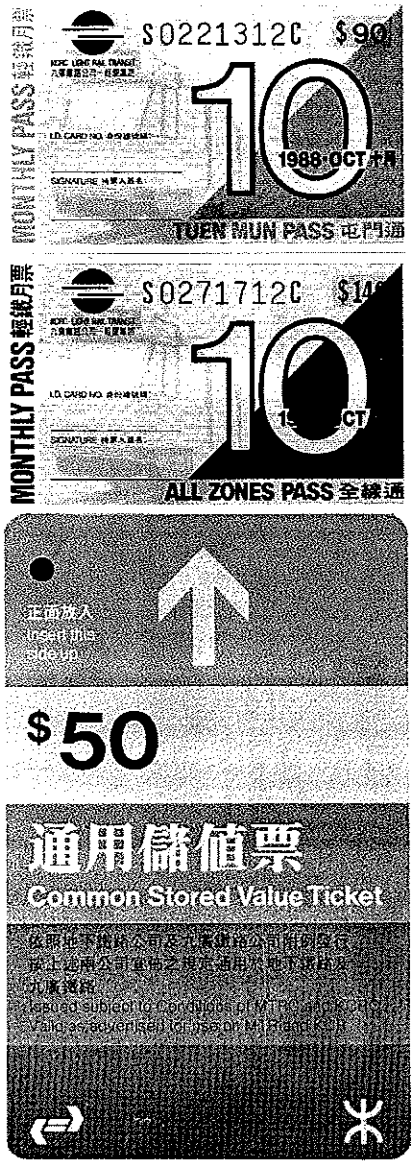
The dates given above indicate tentative completion and are liable to some slippage. However, together these extensions will bring the network up to 32.45 km. There are also more extensions, not yet authorised, some of which may be commissioned before the agreed network is finished. These comprise:

- (vii) Pui To Road to Sam Shing (1.8 km), December 1991;
- (viii) Sam Shing to So Kwun Wat Marina (2.3 km), December 1991;
- (ix) Tin Shui Wai section 3 (0.8 km), August 1994;
- (x) Tin Shui Wai section 4 (1.6 km), November 1994; and
- (xi) So Kwun Wat Marina to So Kwun Wat housing development (0.7 km), December 1994.

If all of these links are built as planned, the regional system would ultimately comprise 39.65 route-km (22). The new lines will provide some interesting features, including viaducts over the Tuen Mun Nullah estuary and southeast of Siu Hong, as well as a decked structure over the Yuen Long Nullah. The Tin Shui Wai line will be built in stages, including an interim reversing-triangle and a temporary loop. A complex terminus is proposed at Sam Shing, whilst a temporary one would be provided at So Kwun Wat Marina. The So Kwun Wat line may be quite picturesque, as it will serve the beaches and the prestigious future marina.

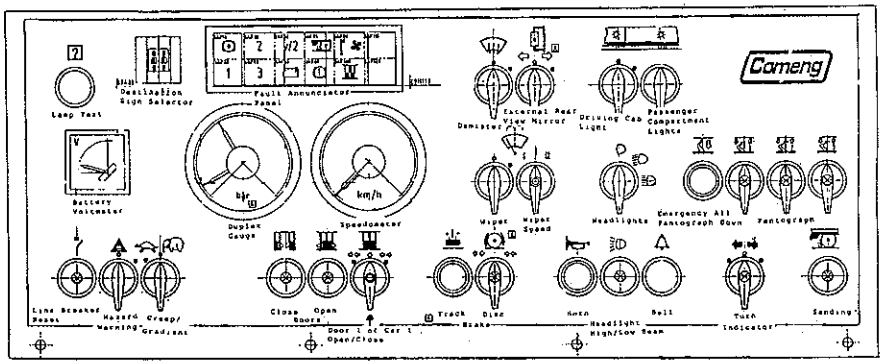
The extensions will require more cars; the consultants for the regional links study envisaged by 2001 an ultimate fleet of 136 cars, all of which would be of the existing design. However, the subsequent urban links study (23) recommended 36 to 60 more cars, the number depending on the choice of route. Four-, six- and eight-axle cars, and also four-axle double-deckers were reviewed for the urban link. It was concluded that a double-sided version of the existing vehicle would be best, and would be paired back-to-back in trains of up to four cars. They would not run into the existing regional system except for maintenance, but it was suggested that some future regional cars should also be double-sided so that certain Yuen Long routes could directly serve the proposed urban links station. As this station would have no loop, double-sided cars would be essential.

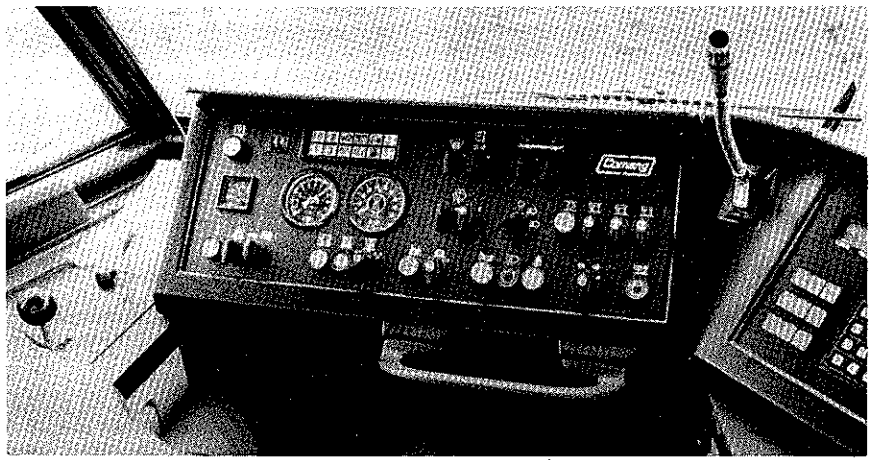
The KCRC has apparently considered the double-sided car but may now prefer a single-sided car capable of coupling behind an existing car but with attributes hard to define simply. In terms of lefthand running, it will have a rear-end control cab but only a front-end "back-up" controller; yet it is expected to be a motor car, though with perhaps only a single chopper. As a consequence it can be a solo motor car for shunting purposes only, while for passenger purposes it will have to be considered as if it were virtually a non-driving



Above: The monthly season-tickets for the North-west Railway are conventional cards, free from any kind of electronic "tagging". We show here one of the Area tickets (for Tuen Mun) at HKD 90, and an all-zones ticket at HKD 140. They are approximately at ⅔ linear reduction. (KCRC

Below: At approximately full size, this is a Common Stored Value Ticket valid both for the MTR and the KCR, but not yet valid for the trams. The varied colours of the originals make it very difficult to get a readable result. (T. V. Runnacles





A photograph of the control desk of a Tuen Mun car. The accompanying drawing, for the quality of which we apologise, shows the function of most controls, but the original was overlaid with a bold layout matrix which we regret that we could not erase properly. (Comeng, T. V. Runnacles

motor. If nothing else, it will be a challenge to people like the Swiss (and others nearer the UK!) who invent coding systems to describe a car's function and equipment unambiguously. Such cars would be cheaper, and could be used to augment existing cars into single-sided double-ended twin-sets. This rather strange configuration could ease rapid shunting of the "control trailers" at starts and ends of peak periods or rapid reversals during emergencies (24), as well as offering a suitable basis for urban link operation, provided that all platforms are on the same side of the track (25). It would also make the rolling stock capable of operating into China or capable of surviving a future change from lefthand to righthand running within Hong Kong, although neither of these possibilities has ever been mentioned (26).

At present the KCRC is seeking prequalification tenders for additional cars, which implies that they would not necessarily be supplied by Comeng. The exact quantity had not been decided at the time of writing, and could range from 30 to 70 cars. A car as described above with a cab at the rear-end is understood to be an option for the new order.

The single-sided double-ended twin-set concept has probably eclipsed its double-sided equivalent, even for the urban link. However, it appears that there is some overall planning preference for an MTR link from Tsuen Wan to Yuen Long, so perhaps a light rail link to the Metropolitan Area or other towns would not be needed so urgently, or at all. Nonetheless, in September 1988, the KCRC revealed a plan to build an LRT extension from Yuen Long to the new border crossing point at Lok Ma Chau, partly over the alignment previously considered for the discarded Yuen Long to Fanling/Sheung Shui urban link (27). Apart from this, the Second Comprehensive Transport Study is examining a totally separate LRT line from Ma On Shan via Sha Tin to Diamond Hill in Kowloon. The KCRC has aspired to introduce LRT to Sha Tin for several years, and this line would both achieve this and also relieve the overcrowded roads and train services in the eastern New Territories.

Not the last word

Here we end our look at tramways in Hong Kong for the time being. However, with so many developments, plans and controversies, this cannot be the last word on the subject. We plan an epilogue to update the six parts in the near future, and no doubt there will still be plenty to report after that. In the meantime the writer would like to thank those many people in transport administration who have answered his questions, but special recognition should be given to Stephen Stowe, General Manager of the Peak Tramways Company Ltd; John Carey, Manager of Hongkong Tramways Ltd; Bob Lindsell, formerly Operations Manager of the LRT; and Ron Rakusen, Partner of Scott Wilson Kirkpatrick & Partners (Hong Kong). Most of all, I am indebted to James So, Commissioner for Transport, for permission to publish these articles. It goes without saying that the author is entirely responsible for any errors, and that any opinions are his own and do not necessarily reflect the views of the organisations or individuals referred to here.

References and notes

(1) Hongkong Standard, "LRT—ordeal by public transport", 19 September 1988.

(2) Scott Wilson Kirkpatrick & Partners *et al*, Light Rail Transit System Extensions Studies; Regional System Final Report", KCRC Light Rail Division, December 1986.

(3) Hongkong Standard, "Hard summer of praying for LRT Director", 24 September 1988.

(4) 278 000 trips a day had been forecast for 1988 in reference (2) above.

(5) Hongkong Standard, "Closer look at LRT junctions", 1 October 1988.

(6) South China Morning Post, "Government sets up group to review LRT safety standards, 2 October 1988.

(7) Hongkong Standard, "Separate LRT from other traffic: Tam", 7 October 1988.

(8) Sunday Morning Post, "Group bids to improve LRT safety record", 9 October 1988.

(9) Oriental Daily News, "Crash! This morning two LRVs collide; two drivers and four passengers injured", 10 October 1988 *(original in Chinese)*.

(10) South China Morning Post, "LRT crash sparks call for review", 11 October 1988.

(11) Hongkong Standard, "Two LRT routes may be scrapped or postponed", 13 October 1988.

(12) South China Morning Post, "TAVA plan may cover light rail crash victims", 18 October 1988.

(13) Hongkong Standard, "LRT turns to public for advice", 16 October 1988.

(14) South China Morning Post, "LRT to act on battered image", 17 October 1988.

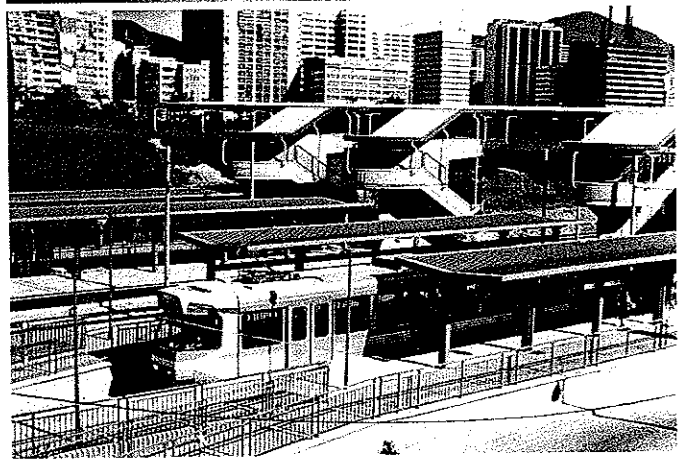
(15) South China Morning Post, "LRT can repair damage", 19 October 1988.

(16) See references (2) and (3) to Part 4 for a list of other published sources.

(17) It is said that the existing platform canopies intrude within the kinetic envelope of any potential double-decker, although this is not conspicuous from observation.

(18) There are two adjacent power stations at Tap Shek Kok. Castle Peak "A" station is a dual-fired (coal or oil) installation with four 350-MW units. Castle Peak "B" is a coal-fired facility with four 660-MW units. The total installed capacity is 4.04 GW.

(19) Studies by the KCRC showed that a "closed" fare collection system with turnstiles at stops or conductors on the cars would greatly increase costs, despite the risk of fraudulent travel with the self-service system. However, if an urban link is built, this would probably have a "closed" system of fare collection.



Above: A multiple-unit pair tailed by 1006 stands on street track at the Yau Oi stop on 16 October 1988.
(T. V. Runnacles

Centre: Gutter-running street operation in Tai Hing Estate. 1044 is just leaving Tai Hing South; note the integration of high platforms in a street environment.
(T. V. Runnacles

Below: The four-platform station at Tuen Mun town centre, seen during test running on 16 July.
(T. V. Runnacles

(20) The traffic control features of the LRT are described in much greater detail in;

Bodell, G. and Huddart, K., "Tram priority in Hong Kong's first light rail transit system", Traffic Engineering & Control, Vol 28 No 9, September 1987,

and

Bodell, G. L. and Thompson, A. A., "Traffic control for the light rail transit system in Tuen Mun and Yuen Long", Hong Kong Engineer, Vol 15 No 12, December 1987.

(21) Hongkong Standard, "LRT comes under fire for traffic jams in NT", 14 October 1988.

