

Photograph album of buses, trolley buses and trams



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Title page: Modern 2022 all-electric, right to left LG72 DVN, LG72 DWX and LG72 DUJ BYD D8UR-DD ADL Enviro400EV buses at the Coventry Pool Meadow Terminus on the 6th June 2024.

ABOUT THE AUTHOR

Michael Pierre de Villiers was born in Durban, South Africa. He was trained to World Meteorological Organization class one meteorologist and multi-discipline weather forecaster in the South African Weather Service where he reached the rank of Director. He served on a weather ship in the South Atlantic. He served on World Meteorological Organization expert teams and was World Meteorological Organization rapporteur for the Africa region. He was also a commercial pilot and flying instructor. More recently he was a weather forecaster in the United Arab Emirates, then in England. Now retired.

M. P. de Villiers
PhD MSc MDip (FRMetS CMet retired)
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Photograph album of buses, coaches, trolley buses and trams

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INTRODUCTION

This article is primarily about motor buses and a lesser number of coaches that the author has photographed. The word motor can be defined as a moving power, force or agency that sets machinery in motion or imparting motion. With regard to buses presented here, this includes internal combustion engines, hybrid internal-combustion, more recently electric engines/motors and now modern all electric motors. There is a smaller section on trolley busses and finally trams, which became bigger than expected.

The modern trend to talk of a drivetrain rather than an engine and transmission rather than a gearbox. The trend toward all electric battery power and electric drive motors, drivetrain is understandably more descriptive. However, while still fuelled by diesel (or petrol) the author believes engine is more appropriate.

The author is particularly indebted to information boards provided with buses at the Transport Museum Wythall and the Aston Manor Road Transport Museum/Aldridge Transport Museum and their websites. For tram references the author is indebted to the Crick National Tramway Museum, Blackpool Heritage Tram Tours and the Manx Electric Railway Online. Most references were obtained from the internet, by far the most were at Wikipedia, which was often the only available reference.

Due to numerous references from the same sources, references are numbered instead of alphabetically. The local reference library was of very little use. Apart from information from the bus museums mentioned, armed only with the bus licence registration or fleet number, the first place to find conformation of the make, the operator and the livery of modern buses, was invariably at Bustimes.org (1). There were also good sources such as Grace's Guide, Historic Vehicles, Local Transport History, Local Transport History Library, MidlandRed.net and The Classic Buses Website, to name a few. More recently, manufacturers websites provided useful information, such as specifications. They tend to concentrate on sales promotion with very little historic information, although there were exceptions. On odd occasion references provided conflicting information, such as specifications for a particular vehicle, or dates. This is to be expected considering that buses/trolley buses and trams could be significantly modified during their service life and pass to different operators.

To meticulously reference each piece of information in sections of text would detract from reading pleasure. Therefore, references have tended to be collected at the end of paragraphs, or sections, although not exclusively. The author apologies for any errors and omissions.

While on the subject of references, it is worth mentioning the way some of the descriptors and names are written. These are double-decker or double-deck, single-decker or single-deck, motor bus or motorbus, trolley bus or trolleybus and tram or car. Both formats are used. This author tends to favour the first option in each instance, although not exclusively. Some names can be confusing. For example, truck. A truck can be a goods vehicle or a tram chassis assembly.

List of acronyms

Unfortunately, the use of acronyms have proliferated. Unfortunate because it means the reader has to remember each one when reading, or it spoils the flow of comprehension, particularly if one has to refer to the list again. However, it does save having to write each one in full each time the item it is mentioned. That said, having provided the list below, there are times when the full title has been used again, usually after a long break since the previous reference, or less used references.

ACV = Associated Commercial Vehicles
AEC = Associated Equipment Company
BMMO = Birmingham & Midland Motor Omnibus Company
BTH = British Thomson-Houston
BYD = Biyadi
CCTV = Closed circuit television
DAF = Doorne's Aanhangwagen Fabriek
DC = Direct current
DK = Dick Kerr
EMB = Electro Mechanical Brake Company
EV = Electric vehicle
ECWVTA = European Community Whole Vehicle Type Approval
EVAG = Essener Verkehrs-AG. Verkehr
GEC = General Electric Company
LGOC = London General Omnibus Company
MVC = Manufacturing Commercial Vehicles
MVG = Mülheimer VerkehrsGesellschaft,
MCW = Metro Cammell Weymann
MMC = Major Model Change
PRV = Park Royal Vehicles
SOS = Superior Omnibus Specification, or Shire's Own Specification.
TWM = Travel West Midlands
WMT = West Midlands Travel
VDL = Probably an acronym for van der Leegte (Author)
WMPTE = West Midlands Public Transport Executive
ZF = ZF Friedrichshafen AG (Germany)

BUSES AND COACHES

The word bus is a contraction of the Latin word omnibus meaning for all, that is, transporting numerous people. There is a difference between a bus and a coach. A bus can be defined as a vehicle that normally carries paying passengers on regular routes, with closely spaced stops where it picks up and sets down passengers whose journeys are usually short. There are instances where buses travel longer distances between villages and cities, although still with regular stops. A bus, single or double deck, is therefore designed for functional resilience and passenger volume. However, “most vehicle designers succumb to the urge to add complication and weight rather than simplicity and lightness” (Thomas 1982). As will be seen later, there are modern buses that are very comfortable with useful (some may say luxury) items for passengers and passengers that are strangers to the route travelled. Such as automatic bus stop announcements and electronic display boards and most recently Universal Serial Bus (USB) recharging points. Unfortunately, closed circuit television (CCTV) has become a necessity. These do come with additional manufacturing cost and increased maintenance. A coach usually carries less passengers in greater comfort, over long distances with few if any stops en route, preferably including an on-board toilet (Thomas 1982). Although, there are long distance, single or double deck, coaches that can carry nearly as many passengers as a bus. Coaches generally cater for the leisure, or tourist, industry.

Most modern buses are bought as a complete unit, but built in two primary parts each built by specialist manufacturers. The one part being the chassis containing the engine, transmission unit (such as the gearbox) and axles. The second part the body, made by a coachbuilder that is attached to the chassis. It is possible to have different body manufacturers with their standard body attached to different manufacturers standard chassis, according to the preference of the purchasing bus operator. These days there are less in the way of bus chassis and body companies, but bigger companies, each with their standard design (Keeley, et al. 2009). There are exceptions. For example, Alexander Dennis who these days build complete integral units.

According to the Busweb.co.uk and the London Transport Museum, the first, brief motor bus service was in 1895 at Siegerland in Germany. It was unprofitable. The six-passenger bus was a modified 1983 Benz Viktoria of 1893. The same type of vehicle was used in Llandudno, Wales, in 1898. The earliest and successful double-decker bus was an 1898 Daimler used by the Motor Traction Company in London in 1898. It could carry 20 passengers at 18kph (11mph). This bus was a success and Daimler began expanding its production. The first mass produced bus was Frank Searles’s B-type double-decker bus. It was sturdy but light with a top speed of 26kph (16mph). Production began in 1910 with 120 in service in London by the end of the year. The following year 895 were built with 1495 in 1912. In 1912, interior electric lighting was fitted with headlights in 1913. Electric interior lighting was introduced from 1912, and headlights in 1913. In all, nearly 3,000 B type chassis were built, mostly with bus bodies, but also as lorries and vans.

Long-defunct coachbuilders’ names proliferated the early years. Some examples: Burlington, Brush, Dixon, Duple, Eastern Coach, East Lancashire, Marshall, Northern Counties, Park Royal, Strachan, Willowbrook. Similarly, chassis builders such as Tilling-Stevens, Karrier, Associated Equipment Company, Birmingham & Midland Motor Omnibus Company, Bristol, Guy and Leyland are no more in existence. Alexander Dennis and Mercedes-Benz are the present most recognisable names.

Most of the photographs were taken at The Transport Museum Wythall (at Chapel Lane, Wythall, Worcestershire) during numerous visits and locally in the Meriden area, less so during travels and on one occasion, at the Aston Manor Road Transport Museum when it was at Witton Road, Aston Manor, Birmingham and after it moved to Aldridge, Walsall, where it became the Aldridge Transport Museum. The photographer of one circa 1926 photograph, in the author's possession, is unknown as are two more recent photographs of trolley buses in Durban. Some photographs were taken while travelling further abroad in Australia and New Zealand.

It was not always easy to get a suitable photograph of a particular bus. Sometimes the bus was on display in a museum packed side by side, front end forward, or tucked in a corner, for example the stylish Bedford Duple Vega coach depicted later in the article. At other times it was a case of snatch a photograph, or miss the opportunity, such as a passing bus or before imminent departure. Bus interior photographs were tricky and rare, due to lighting and limited access.

Vehicles and their photographs are presented chronologically from the oldest to the newest according to when the bus was built, not when the model production commenced. At times it makes sense to group a particular manufacturer's model variants even if, to some extent, it disrupts the chronological order. To try to arrange buses chronologically purely according to a chassis manufacturer from the earliest to the newest model while taking into consideration the earliest to cease trading and the evolution of an old manufacturer still trading under another name, becomes complicated. To clarify, Tilling-Stevens was an early manufacturer and early to cease trading. Meanwhile, Dennis was one of the earlier manufacturers, with the first bus built in 1929, evolved into the present Alexander Dennis that now produces newer technology electric buses as BYD Alexander Dennis. By the way, the author understands BYD stands for Build Your Dreams and is the Chinese pinyin (phonetic alphabet) initials for the China company name Biyadi. Other examples are; Karrier ceased as an independent company in 1948, but the right to use the Karrier name was taken over by subsequent owners. Another example: Metro-Cammell Weymann ceased bus manufacture in 1989 with the bus design rights going to the Netherlands DAF Bus (chassis) and Optare (body) (Transport Museum Wythall (1)). DAF Bus in turn became VDL Bus and Coach in 1993, part of the VDL Groupe (Wikipedia (1)). Nevertheless, into the 2020s buses have tended to be grouped according to manufacturer.

Summaries of most chassis and body manufacturers are introduced to provide background information their models that feature in this article. Occasionally, more detail is given of a particular manufacturers model that was noteworthy, for example, to name earlier models, the Bristol Lodekka, Leyland Titan, Daimler Fleetline. Associated Equipment Company Routemaster and BYD Alexander Dennis Enviro400EV.

Abbreviated vehicle details

Abbreviated details of the vehicles, seen with the vehicle title and elsewhere, were obtained from various sources. There is a standard format that is in universal. These were in the order of road licence registration, chassis, engine, body with seating and the year the particular vehicle was manufactured. Chassis and engine codes were almost invariably a mystery known only to the manufacturer. Codes frequently used by the industry and fraternity before the seating number are: B = single-decker bus, C = coach, D, or DP = dual purpose single-decker bus/semi-coach, H = double-decker bus, L = low bridge double-decker with upper deck sunken gangway on right (driver) side, O = double-decker open top. Codes after the seating number are: D = dual entrance, F = front entrance, R = rear open platform entrance, RD = rear platform entrance with doors, RO = open rear entrance and stairs, T = three doors, t = onboard toilet. Double

decker seating is presented as two figures separated by a forward slash, usually upper deck first, sometimes lower deck. Lower deck seating is always less than the upper deck (Keeley, et al. 2009 and Keeley, et al. 2024).

Transmission types

While the common old internal combustion engine, petrol or diesel, is well known, the purpose and development of the gearbox is less well known. This provides a summary explanation.

The gearbox, or to use the modern more commonly used name transmission, is a mechanical device that uses a set of two or more gears to change the speed or direction of rotation in a machine. Brief explanations of the types used in the past and present are provided below.

Most gearboxes have multiple gear ratios, but there are also those that use a single fixed-gear ratio. Commonly there are 4 or 5 forward gears and one reverse, sometimes up to 8 forward gears. For a considerable time, the gearbox restricted the position of the engine to near to the driver, that is at the front of the bus. This changed with the invention of the semi-automatic gearboxes and the more recently almost universally used automatic gearboxes (Thomas 1982).

Recently hybrid or full electric buses have totally revolutionised the transmission process and done away with the combustion engine and gearboxes. Full-electric buses use a battery to power an electric motor that is linked to the driving wheels assembly typically using a single or two speed transmission. The batteries are charged through a charging station or plug. To put it simply, it is similar to using a handheld cordless power drill that has to be put on charge when the internal rechargeable battery is exhausted. Hybrid-electric buses use the same propulsion, transmission and charging process, except they also have a small internal combustion engine to extend their range after the battery is depleted (Wrightbus (1)).

The lifespan of an electric bus battery ranges from 5 to 12 years, or between 2000 to 3000 charge cycles depending on, for example, the type of battery, operating conditions and maintenance. Lithium-ion batteries, with a longer lifespan than other batteries, are most common (Harris).

Crash Gearbox

A crash gearbox requires the driver to manually match, or synchronise, the engine driveshaft revolutions per minute (RPM or revs for short) with the rotational speed of the gear the driver is selecting. Often referred to as double de-clutching. Instead of pressing the clutch pedal and shifting the gear lever to another gear, the clutch is depressed with neutral selected before again depressing then selecting the next gear (Thomas 1982, Wikipedia (2)).

Sliding mesh gearbox

A type of crash gearbox, it requires considerable effort to engage gears with frequent friction resulting in high wear and tear. “The sliding mesh gearbox is the oldest type of gearbox in which gear shifting is carried out by sliding of certain output shaft gears and meshing with certain lay shaft gears” (Mech Content). “A lay shaft is an intermediate shaft within a gearbox that carries gears, but does not transfer the primary drive of the gearbox either in or out of the gearbox” (Wikipedia (3), Mech Content a).

Constant mesh

Constant mesh transmission is a type of manual gearbox that has all lay shaft gears constantly meshed with output shaft gears. There is no sliding of the gears for meshing as in a sliding

mesh gearbox. This meant the gearbox was less susceptible to wear and more driver-friendly. The method has been mostly replaced by the subsequent use of synchromesh transmission (Etukudo, Mech Content b, Pratik)

Preselect or pre-selective

A preselector gearbox is a type of manual transmission used in buses from 1940-1960. The preselector gearbox allows the driver to select the next gear in advance using gear shift lever, usually with the transmission remaining in the current gear until the driver presses the gear change pedal at the desired time. It removes the need for the driver to master the correct timing of engine speed with the gearbox speed using a clutch pedal and shift lever in order to achieve a smooth gear change. Bearing in mind the high number of gear changes required by stop/start commuter buses and in heavy traffic, the preselect transmission was much less tiring than the crash gearbox and faster, making life much easier for the driver. who could also keep both hands on the wheel such as when pulling out from a bus stop or going around corners. Preselector gearboxes were the forerunner to the widespread use of automatic transmission (Keeley, et al. 2024, Thomas 1982, Wikipedia. (4)).

Synchromesh

Synchromesh (also known as synchroniser rings) on the forward gears automatically match the speed of the input engine driveshaft with that of the gear being selected, making double de-clutching unnecessary (Wikipedia (5)).

Fully automatic

Automatic transmission is a multi-speed transmission used in motor vehicles that needs no action from the driver to change forward gears under normal driving conditions. Vehicles with internal combustion engines, unlike electric vehicles, require the engine to operate in a narrow range of rates of rotation, requiring a gearbox, operated manually or automatically, to drive the wheels over a wide range of speeds.

Automatic transmissions are also found in some heavy commercial vehicles, particularly those which are subject to intense stop/start operation such as buses.

Typical positions on the control box are P-R-N-D

P = Park disengages the gearbox (or transmission) from the engine. It also prevents wheels from turning. (For additional safety the hand, or parking, brake should be engaged).

R = Reverse. It has to be selected to reverse. It also activates reverse lights and can activate beepers as well as parking sensors and cameras.

N = Neutral disengages the gearbox from the engine and allows the vehicle to be moved without the engine, that is freewheel. Useful for towing.

D = Drive. The normal position for forward motion (Wikipedia (6)).

0-9926, Tilling-Stevens TTA2, T-S 40hp 6.44 litre petrol, Tilling O16/16RO, 1913

The oldest bus in the author's photograph collection is the 1913 made Tilling-Stevens TTA2, registration 0-9926, one of Birmingham's early buses. The first O in O16/16RO indicates an open top, RO indicates an open rear entrance and stairs. The only bus of this type in the collection. The 34 seat (16 below and 16 on top) double-decker had a Tilling-Stevens 40hp (30kW) petrol engine with an Electric Traction Motor for transmission. It had a Thomas Tilling body with all rubber tyres. That is, a complete Tilling-Stevens bus. More usual than in later years when the body would be provided by a specialist body/coachbuilder. It was a reliable bus. In service for 11 years, covering 9656km (6000 miles) per month at a top speed of 19kph



0-9926.

(12mph). Information is from the museum's information board, as well as Hucknall 2023 and the Transport Museum Wythall (2). The photograph, dated 23rd June 2012, was taken at the Transport Museum Wythall.

Tilling-Stevens (1897-1950) pioneered the use of a petrol engine connected to an electrical generator which powered a motor that drove the wheels. One may say an early hybrid vehicle. Manufactured in Maidstone the first petrol-electric vehicle in 1906 was easier to operate than the then conventional crash gearbox.

In 1913 an improved 40hp (30kW) engine, the TTA2 was introduced. Tilling-Stevens was voluntarily wound up in 1919 with a new company, Tilling-Stevens Motors started. It lasted until 1930 when it was acquired by Vulcan Motor and Engineering Co of Southport, Lancashire. In 1950 it was sold to Rootes Group when bus production soon ceased, rather producing light commercial engines and vehicle bodies, closing in the 1970s (Grace's Guide (1), Wikipedia (8)).

CN 2870, Midland Red SOS Q, SOS 4.3 litre petrol, Brush B37F, 1927



CN 2870.