(22) Reference (2) above gives this figure as 39.3 km because it assumes the Phase 1 network to be exactly 23 km. However, the precise Phase 1 length is apparently 23.35 km.

(23) See reference (12) to Part 5.

(24) However, the Phase 1 system has only two crossovers along its entire length, one outside the depôt and the other at Hung Shui Kiu.

(25) Single-sided double-ended operation is not unknown: Gmunden in Austria, the Seattle waterfront streetcar and the former Swansea and Mumbles Railway provide examples.

(26) A change to the righthand rule of the road in Hong Kong was first suggested over 40 years ago, but is unlikely to occur, largely because of its impact on bus operation. A light rail line in the Shen Zhen Special Economic Zone adjacent to Hong Kong's border was proposed several years ago by engineering entrepreneur, Gordon Wu, but nothing has been heard of this recently—indeed Wu has become a critic of the Tuen Mun system (South China Morning Post, "Wu wouldn't give consultants the time of day", 13 October 1988).

(27) Sunday Morning Post, "LRT studies extra line to border point", 4 September 1988.

Narrow gauge through northern Spain

Dr ERNST PLEFKA

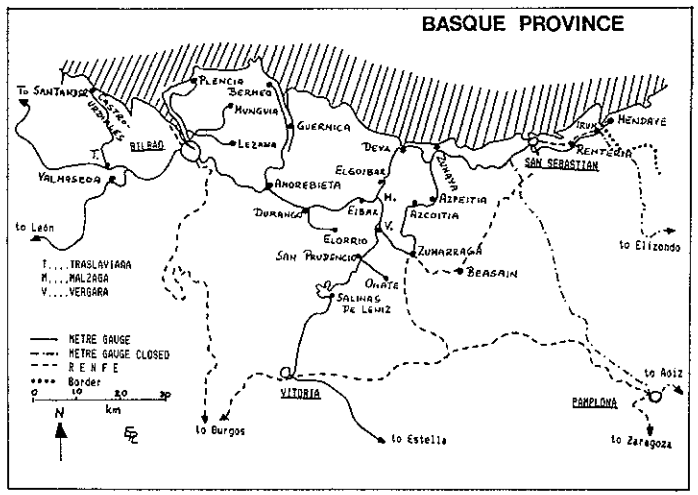
Part 2

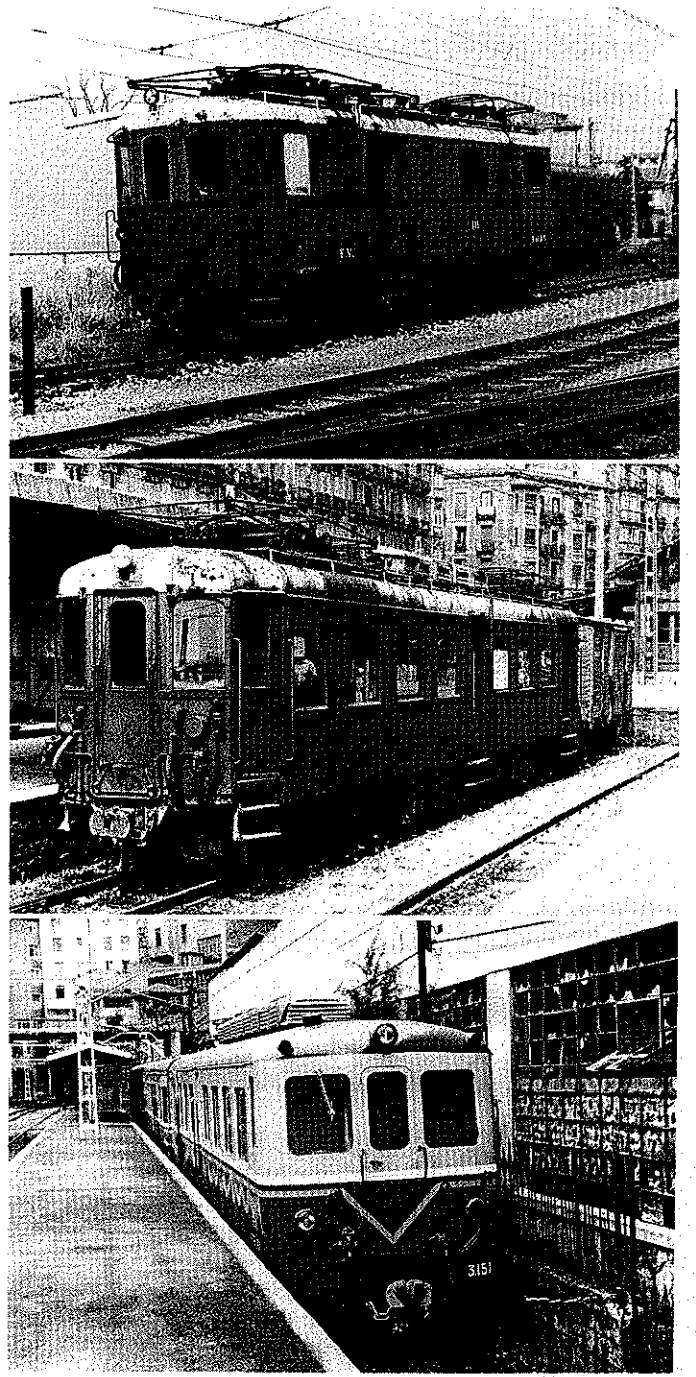
San Sebastian—Bilbao

The *Ferrocarriles Vascongados* (FV), now owned by the Basque ET, came into being through the merger of three companies in 1906:

FC Central de Vizcaya de Bilbao a Durango

In 1868 the mayor of Durango, Don Juan Timoteo de Ercilla y Cenarruzabeitia, conceived the idea of a narrow-gauge railway from Bilbao to Dos Caminos. He was awarded the concession in 1873, but in 1878 transferred it to Don Francisco Nicasio de Igartus y Egusquiza, who one year later substituted metre-gauge into the concession and founded the *FC Central* in 1880. Construction started and on 1 June 1882 the line was opened. Hanomag delivered four 0-6-0 tank engines in 1881, one in 1883 and





Northern Spain (3)

Above: Ganz railcar MACD 3, out of service at Durango in 1978, was one of three built for the Malzaga—Zumarraga line.

Centre: Railcars MCD 7-9 were also built by Ganz in 1930; 7 is seen in San Sebastian in August 1978.

Below: Railcar 3151 is one of the four modern GEE electric cars; it was in service at Elgolbar in July 1981. (E. Plefka

LRT to Rochdale and Oldham will use the existing British Rail line, services on which are supported by ratepayers through Section 20 payments. The users of the line feel disadvantaged by the recent "Network North West" reorganisation which has concentrated services at Piccadilly and has, in the process, left them in something of a backwater. Metrolink would firmly connect the line to the Piccadilly railway hub and relieve its perceived isolation.

As the existing stations at Rochdale and Oldham are not particularly convenient, there are plans to penetrate the centres of both towns with the new light rail services. To reach Oldham town centre the LRVs would require additional hill-climbing ability. Future expansion is in no other way constrained, the nature of the "starter set" being such that it can be extended wherever it is needed.

Even though expansion is physically straightforward to a greater or lesser degree, the Government has recently tightened up the rules by which schemes can qualify for Section 56 capital grant. In essence a financial flood barrier has been created by which the Department of Transport can, if the fancy takes it, resist demand for light rail instead of meeting it as it has done for Metrolink.

The Government should quickly recognise the perfectly obvious link between electorally-crucial "green" issues and ecologically-friendly light rail. Metrolink will assist with that process and there seems little doubt that we can look forward to a much stronger commitment to light rail in the future. This new and very pragmatic commitment on the part of the Government needs to be followed up and directed towards implementing new light rail schemes, extending existing networks and making sure that systems are given the capacity to meet substantial demand supported by reasonable fare levels.

Two Metrolink extension bills are, at the time of writing, going through the Parliamentary process; the first covers Salford Quays and was deposited in November 1987; the second, deposited a year later, covers Trafford Park, Rochdale/ Oldham (without the town centre penetrations) and the first part of the Didsbury line as well as a modification to the Salford Quays line. The Government would do well, wearing its ecological hat, to streamline the creaking Parliamentary process which so handicaps light rail implementation in the UK. Three years to enact a Bill seems ludicrous.

When enacted, these Bills will provide the necessary legal rights for the extensions concerned. They are, however, only part of the complex series of issues to be resolved, most of which are of a purely finance-related nature, leaving little scope for the luxury of using light rail in the more open-minded way of our European neighbours.

Decisions about assigning priority to Metrolink extensions were difficult enough to make before the Section 56 "goalposts" were moved. Now there has to be much more emphasis on private funding, and this means that due regard has to be paid to each line's ability to attract it. This "value capture" potential depends basically on redevelopment possibilities in the vicinity of a projected line, and has little or nothing to do with repairing existing public transport deficiencies.

In looking at the prospects for expanding the system, the capacity of the city-centre section has had to be carefully looked at. The triangular junction which lies at the centre of the network in Piccadilly Gardens is being built in such a way that each of its arms can accept a train of two coupled LRVs. On a hypothesis that the junction will accommodate 24 trains per hour (one every 2.5 mins) on each of its three legs, it will be possible to add two extensions feeding into Victoria and two feeding into GMEX. This assumes a ten-minute headway on each extension.

Extensions feeding into Piccadilly station (Glossop / Hadfield, Marple / Rose Hill, Ashton/Stalybridge) would be served by through-running of LRVs from other routes and so would not add to the number of vehicles penetrating the city centre. However, because of limitations on the capacity of the Piccadilly Gardens-to-Piccadilly station section, it is expected that some services will run straight through between the lines feeding into GMEX and the lines feeding into Victoria—without going to Piccadilly station.

The estimated punctuality of services on the lines feeding into the centre has also had to be forecast. LRVs using entirely-segregated alignments can be expected to run closely to time, while LRVs from lines with less segregation may be expected to arrive at the centre with less predictable punctuality. This need not be a significant problem, but it does show that the extension planning process has more twists and turns than meet the eye.

It is proposed that the depôt will be established at Queens Road, with the work on it expected to be done by Fairclough as one part of its involvement in the project. It is probable, incidentally, that the first LRV test runs and, later, driver training will take place on the Bury line on Sundays when there is no public train service.

In the city centre, full advantage will be taken of light rail's proven ability to act as a catalyst for aesthetic improvements. Already there are initiatives aimed at cleaning up and refurbishing buildings along the route. Opportunities will also exist to carry out landscaping along some of the alignments, and the Central Manchester Development Corporation has indicated its willingness to assist.

Manchester is going to make the most of its light rail system. There's no real opposition to it and there never has been, and that's because people recognise a good idea when they see one. British cities have for too long ignored modern transit technology; it's time for us to find out what we've been missing, so that we too can show the world how to face up bravely to the twenty-first century.

Acknowledgements

The author gratefully acknowledges help given by GMPTE and GM Buses staff with the preparation of this article.

Tramway developments in Hong Kong

T. V. RUNNACLES

Part 7: Into the Year of the Snake (Peak Tramway and HKT)

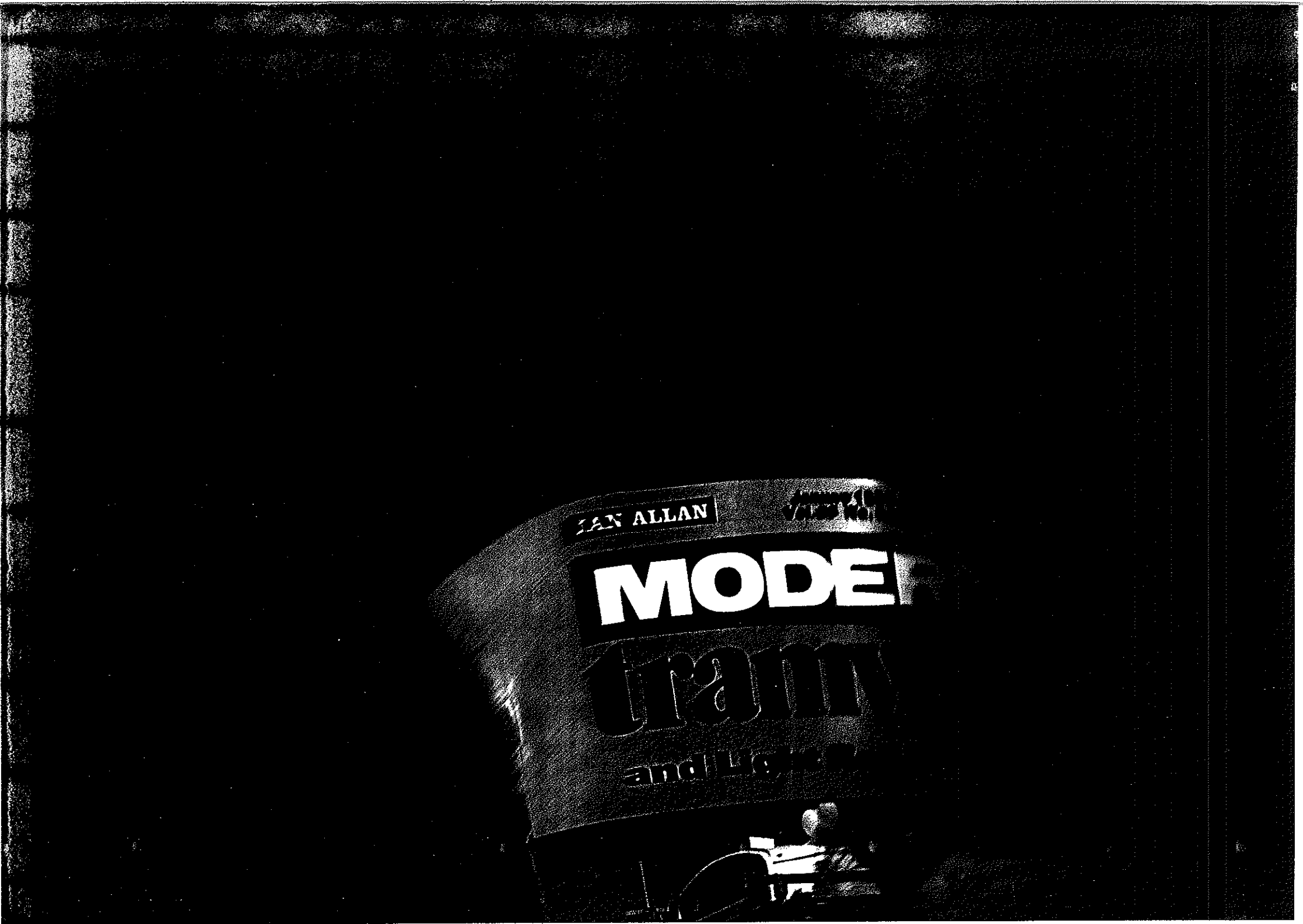
THE previous parts of this review were written between April and October 1988. It is now opportune to chronicle progress in the Chinese "Year of the Snake", covering developments up to mid-October 1989.

Most of the predicted developments materialised on cue. Thus the Peak Tramway was duly modernised, the new Hongkong Tramways' depôts were opened, the near-hysteria about accidents on the Tuen Mun—Yuen Long LRT system subsided, and the Second Comprehensive Transport Study (CTS-2) was published. But other events either failed to happen or did not turn out as foreseen. Little progress has been made with the proposed light transit system to Aberdeen, despite the submission of two competing schemes. There are no additional passenger trams on Hongkong Tramways, and the LRT system's traffic has not risen to expectations, causing the deferment of some network additions. CTS-2 was published in May and recommended three new railways. However, one of these, across the Harbour, may require re-appraisal following an announcement in October that the airport would be relocated to North Lantau and would be served by a new railway to West Kowloon and Central.

The Peak Tramway modernisation

The Peak Tramways Company Limited had a momentous year. Site-work on the modernisation plan began in October 1988 with the excavation of the new "engine chamber" at the upper terminus. As the original haulage gear had to remain operable until the old system closed, the new chamber was built underneath the upper terminus track. This involved setting-back the "parking" position of the trams by some 15 metres downhill and sleeving the haulage ropes for their protection from excavation and installation work.

Despite the excavations at the upper terminus, the tram service continued uninterrupted until the night of 19 June 1989. On the last day of service all revenue was donated to charity. The last trams, cars 1 and 3, completed their passenger journeys at 00.10 hrs on 20 June, after which both were lifted from the tracks just uphill from the lower terminus. Each tram was then placed on a low loader; car No 1 was removed to the Urban Services Department depôt at Ho Man Tin in Kowloon, where it will be stored pending display at the proposed Lei Yue Mun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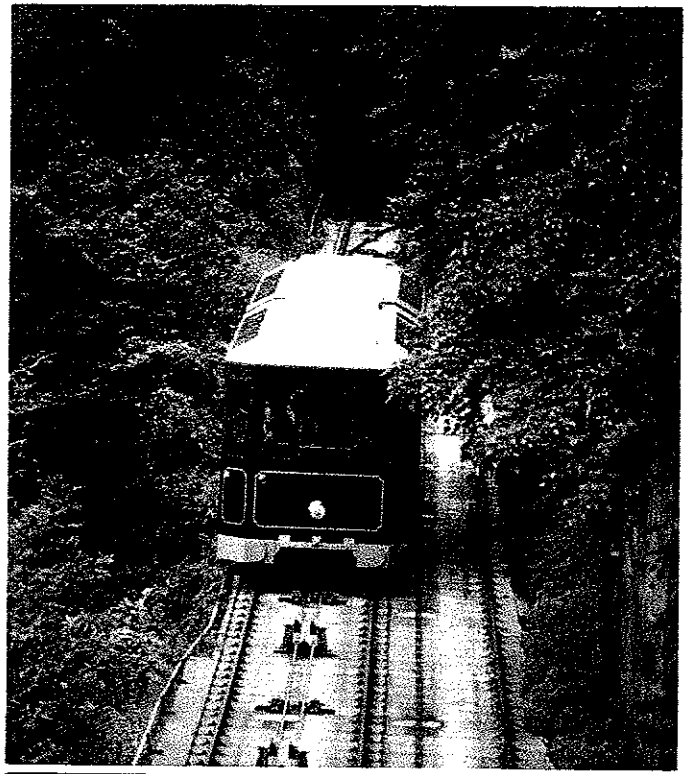


Peak Tramway

Above: One of the new twin-set Peak trams descends below Barker Road on 7 October 1989. The rail on the right has been disused since the line was modernised. The vehicle shown is the "green" tram.
(T. V. Runnacles

Below: The "white" tram descends above Barker Road on the rebuilt Peak Tramway on the same date.
(T. V. Runnacles

transport museum. Car No 3 went to Tsing Yi Island; its fate remains uncertain, but it may eventually be displayed near the upper terminus. Car No 2 (the spare car since March 1988) remains in the small depôt above Kennedy Road. This is now physically isolated from the tramway and, as the depôt is awkwardly located, the tram may remain there for as long as the building remains.

The tramway was closed from 20 June until 3 August, allowing feverish reconstruction throughout the route. The two new twin-set cars were placed on the tracks on 20 and 21 June in the same way that their predecessors had been removed immediately beforehand. The old cables and pulleys were all discarded, and the rails were continuously welded. The pointwork above May Road was replaced with new bladeless switches designed to accommodate the opposing double-flanged wheels and flangeless wheels on each car[1]. Another similar set of points was installed just above the final uphill curve to enable singling of the upper section of track. The former brake-rail was removed throughout.

The overhead trolley wire previously used for telegraph communications was cut down and replaced by ground-level inductive cables beside the rails. The upper and lower termini were remodelled with platforms on each side of the track for quicker boarding and alighting; the lower terminus also received air-conditioning.

The first movement of the new trams took place on 5 July, and the complete journey took four hours. *En route*, the trams' sills fouled the new rope pulleys, necessitating urgent surgery on the sills.

After six hectic weeks, the tramway was ready to be relaunched after its HKD 60 million transformation[2]. At 09.00 hrs on 4 August 1989 the line was commissioned by a "soft opening" ceremony officiated by Hamner Webb Peploe, Managing Director of the Peak Tramways Company. Free rides followed for 700 invited guests, including press representatives, underprivileged children and elderly people. Public service began on Saturday 5 August, whilst the formal opening on 20 September saw a plaque unveiled at the upper terminus by the Governor, His Excellency Sir David Wilson.

The rebuilt funicular had already proved its worth in the first two months of operation, when over 700 000 passengers were carried. Rides during August alone totalled 415 580, which was 82% more than on the equivalent days in 1988. The busiest day was Sunday 13 August, when 24 006 passengers were carried, representing over 12 000 passengers per car, surely a record for any rail transport vehicle in a single day.

The modernisation contract was carried out by Von Roll Transport Systems Ltd of Switzerland, although subcontracts involved British, Austrian, Finnish and German contributions as well. The most visible parts of the new system comprise the two splendid new trams. These were built by Carosserie Gangloff AG of Bern, although the underframes and body skeletons were actually built in Gangloff's French factory. Compared with the old green trams, the new cars feel much more spacious. Seats are provided for 95 passengers in 3 + 2 formation[3], facing uphill, whilst there is space for 25 standees on the ingenious "wave-form" floor that enables passengers to adapt their stance to any gradient on the line. The new trams are 18.5m long, 2.65m wide and 3.08m high over the roof panels.

The trams require considerable electrical power to service the doors, lighting, controls and forced air ventilation. Batteries provide this power and are recharged at the two termini via short lengths of conductor rail, but on-board generators service the ventilation system whilst the trams are moving. However, experience soon showed that the flangeless wheels could not provide the torque required by the generators because of the limited adhesion between the wheels and the rail. Accordingly the generators were disconnected very shortly after the new service began, and it is now intended to double the number of generators. There is also talk of air-conditioning the cars, but this would probably require twin overhead trolley wires to supply current. No decision had been taken about this at the time of writing.

The outward appearance of the new trams is classic, but not old-fashioned. The new livery is burgundy red outlined in gold, with a grey roof and end-sills. The cars are not numbered, and marker lights on the dash-panels merely identify the trams as the "green" and "white" cars respectively. With automation there is no longer a "driver" in charge of the haulage gear, and responsibility for controlling each car has been passed to the attendant on board, who also collects fares at intermediate stations (a task previously performed by a conductor).

The requisite legal amendments to facilitate operation of the new tramway were all enacted during the summer of 1989. The Peak Tramway Ordinance was amended on 8 July, the By-laws were enacted on 12 July, and the Safety Regulations came into effect on 1 September.

Whilst some observers may mourn the passing of the rather idiosycratic green trams, the new Peak Tramway is altogether a magnificent achievement, and reflects great credit on the Company for securing such a

complete transformation with minimal service interruption.

Little light on Aberdeen

In Part 1 a description was given of a proposal by the Peak Tramways' parent company, Hongkong & Shanghai Hotels Ltd, to build a "light transit line" to Aberdeen, with an extension to Ocean Park and a branch to Ap Lei Chau. Subsequently, a major locally-based property group, Cheong Kong (Holdings) Ltd, has taken a 50% stake in the project, which is now called the "Trans Peak Railway" (TPR). Consultants have been carefully examining the proposal, but as it is now one of three rival offers to build a fixed-track link to the southern side of Hong Kong Island, the details are commercially confidential.

The Second Comprehensive Transport Study (CTS-2)[4] examined rail links to Aberdeen, both as a self-contained light rail line, and as an extension of the Mass Transit Railway. However, the economic (community) and financial (commercial) returns on investment were both predicted to be low, and construction was not recommended. But, before these findings were made public, two other developers had proposed schemes rather similar to the TPR. In the spring of 1989 both Sun Hung Kai Properties Ltd and Swire Properties Ltd announced that they were proposing rail routes to the south side of the Island. As with the TPR, alignment details cannot be published, although it is understood that the routes do differ, and that one scheme envisages a second phase of local lines on both the north and south sides of the Island. Technical features are also classified, although it appears that all three developers are converging on standard-gauge light rail equipment, variously using automated or manned articulated cars. Thus some of the more exotic hardware originally proposed for the TPR may have been set aside, notwithstanding an initial enthusiasm to be "on the cutting edge of technology".

Despite the discouraging findings of CTS-2, all three promoters are understood to be still keen on the projects, although all would rely on property development over termini and depôts to defray the capital costs. Government has not decided on any scheme, although it has established a working group to examine all three proposals and has re-run the CTS-2 forecasting model to re-assess the patronage forecasts for each scheme. If Government discerns a genuine transport need for an Aberdeen light railway, it would quite probably specify a route of its own choice and invite bids to build and operate it.

Hongkong Tramways Limited

For Hongkong Tramways it has been a year of mixed fortunes. The most notable achievement was the opening of the two new depôts, but on the other hand patronage began to decline in response to several adverse factors.

Last exit from Sharp Street

Construction work on the two new depôts in Sai Wan Ho and Sai Ying Pun began in the summer of 1988, but it was not until early 1989 that they began to look like tram depôts.

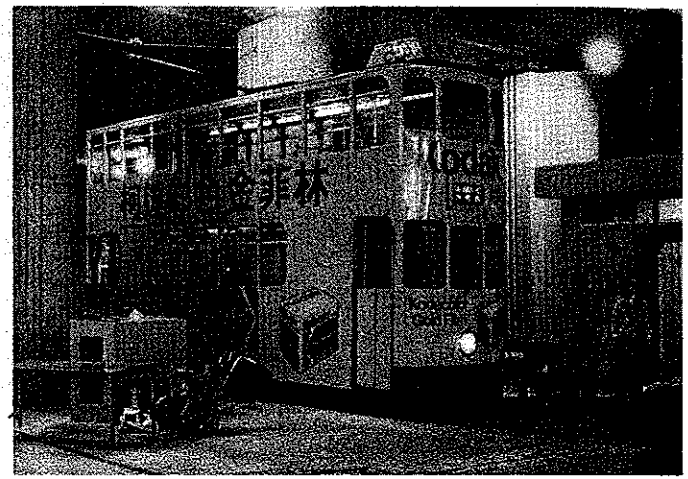
Sai Wan Ho was the first depôt to open. This facility, at the eastern end of the line, benefits from a roof provided by the Island Eastern Corridor Road[5] and was completed during February. The first tram to use the depôt was car 80, which arrived shortly after 18.00 hrs on 28 February. A formal opening ceremony followed on 28 April.