Single-decker CN 2870, with an open front and most noticeable step entrance, was manufactured by Midland Red. The intention being a lightweight bus seating as many passengers as possible within its SOS Queen chassis length of 7.6m (25ft). The engine, with a crash gearbox, was also built by SOS. Its body was made by Brush according to SOS specifications. To refresh the reader's memory, SOS = Superior Omnibus Specification, or Shire's Own Specification.

Further information from a display board at the Transport Museum Wythall states that at less than 4064kg (4 tons), seating 37, it was among the lightest full-size buses built. It proved reliable and durable with more than 650 manufactured. At a time when buses rarely lasted more than 10 years, some were in service for over 20 years.

The bus on display at the museum, photographed 27th April 2024, was operated by Northern General Transport. Northern modernised the square sided body with the addition of curved panels which improved its service life. In 1946 it was sold to become a caravan in Northumberland. It was bought by the museum in 1974 and restored with another Queen chassis discovered complete with running units. The expensive restoration is still work in progress (Transport Museum Wythall (3)).

Karrier Chaser 4 or 6 and Thornycroft A2/FB4 circa 1929



Thornycroft and Karrier buses in Durban.

A black and white photograph (photographer unknown) in central Durban, South Africa, is believed to be circa 1926 prior to 1935 due to the absence of trolley bus wires, the year when trolley buses were introduced. The photograph shows buses parked in Church Street that look like a Thornycroft and longer Karrier buses (Jackson 2003). Research by the author suggests they were probably a circa 1929 Thornycroft model A2/FB4 (Smith 2004) and the three longer buses were Karrier (1908-1948) Chaser 4s built 1928-32 or Chaser 6s built 1930-35. Thornycroft was an English and well known internationally, manufacturer of buses and coaches, but more well known for its trucks (not to be confused with tram trucks) and heavy-duty lorries/transporters from 1896 until taken

over by AEC parent Associated Commercial Vehicles (ACV) in 1961 (Historic Vehicles, Local Transport History Library 2021, Smith 2004).

Formally Clayton and Co from 1908, Karrier Motors Limited was formed in 1920 became a well-known brand and by 1928 was manufacturing and selling four and six wheeled single and double-decker buses as well as trolley buses. This included the 26-35 seat four-wheel Chaser 4 from 1928 to 1932 and the 26 seat Chaser 6 from 1930 to 1935. The name Karrier was probably a deliberate misspelling of carrier. The company went into receivership in 1934, being taken over by the Rootes Group. Trolley bus manufacture was transferred to the Sunbeam factory in Wolverhampton where manufacture continued using both the Sunbeam and Karrier names. 1948, the trolley bus business was sold via Brockhouse (West Bromwich) to Guy Motors Ltd., with the Rootes Group retaining the right to use the Karrier name. (Local Transport History (1), Local Transport History Library 2018, Grace's Guide (2).). "The Karrier name began to disappear from products when Chrysler bought Rootes in 1967. It was finally dropped in the early 1970s" (Wikipedia (9)).

Dennis Brothers Limited

Dennis Brothers Limited (Ltd) was created in 1895 manufacturing bicycles in Guildford. In 1898 they began manufacturing their own design motorised tricycles and motor cars by 1901.

Their first bus, in 1905, was really what is known as a Charabanc, as were numerous other buses until about 1927. All versions were based on goods chassis until 1925 with a four ton (4064kg) chassis in 1921. They were fitted with White and Poppe petrol engines. Dennis Brothers bought the company in 1919. A Charabanc was a long, initially horse drawn, motorised vehicle with more than two transverse rows of forward facing seats, initially roofless, used for holiday excursions, mostly daily sightseeing. Circa earlier 1920s they built a 70hp (52kW) front engine coach that looks like it was developed from a Charabanc. The first bus was a H series double-decker built in 1927. The Dart appeared in 1930. This was a Dennis Electric Vehicle (EV), single-decker, front engine, half-cab, 32-seat bus with an open rear door (advertised cost £885). Or, with front and rear closing doors as specified by the Coventry Corporation. Dennis Brothers built buses to customer specifications. In 1972 shareholders sold

the business to the Hester Group. Subsequently it has had numerous owners, culminating in now being part of Alexander Dennis Ltd.

Significant bus builds were:

The single-decker, front engine, half-cab Lancet, first built in 1942, replaced by the Lancet IV in 1952 with an under-floor engine and 16.3ft (5m) wheelbase.

The double-decker, front engine, half-cab, rear platform door Lance III in 1946 with a 7.6 litre Dennis or Gardner engine;

The double-decker, front engine, half-cab, forward sliding door entrance Loline was manufactured from 1858 to 1967, lengthened 1958 to 30ft (9.1m) as the Loline II

From 1977 to 1981, the full front double-decker with front engine and driver position (one person operation) with the front axle set behind the front door. The engine was a Gardner 6LXB or Voith D851 with automatic gearbox.

From 1977 to 1996 the double-decker and first rear-engine Dennis Dominator's were manufactured with numerous engine options, namely, Gardner 6LXB or turbocharged 6LXCT, Rolls-Royce Eagle, Cummins L10 and DAF.

The well-known Trident, their first low floor double-decker, was manufactured from 1997 to 2006 (Grace's Guide (3), Farrow 2019, Alexander Dennis (1)).

EA 4181, Dennis ES, Dennis D 5.7 litre petrol, Dixon 32 seats, 1929



EA 4181.

The 1929 single-decker EA 4181 with a forward door seated 32 passengers. It had a Dennis D 5.7 litre petrol engine with a Dixon body. Photographed 2nd May 2009 at the then Aston Manor Road Transport Museum in Witton Road, an accompanying information board says the bus had a sliding mesh transmission with a revised Clayton Dewandre vacuum braking system on all four wheels. It was the last of a batch of five vehicles to enter service with the West Bromwich Corporation in 1929. It was used on the country "lanes" routes until the start of World War II when it was converted to an ambulance, after which it returned to passenger service until 1948. The bus was then preserved, appearing at the 1951 Festival of Britain, decorated for the 1953 Queen Elizabeth II's Coronation and as the Christmas Bus until 1963. It is no longer on the Aston Manor Road Transport Museum/Aldridge Transport Museum website (Dennis Society, Grace's Guide (4)).



JF 2378 with squashed roof appearance.

JF 2378, AEC Regal, AEC 6-cylinder 7.4 litre petrol, Burlingham 32 seats, 1931

Also photographed 2nd May 2009, at the then Witton Road Aston Manor Road Transport

Museum, is the 1931 AEC Regal fitted with a 6-cylinder 7.4 litre engine with a sliding mesh gearbox and a Burlingham body, as stated on an information board. The single-decker coach

had a rear entrance and seated 32. Delivered brand new to Provincial Coaches of Leicester, numbered R1, it is “believed to be the oldest surviving Burlingham bodied vehicle.” Still in virtually original condition, it was in service until the 1960s.

The Daimler Company

Founded 1896 with headquarters at Coventry as the Daimler Motor Company Limited and the Daimler Company Limited from 1910. The company bought the right to the use of the Daimler name simultaneously from Gottlieb Daimler and Daimler-Motoren-Gesellschaft of Cannstatt, Germany.

Through the years the Daimler Motor Company was firstly closely associated with AEC, taken over by the Birmingham Small Arms Company group until 1960, then owned by Jaguar Cars until 1966, then British Motor holdings (1966-1968), then British Leyland until 1984. Back to Jaguar Cars (1984-1989), Ford 1989-2007), then the Tata Group.

The company focused on motor car production with its first omnibus in 1912. Buses and trucks used the same chassis and engines with personalised bodywork. Bus chassis became a significant part of the company, mainly double-deckers. The Metropolitan Electric Tramways bought 350 double-decker omnibuses while engines were sold to the London General Omnibus Company (LGOC). The double-decker CB had a 13ft (4m) or the CC a 12ft (3.7m) chassis, both with a 40hp (30kW) engine. At the start of World War I, CC chassis production ceased with CB production increased for military trucks.

After setbacks with unsuccessful vehicles such as a petrol-electric vehicle (too heavy), failure to produce an advanced integral petrol electric hybrid the Knight-Pieper-Lanchester omnibus (stopped by a patent infringement action brought by Tilling-Stevens) after 12 buses had been built, Daimler became more successful in association with AEC. From “1913 to 1916 AEC built some Daimler models under contract and Daimler sold all AEC vehicles which were surplus to LGOC needs.” From 1926 to 1928, a joint Daimler and AEC venture had “AEC vehicles being badged as Associated Daimler, or ADC's”.

During the 1930's the Daimler CO chassis became the main model, with a heavier CW manufactured during World War II, powered by an AEC 7.7 litre engine (100 had a Gardner 5LW engine (CWG5)). Post-war years, production was the Daimler CV, leading to the long production line rear engine double-decker Daimler Fleetline, built from 1960 to 1980. Small numbers of single deck vehicles were also built The Daimler Roadliner, built between 1962 to 1972, was a single-decker with bus and coach chassis.

Today, Daimler Buses is the Bus Division of Daimler Truck. With “its numerous national subsidiaries it is responsible for the global activities of the bus and service brands Mercedes-Benz, Setra, OMNIplus and BusStore” and “subsidiaries include Daimler Buses GmbH with numerous locations in Europe, Daimler Buses Latin America in Brazil, Daimler Buses Mexico, Daimler Coaches North America as well as the bus business of Mercedes-Benz Türk A.Ş in Turkey” (Daimler Truck (1), Wikipedia (10), Wikipedia (11), Wikipedia (12)).

CVP 207, Daimler COG5, Gardner 5LW, Metropolitan-Cammell, H54R (1939), 1937

Photographed 23rd June 2012 at the Transport Museum Wythall, 1937 CVP 207, Daimler COG5 had a Gardner 5LW 7 litre 5-cylinder diesel engine with a Metropolitan-Cammell, double-



CVP 207 with non-original sealed entrance.

decker body and rear entrance. The photograph shows the entrance sealed with a padlocked door to prevent entry.

The current Metro-Cammell body with 54 seats was fitted in 1939 to the operator's design. It was the standard Birmingham bus ordered from 1934-39. The attraction and selection of the Daimler type by the Birmingham City Transport, was the preselector 'easy change' gearboxes that meant less driver physical gear selection effort. All buses had reliable and economical Gardner diesel engines, apart from the first

10 of around 800 purchased. Furthermore, the bus had Daimler's flexible engine mountings that minimised vibration, as well as being fitted with interior panels with a short and dense woven pile velvet-like fabric which deadened sound as well as well-upholstered seats. The result a comfortable ride for passengers. After hard use and neglect during World War II bodies were removed and overhauled, sometimes with a new body, as was the case with this bus in 1939. It continued in use until 1954 when it became a snowplough, becoming one of 41 reintroduced by Midland Red in 1957 to 1958, retiring in 1959 (Transport Museum Wythall (4).

Midland Red

The Birmingham & Midland Motor Omnibus (BMMO) Company, more commonly known as Midland Red was a bus company that operated in the Midlands, rapidly expanding from 1905 until 1981. It became among the largest English bus companies, operating between Gloucester in the south, Derbyshire in the north and from Northampton to the Welsh border. Not only did the company operate buses, it made them as well. Bus manufacture, overhaul and accident repair was at the Carlyle Works, next to the Rotton Park Reservoir in Edgbaston, Birmingham. BMMO's head office was in Vernon Road, Edgbaston. The red livery and the fleet name Midland on the side of the buses led to the widely recognised name Midland Red. It was nationalised in the 1960s then split for privatisation in the 1980s.

In 1912 the company bought its first Tilling-Stevens petrol-electric vehicles. Tilling-Stevens became the main supplier of bus chassis to the company. Between 1923 and 1969, the BMMO built most of the buses it operated. Until 1940 they were designated SOS. There are two versions of the meaning of SOS. Either Superior Omnibus Specification or Shire's Own Specification. The latter named after BMMO's Chief Engineer Mr LG Wyndham Shire from 1912 until retirement in 1940. After 1940, the vehicles for their own use were identified by BMMO. With bus codes FEDD (Front Entrance Double Decker), REDD (Rear Entrance Double Decker). Coaches were ONC, later C or CM for motorway coaches.

After World War II, single-decker models were numbered S6, then S8 to S23, double-deckers models D1 to D10. Designations AD2, GD6 and LD8 referred to batches of AEC, Guy and Leyland vehicles, respectively. These were purchased when inhouse manufacture could not meet the demand for new buses.

When the M1 motorway opened in 1959, Midland Red began non-stop express services between Birmingham and London using a fleet of ten CM6 high-speed motor coaches designed

in 1963 that were capable of sustained cruising at 85mph (140kph) taking 2hrs and 15mins. Later a Coventry to London service was added. The services operated until the middle 1970s.

References: MidlandRed.net (1), MidlandRed.net (2), Wakelin 2024, Wikipedia (13).

RC 7927, BMMO SOS SON, BMMO 8.03 litres diesel, Willowbrook 34 seats, 1946



CVP 207. Left, half cab and front entrance. Right, well upholstered, rear emergency exit.

The 1940 single-decker registered RC 7927, BMMO SOS SON with a BMMO 8.03 litre diesel engine was photographed 6th April 2024 at the Aldridge Transport Museum. With a four-speed constant mesh gearbox transmission, it is the only survivor from the last batch of vehicles ever built by Midland Red for one of its fellow BET (British Electric Traction) operators with a Willowbrook body. It has a forward inward opening wooden door and seated 34 comfortably as seen in the well upholstered interior photograph. The rear central window in the photograph formed part of an emergency exit door. About 25 years after it left service, in the later 1970s, the vehicle was found in a field by Trent Motor Traction who rebuilt the bus. Owned by Trent Motor Traction, it is at the Aldridge Transport Museum, previously the Aston Manor Road Transport Museum (Aldridge Transport Museum (1), MidlandRed.net (3)).

Associated Equipment Company (AEC)

In 1912 the chassis manufacturing section of the London General Omnibus Company (LGOC), created the Associated Equipment Company (AEC). In 1916, AEC came under direct Government control for the duration of World War I. After the war AEC was able to trade freely. In 1928, AEC employed former Leyland Chief Engineer, George Rackham, whose design for a new engine led to a new range of bus chassis, the first model being the Reliance at the end of 1928.

In 1929 the first of the new models was a double-decker named the Regent. Later in the year a single-deck version of the Regent, the Regal was introduced with a longer three-axle wheelbase version named the Renown.

AEC produced its first trolley bus in 1922. In the ten years leading to 1940 there was an increased demand for trolley buses, mainly to replace trams, resulting in increased sales of the AEC 644T three-axle trolley bus version of the Renown, which became the best-selling version of AEC trolley buses compared with the two-axle AEC 611T.

During World War II buses had become dilapidated, damaged and destroyed in the Blitz. After the war there was an immediate demand for new buses. AEC Regent II and Regal I chassis

were replaced with the Regent III and Regal III in 1946. In 1953 a new range of medium-weight range of models, lighter than the existing AEC models, were introduced with the re-use of the Reliance name that was in production until 1979. The Regent III was succeeded by the Regent V in production from 1954 to 1956. This was followed by AEC's best known bus, the Routemaster. More about this bus later.

In 1962, parent company, the Associated Equipment Company, merged with Leyland Motors, becoming known as the Leyland Motor Corporation resulting in a cancellation of a rear-engined successor to the Routemaster by Leyland management. All export AEC models were branded Leyland, while United Kingdom (UK) market AECs remained AECs.

By the early 70's the British Leyland Motor Corporation was in financial difficulties, although AEC was still manufacturing chassis and the sale of commercial vehicles was still profitable. During 1974, the British Leyland Motor Corporation was taken into state ownership to avoid complete collapse. The poor state was mainly due to losses in motor car manufacturing. 25th May 1979, the decision was made to close the AEC factory at Southall, ending 67 years of AEC (Local Transport History (2)).

KMN 835 AEC Regent III, 1949



KMN 835. Left, background bus depot and railway station. Right, platform entrance.

Double decker KMN 835, fleet number 64, was supplied new to the then Isle of Man Douglas Corporation in 1949. The AEC chassis (construction number 9612E2071) most likely had an AEC 9.6 litre diesel engine and Wilson preselect gearbox (except a small number had a 7.7-litre engine and a crash gearbox). A synchromesh option also became available in the early 1950s) and air-pressure operated brakes (except for some with vacuum brakes). KMN 835 has a Northern Counties 56 seat (30 upstairs, 26 below) body (construction number 4265).

Preserved in the Isle of Man Transport heritage fleet, it entered service new in June 1949, withdrawn from service in October 1976. The bus was photographed 15th September 2013 in the Isle of Man near to the Transport Headquarters and the Douglas Railway Station, both visible in the background.

The AEC Regent III was first built in 1939, the last being supplied in 1956. Close to 7000 of the family of buses were built. The last one was in service in 1979. Bodies were also available by Park Royal, Metro Cammell Weymann and Charles H. Roe. The Regent III was superseded by the Regent V, finally the famous London AEC Routemaster.

Regents were mainly built for operation outside London and overseas, including South Africa (Jackson 2003). The author remembers travelling in Regent IIIs, when a child and adolescent in Durban, South Africa. When travelling to or from school we used to throw our school cases in the space under the stairwell at the rear platform entrance then go to sit upstairs, collecting the cases when disembarking. The author also remembers an accident, mentioned by Jackson (2003), when in 1966 a mechanic on a test drive, took the top deck off a bus by driving it under a low bridge at the Greyville Racecourse. The author remembers seeing a photograph in either the Daily News or the Natal Mercury.

After withdrawal from Douglas Corporation service in 1976, it went to a Rotherham dealer in January 1978, then to the London Bus Preservation Group, Cobham, March 1978, then to Nightingale, London August 1978 and back to the Isle of Man Transport June 1994 for preservation (The Classic Manx buses website, Wikipedia (14)).

JOJ 489, Crossley DD42-6, Crossley 8.6 litre, Crossley H30/24R, 1950



JOJ 489.

Manchester based Crossley Motors, manufactured cars from 1904 to 1938, buses from 1926 to 1958 (around 5500 built) and military vehicles from 1914 to 1945. Realising the company was too small to survive alone, the company directors agreed to takeover by AEC in 1958 (Wikipedia (15)).

Surviving Crossley buses are now extremely rare. JOJ 489 was new to Birmingham City Transport in 1950. It is the last survivor of 270 delivered to Birmingham City Transport as part of fleet rebuilding after bus dilapidation and depletion during World War II with no prospect of replacement.

Unusually, this model bus is an entire Crossley product consisting of chassis, body and 6-cylinder diesel engine with a synchromesh gearbox while the body was built to Birmingham City Transport's design. By this time buses would have had different chassis, engine and body manufacturers. It seated 54 (24 lower deck, 30 upper deck)

with a rear entrance. Earlier Crossley's had a traditional chrome radiator, but later buses, including this one seen in the 27th April 2024 photograph at Wythall, had the more modern fashionable concealed radiator.

JOJ 489 (fleet no. 2489) was retired in 1969 after 550000 miles (885139km) of service. After being preserved by a private 2489 group, it was donated to the Transport Museum Wythall in 2021 (Transport Museum Wythall (5)).

Guy Motors

Guy Motors of Wolverhampton manufactured cars, lorries, buses and trolley buses from 1914 to 1982. Its first product was a lighter, but rugged, pressed steel frame 30cwt (1524kg) lorry that resulted in an open 14 seat bus designed for use in the Highlands of Scotland.

After World War I production, Guy Motors returned to civilian commercial production. In 1926, a 6-wheeled version of their dropped-frame chassis was used to build the first 6-wheeled double-decker buses and 6-wheeled trolley buses. Guy double-decker buses and trolley buses

became popular with export sales to South Africa, Pakistan, India and the Netherlands. Guy Motors acquired Sunbeam Commercial Vehicles Limited in 1948, after which all trolley buses produced had the Sunbeam name, although some for UK operators had the Karrier name. Sunbeam trolley buses were the most popular model in South Africa.

During World War II, Guy Motors again concentrated on armoured vehicles. However, buses were becoming dilapidated, damaged and destroyed in the Blitz. The government approached Guy Motors to produce double-decker buses. Between 1942 and 1945, 2000 were built as well as double-decker bus chassis. In 1942, Guy Motors produced first the practical Arab I, then the Arab II double-decker bus. It was based on their original 1933 design, although the frame shape was identical to the Leyland Titan TD8, but aluminium parts were replaced with iron and steel. The result was a successful tough, reliable and economical bus, culminating in the Arab V and production ceasing in the 1970s. In 1946 production of a highly successful single-deck Guy Arab bus began (History Website, Wikipedia (16)).

HWO 334, Guy Arab III, Gardner 6LW, Duple L55R, 1949



HWO 334.

Double-decker HWO 334 was photographed at the Transport Museum Wythall 23rd June 2012. The 1949 built Guy Arab III had a Gardner 6LW 8.4 litres 6-cylinder diesel engine with a crash gearbox and a Duple body with a rear entrance that seated 55 passengers.

An interesting feature is the sunken upper deck gangway on the right (driver's) side, or the off-side as it is often referenced in the UK. This is confusing to the author, because the author's logic is that the off-side would be the side off the road and the on-side on that side of the road. To get back to the main topic. Low bridges and to some extent, tree branches were a problem. Early bus chassis were often the same as truck or lorry chassis with higher ground clearance. A sunken upper deck gangway into the roof of the lower seating area was a solution to restrict the height of the bus. This was before reduced height of the bus chassis were developed by using dropped centre axles, such as the Daimler Fleetline discussed later, as well as later low-floor buses by



HWO 334. Lower deck right sunken ceiling and upper deck right lower gangway.

moving the engine to the rear. The sunken upper deck gangway was not an ideal solution. Apart from reduced headroom for the passenger seated below on the driver side, the upper seats were in rows of four, making it difficult for the conductor to collect fares and for passengers nearer to the window to get out. The 27th April 2024 photographs show the inside of the bus's lower deck and the upper deck seating with sunken gangway on the right (Transport Museum Wythall (6)).

JOJ 533, Guy Arab III Special, Gardner 6LW, Metropolitan-Cammell, H54R, 1950



JOJ 533.

JOJ 533 was photographed 25th April 2009 at the Transport Museum Wythall.

The double-decker Guy Arab III Special was an improved modification of the Arab III for Birmingham City Transport. It still had a Gardner 6LW 8.4 litres 6-cylinder diesel engine, but now had a preselect gearbox. The easy to use preselect gearboxes were appreciated in Birmingham City's traffic congestion. The body was a 54 seat Metropolitan-Cammell, still with a rear entrance, but now with sliding ventilators and a concealed radiator to give it a more modern appearance. There were 300 buses built with

this style of body on Guy, Daimler and Crossley chassis. The model type was in service until 1977 the last route being the 27 mile (43 kilometre) 11 (full) Outer Circle. It is still in use today although in 2021 it is a split 11C clockwise and 11A anticlockwise service. Both start at Acocks Green. The 11C terminates at Erdington then returns as an 11A. The 11A terminates at Perry Barr then returns as an 11C (Transport Museum Wythall (7)).

JOJ 976, Guy Arab IV, Gardner 6LW, Metropolitan-Cammell, H55R, 1953



JOJ 976 behind KFM 775 being washed.

The double-decker IV was the last in the series of Guy Arab buses. Still with the Gardner 6LW 8.4 litres 6-cylinder engine, preselect gearbox and rear door Metropolitan-Cammell body, although a return to 55 seats as in the original Guy Arab. Approximately 600 buses were built between 1951 and 1954. Differences from the previous models were that it was one foot (30 centimetres) longer with one more lower and upper deck windows than the III, but the same as the III Special. Internally, it was still the same as the III Special, except the dense woven pile velvet-like fabric was replaced by a cheaper leather cloth. It was the first

standard Birmingham bus not to have the upper and lower decks built separately. JOJ 976 was retired in 1972 still in its original colours. Seen in the background, it was photographed 9th May 2009 at the Transport Museum Wythall (Transport Museum Wythall (8)).

Bristol buses

Bristol Tramways and Carriage Company was formed in 1887. It started building bus chassis for its own use in 1907 or 1908 (depending on the reference source), beginning with a single-decker Bristol C40 chassis with solid wheels, front door and 16 seats at its Bristol Brislington depot. The driver sat in a semi-open position (under an overhead curved roof) and just behind the engine with the enclosed passenger cabin behind. It soon began building buses for sale to other operators. Until 1987, when the business was sold to Midland Red West, Bristol buses were in wide use in the UK and exported.

A 1921 press photograph and 1922 advertisement shows an enclosed 28 seat coach, or 29 seat motor bus with the engine in front of the driver and passenger cabin in the same shape as a Charabanc. It had an open rear door and closed front door. In 1925 a 2-ton (2032kg) chassis full-fronted, front entrance bus with no separation between driver and passengers was introduced. Initially with solid tyres, later pneumatic. It was intended for one person operation. The body looked like a box with windows plonked on the chassis. A rather ungainly looking contraption compared with models from the 1927, so called Superbus.

The Superbus was a front engined single-decker with half cab. It became the standard bus for many years, until 1954, as the L.3 32-seater with a front entrance and rear emergency door, the L.5 32-seater dual-purpose model and the M 32-seater with front curb-side door and emergency front door on the driver side. The L.5 could be used for single operation with the rear door locked, or with a conductor with front entrance and rear exit. From 1937 there were numerous L versions, including the LW, LS, LL and LH with different Gardner engines and an AEC engine. There was also a L6G double-decker with a Gardner 6LW engine. The LS had a choice of four different engines, the Gardner 4HLW, 5HLW or 6 HLW and the Bristol AUW 6-cylinder.

This bus model was followed by:

The K-type in 1944, consisting of a front engine, half-cab double-decker and a full-front single-decker having Gardner engines or an AEC engine with Eastern Coach Works (ECW) bodies. In 1955 there was the single-decker SC (small capacity) with a Gardener or Perkins engine and ECW body.

From 1956 or 1957 to 1966 the MW (medium weight) was a full-front single-decker with an ECW body and a Gardner engine with G added to the Bristol chassis name. Bristol built 1725 MW chassis.

From 1962-1982 the successful RE (rear engine) single-decker was manufactured, mostly with an ECW body. The engines were either Gardner (6HLX) or Leyland (O.680/O.600) 6-cylinder diesels with, respectively, 6G or 6L in the chassis code.

The double-decker, front engine, half-cab, low floor level Lodekka LD was produced from 1949-1968 with 5200 standard models built. Most series had a rear platform, in particular the LD series, with some later series having a front entrance and hidden radiator cover. Engines were either a 5 or 6-cylinder Gardner with Bristol and Leyland engines least chosen options. The Lodekka was also made under licence by Dennis Brothers as the Loline (Grace's Guide (5), The Local Transport History Library 2022, Wikipedia (18), Wikipedia (19)).

KFM 775, Bristol LSG, Gardner 5LW, Eastern Coach Works B35R, 1950

KFM 775 is a single-decker Bristol LSG with a Gardner 5LW 7 litres 5-cylinder diesel engine and crash gearbox. It has a 35 seat Eastern Coach Works body with a rear sliding door.



KFM 775 with PHA 505G behind.

Delivered new in June 1950 it operated from Bangor, Caernarfonshire, North Wales, to adjacent areas such as the Isle of Anglesey. Its rear closing door meant it was unsuitable for one-man operation. It was moved to Wrexham in the mid-60s, being withdrawn in 1969 after accumulating 575000 miles (925373km). KFM 775 was photographed 9th May 2009, 2nd August 2013 (when the author had the pleasure of riding in the bus) and 16th August 2015 at the Transport Museum Wythall.

The Bristol Tramways and Carriage Company, founded in 1887, began building its own buses in 1907. Bristol chassis became a separate entity as Bristol Commercial Vehicles Limited in 1955, closing in 1983 when production moved to Leyland, its parent company (Transport Museum Wythall (9)).

PHA 505G, in the photograph background, is a BMMO S22 chassis, Carlyle DP45F body, built in 1968. Restored by Paul Hodgkins, it was at Wythall for repainting in Midland Red livery by Kevin later in 2013, then sold to the Leicester Transport Heritage Trust in 2014 (Leicester Transport Heritage Trust).

ORB 277, Daimler CVD6, Daimler CD6, Duple C35F, 1950



ORB 277 of Blue Bus Services.

The 1950 built ORB 277 is a single-decker coach with a Daimler CD6 8.6 litre 6-cylinder diesel engine and a preselector gearbox. The 35 seat body was built by Duple. At the time, soon after World War II, it was a top of the range coach.

The advent of underfloor engines with an enclosed front and more streamlined appearance meant the end of half cab and front engine coaches. Some were modified to a full width front enclosing cab and engine, some had double-deck bodies fitted. Most had shortened service lives. No sooner had ORB 277's operator, Blue Bus Services,

received the coach than it put it up for sale. Receiving little or no interest, it was forced to keep the coach. Blue Bus Services operated in the Derby and Burton-on-Trent area from 1922 until 1973 when the business was sold to Derby Corporation (Transport Museum Wythall (10)).

ORB 277 was photographed on the 23rd June 2012 at the Transport Museum Wythall.

Leyland Motors

Originally the Lancashire Steam Motor Company of 1896, it was renamed Leyland Motors in 1907 manufacturing lorries, buses and trolley buses. The company acquired car manufacturers Triumph in 1960 and Rover in 1967, becoming the British Leyland Motor Corporation in 1968. After a troubled history and collapse in 1975, it was partly nationalised and the UK government

created the holding company British Leyland, renamed BL in 1978. After much restructuring and divestment of subsidiary companies, BL was renamed the Rover Group in 1986, part of British Aerospace. It was bought by BMW in 1994.

Leyland Motors was an important producer of buses used in the UK and worldwide. It was a leader in the manufacture of chassis designed for buses that were different from trucks. It had a lower chassis design to facilitate easier passenger embarkment and dis-embarkment. The 1927 Titan and Tiger ranges revolutionised bus design.

The Leyland Titan was a half-cab, front-mounted engine, bus chassis designed to carry a double-decker bodywork. It was built between 1927 and 1942, and between 1945 and 1969. The various model versions are too numerous to mention. Suffice to say PD versions were by far the most dominant. It is not to be confused with the rear engine, full front, front door (optional central door) Leyland B15 Titan built between 1978 and 1984

In June 1950, as a result of revision to the Construction and Use Regulations, the PD2/12 was the first in the series of PD2s from 1 to 23, to conform to the new 8ft (2.4m) width which no longer required special permission. Prior to this, the maximum width was 7ft 6in (2.3m). The maximum length for double-deckers was also increased to 27ft (8.2m). Leyland increased the wheelbase to 16ft 5in (5m) in the PD2. P stood for passenger and D stood for double-decker.

Another important Leyland achievement was the manufacture between 1956 and 1986 of the trend-setting Atlantean rear-engined double-decker bus. The bus side of the business was separated to become Leyland Bus that was bought by Volvo in 1988. Volvo kept only the Olympian version, which with minor frame and reengineering changes, renamed it the Volvo Olympian, its first bus model (Local Transport History (3), Wikipedia (20), Wikipedia (21), Wikipedia (22), Wikipedia (23)).

PDH 808, Leyland Royal Tiger PSU1, Leyland O600, Park Royal B40F, 1953



PDH 808 photographed 9th May 2009.

South Africa's Bus Body, later Busaf.

This 1953 Walsall Corporation single-decker Leyland Royal Tiger PSU1 with closing front door was photographed on the 25th April 2009 and again on the 9th May 2009 when escorting friends at the Transport Museum Wythall. The Royal Tiger badge was well known to the author on single-deck buses in Durban in the 1960s. In particular the Durban Corporation Leyland Royal Tiger Worldmaster ERT2/1s with their high-floor, open step up front door and red with white roof livery. Later they divided into the Blue Line (powder blue with white roof) and Green Line (dark green with white roof). If memory serves correctly, the bodies were by

PDH 808 has an underfloor Leyland O600 9.8 litre 6-cylinder diesel engine with a synchromesh gearbox. Around this time the synchromesh gearbox became standard in buses. O stood for oil, which was British engineering parlance at the time for compression-ignition engines and 600 cubic inches, or 9.8 litres (Transport Museum Wythall (11)).

The 40 seat body was manufactured by Park Royal at Abbey Road, London. Park Royal Vehicles Ltd was established in 1930. In 1949 it became part of Associated Commercial Vehicles (ACV) which included AEC. Together with AEC, Park Royal were important providers for London Transport and many other fleet owners. Their major claim to fame was the famous Routemaster bus. Park Royal Vehicles closed in July 1980 (Grace's Guide (6)).

As mentioned earlier (ORB 277 Daimler CVD6) underfloor engines were already a major development in 1950 that heralded the demise of half cab and front engine buses/coaches. The big advantage was an unobstructed floor area with room for more seats, although they still had the disadvantage of a high step entrance. PDH 808 was an early underfloor design. It originally had 42 seats, being changed to a 40 seat coach layout in 1959 for evening tours in Cannock Chase, Lichfield and Sutton Coldfield. It was retired in 1973 (Transport Museum Wythall (11)).

FRC 956, Leyland Titan PD2/12, Leyland O600 diesel, Leyland H58RD, 1954



FRC 956.

The reason for chronological reversal of this Leyland Titan bus (built in 1954) and the following Leyland Titan Special (built in 1953) will become apparent in the following text.

Double-decker FRC 956 was photographed at the Transport Museum Wythall in 29th April 2009. Built in 1954, it has a Leyland O600 9.8 litre 6-cylinder diesel engine with a synchromesh gearbox. It has a 58 seat Leyland body and power operated rear entrance door. Passenger comfort and ride compared favourably with private cars, plus it had heating. The synchromesh gearbox made driving easier, however, there was as yet no power steering.

Most bus operators opted for a chassis with a body manufactured by a preferred coachbuilder. Leyland also offered complete chassis, engine and body vehicles. However, increased demand worldwide for their trucks and bus chassis, forced them to cease body production. FRC 956 was the last bus body built by Leyland. Many Leyland Titans were exported to other countries including Australia, Ireland, India, Spain and South Africa (Transport Museum Wythall (12)). The author remembers travelling in Titan PD2s, with an open rear platform entrance, as a child in Durban, South Africa.

SHA 431, Leyland Titan PD2/12 Special, Leyland O600, Leyland H56RD, 1953

SHA 431 was photographed at the Transport Museum Wythall on 9th May 2009 and 2nd August 2013 as seen in the attached photograph.

The Leyland Titan PD2/12 Special had the same Leyland O600 9.8 litre 6-cylinder diesel engine with a synchromesh gearbox and Leyland body with power operated rear entrance doors as the standard PD2/12 already discussed. The differences were essentially superficial Midland Red (or MIMO) operator design modifications.



SHA 431.

It also had two less seats, 56 instead of 58.

SHA 431 operated from the Birmingham Digbeth garage on routes from Birmingham to Coventry, Malvern, Solihull and Stratford until 1967 when it was sold to Foster Brothers gents clothing manufacturers and retailers, as a daily staff shuttle bus between its old factory in central Birmingham to its new factory in Shirley until 1971. It is believed to be the last remaining bus of the one hundred Specials produced (Transport Museum Wythall (13)).

HJA 952E, Leyland Titan PD2/40, 1967



HJA 952E.

From 1923 to 1970 Midland Red built its own buses. However, there were times when bus production could not meet urgent demand. Consequently, buses had to be purchased from other manufacturers. During 1952 and 1952, Midland Red bought one hundred complete Leyland Titans with stipulated Midland Red modifications. Apart from rear platform four-leaf electrically powered doors, the radiator had to be hidden behind a full width engine-bonnet concealing the radiator. Compare this photograph with the previous one of FRC 956. It was the only Leyland Titan PD2/12 body built with this

This new in 1967 Titan is included due to the long production run of the Titan until 1969 and for the sake of continuity. To the best of the author's knowledge, the PD2/40, derived from the PD2/12, made its appearance in 1962. The front is markedly similar to FRC 956.