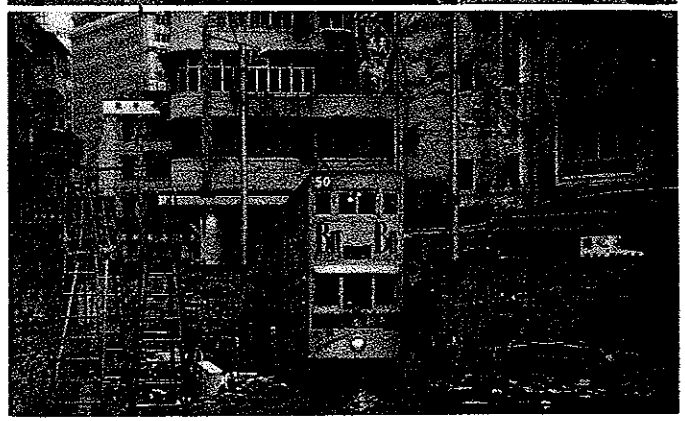
The Western District site was commissioned on 20 March; after careful thought it was named "Whitty Street depôt" so that the travelling public would recognise the name of the terminal loop which had been relocated within the depôt's walls. Oddly, neither the depôt, nor the previous terminus, are (or were) situated on Whitty Street. As at Sai Wan Ho, formal opening came later. On 27 May the hardworking chairman of the Transport Advisory Committee, Maria Tam, drove semi-open-top car 128 through a ceremonial ribbon to declare the depôt officially open. Speeches then followed on the theme of "Trams into the 21st Century", after which numerous invited guests lunched in the depôt's covered reversing loop.

Although Whitty Street depôt had been commissioned in March, the emergency exit route via Water Street and Chiu Kwong Street was delayed until the end of the year, mainly because of work on the improvement of Connaught Road West. This emergency link, which would be used only during a depôt fire, differs from the map in Part 3 because only an east-facing connexion is made with the main line in Des Voeux Road West.

The former Sharp Street depôt closed with some media recognition. Car 31 was assigned as the official last tram in the late afternoon of 20 March. Banners on the car's side proclaimed its historic rôle, although the press corps seemed more intent on familiarity with the pretty motorwoman, Lio Wai-cheng, than the significance of the occasion.

But tram 31's trundle down Canal Road East was not the last exit from Sharp Street. Substation renewal work on 9 April caused the tram route to be split into two, and Sharp Street hosted terminating trams to and from





Above: HKT car 80 has just arrived at Sai Wan Ho depôt, having made history as the first tram to be stabled there, on 28 February 1989.
(T. V. Runnacles

Centre: Tram motorwoman Lio Wai-cheng engages the attention of press photographers before driving car 31 out of Sharp Street for the last official departure from the old depôt on 20 March 1989.
(T. V. Runnacles

Below: Amidst the debris of the already-abandoned Sharp Street depôt, HKT car 50 noses in from Russell Street during the special workings on Sunday 9 April 1989.
(T. V. Runnacles

the west. Throughout that wet Sunday a procession of trams passed through the depôt. The exact last car was not recorded, but 9 April really was the end. In May the overhead was dismantled, and in July the demolition of the sheds, offices and workshops commenced. By early August the entire site had been razed to the ground and contractors' hoardings proclaimed the coming of the prestigious Times Square development. The connecting depôt tracks in Russell Street and Canal Road East have not been lifted, as HKT wishes to retain these wayleaves in the hope that the future development may be served by tram.

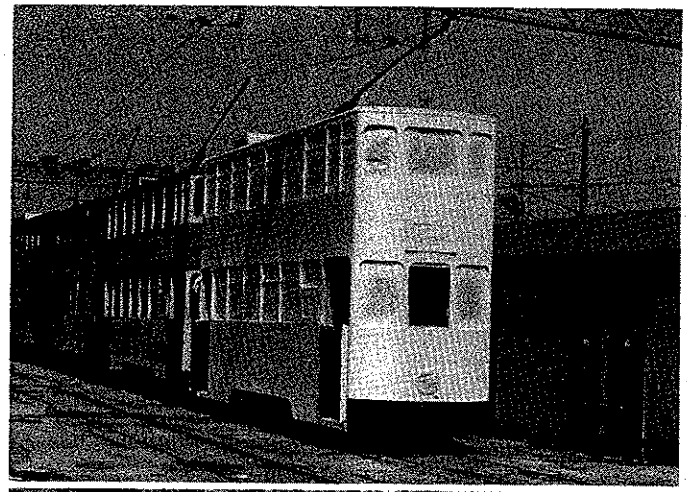
The environmental agitation that had preceded the new depôts did not vanish with their opening. Complaints were received about the brilliance of the depôt lights, whilst the noise of wheel squeal on approach and exit curves inevitably prompted protests. HKT has been particularly anxious to be a good neighbour to nearby residents, and has tried various methods to reduce the wheel squeal problem. The use of oil and various unappetising slurries in the rail grooves soon proved impractical, and the best remedy proved to be water. In thirsty Hong Kong the Water Supplies Department rejected any idea of permanent water fountains, so a mobile water carrier emerged as the preferred solution. HKT intends to purchase two water bowsers on lorry chassis to lubricate the tracks in the early mornings and late evenings.

Water bowsers will take time to acquire, and in the third week of September tram 100, which was due for scrapping, was adapted as a sprinkler car and numbered 201[6]. Five former oil drums replaced upper saloon seats and plumbing led from these to the four wheels of the car and also to the end platforms for manually-assisted sprinkling. This improbable contraption made its first practical test in Sai Wan Ho at 23.00 hrs on 29 September. As it sprayed the track, car 64 pursued it, whilst sound-engineers measured the latter's noise levels. It appeared that there was some improvement, but against an ambient noise of passing lorries and buses, not to mention heavy jets taking off from nearby Kai Tak airport every few minutes, it was really rather difficult to tell.

Car 201 will be scrapped when the rubber-tyred replacement arrives, but autumn 1989 may be remembered as an interlude when

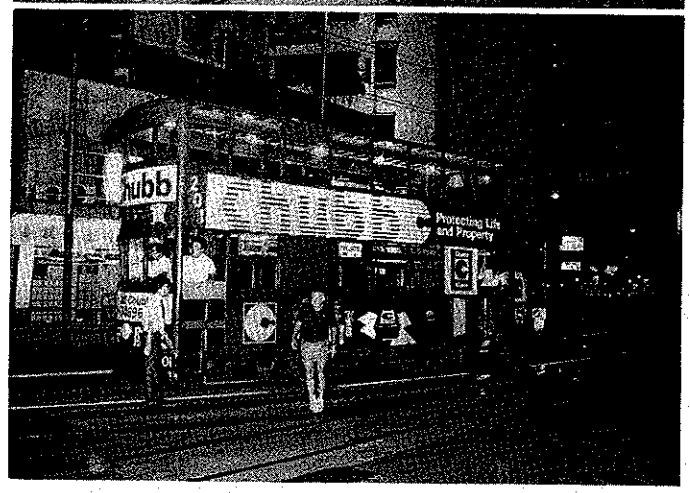
Above: HKT car 134 rumbles over the new junction at the entrance to Sai Wan Ho depôt on 20 August 1989. (T. V. Runnacles

Below: The underframe is all that remains of the old car 117 in the scrapline at Whitty Street depôt on 20 August 1989. Dismantling of car 94 has already begun in the background. (T. V. Runnacles



Above: Undignified by no number and looking like a ghost, a brand new car is masked for spray-painting on 20 August 1989 at Whitty Street depôt. (T. V. Runnacles

Centre: The approaches to the new Whitty Street depôt have provided HKT with its most complex trackwork in the vicinity of Hill Road. Rebodied cars 62 and 8 dance across the new junctions on the same date. (T. V. Runnacles



Below: The temporary sprinkler car 201, formerly 100, on trial in Shau Kei Wan Road near Sai Wan Ho depôt on 29 September 1989. The entry and exit gates have been removed, but the advertising livery remains. (T. V. Runnacles

HKT again had 164 trams (for a new car 100 had already entered service). However, with only 163 trucks, not all vehicles could be operated simultaneously[7].

Patronage growth arrested

Since early 1985 patronage had been steadily increasing, but this trend hesitated in August 1988 and went into reverse by October that year. Results up to September 1989 showed a 3.9% fall in patronage from the equivalent months in 1988. Several factors were to blame, including worsening traffic congestion, labour shortages, tramcar shortages, power failures, a fall in tourist traffic and inclement weather.

Traffic congestion conspicuously increased during 1988-9, especially around Causeway Bay and Happy Valley, where trams became trapped in vehicle tailbacks from the Cross Harbour Tunnel. In total, congestion caused a 12% loss in scheduled vehicle-kilometres. In Hong Kong's buoyant economy, labour shortages are a growing problem, and by early 1989 motormen were 10% short of establishment, causing a further 4% loss of scheduled trips. HKT has recently halved this shortfall by re-recruiting ex-motormen as part-timers. Engineering-staff shortages have also affected tram rebuilding and maintenance, resulting in four trams being out of service at any one time for rebodying, in addition to those sidetracked for routine maintenance. These factors forced prospective passengers to consider other modes, and—as the bus operators were similarly afflicted—many opted for the MTR, which has enjoyed considerable traffic growth.

But if these were chronic problems, others were quite specific to the spring and early summer of 1989. The weather, wetter than in recent years, tempted fewer people outdoors for leisure trips, but most conspicuous of all was a plague of power failures.

During the winter and spring the manually-supervised mercury-arc substations were being replaced by solid-state remote-controlled substations. These ought to have been of great benefit to HKT, as indeed they now are. However, their installation was accompanied by numerous traction current failures, apparently caused by circuit breaker settings that were too sensitive, and some confusion about the identity of earth and negative cables. Unlike the old substations, the new ones are remotely monitored from the Hongkong Electric Company's power station console in Aberdeen. Indirectly, this was the source of the problem as, although a tripped circuit caused by a transient overload would be automatically corrected after a short period, any consequent tripping would leave the breakers open pending investigation. A convoy of trams starting off together would be liable to precipitate a second failure. In total there were 18 service interruptions in March and April, the longest of which idled trams for 149 minutes.

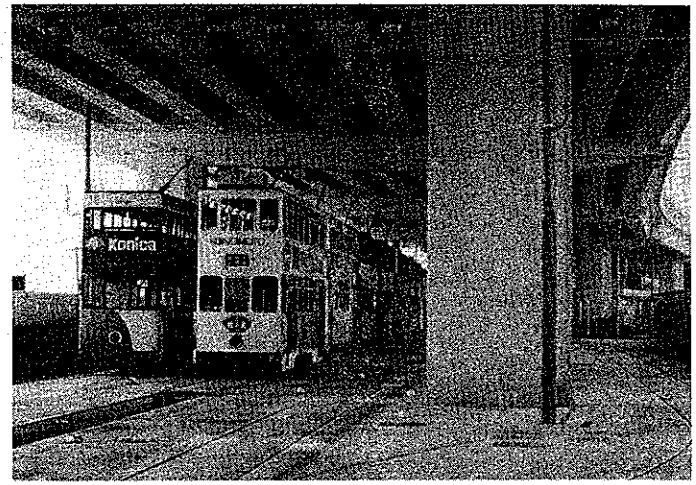
Against the trend of patronage decline, there had been hopes that passengers would support a new morning-peak service introduced between Kennedy Town and Western Market on 4 April. The Central and Western District Board had long been pressing for this service, believing that it would flourish as a dedicated feeder to the MTR's Sheung Wan station. However, most passengers still wanted to ride through to Central and Wan Chai. With 35% load factors it could not last long, and was withdrawn after 12 May, having operated for just six weeks. With its demise the inner tracks on Cleverly Street, installed in 1987 but hitherto hardly used, again fell silent.

Extensions and new cars?

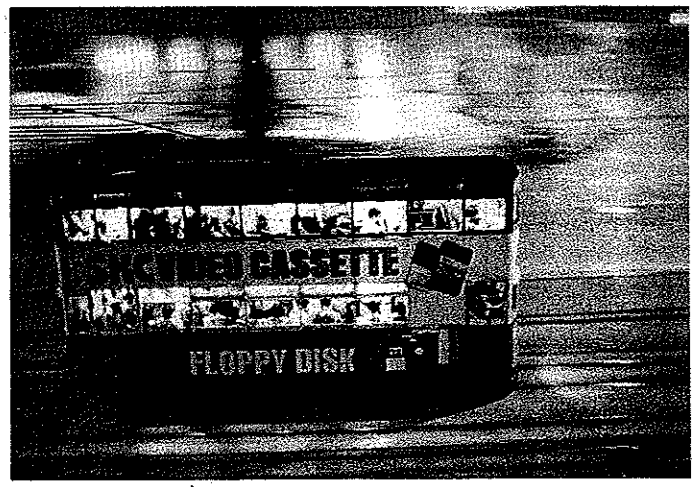
In August 1988 HKT commissioned the MVA Consultancy to undertake a network planning and development study. This was completed in April 1989, and its recommendations are still being considered by the Wharf (Holdings) Ltd Board of Directors. As such, they remain confidential, although it is understood that existing operations were reviewed, and recommendations were made for short and longer term improvements.

HKT still aspires to extend its network to serve three new reclamations now at the planning feasibility stage. The most imminent of these would be an extension to Aldrich Bay near Shau Kei Wan. Although HKT has recently reconfirmed its interest in this line, its planning must be revised as the reclamation is currently is currently being re-examined to accommodate greater population density. The target date for this line is the mid-1990s.

A proposed extension on the Central and Wan Chai reclamation is now conceived as a through route joining the existing line both at Western Market and immediately east of Causeway Bay. This would yield operational and revenue advantages, despite the potentially high cost of structural work at the eastern end to bridge existing roads. Some commentators have suggested that the proposed high quality commercial and residential development could warrant a premium fare service with air-conditioned trams. This route would not be built until around the turn of the century.