Double-decker, front engined HJA 952E, has a Leyland 6-cylinder O600 9.8 litre diesel engine with a synchromesh gearbox and East Lincs body with a rear platform entrance. East Lincs (or East Lancashire Coachbuilders Limited) was founded in 1934, defunct in 2010 after takeover by the parent Darwen Group (Wikipedia (24), Wikipedia (25), UK Classic bus Bodies).



The bus was photographed 6th June 2008 at Fromes Hill, Herefordshire. The author has recently discovered that in 2022. the bus was restored to roadworthy condition and excellently restored externally in red livery, except with a rear platform door. Internally it is the Deckerdenance Bar. The lower

deck is a bar, the upper deck is a posh cocktail lounge. Part of a mobile events venue, it is central to a circular marquee with dining space, entertainment area and lounge (Clagmaster,, Deckerdence unique mobile venue).

UHA 255, BMMO S14, BMMO 8 litre, BMMO B44F, 1955



UHA 255.

UHA 255 was the first of a first batch of ninety-eight lightweight, shortened 5m (16.3ft) wheelbase (single-deck, S14 buses built by Birmingham and Midland Motor Omnibus Company Limited (BMMO) in 1955. It was fitted with independent front suspension and a standard 4-speed constant-mesh manual David Brown gearbox. It has a BMMO 6-cylinder diesel engine and BMMO body seating 44 with a front entrance door. It was withdrawn from service in 1970. UHA 255 (fleet number 4255) was one of the few S14s not converted to driver only operation.

This bus was purchased by a local enthusiast and passed to the museum's predecessor society in 1977. While repainted to improve its appearance it still requires a major overhaul, particularly its mechanical units. It was photographed 27th April 2024 at Wythall in Hall 1, the Power Hall (Transport Museum Wythall (14)).

The importance of the S14 was its chassis less construction. Chassis less refers to integral construction. It means that the chassis and body are a single (integral) structure. A strengthened body frame supported the running units, engine, gearbox, etc.) and suspension. It was also a means of achieving greater strength and rigidity without extra weight. Extensive use of weight saving fibre glass (now called glass fibre) meant that a single rear axle with two wheels could be used. The total unladen weight of the bus being remarkably just over 5080kg (5 tons). The 8 litre engine gave a spritely power to /weight ratio. The S14 was in production until 1959 (MidlandRed.net (4)).

TOB 377 AEC Reliance, probably 7.7-litre AH470 or 8.1 litre AH505, Burlingham Seagull Mk2, 1956



TOB 377.

TOB 377 was photographed at Witton Road Aston Manor Road Transport Museum 2nd May 2009. The AEC Reliance MU3RV model coach probably had an AEC AH470 7.7 litres or AH505 8.1 litres engine. The body was a 37 seat Burlingham Seagull Mk2 with a central door.

Flight's Coach Travel Ltd. offered private charters, daily tours, private charters, inclusive holidays with some express coastal services. A fleet of Burlingham Seagull coaches were used in the 1950s. The attractive and streamlined TOB 377 was a new purchase in 1956. It was sold to Mulleys

Motorways, Bury St Edmunds in 1961 where it remained until 1996 when it was repurchased by Flight's for preservation (Rostance 2010, Farrow 2015, Wikipedia (26)).

WMN 485, Guy Otter NLLDP, Perkins P6, Mulliner B26F, 1957



WMN 485.

Single-decker WMN 485 (registered UTU 596J for on-road use) had a Perkins P6 4.73 litre 6-cylinder diesel engine with a crash gearbox and a 26 seat Mulliner body with a front door. It was photographed 2nd August 2013 at the Transport Museum Wythall.

Small buses needed to be cheap. Consequently, the bodies were usually built on readily available high production truck chassis. This Guy Otter was one of five bought by the Isle of Man Douglas Corporation with a specified large destination box. It was in service at Douglas from new in 1957 to 1970. All five had

chassis built by Guy in Wolverhampton and bodies by Mulliner in Birmingham (Transport Museum Wythall (15)).

VVP 911 Bedford SB3, Bedford 4.9 litre petrol, Duple Vega C41F, 1958



VVP 911 hidden in a corner at the museum and simulated sunny roof windows.

The single-deck VVP 911 coach had a front petrol engine with the driver located alongside to the right and a four-speed synchromesh gearbox (and one reverse, obviously), all located over the front axle. The model was available later with improvements/modifications, such as a diesel engine and five-speed gearbox (Keeley, et al, 2024).

It was very popular with over 5400 built between 1950 and 1986, 70% of them for overseas operators. With a chassis based on their truck chassis, it was tough and reliable, particularly useful in rural areas. With a long life and cheap, it was popular in the second-hand market (Thomas 1982, Wikipedia (27)).

Looking at the stylishly streamlined Duple Vega body in the 27th April 2024 photograph, one can see why Duple was the biggest coach body builder in Britain at the time. The coach had orange coloured roof glass to give a sunny impression. It had a sliding front door behind the front axle, seated 41 in comfort and had roof racks for luggage.

VVP 911 was bought new by Sandwell Motor Co, Handsworth, Birmingham, in 1958. It was sold to West Wight of Totland Bay, Isle of Wight, in 1960, being purchased by the museum in still excellent condition in 1984 (Transport Museum Wythall (16)).

WND 477, Leyland Tiger Cub PSUC1/2, Duple Britannia C41F, 1958



WND 477.

WND 477 was a coach variant of the Tiger Cub with an under-floor engine that was either a O.350 5.76 litre diesel, or a 6.15 litre O.375, probably with a four-speed constant mesh gearbox. The typically streamlined style Duple Britannia body seated 41 with the step entrance door forward of the front axle. The step up being necessary due to the under-floor engine.

Built in 1958, it began service with Spencer Tours, Manchester. When photographed 10th December 2005 at the northern end of North Parade, Llandudno, in maroon and cream

livery, it was owned and apparently it is still owned, by Alpine Travel, Llandudno, for Marine Drive Tours Around The Great Orme. Not the best of photographs. An unexpected sighting, it had to be photographed quickly before its imminent departure (Old Bus Photos, Rossendalain2013, Visit Conwy, Wikipedia (28)).

WDF 569, Leyland Tiger Cub PSUC1/2, Leyland O370 5.76 litre, Willowbrook DP41F, 1959



WDF 569.

In production from 1952 to 1970, the single-decker Tiger Cub has an under-floor engine mounted on a light weight chassis with a constant mesh gearbox. It was built in response to some criticism that the Royal Tiger was overweight. It was nearly two tons lighter than the Royal Tiger. Over 4500 Tiger Cubs were built by 1970. It became popular among coach operators as well as smaller independent bus companies operating in rural or thinly populated areas.

Front door WDF 569, photographed 4th April 2024 squeezed between other buses at Wythall, has a dual purpose 41 seat Willowbrook body (fitted with seat headrests). It was bought new in 1959 by Soudley Valley Coaches. It spent most of its 20 years service operating to Cinderford and Gloucester. The bus arrived at Wythall in 1980 with restoration completed in 2000 (Transport Museum Wythall (17), Local Transport History (4), Wikipedia (29)).

802 MHW Bristol Lodekka FSF6G, Gardner 8.4 litre, Eastern Coach Works H34/26F 1961

Earlier discussion of 1949 bus HWO 334 highlighted the particular problem of low bridges for double-decker buses and a rather inconvenient solution to the problem using a sunken upper



802 MHW.

deck gangway. The Bristol company solved the problem in 1954. The solution was an important mechanical invention, namely the drop-centre rear axle. Along with an angled drive shaft from the front mounted engine, this meant the lower deck floor (the same level as the entrance area at the rear) could be lowered with a similar lowering of the upper deck floor and a lower overall bus height. Hence the bus name Lodekka. Over time the bus design evolved with a number of variants. The Lodekka was in production until 1968 (Thomas 1982). 802 MHW, with a crash gearbox and concealed front radiator, was a shorter length bus with a front door. Hence the FSF designation with just over 200 of this model manufactured.

Seating 60 (26 on the lower deck and 34 upstairs), this Bristol Lodekka FSF6G, fleet number 6037, was in service in the Cheltenham District with the Bristol Omnibus Company. It was sold to Western National who changed the fleet number to 1011 and used until 1978, when it came to the Transport Museum Wythall, who restored it to its Cheltenham District colours (Transport Museum Wythall (18)). 802 MHW was photographed 27th April 2024 at Wythall. 1949 HWO 334 (discussed and shown earlier in a photograph) is just visible in the right of the photograph.

AEC Routemaster

The Associated Equipment Company (AEC) red Routemaster is Britain's, possibly the World's, most famous bus, was in production from 1954 to 1968.

The Routemaster was the response to a London Transport requirement for a standardised bus that would replace the wide variety of bus types in use as well as close its antiquated tram system and the World's largest trolley bus network. This made sense. Operating costs would be reduced due to reduced stocked spares, standardised maintenance and training, as well as greater route flexibility.

The layout of the vehicle was conventional for the time. The bus would be a double-decker about 27 feet (8 metres) in length with an open rear platform to enable speedier passenger embarkation and disembarkation compared with doors. It would seat 64 passengers. It would have a half-cab and front-mounted rear-wheel-drive engine to avoid the high floor of an underfloor-mounted engine. To save weight the body would be an aluminium alloy stressed skin integral construction. This would save fuel and tyre life. The AEC chassis consisted of two separate steel sub-frames. The front A frame carried the engine, transmission, steering and front suspension. The rear B frame carried the rear axle and rear suspension.

By the time the 27 feet 6 inches (8.38 metres) Routemaster, code named the RM, went into full production, bus length regulations, introduced in 1956, permitted two-axle double deck buses up to 30 feet (9.14 metres) in length. Apparently, the introduction of longer buses close to the maximum length, such as the RML, were delayed by union resistance to the extra work for conductors.

AEC bus chassis and engine manufacturers and Park Royal Vehicles (PRV) bus bodybuilders were part of Associated Commercial Vehicles (ACV). Both were already important supplies of

buses to London Transport. Both were located near to each other in North London. Modern tender process and year on year wrangling, cronyism and legal processes aside, it made sense to award the design and development contract to them.

Work began in 1951. The first prototype was completed in 1954. The first batch of RM production buses entered service in November 1959 (Zayanak), or 1958 (Routemaster Association (1)), or 1956 (Wikipedia (30)). The RM was built until 1965. The introduction of many brand-new buses into daily service without proper proof of concept testing, resulted in a glut of faults occurring. Many serious, including steering, gearbox and electrical system. It was about four years before satisfactory fleet operation was achieved.

Next in production was the RML standard bus, built from 1961 to 1965 or 68. It had a central 28 inches (71cm) insert that added a split row of four seats (two pairs) downstairs with the same upstairs. Viewed side on, it can be readily identified by an extra smaller central window in the lower and upper decks. The result was a bus of similar length to the trolley bus and capacity. The RML replaced the RM from 1965.

RMC was a standard RM length coach with a rear staircase door and rear entrance door. The RCL was a long coach version of the RML with a rear staircase and rear entrance door (more about this version below). The RMF was a long RML bus with a front staircase and front entrance doors. The RMA was a standard RM length coach with front staircase and front entrance doors. There was also a one-off prototype FRM stretched (31.3ft (9.54m) front staircase and front entrance doors with a rear mounted transverse engine.

Most Routemasters were built for London Transport. In total 2876 Routemasters were built. The last Routemasters were withdrawn from regular service in December 2005, although two Transport for London heritage routes were in central London until 2019 (Wikipedia (30)).

WLT 506, AEC Routemaster R2RH, Leyland O600, Park Royal, 1960



WLT 506.

AEC Routemaster WLT 506 was one of the early RM versions delivered to London Transport in 1960 with the fleet registration RM 506. The RM was a standard bus with rear staircase, and open rear entrance. It was 27.5 feet (8.38 m) long with Two thousand one hundred and twenty-three built for London Transport. The Park Royal body seated 64 (28 downstairs, 36 upstairs). The diesel engine was originally an AEC AV590 6-cylinder 9.6 litres. However, while with London Transport, it was replaced with a Leyland O600 9.8 litres diesel as part of a London Transport Aldenham Works overhaul. It is believed it originally had an

AEC direct selection/automatic 4 speed gearbox. Basically automatic/semi-automatic (Aldridge Transport Museum (2), Routemaster Association (2)).

WLT 506 was fully restored to roadworthy condition at Witton Road Aston Manor Road Transport Museum where it was photographed on the 2nd May 2009.

JJD 390D, AEC Routemaster R2RH, Park Royal H40/32R, 1966



JJD 390D.

Built in February 1966 it had an AEC AV590 6-cylinder 9.6 litre diesel engine with an AEC direct selection/automatic 4 speed gearbox. The Park Royal body seated 72 (32 downstairs, 40 upstairs). New as London Transport RML2390, its original road licence was LLD 390D. The RML was a long bus with rear staircase and open rear entrance. It was 29.91 feet (9.12 m) long with 524 built for London Transport.

In 1990, it was fitted with a Cummins engine, refurbished four years later, it went to a succession of bus operators including as far north as Glasgow (First Glasgow) and south-

west to First Devon & Cornwall, then a private owner. In 2008 it was repainted red by South East Coachworks for Routemaster Hire Ltd. of Knebworth (Devoy). It was photographed in London 10th August 2013 on hire from Routemaster Hire Ltd for a wedding. Notice the smaller central lower and upper deck windows.

CUV 219C, AEC-PRV Routemaster, AEC 9.6 litre, Park Royal H65RD, 1965



CUV 219C.

CUV 219C, or RCL 2219, had an AEC AV590 9.6 litre 6-cylinder diesel with an AEC direct selection 4 speed gearbox and a Park Royal body with a rear staircase and rear platform entrance. It seated 65 passengers, 29 downstairs and 36 upstairs.

RCL 2219 was one of 43 built in 1965 for the London Transport Green Line limited stop service from central London to the outer reaches of London. It was a more luxurious version of the RML. Essentially a RML, the RCL long coach had modified suspension and interior for a more comfortable longer range ride, an electrically operated door and semi-automatic gearbox, plus twin headlights.

The Green Line operated on a few specific longer routes. The intention being to attract motor car travellers back to the bus. London Transport was divided in 1970 and its Green Line buses passed to a new company, London

Country. Declared redundant by London Country in 1978, RCL 2219 returned to London Transport, as a driver training bus. In 1980, it was painted red for a few more years' service, before going to the Transport Museum Wythall where it was restored to its original condition (Transport Museum Wythall (19), Routemaster Association (3), Wikipedia (30)). CUV 219C was photographed 25th April 2009 at the Transport Museum Wythall.

248 NEA, Daimler CVG6/30, Gardner 6LX, Metropolitan-Cammell, H74R, 1963

Double-decker 248 NEA was typical of Daimler buses with Metro-Cammell bodies that operated with West Bromwich for many years. The CVG6-30 (30 feet, 9.1 metres) long chassis



248 NEA.

meant its use became increasingly restricted to conductor operated routes. The buses were absorbed into WMPTE in 1969 where 248 NEA was eventually retired in 1978. In 1979 it arrived at the Transport Museum Wythall where it was restored to West Bromwich colours in 1986 and later internal restoration completed (Transport Museum Wythall (20)). The bus was photographed 2nd August 2013 and 16th August 2015 at the Transport Museum Wythall.

was introduced following relaxation of dimensions in 1956. The Gardner 6LW 8.4 litre engine was a little small for a full Metro-Cammell body 74-seat load plus standing passengers, although adequate. It had air brakes and a recently introduced 'Daimatic' electro-pneumatic gearbox that was standard on the Daimler CVG6/30 longer chassis.

Thirty-five of the longer body buses were bought by West Bromwich between 1958 and 1965 along with two batches of shorter CVG6 buses. Driver only buses were already becoming prevalent. This rear door model

6545 HA, BMMO S16, BMMO 8 litre, BMMO SD B52F, 1964



6545 HA showing the front door and rear emergency exit.

Single-decker 6545 HA had a BMMO 8 litre 6-cylinder diesel engine with a crash gearbox, (more specifically a constant mesh manual gearbox) and a BMMO SD 52 seat body with a widebody front and front doored entrance. It was photographed 16th August 2015 at the Transport Museum Wythall.

The lightweight chassis less S14 and S15 single-deckers, manufactured from 1955 to 1962 were very successful. Legislation passed in August 1961 increased the maximum length for single-deck buses and coaches from 30ft to 36ft (9.1m to 11m) and maximum width from 8ft to 8.21ft (2.4m to 2.5m). BMMO was quick to capitalise on the higher passenger capacity this presented. A stretched S14 prototype, the S16 with 52 seats, entered service in April 1962 and a batch of 50 in December with a second batch of 34 in January 1964. This was in spite of the model becoming outdated by the S17.

The proven BMMO 8 litre engine via a constant mesh gearbox used in the S14, was retained. However, it was not a success. It was underpowered when fully laden and drivers struggled

with the combination of manual gearbox and long length. It is believed that the second batch of 34 buses were built by BMMO to get rid of 8 litre engines, constant mesh gearboxes and other parts that had become obsolete due to the introduction of more advanced BMMO S17.

6545 HA (or 5545 fleet number) was the last manual gearbox bus built by BMMO. It entered service in 1964 withdrawn in July 1976. During a prolonged period, the Transport Museum Wythall undertook a major body and mechanical overhaul with the bus fully restored and roadworthy in 1996 (Transport Museum Wythall (21), (MidlandRed.net (5)).

BHA 399C, BMMO D9, BMMO 10.5litre, BMMO H72RD, 1965



Double-decker BHA 399C was another BMMO complete build. It featured a more powerful BMMO 10.5 litre 6-cylinder diesel engine. The BMMO body seated 72 (32 downstairs, 40 upstairs). The rear platform doors were electrically operated. BHA 399C (fleet number 5399) entered service in 1965, withdrawn in 1980. The rather obscured photograph of the bus (second from the left) was taken on the 16th August 2015. at the Transport Museum Wythall. The other buses feature elsewhere, namely, JOJ 976 (left), R1 NEG (centre right) and 248 NEA (right).

BHA 399C second from left.

The first D9 was built in 1958 with a further 334 manufactured to the increased length of 30ft (9.1m) from 1960 to 1966. They took advantage of the increased length permitted for double-deckers. New features included a powerful engine coupled to a four-speed semi-automatic gearbox made by Self Changing Gears Limited of Coventry with power steering and disc-brakes on both axles. The front axle was independently sprung with variable rate rubber suspension throughout. Weight was saved due to extensive use of fibreglass, such as the roof and bonnet and smaller parts. It had a very tight turning circle due to the short 17.21ft (5.25m) wheelbase (Transport Museum Wythall (22), MidlandRed.net (6)).

6370 HA BMMO D9, 1964



Built a year earlier, this BMMO D9, companion to BHA 399C above, was photographed on the 6th April 2024 at the Aldridge Transport Museum showing the rear platform entrance door and step to the cabin floor. Until withdrawn in 1979, it spent



most of its service time in Leicester (Aldridge Transport Museum (3)).

6370 HA.

DAX 610C, Bristol MW6G, Gardner 6HLW, Eastern Coach Works B45F, 1965



DAX 610C.

A popular single-decker, with 1750 built, was the Bristol MW (medium weight) bus that had an underfloor Gardner 6HLW 8.4 litre 6-cylinder diesel engine with a front doored entrance Eastern Coach Works (ECW) body, seating 65.

DAX 610C was delivered new to Red & White Services Ltd of Chepstow in 1965 working from Blackwood in South Wales, later working in the area around Cinderford, in England near the Welsh border. It was badly damaged in the mid-1970s when it went off the road trying to avoid sheep. It was repaired by ECW. However, its engine failed

in 1979. It was withdrawn from service and used for spare parts for other buses. A newer bus was written-off, also due to sheep. So, DAX 610C was repaired, fitted with a new engine and returned to service, being the last Bristol MW to be withdrawn from service at Cinderford in 1980. It was replaced by a Leyland National step-floor single-decker. DAX 610C was photographed 23rd June 2012 at the Transport Museum Wythall (Transport Museum Wythall (23)).

Daimler Fleetline

The Daimler Fleetline, known as the Leyland Fleetline from circa 1975, was a rear-engined double-decker bus chassis built between 1960 and 1983. Between 1960 and 1973, it was manufactured at Radford in Coventry, with production then transferred to the Leyland factory at Farington, Lancashire.

The standard Fleetline length was 30ft (9.1m). Later in the 1960s an extended chassis resulted in a longer 36ft (11m) double-decker Fleetline becoming available. Daimler Fleetline chassis coding began with the letters CR, the C either meaning Coventry or Commercial and R for rear-engine. Single-deckers became SR. Other later Leyland Fleetline chassis codes were FE for Fleetline, followed by 30 or 33 (feet length), A for Air brakes, G for Gardner or L for Leyland engine.

It was standard built with a drop-centre rear axle so that the low-height body floor could extend to the rear without a step causing lower ceiling height and raised seating. Similarly, a dropped front axle removed the need for a step at the front. A dropped axle bends upward at its ends. Dropped axles also lower the buses centre of gravity with increased stability, because the bodywork is lower relative to the wheels. Furthermore, larger diameter wheels can be fitted resulting in a smoother ride over a rough surface.

The Fleetline was fitted with a Gardner 6LX or 6LW diesel engine with a more powerful 6LXB option from 1968 and in 1970, the option of a Leyland O.680 engine (the CRL6).

During 1960–1968, Daimler, with the Fleetline, became the second-largest (after Leyland) double-decker bus manufacturer in Britain. London Transport, the largest British Fleetline operator, bought 2646 between 1970 and 1978. Although, the entrance doors (at front, or front and centre) compared with open entrance Routemasters, were slower to embark or disembark

passengers. Another big bus operator, was second in fleet size Birmingham with well over 1000 Fleetlines in 1965, including single-deckers. Other major operators were Manchester and the South Yorkshire Passenger Transport Executive (Wikipedia (31), Wikipedia (32)).

BON 474C, Daimler Fleetline CRG6, Gardner 6LX, Marshall B37F, 1965



BON 474C on the right.

BON 474C registered single-decker Daimler Fleetline was one of twenty-four CRG6s built with a 6 cylinder diesel Gardner 6LX 10.45 litre engine and semi-automatic gearbox. It has a Marshall 37-seat body with a closing front door entrance.

The Birmingham need for this single-deck Fleetline bus was that had to negotiate the low bridges for the intended route at Bournville and Northfield stations. It had to have the same one step to the ground entrance and length as the double-decker to

negotiate the narrow roads required by the Education Department's special services and because several of the service garages did not have maintenance pits for busses longer than the double-deckers. This ruled out new designs of longer rear-underfloor engine buses. Hence their close resemblance to a double-decker Fleetline with the upper deck removed and the same 37 downstairs seats.

It was considered to convert all of them to double-deckers when they became part of the West Midlands Passenger Transport Executive (WMPTE) in 1969, but never executed. BON 474C was retired in 1981. It was photographed 23th June 2012 at the Transport Museum Wythall (Transport Museum Wythall (24)).

NEA 101F, Daimler Fleetline CRG6, Gardner 6LX, MCW H73F, 1968



DNEA 101F.

NEA 101F was another CRG6 with a Gardner 6LX 10.45 litre 6 cylinder diesel rear engine and semi-automatic gearbox. However, this one is a double-decker with a Metro Cammell Weymann (MCW) 73 seat body and front entrance with doors.

The Fleetline chassis had a dropped centre rear axle, which meant double-deckers could have a lower maximum height while retaining good internal headroom. This enabled bus operators to use the bus on routes with low bridges currently being served by

single-deckers. West Bromwich Corporation was such an operator with NEA 101F shown in the 27th April 2024 photograph in their ivory white livery with blue trim at the Transport Museum Wythall.

The low bridge double-deckers passed to the new WMPTE on 1 October 1969 and painted in their livery, then retired during 1981 to 1982. However, repaired NEA 101F entered service

again in 1985 being sent to the Transport Museum Wythall in 1988 where it was restored to its original state plus road worthy in 2018 (Transport Museum Wythall (25)).

NOV 796G, Daimler Fleetline CRG6, Gardner 6LX, Park Royal H72D, 1968



NOV 796G.

Recreation Department as a hospitality centre at shows and exhibitions, until it was “bought for preservation by a group of Museum members in March 2005.” Fully restored. NOV 796G was photographed 25th April 2009 at the Transport Museum Wythall (Transport Museum Wythall (26)).

Another CRG6 double-decker with the same Gardner 6LX 10.45 litres 6 cylinder diesel rear engine and semi-automatic gearbox, except this bus has a Park Royal 72 seat body with front and centre folding door entrances. The bus one of the last batch of 100 buses with Park Royal bodies delivered to Birmingham City Transport during 1968 to 1969 and the only order that had front and centre doors. An order not repeated when WMPTE, which took over in October 1969.

NOV 796G was withdrawn from service early in 1983. It was then used by Birmingham City Council's Amenities &

XDH 516G, Daimler Fleetline CRG6, Gardner 6LX, Northern Counties H68D, 1969



XDH 516G.

Another CRG6 double-decker with the Gardner 6LX 10.45 litres 6 cylinder diesel rear engine and semi-automatic gearbox. However, this bus for the Walsall Corporation, had a Northern Counties body with notably different customer specifications. Seating less passengers (68) it had a much shorter front overhang and a sliding centre door behind the front axle in early models. Soon modified to add a narrow door ahead of the axle. About 100 Northern Counties body buses were in service when WMPTE took over the fleet in 1969, converting them to driver only operation in 1970. XDH 516G was photographed on the 9th May 2009 at the Transport Museum Wythall (Transport Museum Wythall (27)).

PDU 135M, Daimler Fleetline CRG6, Gardner 6LX, East Lancs H74F, 1973

Yet another CRG6 double-decker with a Gardner 6LX 10.45 litre 6-cylinder diesel rear engine and semi-automatic gearbox. However, this time it has an East Lancashire 74 seat body with a front folding door.



PDU 135M, looking the worse for wear, was photographed on the 25th April 2009 at the Transport Museum Wythall. It was restored in the same maroon and cream colours to Coventry Transport livery at the time, as seen in photographs on line. The bus appeared in the 2009 Transport Museum Wythall Guide (Keeley, et al, 2009), but no longer listed online in 2024. An online photograph shows the bus still at Wythall in 2011. Present location unknown.

LHA 870F, BMMO S21, 1967

Manufactured to the maximum single-decker size allowed at the time 36ft (11m) long by 8ft 2.5in (2.5m) wide), the entirely Midland Red integrally built bus has a BMO S21 chassis, a BMMO 10.5 litre diesel engine and semi-automatic four-speed gearbox with a BMMO 49 seat body and forward door. The underfloor engine and gearbox, situated midway under the bus, were the same as in the S17, which was an improvement on the underpowered S16. It also had S17 disc brakes on all wheels, later rear drum brakes were fitted. An innovation was the Dunlop Metalastik rubber suspension with no front axle beam. A disadvantage of the underfloor engine was the high step up to the bus floor from street level, as seen in the photograph.



LHA 870F.

LHA 870F, fleet number 5870, was one of a batch of 30 dual purpose (semi-coach) buses entirely built by BMMO at Edgbaston,



LHA 870F showing the high step up, the driver's position and comfortable interior.

Birmingham, for long distance stage services during the week and private coach hire during weekends. As a semi-coach it had more comfortable blue coloured vinyl seats. The seats, still in good condition, are those originally fitted. There are overhead luggage racks and a two-door

luggage compartment at the rear, accessed from outside. The side windows are fixed with ventilation from air forced through two roof scoops at the rear. Additional lighting and ventilation is provided by three skylight windows that can be opened. An altogether pleasing bus/coach for the time (Aldridge Transport Museum (4) and information poster, MidlandRed.net (7)). The bus was photographed at the Aldridge Transport Museum 6th April 2024.

KHW 306E, Bristol RELL6L, Leyland O680, Eastern Coach Works B53F, 1967



KHW 306E.

was a single-decker built for Cheltenham District service with a Leyland O680 11.1 litres 6-cylinder diesel under floor engine and semi-automatic gearbox. The body was an Eastern Coach Works seating 53 with a front door. Decoded RELL6L stood for rear engine, LL long (36ft, 11m) and low frame and 6L Leyland engine.

Single-deckers with their high floors and difficult stepped entrances had become unpopular by the mid-1960s. The solution was rear engine buses and as already mentioned dropped axle chassis. Some early models were not a success. The single-decker Bristol RELL6L was an exception and the most popular version. Bristol offered RE versions with two chassis frame heights for bus or coach, two engines (Gardner or Leyland) and three lengths, 36ft (11m) being the most popular length. The model was in production until the mid-1970s when, under Leyland ownership, it was replaced by the Leyland National. This particular bus was first built in 1967 with front access, rebuilt in 1969 with additional centre access. It was withdrawn from in 1981 by which time it was in the green livery of the National Bus Company. KHW 306E was photographed on the 8th August 2015 at the Transport Museum Wythall where it had been restored to its original single front door and Cheltenham District livery (Transport Museum Wythall (28)).

NJW 719E, Daimler Roadliner SRC6, Cummins V6, Strachan B54D, 1967



NJW 719E.

An early rear under floor engined single-decker bus, NJW 719E has a Cummins 9.63 litre V6-200 diesel engine and a semi-automatic gear box with a Strachans body that seated 54 while having a front and central door. It was photograph 2009-04-25 and 2009-05-09 at the Transport Museum Wythall.

First built from 1962 or 1964 (depending on reference source) to 1972, single-deck Roadliners were introduced for driver only operations, because of driver shortages, costs and driver only double-deckers were not legal before 1967.

Single-deckers with underfloor-engines created a level space for more seats, but had high entrance steps. The solution was to move the engine to the rear under the floor, resulting in a lower floor and lower entry door, but still a step up to the rear seats. These early configuration buses, including the Roadliner, were unreliable with Roadliner orders cancelled. The model was dropped when Daimler was taken over by the Leyland Group.

NJW 719E was one of six bought by the Wolverhampton Corporation (who specified Cummins engines and rubber suspension), before passing to WMPTE in 1969 until 1975. It was then sold to two other users with livery change. The Transport Museum Wythall obtained the bus in 1983 restoring it to its original condition with Wolverhampton livery, while Cummins completely rebuilt the engine free of charge (Transport Museum Wythall (29)).

OWE 271K, Bristol VRT/SL2, Gardner 6LX, East Lancashire H73F, 1972



OWE 271K.

Double-decker OWE 271K has a Gardner 6LX 10.45 litre diesel engine with a semi-automatic gearbox and an East Lancashire body seating 73 with a forward door. It was one of 18 bought by the Sheffield Corporation in 1972. VRT in the chassis code indicates a vertical rear-engine transverse with the distinct appearance of appearing to hang on the end of the bus, as seen in the rear view photograph taken at the Transport Museum Wythall 9th May 2009. This enabled a downstairs low and flat floor the length of the bus (Transport Museum Wythall (30)).

The Bristol VR had a simple and logical code for its chassis. VRT has already been explained. L instead of T meant longitudinal engine alignment. The next section, SL2, indicates a short, low-floor series 2 chassis. It could also be simply SL or series 3. VRLs were LH, long and high-floor series 1 or 2 (Wikipedia (33)).

Sheffield Corporation had a varied fleet of buses. The corporation tended to spread its orders among different constructors, probably using competition to get the best deals, rather than get the best economically from a standardised fleet. Their fleet and other municipalities, with large fleets were absorbed into the Passenger Transport Executives in 1969-70 and 1974. Sheffield's buses were absorbed into the South Yorkshire Passenger Transport Executive in 1974 when its livery was changed. They were all sold during 1979. OWE 271K was retired in 1993 "when it was bought by Phil Ireland for major overhaul and restoration to Sheffield colours" (Transport Museum Wythall (30)).

GCL 349N, Bristol RELH-4? Gardner 6HLW/X/XB, Leyland O600/O680, Brislington, 1974

The white single-decker GCL 349N was photographed 2nd August 2013 tucked away on the far side of The Shire Hall at the Transport Museum Wythall. However, it does not appear in the 2009 Transport Museum Wythall Guide (Keeley, et al, 2009) and not listed online in 2024.

The successful Bristol RE buses were built between 1962 to 1982. See the Bristol Motors section. Built for the Eastern Counties Omnibus Company new in 1974, GCL 349N, fleet



GCL 349N alongside the workshed.

number RLE740, is believed to have a Bristol RELH6L chassis, that is, RE rear engine, LH long (36ft, 11m), high frame with originally a Leyland O600/or O680 engine and an Eastern Coach Works DP (dual-purpose bus) body seating 49 with a front door.

Apparently, it was re-engined with a Gardner 6HLX in 1981 and as of 2022, it is at the Stroud Group for further preservation (Grace's Guide (7), Bristol Illustrated History (1), Bristol Illustrated History (2)).

NOE 544R, Leyland National 11351A/1R, Leyland O510, Leyland National B49F, 1976



NOE 544R in a shed in 2009 and rear view 2024 showing the warm air pod.

The single-decker NOE 544R had a Leyland O.510 8.4 litre turbocharged 6-cylinder diesel rear engine with a semi-automatic gearbox and a 49 seat Leyland National body. In spite of the rear engine, the floor was still high enough that it the front door had a stepped entrance as experienced by the author when embarking the bus for the enjoyable trip from Wythall railway station to the museum in April 2024.

NOE 544R was photographed on the 9th May 2009 and 27th April 2024 at the Transport Museum Wythall. The roof pod at the rear housed heating equipment that blew warm air into the bus at roof level. Prior to 1976 the pod was more prominent on the roof. The bus was one of 75 bought by Midland Red after the company ceased manufacturing its own buses in 1970. The batch was delivered between 1976 and 1977. It spent its last 14 years in service at Midland Red West in whose livery it has been preserved by the Wythall museum who received the bus immediately after its end of service.

During the later 1960s, British Leyland had a near monopoly on chassis construction and a large part of body manufacture, having taken over most of the bus manufacturers during nationalisation of the industry, resulting in the end of the production of these manufacturers models. An example being Bristol and the end of their two models mentioned earlier, namely DAX 610C and KHW 306E. British Leyland's replacement was the standard Leyland National,

admittedly a reliable product after initial manufacture problems and customers used to products designed to their requirements (Transport Museum Wythall (31)).

The integral, modular construction Leyland National was designed to be a highly standardised bus suitable for most bus operators thereby cutting cost production. In partnership with the new National Bus Company and the belief that driver-only single-decker buses were the future, they began an early form of mass-production using a purpose-built factory and semi-skilled labour. The project was somewhat spoilt by driver-only double-decker buses being approved in 1967, resulting in reduced production.

The Leyland National bus body was used in the construction of the Pacer diesel motor unit (DMU) railcar built between 1980 and 1987. The Pacer was intended as a short-term solution to a shortage of rolling stock. A railcar requires a strong underframe upon which a comparatively lightweight body can be placed. To reduce costs, the Leyland National was selected. In a way it worked, but it required progressive modification so that in the end it was hardly recognisable when compared with the original (Thomas 1982). Instead of conventional two four-wheel bogies, the underframe had two axles and four wheels. The disadvantage of this was a rather noisy, squealing, wobbly, rough riding and slow train. The author had experience of this travelling on a Pacer between Exeter and Paignton in 2009. The squeals were due to wheel flanges grating on curved track because it does not have flexible bogies.

Metropolitan-Cammell-Weymann

Metro-Cammell-Weymann (MCW) was formed in 1932 by the combining of two bus building companies, Weymann Motor Bodies and Metro Cammell's bus-body building division. The buses were manufactured by their respective factories until 1966.