Above: An early Sunday morning line-up of trams awaiting calls to duty at Sai Wan Ho depôt on 20 August 1989. (T. V. Runnacles



Below: Carrying a standing load on both decks, unrebodied HKT car 7 hurries east along Queensway at the end of the evening rush-hour on 18 September 1989. (T. V. Runnacles

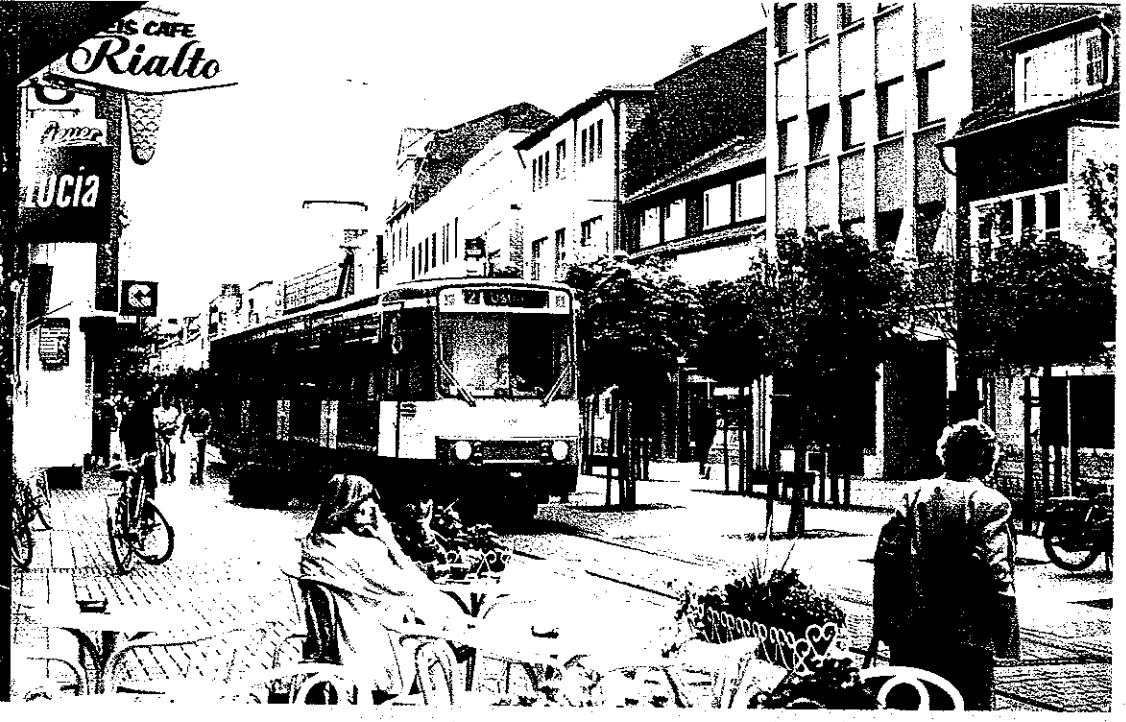
An extension to the proposed Green Island reclamation cannot be delineated as land-use planning has not been finalised. The rôle of any tramway extension would depend in part on whether the MTR Island Line would also be extended to Green Island, and in any case it is unlikely to be built until early next century.

New lines would require additional cars but, even without extensions, CTS-2 has forecast a 25% growth in HKT traffic over the period from 1988 to 2001. Advertising to market HKT's positive attributes could also win more traffic from rival modes[8]. These trends betoken fleet strengthening if HKT is to participate in a growing travel market. In Part 3 it was stated that Wharf (Holdings) Ltd had asked HKT to add 10 more cars in 1989; this report proved to be unfounded but, by the end of 1989, new cars were definitely being considered by both HKT and its parent company.

It would be idle to speculate too much about what form any new cars would take, or how many of them would be built. One option would be more cars of the existing two-axle type; most of the parts could be manufactured locally, although certain electrical and mechanical components might pose procurement problems. On the other hand, a larger bogie car could bring operational and revenue benefits, but only if it could be obtained at reasonable cost. Contemporary tramcars are by no means cheap, and new vehicles built overseas could play havoc with HKT's popular low-fares policy. Current

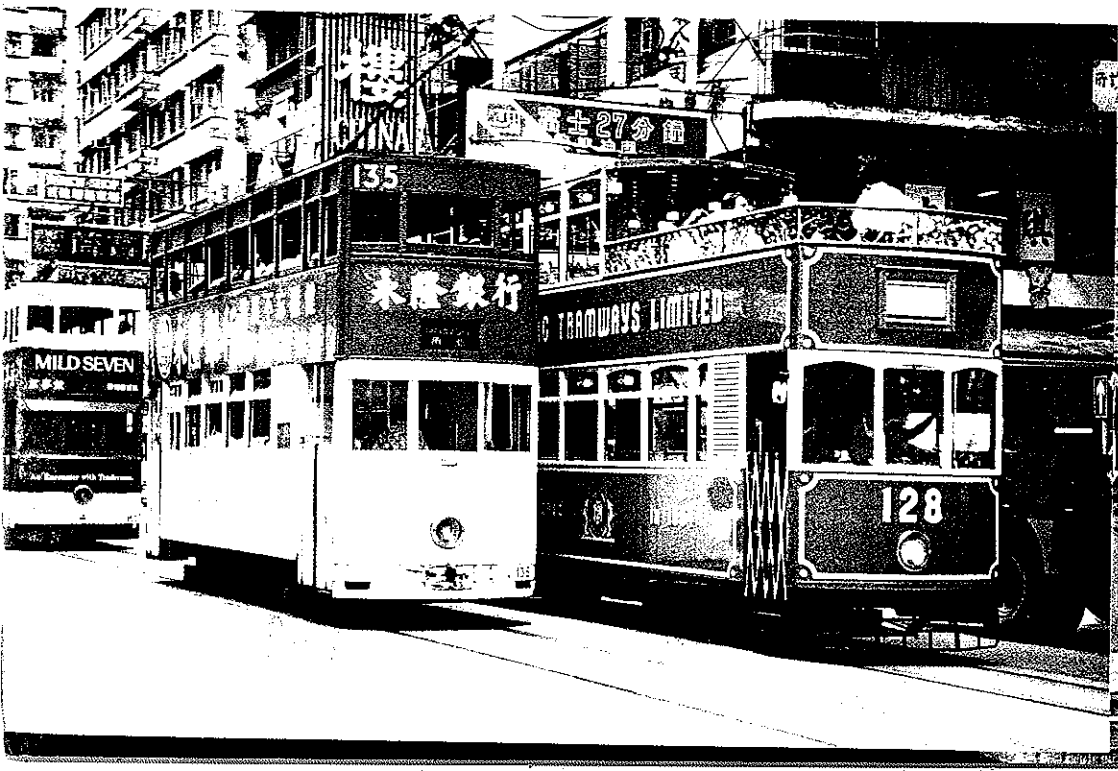
▲ *Above:* Hong Kong's Peak Tramway car 1 nears the upper terminus on 19 April 1988 as a reminder of the pre-modernisation scene. (T. V. Runnacles

Below: HKT semi-open-topper 128 on "dim-sum" duty passes 135 in Johnston Road on 5 May 1988. (T. V. Runnacles ▼



▲ *Above:* Köln *Stadtbahn-B* car 2005 runs past street cafes in the pedestrianised main street of Frechen on 22 August 1986. (W. J. Wyse

Below: Essen *Stadtbahn-B* car 5107 at Gruga Stadion high-platform terminus of standard-gauge route 11 on 1 June 1986. (W. J. Wyse ▼

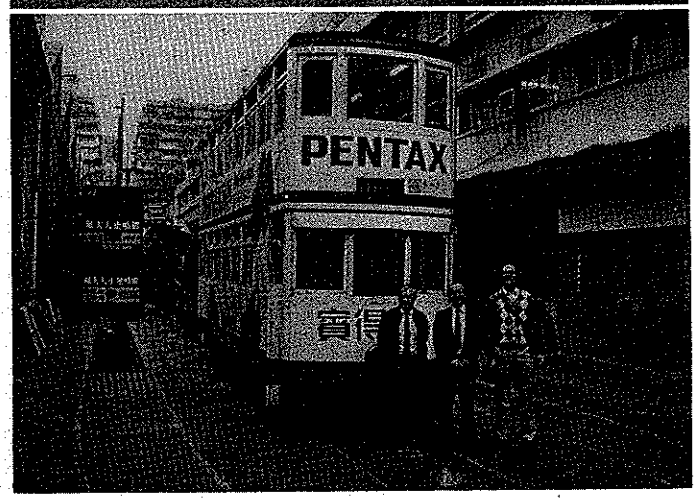


thinking within HKT inclines towards the assembly of a prototype car using secondhand components from abroad. Because of HKT's two-metre vehicle width restriction and preference for double-deckers, no complete tram used elsewhere would be suitable, but the company would certainly welcome offers of secondhand equipment and narrow-gauge bogies from any operators planning to dispose of such hardware.

Farewell to the green cars?

Whatever decisions lie ahead about rolling-stock policy, the present refurbishment programme continues, albeit less quickly than originally planned. By the end of September 1989 just over half the fleet had been rebodied or rebuilt, comprising the two "vintage trams", 15 rebuilt cars and 71 "new" or rebodied cars. At the present rate the programme should be completed in the autumn of 1991.

More noticeable than the steady decline of the traditional trams has been the near extinction of HKT's green livery. By October 1989 only two trams, 86 and 91, still wore green paint, all of the remainder being in advertising schemes, some of eye-catching individuality. It seemed inevitable that the last green cars would disappear within weeks of these words being written, but the traditional livery may not disappear forever, as car 120 may eventually shed its advertising pink and green colours in favour of a basic green paint scheme complemented by individual advertising panels. It still seems likely that 120 will be kept as an operational museum car.



Above: HKT car 80 makes history as it enteres the Sai Wan Ho depôt as the first tram to be stabled there on 28 February 1989.
(T. V. Runnacles

Below: Cars 122 and 113 after being examined on 7 March 1989 for possible export to San Francisco. Standing in front of 113 are (left to right) Ted Wiggins and John Carey of HKT, and Stephen Taber of Market Street Railway Company.
(T. V. Runnacles

Prospects for the preservation of other tram improved during 1989. The Urban Council is preparing covered accommodation at Ho Man Tin for large transport exhibits prior to opening the Lei Yue Mun Transport Museum in the early 1990s. Peak tramcar No 1 is already there, and HKT cars 122 and/or 163 should eventually follow, albeit minus trucks and equipment for quite some time to come. Car 122, together with 113, was also inspected in March 1989 by Stephen Taber on behalf of the Market Street Railway Company, which runs the San Francisco Trolley Festival. Welcome news emerged at the same time that the United States' Assistant Cultural Attaché in Bruxelles had gained agreement for the purchase of an STIB two-axle truck and equipment so that an HKT car could be operated over Muni's standard-gauge tracks. Muni's own staff have established that a double-deck tram can (only just!) gain sufficient vertical clearance to reach the Muni Metro Center workshops over the new J-route extension south of Church Street. With any luck, an HKT car could sometime polish San Francisco's rails. Given this interest in exporting an HKT car to the USA, it seems slightly odd that no approaches have been received to acquire one for preservation in Great Britain. Given the heroic efforts of British preservationists in restoring crippled hulks, it seems strange to observe the scrapping of HKT's British-type double-deck trams at the rate of three a month.

HKT's own pseudo-historic cars, 28 and 128, still grace the rails daily, but the HKD 2 tour service was unfortunately withdrawn in the summer of 1988 after it was found that heavy use was causing premature vehicle dilapidation. Open-balcony car 28 was refurbished after its regular service ceased, and is now used, along with 128, only on private charters and the twice daily tours for "dim sum", lunch and tea.

Two possible rolling-stock developments which have not yet taken place include the provision of transponders and pantographs. It had been intended to operate points by transponders to coincide with the opening of the new depôts but this has been deferred, partly because HKT is examining the scope to make greater use of transponders in vehicle monitoring and service regulation. Any conversion of current collection to pantographs appears to be of low priority, but may accompany any acquisition of bogie cars and the provision of more on-line turnback crossovers.

(to be continued

References

(1) One car has the flangeless wheels on the opposite side to the other so that each car always follows its own path at the passing loop.

(2) The total price had increased by some HKD 10 million from the estimate quoted in Part 1.

(3) This amends the capacity figures given in Part 1.

(4) Transport Department, Hong Kong Government (jointly with Wilbur Smith Associates), "Hong Kong Second Comprehensive Transport Study", May 1989.

(5) In Part 3 this road was prematurely called the "Eastern Expressway". Whereas the Island Eastern Corridor is likely thus to be renamed, this must await the passage of expressway legislation.

(6) The previous works car had been No 200 and was scrapped in 1984. It was a combined grinder, sprinkler and driver-training single-decker.

(7) HKT has obviously discarded trucks over the years, as 174 were in stock when "Hongkong Tramways" was published in 1970. A further 20 trucks perished when the Metal Sections Ltd trailers were scrapped in 1982. With car 201 and the new car 100 running simultaneously it is now obvious that new cars no longer necessarily employ the trucks of their scrapped numbersakes.

(8) HKT intended to start advertising itself on television some weeks after these words were written.

Heritage Column

J. H. PRICE

IF you look at page 11 of the 1980 edition of our book "Tramways of Western Germany", you will find a list of 23 trams preserved by *Stuttgarter Strassenbahn AG*, including cars from Esslingen, END, Feuerbach, Reutlingen and the *Filderbahn*. The reason the Stuttgart collection has not yet featured in this series is that the cars were in store and not on show, but that has changed with effect from 29 April 1989.