In 1948 Leyland Motors and MCW began a twenty-year exclusive collaboration agreement regarding integral designs and body-on-chassis production in that a Leyland chassis, engine and mechanical units would be permanently attached to a heavy-duty body structure. The result was the three series Leyland/MCW Olympic built from 1949. In 1966 the Weymann factory closed and The Metro-Cammell and Weymann brand names were dropped. 1970, the parent company, Cammell Laird, was renamed the Laird Group. Half of its business was shipbuilding.

The most notable MCW bus as an independent bodybuilder being the Scania Metropolitan built from 1973 to 1978. It was the first joint venture double-decker between MCW and Saab-Scania with 662 built. Prior to this they jointly built the low sales Metro-Scania single-decker

From 1977 MCW (part of the Laird Group from 1970) also began building bus chassis. The result being the double-decker MCW chassis and body Metrobus Mk I and later Mk II with over 4000 built between 1966 to 1989.

During the 1980s MCW built the Metroliner as a standard single-deck coach or the more numerous luxury double-deck twin rear-axle coach. From 1986 to 1989 MCW built the 25 to 33 seat Metrorider minibus.

In 1989 the Laird group decided to sell its bus and rail divisions to concentrate on shipbuilding. The Metrobus design was bought by DAF (chassis) and Optare (body), becoming the Optare Spectra. The Metroliner design was bought by Optare, but not produced. The Metrorider was also bought by Optare and subtly renamed the MetroRider (Grace's Guide (8)).

WDA 835T, MCW Metrobus DR102/1, Gardner 6LX, MCW H73F, 1978



WDA 835T.

WDA 835T has a Gardner 6LXB 10.45 litre 6-cylinder diesel rear engine with a fully automatic gearbox and integral retarder. It seated 43 upstairs, 30 downstairs with a door forward of the front axle.

Concerned by the near monopoly bus chassis construction by British Leyland Motor Corporation, Metro-Cammell Weymann, after seeking collaboration with Scania and Ford, decided to go it alone and build an entirely new bus from the chassis up with a new extruded aluminium frame sectioned body. The Metrobus prototypes were on the road in 1977. Production models began in 1978, becoming a popular model and Leyland challenger.

WDA 835T's significance is that it was the fifth of five pre-production buses for WMPTE and the "true prototype of the production vehicles that would follow, including the interior trim that became standard for the next few years." A built in Birmingham, operated in Birmingham bus. The bus, photographed on the 27th April 2024, was withdrawn from service in May 1998. The Transport Museum Wythall acquired the bus in 2005, more recently restoring it to its original service condition (Transport Museum Wythall (32)).

WDA 4T, Leyland Titan B15, Park Royal, H47/26F, 1979



WDA 4T left next to BON 474C.

WDA 4T, fleet number 74, was one of an early batch of Titans rear-engined double-decker Titans manufactured by Leyland between 1977 and 1984. It has a Park Royal front door body with seating for 47 upstairs, 26 downstairs. Probably with a Leyland TL11 engine or Gardner 6LXB (Chasewater Railway Museum).

It was one of an early production batch of five delivered to WMPTE for trial. WMPTE did not order more. Instead, they were withdrawn in 1983 and sold. The bus was passed to a succession of operators in different liveries. It was converted to a coach with 43 seating upstairs, 29 below for use by Selkent Travel. During 2006 it became part of the specialist heritage bus operator Midland Classic where it was painted yellow with red trim. When photographed on the 23rd June 2012 it had passed into preservation in 2011 and was at Wythall for restoration to its original WMPTE condition (Wikimedia Commons (1)). Present whereabouts unknown. See the photograph of BON 474C for another view of WDA 4T.

B811 AOP, MCW Metrobus DR102/27, Gardner 6LXB, MCW H73F, 1984

Double-decker B811 AOP, photographed at the Transport Museum Wythall 27th April 2024, is an example of a typical Mk II delivered to Travel West Midlands (TWM). It is fitted with a Gardner 6LXB 10.45 litre 6-cylinder diesel engine with a fully automatic gearbox and integral retarder, as well as a Metro-Cammell Weymann body seating 73 (43 upstairs and 30



B811 AOP.

downstairs) with a front door. B811 AOP was withdrawn from service at the Acocks Green depot in 2009. A few were kept until 2017 for driver training (Transport Museum Wythall (33)).

During 1981, Metro-Cammell Weymann invested in new Computer Numerical Control (CNC) machining for greater precision to manufacture metal components. CNC manufacturing uses computer-generated instructions to instruct machine tools to automatically make a custom-designed product or part from raw material. The process can be used on a wide range of materials from expanded polyurethane foam to nickel superalloys (Rapid Direct and Xometry). The result was the Mk II, a redesign of the Metrobus body, using “fewer aluminium extrusions, and ‘universal’ brackets that could be used throughout the frame”.

As stated above, production ceased in 1989 with the last bus delivered to TWM in December. WMPTE, later TWM, operated over 1100 MkI and MkII buses between 1977 and the last bus in 2010 (Wikipedia (34)).



NOA 462X.

NOA 462X MCW Metrobus Mk II, 1982

Also on display and photographed at the Transport Museum Wythall 27th April 2024, was NOA 462X, WMPTE fleet number 2462, built in 1982. It is not on the museum's inventory, because it belongs to a member who offers its use on some event days. On this occasion the bus was on site for maintenance.

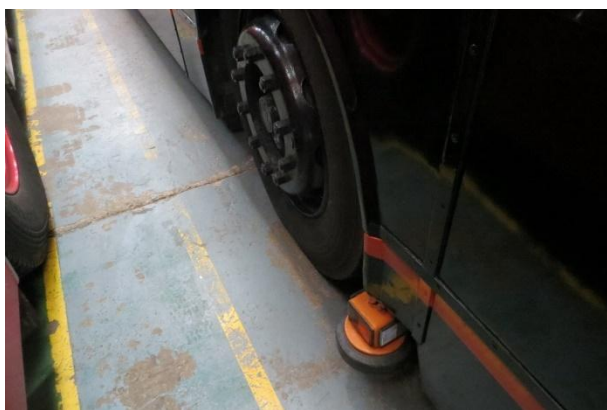


A110 WVP.

A110 WVP, MCW Metrobus Mk II, GR 133, H43/30F, 1984

Metrobus A110 WVP, fleet number 8110, had a MCW chassis and body seating 73 (43 upstairs and 30 downstairs) with a low forward door and single low step to the bus floor. It has a Gardner 6LXB 10.45 litre diesel engine with a fully automatic gearbox and integral retarder. Photographed at the Aldridge Transport Museum 6th April 2024.

An information poster on the bus informs one that the bus was one of a fleet of fourteen (in a special livery) fitted from new build with a guide wheel ahead of each front axle wheel for use on an experimental guided busway, known as Traceline 65, the first such experiment in Britain. The buses were coded GR 133. The 600m section was on route 65 at Small Heath in Birmingham. The guide wheels on either side of the bus slotted into a pair of guide rails that were built in a former



A110 WVP guide wheel.

tramway reservation, requiring no steering by the driver. The trial started in 1984, ending in 1987 after deregulation of buses services in 1986.

The buses then had their guide wheels removed, returning to normal service with new fleet numbers from 2961 to 2974. 8110 became 2970 with Travel Coventry light blue livery. After arriving at the Aldridge Transport Museum, the bus's original Tracline 65 livery was restored with guide wheels replaced and rear end changes made

late in the 1990s reversed (Aldridge Transport Museum (5)). The author was able to inspect the inside of the bus downstairs and upstairs. It is in very good condition.

F685 YOG MCW Metrider MF 150/113, 1988



F685 YOG.

MCW was the first manufacturer to produce a purpose-built small bus that was of integral construction and did not rely on a modified van chassis and body. A reminder; integral construction means the chassis and body are a single structure. Manufactured between 1986 and 1989, it was also MCW's last new bus design. The minibus with a step front entrance door seated between 25 to 33. It is believed to have a Cummins B series engine with a manual or automatic gearbox. A seat count revealed that F685 YOG seated 23.

F685 YOG was the last of 86 buses delivered to WMT and the only survivor in preservation. It was temporarily operated by WMT subsidiary Metrowest in its green and cream livery in 1994, before returning to WMT and repainted in its original silver, blue and red livery. Donated to the Aldridge Transport Museum, it has been restored in the Metrowest colours where it was photographed on the 6th April 2024 (Aldridge Transport Museum (6)).

H804 WNP, Dennis Javelin, Plaxton Paramount, 1991



F685 YOG.

H804 WNP is a single-deck, compact coach with a Dennis Javelin chassis (number 8.5SDA1926/629) and an underfloor engine. The chassis was introduced in 1986 with 225 Dennis Javelins built. The engine is most likely a Cummins C series or a Cummins ISBe with ZF transmission. This bus was built in 1991 with a Plaxton Paramount body (number 91.8HFA2403). It seats 33 with a front step entrance door and a wheelchair lift. The Plaxton Paramount body dates from 1982 to 1992 (West Midlands Buses in

Photographs (1), Wikipedia (35), Wikipedia (36)).

H804 WNP was delivered new to Hereford and Worcester Council in 1991. Later it went to Walsall Community Transport where it was registered H5 WCT. Surplus to requirement, Walsall Community Transport, donated it to the Aldridge Transport Museum. Prior to the donation it reverted to its original H804 WNP (Aldridge Transport Museum (7)).

Volvo

The Volvo Bus Corporation (formal name: Volvo Bussar AB) in Gothenburg, is a subsidiary of Volvo the Sweden vehicle manufacturer, becoming an independent division in 1968. It is among the world's largest bus manufacturers with production facilities in Europe, North and South America, Asia and Australia. The product range includes chassis, as well as complete buses and coaches. Chassis and buses were built from the 1930s (Wikipedia (37)).

MJI 2366, Volvo B10B, Plaxton Verde, 1995



MJI 2366.

Built new in 1995 as N607 FJO, Volvo B10B, chassis number YV3R13F17SA002168, Plaxton Verde B51F body number 9611.9VEL4079. Ex-Go West Midland, ex-Diamond (before Rotola), acquired by de Courcey in 2008, fleet number 66 MJI 2300.

Plaxton Verde bodies were built between 1991 and 1997. The full size, step-entrance front door, single-decker 51 seat body is mounted on a rear-engine Volvo B10B chassis. The body was mostly attached to Dennis Lance chassis. Others were DAF SB220 and Scania N113.

This bus was photographed on the 12th November 2011 at the Pool Meadow Bus Terminus., Coventry. The front door double-decker behind is de Courcey Courcey P864 VFG (fleet number 864), a Scania N113DRB with an East Lancs Cityzen seating 47 upstairs, 31 downstairs (West Midlands Buses in Photographs (2)).

Based near Coventry, close to the Coventry Airport, Travel de Courcey operated bus services in the Coventry and Warwickshire area as well as National Express contracts. It ceased trading in 2020 apparently due to the steep decline in passengers due to the COVID-19 pandemic (CWG43, Wikipedia (38), Wikipedia (39)).

Optare

Optare, 1985 to 2020, is a British bus manufacturer based in North Yorkshire that became Switch Mobility from 2020, a subsidiary of Ashok Leyland an Indian company. Optare was founded in 1985 when Leyland Bus closed its Charles H Roe vehicle bodywork in Leeds. An ex-Roe plant director backed by the West Yorkshire Enterprise Board and numerous redundant Roe employees formed Optare.

It began by building some bodies for Dennis Dominos and Leyland Cubs then minibus bodies. The first full size bus was the single-decker Optare Delta in 1988, followed by the 1995 low-floor, full size, single-decker Optare Exel and the successful 1997 Solo. The name Solo

encapsulates the so low, low-floor, made possible by placing the front axle ahead of the door, plus it had kneeling suspension for even easier access. Bodies were also made for the single-decker DAF SB220 and the double-decker MCW Metrobus. More recently, in 2022, as Switch Mobility, it has built electric double-decker Switch EiV 22s for Bengaluru and Mumbai in India (Wikipedia (40)).

N155 BOF Optare MetroRider, 1996



N155 BOF.

West Midlands Police for use as a police liaison community unit. It was donated to the Museum in 2014 still in its police colours (Aldridge Transport Museum (8), Wikipedia (41)).

The MCW Metrorider minibus design was bought by Optare and not so subtly renamed it the MetroRider. Optare then produced these buses based on the MCW Metrorider. It has a Commins diesel engine with the option of a manual or automatic gearbox and a front step entrance door. It was built between 1989 and 2000 when 1159 were manufactured.

The vehicle on display at the Aldridge Transport Museum, photographed 2024-04-06, was operated by Merry Hill Minibuses, then passed to WMT who later donated it to

Mercedes-Benz

Mercedes-Benz has produced buses since 1895 in Mannheim, Germany. From 1995, Mercedes-Benz's buses and coaches were under the auspices of EvoBus GmbH. From 2019, EvoBus GmbH Mercedes-Benz trucks and buses were managed by Daimler Truck. Since December 2021 it belonged to Daimler Truck AG. As of 12 July 2023, EvoBus GmbH became Daimler Buses GmbH. Mercedes-Benz produces a wide range of buses and coaches, mainly for Europe and Asia. Although, it has factories worldwide. (Daimler Truck (2), Wikipedia (42)).

S569 VUK, Mercedes-Benz O405N2, 1998



S569 VUK.

mounted on platforms. The N2 was a proper low-floor version. Engines were Mercedes-Benz OM447h, hII or hLA, 157 kW to 184kW). Transmission Mercedes-Benz, Allison, Voith or ZF (Busphoto, John, Wikipedia (43)).

The front door, single-decker bus, photographed 2009-08-21 is a Coventry National Express, fleet number 1569, travelling from Coventry to Solihull on route 19W. Route 19W no longer exists. It was stationary in traffic nearing Meriden Green.

Its Mercedes-Benz O405N2 chassis serial number was 88534. The Mercedes-Benz O405 was a single-deck bus manufactured by Mercedes-Benz from 1983 to 2002 either an integral bus or a bus chassis type. The O405N was a low-floor version of the high-floor O405, first in use in 1989. The O405N did not have steps at the door, however, the seats are

Doorne's Aanhangwagen Fabriek (DAF)

Founded in 1928 as Hub van Doorne in Eindhoven, the Netherlands, it changed its name to Doorne's Aanhangwagen Fabriek (DAF) in 1948, building chassis, engines, trailers, complete trucks, heavy lorries and buses. DAF Bus in turn became VDL Bus and Coach in 1993, part of the VDL Groupe (Wikipedia (1), Wikipedia (44)). VDL is probably an acronym for van der Leegte – Author).

R1 NEG, DAF DB250LF, Volvo D6A, Optare Spectra H72F, 1998

Double-decker R1 NEG has a DAF RS200 8.66 litre turbocharged 6-cylinder diesel with integral retarder and Optare Spectra front double-door body seating 72.

As stated above under the heading Metro-Cammell Weymann, the new owners of the Metrobus redesigned it, becoming the Optare Spectra in 1991. The DAF DB250 chassis was a development of its SB220, a single-decker bus chassis built from 1985, with a right-hand drive version for the UK in 1988. The Spectra kept the Metrobus's upright transverse rear engine and low-height chassis with the rear axle and suspension from the Metroliner Express. The Optare body also had an aluminium frame, although it was based on an Alusuisse structure that was developed for Hess double-decker bodies (Wikipedia (44), Wikipedia (45)).



R1 NEG after arrival in 2015 (left) and after restoration (right).

In 1997, DAF designed a new low-floor chassis while Optare developed a new version of the Spectra body to fit the DB250LF (LF = low floor) chassis. R1 NEG was the “first low-floor, easy-access double-decker in Britain to be handed over to a customer.” Namely, TWM in 1997. It was licensed in 1998 and retired from service in 2015.

National Express West Midlands presented the bus to the Transport Museum Wythall direct from end of service in June 2015. The museum returned to its original red, white and blue livery with the extensive promotional graphics when first displayed in service in 1997. (Transport Museum Wythall (34)). It was photographed 8th August 2015 after arrival at the Transport Museum Wythall and again in its original livery on the 27th April 2024.

W356 EOL, Mercedes-Benz O404, Hispano Vita C49Ft or C53F, 1992-1999?

The front door step entrance, single-deck Mercedes-Benz O404 was built as a complete coach or a coach chassis. Benz between 1992 and 1999. The chassis was available in three lengths 9.3m, 10.7m and 12m (Wikipedia (46)).



W356 EOL.

Hollywood Travels' W356 EOL coach was photographed on the 11th February 2013 on the Birmingham Road going up Meriden Hill outbound from Meriden toward Showell Lane after heavy snow on the 10th and still light snow on the 11th.

Not much information could be found about the coach, except that it has a Hispano Vita body with a front door, seating either 49 or 53 passengers. Its length is also unknown. The t in the header C49Ft seating code is interesting. In a coach it means it has a toilet. Although, it is not 100% known for certain

that it has a toilet. By the way, an uppercase T applies to an articulated treble door vehicle. This coach is also believed to have a transverse rear engine with the radiator on the left judging by other photographs seen online of the coach. Its year of manufacture is also unknown apart from the fact that the O404 was built between 1992 and 1999. A previous owner is known to have been Buckleys Coach Holidays at Doncaster around 2000 to 2003 and at Hollywood Travel at Garretts Green, Birmingham and Shirley, Solihull by 2005, but long since disposed of by Hollywood Travel.

The Vita body was built by Hispano Carrocera, S.A.), based in Zaragoza, Aragon, Spain. Founded in 1947, it was among the largest manufacturers of bus and coach bodybuilders in Europe. It became a wholly owned subsidiary of Tata Motors in India. The business closed in 2013 (Wikipedia (47)).

YM52 TSO Optare Solo M850, 2002



YM52 TSO.

Johnsons Excellbus YM52 TSO (fleet number 539) was photographed in gloomy and overcast weather on the 12th November 2011 in Coventry's in Little Park Street about to turn into Early Street with the City Council building in the background. The author understands that it was taken out of service by 2020.

The Optare (now Switch Mobility) Solo is a low-floor single-decked, integral midi bus. As mentioned previously when discussing the Optare company, the name Solo reflects

the so low, low-floor, made possible by placing the front axle ahead of the door and the kneeling suspension resulting in 200 mm (8 in) from the ground to the entrance platform. Production of the Solo began in 1998 ending in 2012 when it was replaced by the modified Solo SR.

The Optare Solo is powered by a Mercedes-Benz OM904LA 122 bhp (91 kW) or 147 bhp (110 kW) rear engine, usually with an Allison 2000 automatic gearbox. Later in its production there was the option of a Cummins ISBe 6-cylinder 185 bhp (138 kW) engine or a MAN engine and 4-speed Allison AT545 gearbox.

Seating was for 23-37 passengers depending on length. The lengths are: 7.8m (25ft 7in), 8.5m (27ft 11in), 9.2m (30ft 2in) and 9.9m (32ft 6in). YM52 TSO is 8.5m hence the M850 chassis code. Therefore 7.8m = M780, etc for other lengths. When the bigger Cummins engine became an option the rear of the bus had to be extended by 0.3m (1ft) to accommodate the engine. Chassis codes were changed accordingly. So that M780 became M810, M850 became M880, etc. All versions were 2.5m (8ft 2in) wide (Wikipedia (48)).

WSR 501, Scania L94UB, Volgren CR224L B45FW, 2002



WSR 501.

indicates urban, short distance, normal comfort and B normal bus chassis. Volgren is an Australian bus and coach body manufacturer (Wikipedia (49)).

Now for something totally different. A South Australia Adelaide Metro SouthLink bus owned by Keolis Downer. Chassis number YS4L4X20001842151) and Volgren body number VG1596 dated 2002. The single-deck, front door, 45 seat bus was photographed on the 2nd October 2017 at Mount Lofty north of the city of Adelaide. The fleet number 3206 bus is in Admet livery from the Aldgate depot (Australian Bus Fleet Lists (1)).

The Scania L94UB designation signifies: L the chassis has a longitudinal engine behind the rearmost axle, inclined 60° to the left; U

X389 NNO, Dennis Trident 2, Alexander ALX400 H47/30F, 2001



X389 NNO.

Double-decker X389 NNO, fleet number 814 of Travel de Coursey, Trident 2 chassis number SFD311BR1YGX21229, has an Alexander ALX400 body (number 0002/63) seating 47 upstairs and 30 downstairs with a front door. Built new 2001, it was acquired by Travel de Coursey in 2012 (West Midlands Buses in Photographs (3)).

The Travel de Coursey bus was photographed 2013-02-11 after recent snow on the Birmingham Road, Millison's Wood heading toward Meriden.

BV02 ASV, Dennis Trident 2, Cummins ISCe diesel, Alexander ALX400 H75F, 2002

The low-floor double-decker Dennis Trident 2 (2 stood for 2-axle) chassis bus was powered by Euro3 standard Cummins ISCe 225hp (168kW), ISBe 250hp (186kW), or ISLe 320hp (239kW) turbocharged 6-cylinder diesel engines. The ISCe 8.3 litre being the default engine which is installed in BX02 ASV. The rear engine is mounted transversely on the right side of the engine compartment with the radiator on the left side. BX02 ASV's transmission (gearbox) is a fully automatic Voith with integral retarder while the body is an Alexander ALX400 seating 75 with a front entrance door.



BV02 ASV.

The Trident 2 was built from 1997 to 2006. The buses were manufactured to conform with the Public Service Vehicle Accessibility Regulations in force from January 2001. In summary they should have easy-access low floors, with provision for the carriage of wheelchairs (which included a fold out ramp to pavement level for access) and priority seats for passengers with limited mobility. The Trident 2 was very popular with well over 2000 built. TWM ordered 360 Dennis Trident 2s in annual batches from 2001 to 2005. During “which time the manufacturers' names changed from Dennis and Alexander (separately) to Transbus to Alexander Dennis” (Transport Museum Wythall (35), Wikipedia (50)). National Express West Midlands BV02 ASV was photographed in the workshop shed on the 27th April 2024.

BV52 OCD, Dennis Trident 2, Alexander ALX400, 2002

National Express Coventry bus fleet number 4409 was photographed on the 23rd August 2009 at the Main Road, Meriden Green bus stop en route from Coventry to Solihull and Solihull Railway Station on the then 19X route (Bustimes.org (2)).



BV52 OCD.

BX54 DEU, Dennis Trident 2, Alexander ALX400, H45/28F, 2004

National Express West Midlands bus fleet number 4610 in a snow scene photograph on the 11th February 2013 on the Birmingham Road, Meriden Hill toward Millison’s Wood. It was still in service in 2024 when it was photographed in Poplar Road terminus in Solihull on the 17th April 2024 in its present livery (Bustimes.org (3), uk buses (1)).



BX54 DEU seen in 1013 (left) and 2024 (right) after 20 years of service.

557 KEJ, Volvo B12BLE, Bustech VST B51DW, 2007



557 KEJ.

The Volvo B12BLE, launched in 2001, is a suburban bus chassis with a rear-mounted transverse 12-litre Volvo DH12E engine (Wikipedia (51)). BusTech Group, founded in 1995, is an Australian bus manufacturer with production facilities in Rocklea, Queensland, Adelaide, South Australia and Burnie, Tasmania (Wikipedia (52)).

Another this time completely different bus. This Australia Kinetic-Maroola bus operated and owned by Translink in Queensland on the Gold City Coast. Fleet number 5731, built in May 2007, is a single deck bus with front and central doors seating 51. Its Volvo chassis number is YV3R8F8237A118302 with a Bustech VST body number 07/048. It was photographed 4th October 2022 at Maroochydore operating route 600 Maroochydore to Caloundra Australian Bus Fleet Lists (2)).

YX08 FLA, Volkswagen Transporter T5/Bluebird Tucana, 2008

The West Midlands Special Needs Transport Ring And Ride Service is a community service in the West Midlands for people that find it difficult or impossible to use conventional public transport in the Birmingham, Sandwell and Dudley, Walsall, Wolverhampton, Solihull and Coventry councils. Members of the public can call and register themselves or a carer or member of the family can call and register on their behalf.



YX08 FLA.

The vehicle in the photograph was photographed on the Birmingham Road at Millison's Wood heading toward Meriden Green in an overcast and wet day on the 11th January 2013. It is a Volkswagen Transporter T5/Bluebird Tucana, registration YX08 FLA, now known as a Mellor Tucana.

Registered in 2008, it is a wheelchair-accessible minibus manufactured by Mellor Coachcraft in Rochdale, England. Entering production in 2005, the Bluebird Tucana body was attached to the Volkswagen Transporter T5 chassis. Over 650 were built before Bluebird Vehicles entered

administration in 2014. Capacity is 15 seats or 4 wheelchairs. All vehicles are fitted with a rear door access lift. Apart from the side door, there is also has a narrow emergency door at the rear on the driver's side. It has a 2.0-litre 4-cylinder Euro-6 engine with a 7 speed direct-shift gearbox or 6 speed manual (Wikipedia (53)).

Mercedes-Benz Citaro

The low-floor, air conditioned, single-decker Mercedes-Benz Citaro, first manufactured in 1997 (as the Mercedes-Banz O405), is built as a rigid or articulated, bus available in a range of configurations. Over 55000 Citaros were manufactured by 2019. Present model examples are

the standard 12m Citaro, the shorter 10m Citaro K and the 18m articulated Citaro G. Hybrid versions are available for all three and full electric standard and articulated versions.

There is also a Citaro LE (low-entry). There is a difference between a low-floor and low-entry bus. Low-floor buses are fully low-floor buses. That is, it extends the length of the bus. Low-entry buses have step-free access to a part of the bus, usually from the front to the middle door, or thereabout if it has a single front door. The higher rear floor permits less complicated maintenance of the rear engine unit.

From 2005 the Citaro was built with Euro IV, Euro V and European Emission Vehicles standards compliant engines. The standard engines for the Citaro and Citaro K, at the time of website access, are the Mercedes-Benz OM 936 h or OM 936 engine with Voith Diwa.6, 4-speed, automatic transmission. The G model has the option of the OM 470 or OM936 engine with Voith DIWA.6 transmission. The LE model has an OM936 engine with Voith Diwa.6, 4-speed, automatic transmission. All engines are 6-cylinder in-line. Standard seating for the Citaro is 31 (max 106), the K 25 (max 86), the G 42 (163) and the LE 34 (106) (Mercedes-Benz (1), Mercedes-Benz (2), Wikipedia (54), Wikipedia (55)).

BJ03 ESV, Mercedes-Benz Citaro O405GN Bendibus, 2003

BJ03 ESV, fleet number 6015, was one of 10 new low-floor, single-decker, articulated buses for National Express Travel Coventry in 2003. G indicates 3-axle, N low-floor. The articulated bus can accommodate 42 seated passengers to a maximum of 164 with standing passengers (Mercedes-Benz (a)).

Colloquially known as "bendy buses", they were a rarity in the UK compared with other countries. Probably due to the prevalence of narrow streets in large parts of the cities. At most there were about 500 in service in the UK at one time and most in use in London.

Early in 2000, eleven O405s were delivered to 2000 TWM. Late in 2003 Travel Coventry bought 10. The 11 TWM buses were transferred to Coventry with one scrapped after a depot fire. The remaining 10 ex-TWM were withdrawn from service in late 2011. The Coventry 10 were withdrawn in March 2018 (Wikipedia (56)).

6015 was photographed 15th September 2012 at the then Ricoh Arena, now Coventry Building Society Arena, Coventry. Most of the buses were scrapped. However, 6015 survived, being



BJ03 ESV outside and inside looking forward over the join between the two halves.

owned by the Travel Coventry - Bus Preservation Group with restoration in progress to its original condition (Windle 2023).

E VG 4662, Mercedes-Benz Citaro O530 II Facelift



E VG 4662.

The single-deck, three door, rear engine, three axle, articulated bus was photographed 13th February 2014 in Kurt-Jooss Straße (street or road) at the Thea-Leymann Straße bus stop. The bus stop is opposite a park which is in front of the then Express by Holiday Inn, now apparently a Premier Inn. The bus route 147 on the bus destination board has also changed to 145.

The bus, fleet number 4662, was operated by EVAG, or to give its full name Essener Verkehrs-AG. Verkehr literal translation is traffic. In this instance transport or service would be a better English translation. EVAG

was the city of Essen transport company. September 2017, the company merged with the Mülheimer VerkehrsGesellschaft (MVG), which was in turn joined by the Via Verkehrsgesellschaft, to become Ruhrbahn (Wikipedia (57)).

The Citaro O530 II Facelift, as the name implies, featured a redesigned exterior from 2006. Most noticeable is the changed front and rear design. The front below the windscreen was also given a smooth surface suitable for front advertising minus the Merced badge. From 2012, the O530 II, or C2 (second generation) could have Euro 6 engines installed (Wikipedia (54)). Judging by what can be seen of the front of E VG 4662 and compared with an online photograph of the bus, it is a pre-2012 model (BUS-BILD.de).

YNH-359, Van Hool New AG300, 2008



YNH-359.

The 3 door, low floor, articulated bus, was photographed on the 28th May 2009 on Bessenveldstraat in Brussels having left the Diegem bus stop travelling west toward the Eurocontrol building.

Fleet number 5265 is operated by the Vlaamse Vervoersmaatschappij De Lijn (The Line) a Flemish government public transport company. The bus chassis and body was built in 2008 by Van Hool at their Belgian factory in Koningshooikt. It has a DAF PE265C Euro5/EEV diesel engine with Voith or ZF Ecomat II transmission, seating 48-60. In

production 1992 to 2018 (Wikipedia (58)).

BF60 OFA, Mercedes-Benz Citaro O530, 2010

Single-decker BF60 OFA was registered new in 2010. The Diamond Bus North West bus, fleet number 30030 in Signature livery, was operating route number 82 from Coventry to Solihull.



BF60 OFA.

northward to Ramsey route 3.

Photographed on the 22nd December 2011 in winter sun on the Birmingham Road at Millison's Wood heading toward Meriden (Bustimes.org (4)).

NMN-257-M Mercedes-Benz Citaro C2 O295N, B41F, 2019

Low-floor, front door, single-decker NMN-257-M fleet number 257, 41 seat configuration, was manufactured in 2018. Although, registered new in service in 2019 to Bus Vannin on the Isle of Man. It was photographed on the 29th February 2024 at Douglas bus stand D about to depart

PMN-270-D Mercedes-Benz Citaro C2, O295N, B41F, 2020

Low-floor, front door, single-decker PMN-270-D, fleet number 270, 41 seat configuration, was manufactured and registered in 2020. In service with Bus Vannin on the Isle of Man, it was photographed on the 29th February 2024 at Ronaldsway Airport en-route from Port St Mary to Onchan, via Douglas route 2.



Bus Vannin NMN-257-M (left) and PMN-270-D (right). NMN and PMN are not in error.

Wrightbus

Wrightbus chassis and bodybuilders, at Ballymena, Antrim, Northern Ireland, was established in 1946 as Robert Wright & Son Coachbuilders. Its first bus, in 1950, was a front door single-decker for the Tyrone County Education Committee, known as the Commer bus. During 1973, 20 front door single-decker buses, branded Superbus, were delivered to Greater Manchester Buses, known locally as GM buses.

2001 they tested an articulated bus on the London route 207. 2002 was the year the future popular low-floor double-decker Eclipse Gemini, was introduced. In 2004 the 1000th bus was delivered to Arriva London.

2012 Wrightbus introduced the New Routemaster to service in London with its three entrances, the rear one being a hop-on-hop-off door as in the old AEC Routemaster, however, soon to become an enclosed door.

2014, the StreetDeck double-decker diesel was introduced followed by hybrid-electric vehicle (HEV), full-electric (battery electric vehicle (BEV)) and hydrogen powered (hydrogen fuel cell electric vehicle (FCEV) versions. The world's first hydrogen powered double-decker bus the StreetDeck Hydroliner FCEV was officially in service in 2021 in Aberdeen with the First Group bus fleet.

The present range of UK buses are: the double-decker StreetDeck Hydroliner FCEV, StreetDeck Electroliner BEV introduced in 2021; the 2014 introduced Ultroliner EU6 diesel); the single-deckers GB Kite (Hydroliner FCEV and Electroliner BEV in 2023; and the GB Hawk (EU6 diesel) and Streetlite (Ultroliner W/F and D/F) (Wrightbus (2), Wrightbus (3)).

LK60 HPJ, VDL SB200, Wrightbus Pulsar, 2010



LK60 HPJ with yellow Duck behind.

A First London Bus company hydrogen fuel cell single-decker, front door bus, fleet number WSH62993, at Waterloo Station, London, photographed 10th August 2013 with a Duck in the background. This Pulsar was one of the trial buses for Transport for London in 2010. Having worked with hydrogen many years ago, the author does not believe hydrogen buses are a good idea. Hydrogen is highly flammable.

The bus has a VDL Bus & Coach SB200 chassis with Wright Pulsar body and hydrogen fuel cell technology. VDL is a Netherlands based bus manufacturer, which

is an amalgamation of a number of bus building companies in the VDL Group (Wikimedia Commons (2)).

The Ducks, operated by the London Duck Tour, are famous Second World War amphibious vehicles that were rebuilt and modified to conform to strict road and river authority's safety regulations. The United States General Motors Corporation (GMC) name for the original vehicle was DUKW. D indicated a vehicle designed in 1942, U meant utility vehicle, K indicated four-wheel drive ability and W dual-rear axle arrangement. It was built with a Banjo axle GMC 6x6 chassis with a GMC 270 cubic inch (4424 cc) 91hp (68kW) engine and transmission. Speed in water 5knots (9kph, 6mph), on land 80kph (50mph) (Britannica, Wikipedia (59)).



YJ12 GUC.

YJ12 GUC, Optare Versa Hybrid, 2012

Black Diamond liveried, fleet number 30132, bus in snow scene photograph 11th February 2013 Birmingham Road, Meriden Hill toward Millison's Wood.

The Optare Versa Hybrid was introduced in 2010. A hybrid electric bus combines an internal combustion engine propulsion

system with an electric propulsion system. Usually a diesel engine. The aim is to use less fossil fuel.

YX62 HKD, Ford Transit 125 T460, 2012



YX62 HKD.

Another West Midlands Special Needs Transport Ring And Ride Service minibus for people that find it difficult or impossible to use conventional public transport (see YX08 FLA). This minibus is a Ford Transit T460 with rear door wheel chair access. It seats 17 plus the driver. Obviously less seating with wheelchairs.

Unfortunately, no other information regarding this minibus (fleet number A267) could be found. It was photographed on the 17th April 2024 in Drury Lane, Solihull.

LTZ 1087, Wrightbus New Routemaster, 2013



LTZ 1087 New Routemaster.

The low-floor, double-decker diesel-hybrid New Routemaster, built by Wrightbus was in production from 2011 to 2017 with 1000 manufactured. It has a front, central door and rear door that could be left open as a platform entrance. It has a front and the rear staircase. The rear entrance was soon kept closed between stops with front boarding only. Passenger seating is 80, 87 without a wheelchair. Upper deck seating is 40. Lower deck 22 seats with 1 wheelchair and 18 standing. 25 standing without a wheelchair.

London United New Routemaster LTZ 1087, fleet number LT87, in compulsory London Red livery allocated to Hammersmith route 9, was photographed 13th November 2013 in London on the Kensington Road, Knightsbridge (London Reconnections).