Stuttgart's long-term intention is to turn the former Bad Cannstatt depôt (on the Stadion route) into a transport museum some time in the 1990s, located handily near the well-known Daimler-Benz Museum. However, an interim solution has now been found by bringing the best of the historic trams together in Gerlingen depôt, where they will be looked after by a local association, *Stuttgarter Historische Strassenbahnen eV*, (SHB), an arrangement very similar to that at Nürnberg described in our September 1987 issue. Eventually, the metre-gauge tramway to Gerlingen will be replaced by a standard-gauge *Stadtbahn*, and that is when the museum cars will move to Bad Cannstatt.

European funds, has a strong chance of approval by the EC.

It is anticipated that, providing the WMPTE has secured at least an "amber light" for funding by next April, the decision on design and tendering method and contract type will have been taken. During the 1990-1 financial year, this preparatory work will be undertaken, as, in the latter part of this period, will the preparatory works necessary to divert statutory undertakers' services, etc. The construction and supply contracts are expected to be let by 1 April 1991, and public service is expected to commence on part of the line by the end of summer 1993, with completion by mid-1994.

Line 1 is expected to cost around £60 million, and the anticipated initial ridership (based on the very conservative assumptions which have to be taken to satisfy DTp rules) is between 15 000 and 20 000 per day (4.4 M to 5.8 M per annum). The accompanying map shows the location of the line.

Rôle of the PTE(*)

The rôle of the Passenger Transport Executive is that of promoter, performance setter and controller, and owner of the system under the broad policy and financial support of the Passenger Transport Authority.

The PTE is the promoter of the Parliamentary Bills which give it the powers to establish and operate Midland Metro and to obtain the land necessary for that purpose.

It is the task of the Executive to drive forward the system to attainment, raising the finance from the various sources involved, and bringing forward suitable corporate structures to facilitate the involvement, in particular, of private sector finance.

It is also the rôle of the Executive to prescribe what the system is to be like — its technical details, the performance criteria to be achieved, the minimum levels of service to be provided, the stops and stations, the signing, corporate identity and general "look" and aesthetics.

In specifying the system, the Executive will want to achieve standards and an efficiency of operation appropriate to the beginning of the 21st century. The specification will be so drawn up as to make the system as viable and reliable as it can be in operation. The technologies involved will be ones either already proved in public service or exhaustively tested in simulated operation. The specifications may be expected to be demanding but achievable and both to permit and encourage competition. For instance, the light rail vehicle (LRV) or tram will be so specified that a number of manufacturers or suppliers may be expected to compete, but demanding in the sense that the performance and operating efficiency levels expected will break new ground.

An artist's impression of a street scene in Wolverhampton as it might look if a town centre loop is implemented. (WMPTE

The LRV will be of a low-floor design, but tenderers will be expected to achieve this whilst eschewing quirky or gimmicky features like miniature wheels. Some of the otherwise most impressive LRVs belie the label "light rail", and the supplier of the Midland Metro LRV will be expected to supply a vehicle which is lighter in weight and more efficient in operation than some of those which currently masquerade as "light".

It seems likely, certainly for the first line, that Government grant conditions will preclude the Executive from directly operating the Metro system, though that course of action would be the first preference of the Executive and, probably, of the Passenger Transport Authority. Instead of direct operation, the Executive may let by open competition an operating concession for a period of years. The Executive may seek a minority interest in the corporate arrangements so as to be able to influence the operator's decision-making on behalf of passengers.

Once each route is constructed, the Executive will closely and continuously monitor the performance of the operator to ensure that the performance specified in the contract is actually achieved.

There may be expected to be penalty provisions for poor performance, and provisions by which the operating concession reverts to the Executive in the event of persistent breach of the operating contract.

Acknowledgement

After most of this article had been written, a paper by R. J. Tarr, Director-General of the WMPTE, entitled "Midland Metro: Taking the Midlands into the 21st Century" was presented to the "Light Rail 89" Conference, held in Bristol on 14-16 November. It contained so much more additional and new information that excerpts from it have been taken, almost verbatim, and used to replace and enhance sections of the original article. These sections have been indicated by (*) in the headings and are reproduced by permission of Mr Tarr and the PTE, to whom they are gratefully acknowledged.

(to be continued

Tramway developments in Hong Kong

1963

T. V. RUNNACLES

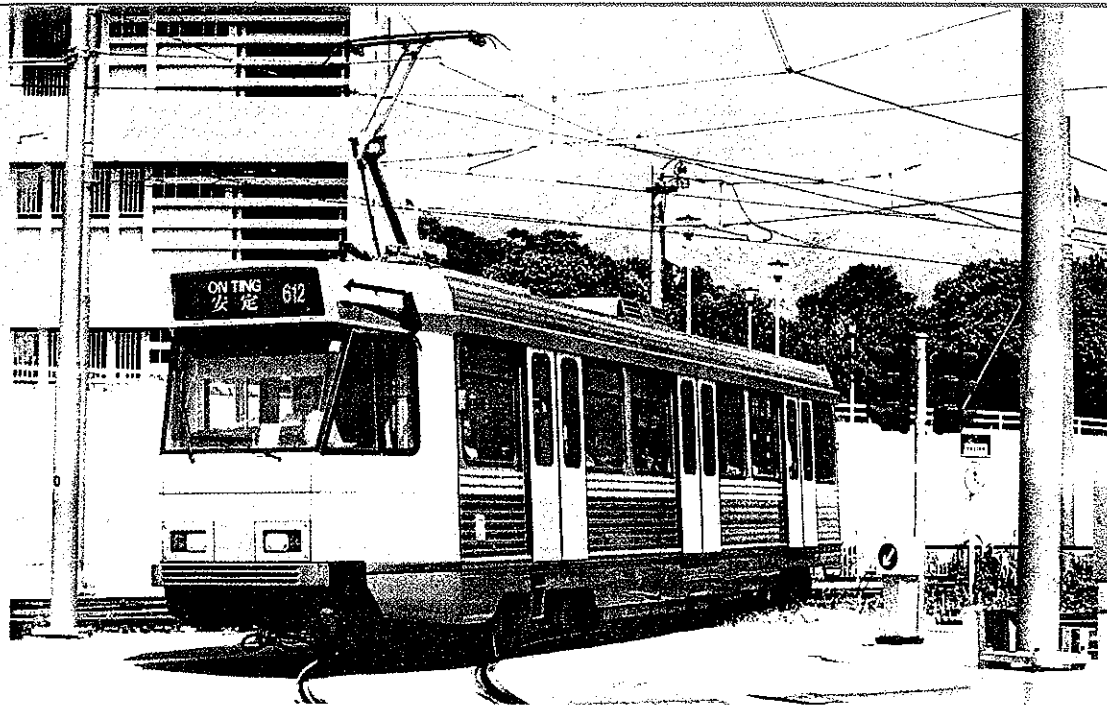
Part 8: Into the Year of the Snake (North West Railway)

The Tuen Mun—Yuen Long LRT system

AFTER its painful birth, the LRT system has come to enjoy less hostile press exposure. Even so it has not managed to escape unfavourable comments entirely; these have been mainly about senior personnel movements and a recent proposed fares increase. More positively, patronage has risen to make the LRT already the world's busiest second-generation tramway system, although traffic is still below expectations.

Complaints about accidents still preoccupied the local press until the end of 1988, although growing familiarity with the system and various remedial measures ensured that the incidence and severity of accidents progressibly decreased. The remaining areas of concern primarily relate to shunt-collisions between trams at stops and door-closing incidents. The former is being tackled by additional driver-training, whilst the latter may require audible warnings to users that the car doors are about to close.

Accident rates in terms of "reportable incidents" fell from 20 in December 1988 to 12 in June 1989: expressed differently, these amounted to one every 20 000 vehicle-kilometres and one every 39 167 vehicle-kilometres respectively. However, the public interest in accident statistics waned in early 1989 largely because a different LRT story grabbed the headlines. In January the press

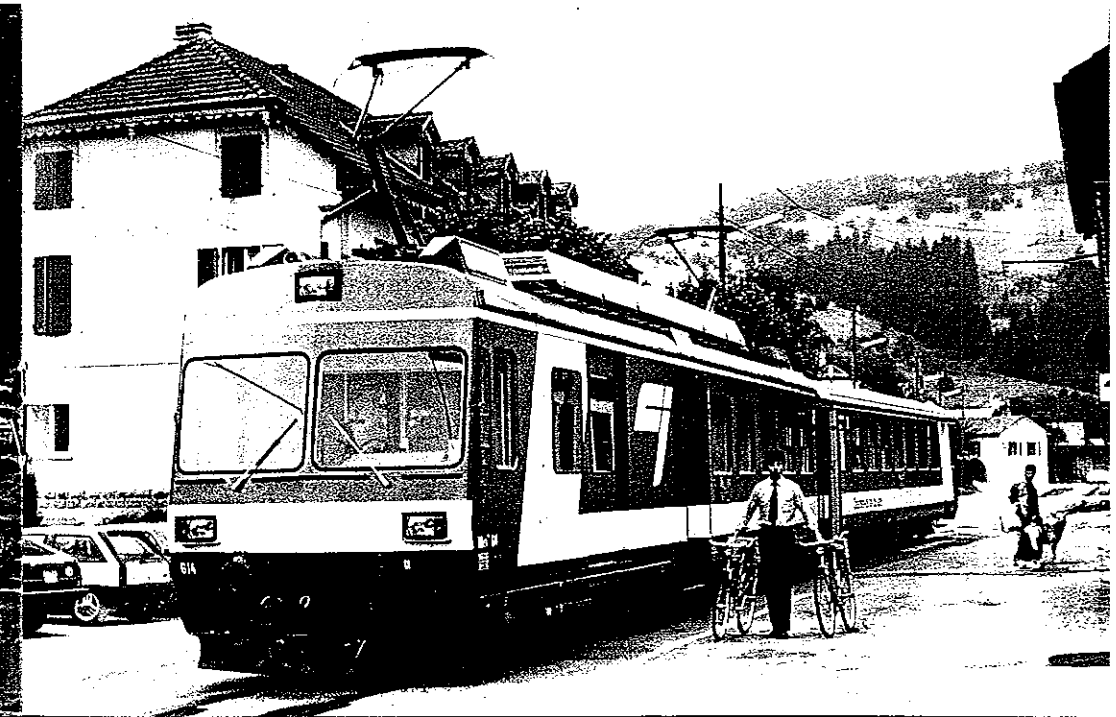


▲ *Above:* Tuen Mun LRT car 1054 crosses the road south of Kei Lun on 9 September 1989. (T. V. Runnacles

Below: Tuen Mun LRT car 1039 on a quiet stretch of street track in Yau Oi Estate on 19 August 1989. (T. V. Runnacles ▼

▲ *Above:* Light rail modernisation in Swiss Canton Vaud meant new cars for Nyon—St Cergue, seen here at St Cergue in July 1987. (W. J. Wyse

Below: The only light rail system in Swiss Canton Jura, the CJ has received new rolling stock. The driver unloads bicycles from 614 and a control trailer at Glovelier in July 1987. (W. J. Wyse ▼



discovered that the LRT director, Joe Wade, had left the KCRC to the accompaniment of an appreciable *ex-gratia* payment. As the heavy-rail director had simultaneously left with a similar payment, the story was pursued with unrelenting vigour until April and even beyond. The press and its public relished talk of KCRC Board leaks, and speculation about feuds within the Board and between the Corporation and its sole-owner, the Hong Kong Government. Whatever may have been the circumstances of the case, it did little to enhance the LRT's image. As for Joe Wade's departure, few thinking people would deny his tremendous achievement in overseeing the system's transition from drawing board to operation, but apparently he was the chosen scapegoat for the system's initial public disapproval. Mr Wade was replaced from within the KCRC by Jonathan Yu Hoy-gin; as a Cantonese-speaker, it was hoped that Mr Yu would be more easily identified by his customers as "their own man".

Patronage fails to impress

When the LRT system opened there was evidence of considerable novelty-riding, but this soon subsided, resulting in an estimated average daily patronage of 153 448 trips for all operational days in 1988. In the first seven months of 1989 patronage crept-up to 159 679 boardings daily, but this concealed a rather sudden growth in July to 184 000 daily boardings. The start of a new school term in September saw a further surge, and the busiest day that month saw 213 000 passengers using the LRT. Of all the systems built since the light rail revival began over a decade ago, only Manila carries more passengers than Tuen Mun, although operationally Manila is more akin to a metro than a tramway.

The HKD 5 stamp depicting a Tuen Mun car (incorrectly numbered 104!) which was issued as part of the "Building for the future" series on 5 October 1989.

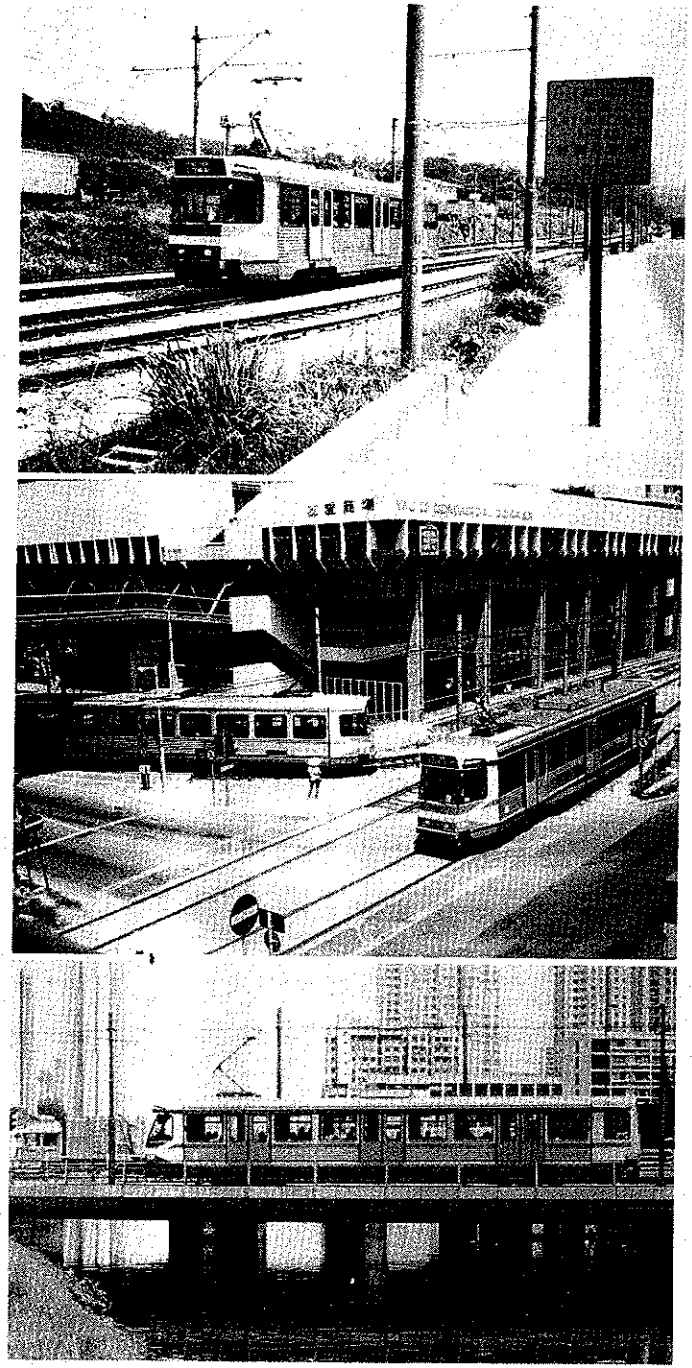
But the KCRC has not been rejoicing over the LRT's relative popularity. When the Corporation took the project on in 1984, it was predicted that patronage would have reached 350 000 daily trips by 1989, and even the more conservative predictions of the 1987 Regional Links Study[9] had still expected 278 000 boardings daily in 1988. The reasons for the patronage shortfall have been assessed, and appear to comprise:

- competition from taxis, minibuses and private buses;
- population shortfalls; and
- unexpected population distribution problems.

In terms of market share the LRT carried only 47% of local trips in June, or 56% when taken together with its feeder buses. Taxis still carried a surprising 21%, reflecting their low fares and much shared-riding. Private buses, run by factories and schools, still carried over 9% of riders, and the other travellers were still using minibuses. In part the popularity of these modes reflected population distribution, especially in Tuen Mun, where many people continued to live in the south and east of the town as yet unserved by the LRT. By contrast, in the north and west the trams called at housing blocks which were still partly unoccupied. Apart from delays in the public housing programme, many private home-buyers acquired flats for speculation rather than for residence, so these properties were not producing trips on the light railway. These problems will no doubt correct themselves over time, although the high proportion of commuting-out by KMB buses to Kowloon is likely to persist for many years. This is because, in Hong Kong's tight labour market, workers will generally prefer higher-paid jobs in the metropolitan area to the restricted choice of lower-paid opportunities in Tuen Mun and Yuen Long.

Extensions reviewed

The relative shortfall in customers had inevitable revenue consequences, and the KCRC's Annual Report for 1988[10] revealed that the LRT system had accrued an accumulated loss of HKD 82 million by 31 December 1988. After deducting depreciation charges, operating costs exceeded revenue by HKD 47 million. Farebox receipts were meeting only 39% of operating costs, and losses in 1988 were running at nearly HKD 448 000 a day, although by the autumn of 1989 these losses had diminished to about HKD 60 000 daily. The sale of the Pierhead Gardens development had brought a once-for-all



Above: Signs of the times: motorists are warned of the tracks crossing the road outside the depôt in Tuen Mun whilst car 1061 heads south. All three photographs were taken on 19 August 1989. (T. V. Runnacles

Centre: Tuen Mun displays its character as a tramway town as car 1054 approaches the On Ting turning loop, whilst 1053 turns into the main line from Yau Oi. (T. V. Runnacles

Below: Tram 1011 crosses the Tuen Mun Nullah. (T. V. Runnacles

income of HKD 238 million, but this could not be used to offset operational deficits.

In Hong Kong, for a public transport system to lose money is almost unknown, and the KCRC immediately set about reviewing expansion plans for the system. On 24 July the KCRC Board approved three extensions within Tuen Mun, comprising:

- *Link 1:* Ferry Pier to Yau Oi;
- *Link 2:* Yau Oi to Sam Shing; and
- *Link 3:* Tuen Mun Northeast (Pui To Road to Siu Hong)

The Government has already made much progress in preparing the alignments of links 1 and 2, and the KCRC was expected to call for tenders for the permanent way, electrification and stops in early 1990. It is anticipated that links 1 and 2 will open in October 1991, with link 3 following in December. These dates reflect slippages of 10 to 16 months on the schedule previously recommended. Nevertheless, these three links would bring advantages through more logical routeing, and should improve the LRT's financial viability.

After these three authorised links, the next route to open is now likely to be the connexion between Pui To Road and Sam Shing via the Castle Peak Road, which may open in 1994. On the other hand, the KCRC would like to construct the Yuen Long northern bypass line as soon as possible, not only because it would serve the large Long Ping housing estate, but also because of platform congestion on the existing route along Yuen Long's main street. However, although this route was originally recommended for December 1991, opening will probably have to wait until 1995 because a road flyover is planned at the western junction. The KCRC hopes to convince Government to advance the flyover so as to open the LRT route sooner.

Much less certain are the routes southeast of Sam Shing to So Kwun Wat in Tuen Mun and to Tin Shui Wai. The So Kwun Wat line has no definite date, and will be built only if and when demand warrants it. The route to the new town of Tin Shui Wai seems certain to slip well beyond the June 1992 date originally recommended for its first section. Expected delays in the town's population build-up and the present LRT losses are conspiring to defer the Tin Shui Wai link, and possibly to reduce its scope. The town will initially be served by feeder buses and, even when the light railway is built, it will probably be left as a simple spur rather than as a loop around the town.

Urban link still undecided

The so-called "Urban Link" route to connect the LRT system to the metropolitan area was examined in CTS-2, which recommended that it should be built in the early 1990s, although further detailed study is required. CTS-2 examined four options, comprising routes from Tsuen Wan MTR terminus to either Tuen Mun or Yuen Long, operated either as MTR or LRT services. Although no positive recommendation was made, the preference was for an MTR extension to Yuen Long. The peak hour loadings would tax even four-car LRT trains, although they would be well within the capacity of the MTR. CTS-2 vaguely suggested some form of intermediate capacity train, but neither this nor an LRT link would attract as many passengers as an MTR extension if fares were to be charged separately between Tsuen Wan and Yuen Long.

So far the options are still open, although a KCRC executive said in May 1989 that it would be "silly" to build a light rail (rather then a heavy-rail) link from the North-west territories to Tsuen Wan[11]. In so remarking he was reflecting a contemporary hope that interurban passenger service might be provided over part of a second KCRC heavy-rail line from the Chinese border to the container port. The same consideration caused the LRT division's idea of extending the LRT from Yuen Long to Man Kam To to be shelved. But circumstances can change quickly in Hong Kong's dynamic planning environment. There is now little early prospect of a second KCR heavy-rail line to the container port. The existing container port is too spread-out to nourish a railway, and rail-freight containerisation is virtually unknown in China. The best hope for any rail connexion to maritime cargo facilities would be in relation to a new port in the western harbour, which is planned for the first decade of the 21st century. No decision is likely to be made about this railway yet, and it is unlikely to materialise before 2006.

But it is the airport, rather than the port, that may have the greatest bearing on the urban link debate. In mid-October, the Governor of Hong Kong announced that Kai Tak Airport in Kowloon would be replaced in 1997 by a new airport at Chep Lap Kok on the north coast of Lantau, directly opposite Tuen Mun. This would be served by a new railway to Kowloon and Hong Kong Island. A rail link from Yuen Long or Tuen Mun would be likely to connect with this new railway to avoid overloading the Tsuen Wan MTR line. It could be speculated that the airport railway could even serve the North-west New Territories by a branch line, but the strategy will no doubt become much clearer when a Government-commissioned railway development study is completed in the second half of 1990.

Above: The density of development in Tuen Mun shows up well in this view of cars 1058 and 1009 passing in Pui To Road.
(T. V. Runnacles

Centre: Car 1019 on the turning loop at Leung Tin stop whilst working the new route 507.
(T. V. Runnacles

Below: The light rail flyover for the Tuen Mun Northeast link was taking shape south of Siu Hong stop. All three photographs were taken on 19 August 1989.
(T. V. Runnacles

LRV options simplified

In Part 6, an account was given of certain options for LRT fleet expansion. With patronage less than predicted, some extensions deferred and the use of light rail equipment on the urban link in doubt, the rolling stock picture has become much simpler. Future cars will be virtually the same as the existing trams, and there will be no major short-term fleet expansion. The three authorised extensions will actually save rolling stock although, to cope with patronage growth, the KCRC expects to invite tenders for six to eight cars early in 1990 for delivery in 1992, and similar orders may follow, in line with further growth. The KCRC would like to retain the existing specifications, so double-sided cars or cars with rear-end cabs seem to be forgotten now. The only major change in the specification is likely to be the provision of full-height offside and/or rear-end emergency exit doors in response to a new Transport Department requirement.

The existing cars have proven to be very reliable, apart from a few lighting and air-conditioning failures which have now been overcome. Experience has shown that the crush-capacity of the trams is 220 passengers rather than the design figure of 190. Three cars have had 16 seats removed, raising their crush capacity to 240, but this experiment will not be extended to the whole fleet because of doubts about the ability to satisfactorily air-condition the additional payload. In response to passenger complaints, more hand-grabs have been provided for standees.

All cars are now equipped with couplers, but multiple-unit operation is still comparatively rare because the KCRC is concerned to improve the frequency of trams before increasing the capacity of each departure. During the 1989 school summer holidays no multiple-unit trains were running at all, but several were assigned to Yuen Long services with the start of the autumn term.

Energy saving has proven to be exceptionally good with the Comeng-built cars. On the longer routes to Yuen Long, regenerative braking has effected a 47% energy saving, whilst even the Tuen Mun local services are contributing 27%.

Services

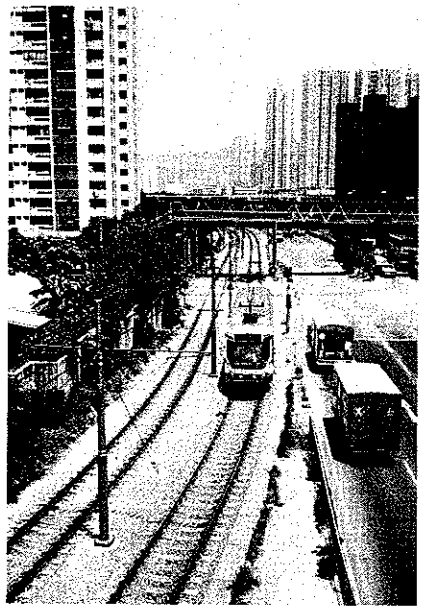
The year has seen a steady increase in the number of car-km operated, rising from 400 000 in December 1988 to 470 000 km in June 1989. Tram speeds are also increasing with greater familiarity and confidence, and 10% has been cut from the journey times of the Yuen Long routes.

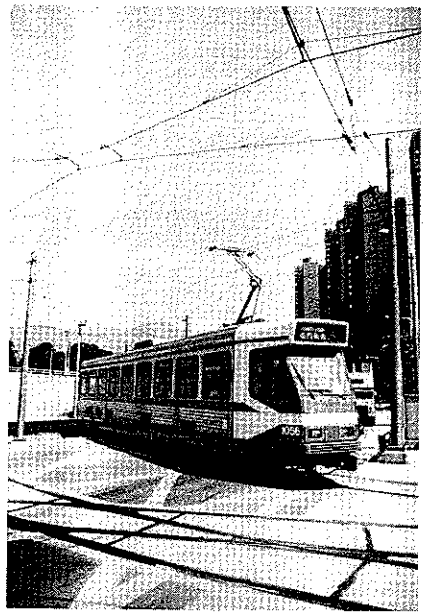
On 3 June, route 507 was introduced between Leung Tin and On Ting. This was one of the two services deferred when the system was inaugurated in 1988. The other missing service, the 512, is unlikely to be introduced at all. Another service number now appears on destination blinds after 20.00 hrs when route 511 (Ferry Pier to Siu Hong) replaces the 611 to Yuen Long; Yuen Long passengers can change at Siu Hong to the 610 and 612 services. Looking further ahead, route 611 will be renumbered 613 and diverted via the Ferry Pier-Yau Oi link in October 1991; in December 1991 it will be further re-routed via the Northeast Link.

Revenue

Before the LRT opened there was much scepticism about the ability of a self-service fare system to function efficiently in Hong Kong. It was expected that there would be widespread fare evasion, and an all-day survey was conducted to determine the scale of this problem during July 1989. It was found that 4400 passengers had no ticket to show, indicating a 2% fare evasion rate. Given Hong Kong's reputation for "sharp practice", this would appear to be commendably low. Nonetheless, surveillance has been increased, and uniformed ticket inspectors now operate in teams of five at a time.

Two schoolgirls cross the tracks whilst car 1061 loads at Tai Tong Road stop in Yuen Long on 24 April 1989. (T. V. Runnacles





Above: Car 1019 heads south towards the On Ting stop on 19 August 1989. (T. V. Runnacles

Below: Tram 1056 turns across the road to head east at the junction south of Kei Lun in northwestern Tuen Mun on 9 September 1989. (T. V. Runnacles

With the system suffering operating losses, it was inevitable that fares would have to increase. In July the KCRC Board approved a fare increase averaging 25% for LRT services. This was hardly unreasonable because KMB bus fares had increased earlier in the year to the point where average LRT fares were 10% lower than equivalent bus fares would have been. All along it had been intended that LRT fares would be up to 30% higher than prevailing bus fares to reflect the better quality of service.

Of course, the public did not see the situation so sympathetically, and protests soon came from district boards and individuals complaining that the standard of service was so poor that no increase was justified. These criticisms may have influenced Government's Executive Council, because it was reported at the end of August that the proposal to raise fares had been referred back to the KCRC[12]. As a result, the increases scheduled for 1 October have been deferred until 1 January 1990, with the promise of a 15-month fares freeze after that[13]. As such, expectations that the LRT would break even by 1992 have now receded to 1993.

Marketing and public relations

Fares are closely related to marketing and public relations, and the criticisms raised over the proposed fare increase suggested that the LRT still had to win the hearts and minds of its users. However, the management is certainly now trying quite hard. Perhaps the principal target is to market the monthly tickets more successfully. Only 30% of passengers use monthly tickets, whereas the KCRC would like to see this fraction rise to 60%. To tempt people to buy monthly tickets, a deeper discount will be offered after the fare increase, and more zones will be offered to users at weekends. A three-month "pass" will be introduced for schoolchildren, and this will also be valid during school holidays, whilst deals are being struck with department stores to offer discounts to monthly season-ticket holders in an effort to encourage evening shopping. All of these measures are seen by the LRT management as ways of giving better value for money.

Other aspects of public relations aim to make the LRT more central to community life, and depôt tours are frequently offered to interested residents' organisations. Information packs are issued, and even tourists are not forgotten, as one pamphlet gives advice on places of interest that may be reached by the light railway.

Private hires are still rare on the LRT, but a notable example occurred on 18 March when KCRC employee Herbert Ho chartered a tram to convey his bride, Irene Cheung, and wedding guests for a mobile wedding reception.

A second tram was named on 18 September when car 1070 was named "F. D. Snell" in honour of Dudley Snell, the well-known tramway advocate and former General Manager of Melbourne's trams and buses, who died in December 1988 whilst working as project manager for the Leighton-MTA Consortium which built the light railway[14]. In a touching ceremony, Mrs Joan Snell was invited from Australia to attend the naming in honour of her late husband.

As if to affirm the light railway's place in society, an HKD 5 stamp was issued on 5 October 1989 depicting a Tuen Mun tram.

Impressions one year on

It was no coincidence that the naming of car 1070 happened a year to the day after public service began. Despite public grumbles about the light railway (a fate it shares with all other modes of transport in Hong Kong), many cities could envy such a splendid system with its frequent trams and heavy patronage. The most abiding impression today is how the system fits the environment as if it had always been there. A year ago everything looked shiny and new, but in Hong Kong the climate and air-pollution conspire to "weather" the environment very quickly. The cars still glitter in the harsh sunlight, but once-pristine ballast is now coated with a patina of oxide dust and grime, whilst some traction poles are already black with exhaust soot and dirt. Far from implying that this indicates a lack of maintenance, it contributes greatly to the image of a busy system doing a good job.

(to be continued

References

[9] See reference (2) in Part 6.

[10] Kowloon Canton Railway Corporation, "Annual Report for 1988", Hong Kong, 1989.

[11] Hongkong Standard, "Heavy rail link urged for NT", 27 May 1989.

[12] Hongkong Standard, "ExCo knocks back LRT's fare rise plan", 30 August 1989.

[13] South China Morning Post, "Rise in LRT fares frozen for 15 months", 6 October 1989.

[14] Dudley Snell was one of several key figures who are no longer alive to witness their achievements. Others include the late Richard Butler who, as Principal Assistant Secretary for the Environment, chaired the initial light rail negotiating team in 1979; the late Stanley Barden who, as Project Manager for Tuen Mun, agreed to the light rail strategy and oversaw the provision of its track reserves; and the late Martin Garrett, Government's first Chief Engineer/Light Rail Transit.

Museum News

Dudley (GB). The Black Country Museum has imported three more 21E trucks from Porto, thus allowing complete Porto trams 161 and 176 to be offered for resale. The trucks will be used under Wolverhampton 49 and Wolverhampton District 34 or 102. The body of a Preston-built open-top car of Dudley & Stourbridge series 23-28 of 1901 has also been acquired. (J. H. Price, J. S. Webb

National Tramway Museum (GB). Training of Gateshead Garden Festival tramway staff commenced in September last year and Sunderland 100 now in British Steel blue and white left Crich for Gateshead on 12 December. Depature of the three cars for Gateshead (5, 100, 102) will allow work to recommence on Liverpool 869. 1990 opening dates at Crich are Saturdays, Sundays and Bank Holidays 31 March to 28 October, daily except Fridays from 7 May to 27 September, and every day 7-22 April, 26 May to 8 June, 18 July to 3 September and 20-28 October. (J. H. Price, TMS

Neath (GB). Restoration of the gas tram has been completed but the Borough Council has been unable to find a permanent home for its display following the breakdown of negotiations with the developer of the town centre Fairfield scheme. Further efforts are to be made to find a suitable local home.
(P. Trotter, 'South Wales Evening Post'

Antwerpen (BE). Additions to Edegem museum since our July 1983 article include Antwerpen 200, 550, 601 and 8821; NMVB 9785, 10298 and 19580, steam loco 1000 with trailer A1209 and some buses, filling all available space. (M. J. Russell

Liège (BE). Since our November 1986 article, Natalis museum has added *Tramways Est — Ouest* 43 and horse car 132 from Woluwe, plus TULE 193 and trolleybus 432, *Tramway Liègoise* horse car 11, a horse-drawn tower wagon and three buses.
(M. J. Russell

Edmonton (CA). Ex-Hannover *Stadtbahn* car 601 ran under its own power for the first time in 14 years on 21 October, being confined to a short section of straight track at the Fort Edmonton museum, since the overhead is not suitable for pantograph operation.
(J. A. Kernahan

Nelson (CA). Plans to construct a heritage tramway in this rather small resort town in south-east British Columbia will now come to fruition thanks to grants approaching CAD 1 million. In phase 1, about 1 km will run from Lakeside Park along the shore of Kootenay Lake; later the line will be extended in to the city centre along Baker St. Car 23 will be restored to operating condition using replica Brill 276 trucks built at Fort Edmonton. Toronto PCC 4504, acquired last year, is in open storage and will be used as a source of parts to be traded. It is hoped that the first part of the line will open this summer. (S. J. Morgan

Victoria (CA). Porto 167 is being restored at Garbolli Rd bus garage for static display, and will be joined by

Birney car 400 from the BC Museum of Transportation at Cloverdale. When 167 is finished, its place in the restoration area will be taken by one of the BC Electric cars (1220 or 1231, St Louis 1913), BC Transit has also acquired a third ex-BC Electric interurban-type tram, self-built wooden-bodied 1207 of 1905, as a long-term restoration project. A heritage line is still a possibility, but not before 1991. (S. J. Morgan

Cincinnati (US). 1923 tram 2435 has been restored for display at a museum in the Union terminal, due to open in 1991. ('Enquirer'

Frederick (US). The Frederick Trolley Committee, which owns the bodies of city car 62 and Hagerstown and Frederick interurban car 171, has acquired Philadelphia PCC 2103 for its proposed East Street heritage tramway. (H. Luff

Kennebunkport (US). Recent additions to the Seashore Trolley Museum are CSS&SB 32 of 1929, and New York subway car 800 of 1934. Operation of high-platform rapid transit cars enables the museum to cater for wheelchair passengers. The publisher McGraw-Hill has donated its bound volumes of "Street Railway Journal" and "Electric Railway Journal". (Seashore

Portland (US). Hong Kong 12 has arrived from Cloverdale (BC) museum for display at Montgomery Park retail centre at the junction of NW 27th Avenue and Vaughan Street in north-west Portland, Porto 178 (mysteriously renumbered 819 when it was repainted in 1985) is also at this location. (S. J. Morgan

Rockhill Furnace (US). The Rockhill Trolley Museum (previously Shade Gap Electric Railway) has restored York Railways 163, a 1924 Brill curved-side car, now on Brill 77E1 bogies obtained from the Nankai tramway at Osaka, Japan. (A. Martlew

Reviews

The Tramways of Brazil — a 130-year survey, *by Allen Morrison. 200 pages, 270 x 215 mm, 258 photographs, 49 maps. Published by the author in New York; US distributor Harold E. Cox, 80 Virginia Terrace, Forty Fort, PA 18704; available in Europe from LRTA Publications, 13A The Precinct, Broxbourne, Herts EN10 7HY, price £15. ISBN 0-9622348-1-8.*

This book is an extraordinary achievement, an English-language Brazilian equivalent of "Great British Tramway Networks", the kind of book that appears only once in a decade. The author made the acquaintance of Charles J. Dunlop, formes secretary of the Rio de Janeiro Tramway, Light & Power Company, and was evidently so fascinated by what he thus learned about Brazilian tramways that he decided to complete the story and publish it as a book. The task has taken ten years of travel and research, plus learning Portuguese. Brazil has had 100 tramways, 48 of them electric, and most of them bought their cars in the USA, with smaller numbers from England, Belgium and Germany. In later years these were joined by secondhand cars from various North American tramways, including New York, Staten Island, Brockton, Baltimore, Boston, Miami, Providence, Worcester and York, some of which survive today in parks and playgrounds. There was also much trading in secondhand trams within Brazil, which must have been even harder to trace. Everything about this book — corporate histories, photo-coverage, maps, bibliography — is impressive, and in the academic world would certainly qualify the author for a PhD or equivalent. British readers will be frequently reminded of Portugal, especially with the open cars of Sintra which were the most commonly-used type in Brazil. There is plenty of tramway folklore, such as the tram which would stop for ladies only (men could jump on as it passed) and a few tragedies, such as that in which a funeral tram ran away down a hill "causing additional fatalities", and so incensing the population that the system never reopened. (J.H.P.

Light Rail Review 1, *edited by Michael Taplin and Peter Fox. 64 pages A4 portrait, 95 illustrations (35 in colour), laminated cover, perfect bound. Published November 1989 jointly by LRTA Publications, 13A The Precinct, Broxbourne, Herts EN10 7HY (Girobank 592 3050) and Platform 5 Publishing Ltd, Lydgate House, Lydgate Lane, Sheffield S10 5FH, price £5.95 (by post £6.55 UK or £6.85 overseas). ISBN 1-872524-00-1.*

When reviewing one's own organisation's books, detailed description is better than "hype". The aim of "Light Rail Review 1" (like its thinner predecessor "Light Rail '87") is to present the current state-of-the-art in respect of Light Rail in the UK, with foreign comparisons where appropriate. It has appeared just as the UK LRT industry is poised to take off, and is so up-to-date that it records the UK government's 50% grant of 24 October to Manchester Metrolink in a book published on 14 November. An introduction by Dr Tony Ridley is followed by good articles on West Midlands Metro, LRT funding, Avon Metro, South Yorkshire, Manchester Metro, other UK proposals, low-floor LRVs, Karlsruhe, and LRT safety regulations, interspersed with two photo features (USA in black/white, and worldwide in colour) and followed by a current world list of LRT systems and a 60-year retrospect. The nine maps include the proposals for Avon, Croydon and Nottingham, and the paper by David Holt brings out clearly how Manchester, ahead of the field, will establish a whole range of precedents and is taking great care to get it right.

Even the advertisements are worth a mention, with informative displays by Alsthom-GEC, BR Research, Fairclough, LT International, Minet and Mowlem. Docklands is neatly described as a "this or nothing" system from which lessons are now being learned, but the treatment of commercial funding would have been helped by examples from Oslo, where property developers have been funding light rail or metro lines for some 80 years. A thoughtful editorial makes a plea for the type of transport funding employed in France *(versement transport /* payroll tax) or in West Germany and the USA (fuel tax), both of which are surely a better way than the plea for government transport funds made by the Lord Mayor of London at his inaugural banquet on 13 November, on the ground that the city helps our balance of payments. Someone should send him a copy of "Light Rail Review" — with an invoice. (J.H.P.

Tramway Review 138 (Summer 1989), *edited by R. J. S. Wiseman. 32 pages 215 x 140 mm, 12 photographs and one double-page map. Published by the Light Rail Transit Association and obtainable from LRTA Publications, 13A The Precinct, Broxbourne, Herts EN10 7HY or from Girobank account 592 3050. price £1.15. ISSN 0041-1019.*

The leading article is a description of the Manchester Corporation Tramways in Chorlton-cum-Hardy, three miles to the west of the city, by A. K. Kirby. It describes the economic and tramway development of the area and is supported by photographs at widely-separated dates. This article and map take up the greater part of the issue, leaving room for only a single-page article by Alan A. Jackson on "A little-known London tramway", built to run from the theatre entrance to the Royal Box at the London Coliseum theatre in 1903. It carried royalty once, and then failed! There are the usual letters and Information Bureau. (G.E.B.