The hybrid diesel-electric bus is driven by a battery-powered electric motor that is charged by a diesel fuelled generator and by energy recovered during braking, known as regenerative braking. Kinetic energy, or potential energy, that is generated when a moving vehicle is slowed by braking can be converted into a format that can be immediately used or stored until needed. To do this, the bus has a Euro V compliant Cummins ISBe 4.5 litre. 4-cylinder, 185 hp (138 kW) engine with an in series 18 kWh Microvast Lithium Titanate battery and Microvast LpTO, Siemens ELFA2 electric traction motor. As at April 2023 all electric conversion buses were being trialled.

The bus is not seen as a success. Mainly because of the three doors passengers. Passengers can board without touching their oyster cards to the reader and the one-person operation driver cannot check passenger payment. Apart from loss of revenue, the readers are used to indicate

passenger demand. Due to payment evasion, the data are an underestimation leading to reduced bus provision, resulting in insufficient buses on routes. Limiting payment to the front door reader only will negate quicker embarking and disembarking, making the bus the same as other single door buses (Wikipedia (60), Wikimedia Commons (3)).

YX51 AYE, Volvo B7TL, Plaxton President low height, 2001



From left YX06 CXN, YX51 AYE, YX08 FXD.

Somewhat out of chronological order, this bus and the following two, seen in a single photograph, have been grouped here because they relate to three Volvo buses seen together at a Scarborough depot next to Tesco on the 9th July 2019. Followed by more recent Volvo Wright Eclipse buses.

East Yorkshire Motor Services YX51 AYE, fleet number 589, is the central bus in the photograph with a Plaxton President body. Notice the

roadside tree branch protectors on the upper left corner of the buses. An easy way to identify whether a low-height or full-height bus, the low-height bus upper deck windscreen has a central vertical dividing bar (Basford).

The Volvo B7TL is a low-floor double-decker bus chassis introduced in 1999 with a transverse rear engine and radiator on the right. The engine is a 7.3 litre Volvo D7C with a ZF Ecomat or Voith DIWA gearbox. It replaced the 2-axle version of the Volvo Olympian (Wikipedia (61)).

YX06 CXN, Volvo B7TL, Wright Eclipse Gemini, 2006

East Yorkshire Motor Services bus fleet number 712 at Scarborough depot next to Tesco is the bus on the left in the photograph this time with a Wright Eclipse Gemini body (Bustimes.org (5)).

YX08 FXD, Volvo B9TL, Wright Eclipse Gemini, 2008

East Yorkshire Motor Services bus fleet number 742 at Scarborough depot next to Tesco in the bus on the right in the photograph with a seemingly identical Wright Eclipse Gemini body as YX08 CXN (Bustimes.org (6)).

The low-floor double-decker B9TL, built from 2002 until 2018 superseded the B7TL. The B9TL has the same chassis as the B7TL. The main difference being a Volvo D9A 9.3 litre engine with the added addition of a ZF EcoLife transmission (Wikipedia (62)).

BX12 DFY, Volvo B7RLE Wright Eclipse 2, B43F, 2012

Built by Wrightbus between 1999 and 2019, the Wright Eclipse is a low-floor single-deck bus body. It was named Eclipse after the solar eclipse that was visible in the UK in 1999. Eclipse 2 (second generation) production began in 2008 and Eclipse 3 (third generation) in 2015 Wikipedia (63). National Express West Midlands, fleet number 2122 Crimson livery, at Walsall bus terminus, seen below, was photographed on the 6th April 2024 (Bustimes.org (7), uk buses (1)). The emergency exit is barely visible at the second narrower window from the right. The three smaller rear windows are over the higher deck section.

BX13 JSY, Volvo B7RLE Wright Eclipse 2, B43F, 2013

National Express Coventry, fleet number 2159 Blueson livery, at Trinity Street bus terminus, Coventry, photographed on the 30th April 2024. BX13 JSY, seen below, is included here simply to show the bus in a different National Express livery.



BX12 DFY (left) and BX13 JSY (right).

BT66 MVR, Volvo B5TL, Wright Eclipse Gemini 3, DP41/28F, 2016



BT66 MVR 6th July 2019 at Whitby.

The low-floor, long wheelbase, twin axle, double-decker Volvo B5TL Euro6 compliant chassis replaced the B9TL as Volvo's Euro 6 compliant double decker product for the UK and Ireland markets. The diesel engine is a 4-cylinder, 5.1 litre D5K-240, rated at 240 bhp/177 kW. The move to a smaller engine was one of the weight-reduction measures applied to the new bus in conjunction with Wrightbus bodybuilders. The result was 1000kg weight reduction compared with its predecessor. The transmission is a ZF EcoLife Type 6AP1003B. The body is a

Wright Eclipse Gemini 3 (Bustimes.org (8), uk buses (2)).

The different Gemini, Gemini 2 and Gemini 3 bodies were essentially 1st (2001-2009), 2nd (2008-2018) and 3rd (2013 to present) generation design (or facelift) versions (Wikipedia (64), Wikipedia (65)).

The York and Country Transdev Coastliner, BT66 MVR, fleet number 3633, route 840 from Leeds to Whitby via York, was photographed 6th July 2019 at Whitby prior to returning to Leeds. The Transdev Coastliner, route 843, also operates from Leeds via York to Scarborough. From York the author and wife travelled on the Transdev Coastliner 840 bus to Whitby a 2 hour 17 minute trip excluding a comfort stop after 52 minutes at Malton bus station.

Excellent busses. Semi-reclining seats, 4g Wi-Fi and USB points (not that we used them), automated GPS managed guide talk of interesting places along the route, scrolling screens showing next stop and audio announcements to assist visually impaired passengers. ISRI (Isringhausen) seats are installed. Ega coach type upstairs and Civic V3 downstairs. ISRI seats

are ergonomically shaped to ensure a comfortable seating position for long journeys. The upper deck's 41 Ega seats are moquette trimmed with leather headrest. Moquette is woven short and dense pile fabric. The lower deck has 18 similarly finished Isri Civic V3 seats with four wider



BT66 MVU fleet number 3635
photographed 10th July 2019 at York railway station.

spaced Ega coach seats across the rear and tip-up seats in the front low floor area. Some seats are grouped around tables club style for the use of laptops and tablets. There is a single wheelchair position. Small luggage racks are provided. a 90kg capacity. Maximum passenger capacity is 74 with a maximum of 69 seated. Windows are tinted double glazed with skylight roof panels, including an emergency exit window incorporated in one of the roof panels. It has low energy lighting. It has wood effect flooring and litter bins incorporated on both decks (Cole 2016). All this in a scheduled bus service, not a touring bus!



SL16 YPM.

SL16 YPM, Wright StreetDeck, H45/29F, 2016

The National Express West Midlands bus, fleet number 3302, was photographed on the 6th April 2024 at the Walsall Bus Terminus (Bustimes.org (9), uk buses (1)).

The Wright StreetDeck is an integral double-decker bus manufactured by Wrightbus since 2014, originally delivered as standard with a Daimler OM934 diesel engine (Daimler OM934 5.1 litre 4-cylinder Euro 6 or Daimler OM936 7.7 litre 6-cylinder Euro 6). Hybrid-electric, full-electric and hydrogen-powered variants have subsequently been produced. Production of the StreetDeck range was briefly suspended when Wrightbus entered administration in September 2019 (Wikipedia (66)).

BU16 UWO, Volvo B8RLE, MCV Evolution B46F, 2016

BU16 UWO is a full size, single-deck bus with a Volvo B8RLE chassis (number YV3T7U520FA171524). It has a 7.7-litre rear engined, low-entry bus chassis, as indicated by RLE in in the Volvo chassis code. The chassis was first built in 2013. The engine is probably a Volvo D8K (Euro VI) or D8C (Euro III/V) with either ZF EcoLife, Voith DIWA.6 or Volvo I-Shift transmission. The body (number NB593) was built by Manufacturing Commercial Vehicles MCV) an Egyptian manufacturer that has built bus bodies in the UK since 2002 after the purchase of Marshall Bus. It has a front door and seats 46 (Wikipedia (67), Wikipedia (68), Wikipedia (69))



BU16 UWO.

Owned and operated by Centrebus Chaserider, the bus was photographed 6th April 2024 outbound on Northgate Road, Aldridge, Walsall (Bustimes.org (10), West Midlands Buses in Photographs (4)).

SF68 LJZ, Fiat Ducato Mellor Orion, 2018



SF68 LJZ.

SF68 LJZ, fleet number 3, is a bus operated by West Midlands Bus on behalf of Walsall Community Transport a charitable not-for-profit organisation. The bus was photographed on the 6th April 2024 at the Walsall Bus Terminus (Bustimes.org (11)).

The low-floor minibus has a Fiat Ducato chassis and ZF 9 speed auto or 6 speed manual transmission. The front mounted and front-wheel drive engine is a 180 bhp (130 kW) Iveco F1AE3481E diesel. It is Euro6 compliant. From 2019 an electric version, the

Orion E, became available. The Mellor Orion body seats 16 passengers. It has a front door with a fold-out ramp with a rear driver side emergency exit door. Rear access doors and fold-out ramp with lowering rear air suspension are optional. It can be fitted to accommodate 5 wheelchairs. The longer Orion Plus seats 20 (Mellor Bus, Wikipedia (70)).

YJ19 HXU, Optare Solo SR, 2019



YJ19 HXU.

Production of the Optare Solo SR began in 2007 to the present. Its standard engine is a Cummins B series/ISB/TSBe, alternatively a Mercedes-Benz or Man engine. Like the original Solo it is low entry, low floor with a rear engine. Transmission is Allison or Voith DIWA.

Solo SR is a completely redesigned Solo (see YM52 TSO Optare Solo M850, 2002). Most notably the front curved windscreen flowing to the sweeping streamlined roof with an integrated front destination and air conditioning unit under the front part of the roof, as well as curved side windows. These

features are clearly evident in Flexibus YJ19 HXU (fleet number 31). The front wheels remain forward of the door and the so low, low-floor. The destination box of the older Solo is optional.

The Solo SR is available in 7.1m, 7.8m, 8.9m and 9.6m lengths, all with a 2.35m wide body. However, the 8.9m and 9.6m versions are also available with a 2.5m wide body and up to 37 seats in the longest version. Since 2012 the body weight has been reduced with a cost reduction and improved fuel economy. Flexibus YJ19 HXU built in 2019 presumably has all the newer features. It was photographed on the 16th May 2024 at a Poplar Road bus stand in the centre of Solihull (Bustimes.org (12)).

Since 2023 diesel Solo SRs are due to be in service early in 2024 for a large Stagecoach Group order will have Euro IV compliant diesel engine (Wikipedia (48)).

Alexander Dennis

Dennis Brothers Limited (Ltd) was created in 1895 in Guildford manufacturing bicycles. In 1898 they began manufacturing their own design motorised tricycles with motor cars in 1901 leading to numerous and successful buses (refer back to Dennis Brother Limited). The shareholders sold the business to the Hester Group in 1972. Subsequently it had numerous owners, including TransBus International, culminating in now being part of Alexander Dennis (Alexander Dennis (2)).

The British bus manufacturer, Alexander Dennis based in Larbert, Scotland, is the biggest bus and coach manufacturer in the UK. It has manufacturing plants and partnerships in Canada, China, Europe, Hong Kong, Malaysia, New Zealand, Singapore, South Africa and the United States. Originally, Walter Alexander Coachbuilders of Falkirk, established in 1947, via mergers, acquisitions and changed ownership, including well known bus chassis and body manufacturers such as Plaxton, TransBus and Dennis, it became Alexander Dennis (Wikipedia (71), Wikipedia (72)).

In 2005, Alexander Dennis developed the new version of the Trident 2 chassis for its Enviro400 double-decker. Initially it had the Cummins ISCe Euro3 compliant engine. it was replaced by the ISBe 6-cylinder Euro4. Other modifications included a longer front ahead of the front axle and a different shape fuel tank (Wikipedia (50)).

Bus chassis and body building has evolved from diesel powered to hybrid-electric to full electric. Culminating in the present range of Enviro buses.

The current range of complete buses available in the UK and Ireland are: single-deckers Enviro100EV, Enviro200, BYD AD Enviro200EV; double-deckers Enviro400, Enviro400EV (battery-electric), BYD AD Enviro400EV (battery-electric), Enviro400FCEV (hydrogen-fuel cell) Enviro400ER (hybrid) and three axle Enviro400XLB. Six Plaxton body coach models are not included (Alexander Dennis (3)).

At the expense of chronological order compared with buses already presented, the Enviro examples are grouped together below from 2012 to the present.



KX62 BSV.

KX62 BSV, ADL Enviro200, B37F, 2012

KX62 BSV is a front door Stagecoach Beachball livery bus, fleet number 36753 photographed at Solihull railway station terminus On the 17th April 2024 (Bustimes.org (13), uk buses (3)). The emergency exit with a much narrower window is visible ahead of the rear wheel.

The Enviro200 is a low-floor single-deck bus. Built in 2012, KX62 BSV is a third generation (2009-2018) Enviro200. This included major chassis redesign and front change to comply with European Community

Whole Vehicle Type Approval (ECWVTA). Quite a mouthful. Externally, LED daytime lights were added below the headlights, the driver side emergency door was relocated while front and rear bumpers were redesigned and new bus lengths, plus a EuroV engine. The standard Enviro200 engine is a rear transverse mounted 4 cylinder, 4.5 litre diesel Cummins B4.5 (Wikipedia (73)). Notice the radiator vent on the right rear in the photograph.

The Enviro200 has in various lengths. 8.9m, 9.7m and 10.8m with, respectively, wheelbases of 3.9m, 4.7m or 5.8m and seating, respectively, 30, 34 or 40 (Alexander Dennis (4)).



YY14 WFA.

YY14 WFA, ADL Enviro200, B34F, 2014

Stagecoach Local livery bus, fleet number 37110, photographed 30th March 2024 on the A45 from Coventry to Solihull on the 82 route, soon to turn off on a slip road to the Birmingham Road then passing through Millison's Wood and Meriden (Bustimes.org (14), uk buses (3)). Compare this colour scheme with KX62 BSV above.

GWU37, Alexander Dennis/Kiwi Bus Enviro200, 2013.

This Go Wellington, New Zealand bus, fleet number 4238, was photographed on the 5th October 2017 in Wellington. The low-floor, single-deck, dual door bus seats 35 passengers. The rear door is rather narrow. Probably used as an emergency exit. Its rear engine has automatic transmission. This is clearly evident from the KIWI Bus Builders site photographs that show the low-floor with rear engine. While the driver has an accelerator and brake pedals. No clutch. The chassis number of this bus is SFD6F3BR5DMY63534 (KIWI Bus Builders, Australian Bus Fleet Lists (3)).



GWU37.

SK15 HBZ ADL/TransBus Enviro300, B41F, 2015

The low entry, low floor, single deck, Stagecoach fleet number 27219 bus in local livery, was photographed 17th April 2024 at the Solihull Railway Station terminus (Bustimes.org (15), uk buses (3)). Inside, above the door, was a notice stating the total passenger capacity 70. 41 seated, 29 standing. Or 39 seated with one wheelchair and 30 standing. Or 36 seated and 34 standing.



SK15 HBZ.

Previously the TransBus Enviro300, the Alexander Dennis Enviro300 is an integral, light-weight, full-size single-decker with more than 1000 built from 2001 to 2015. Production ceased with the introduction of a long-wheelbase Enviro200 MMC.

Between 2011 and 2015, Stagecoach bought, in batches of 50, 28 and 28, Enviro300s on a Scania K230UB chassis with a diesel Scania DC9/OC9 engine. Transmission uncertain. Could be ZF Ecomat/EcoLife, Voith DIWA or Allison (Wikipedia (74)).



SK15 HDA.

SK15 HDA, Alexander Dennis Enviro400 MMC, H45/32F, 2015

SK15 HAD Oxford Stagecoach fleet number 10438 bus, with front door and front stairs Bustimes.org (16). It was photographed on the 16th January 2019 in Oxford.

The Enviro400 MMC is a low-floor double-decker bus in production since 2014, replacing the Enviro400. Compared with the original Enviro400, the MMC is a body redesign with new front and rear. Length is 11.5m with a 6.4m wheelbase. Standard seating is 85, 51 in the upper deck, 34 in the lower deck. It has 1 wheelchair space with a

manual ramp at the front door. The standard rear transverse mounted engine is Euro6 compliant Cummins B6.7 (6 cylinder 6.7 litre diesel) with a Voith DIWA transmission (Alexander Dennis (5)). The radiator is on the right as indicated by the radiator vent in the photograph. An emergency exit door is immediately in front of the vent.



SN65 OJA (left) photographed in 2021 and SN66 WFL (right) in 2018.

SN65 OJA, ADL Enviro400 MMC, 2015

Johnsons Excelbus new route 82 service contract started 25th February 2019. April 2022, they sold their Excelbus operations to Diamond Bus Limited, a subsidiary of Rotala PLC (Johnsons Coaches, Bustimes.org (17)).

The bus (fleet number 322), shown above, was photographed on the 8th January 2021 travelling uphill past the Millison's Wood boundary on the Birmingham Road toward Meriden. The bus is believed to now at Cardiff Bus, Wales.

SN66 WFL, ADL Enviro400 MMC, H43/30F, 2016

SN66 WFL National Express West Midland bus in Platinum Price Branding livery (Bustimes.org (18), uk buses (1)) was photographed above at roughly the same location as SN65 OJA also in snow, although three years earlier on the 18th March 2018. It is also heading toward Meriden is this route X1 bus (fleet number 6842) from Coventry to Birmingham. The route was previously numbered 900.

SN67 XDC, ADL Enviro200 MMC, B39F, 2017



SN67 XDC.

This Stagecoach fleet number 26210 bus, in Gold (luxury brand) livery with posh stitched leather upholstery, WiFi and USB charging, was photographed on the 15th August 2019 at Atherstone north-west of Coventry (Bustimes.org (19), uk buses (3)) on route 48. The Stagecoach Group operate a large number of Enviro200 MMCs in England, Wales and Scotland.

The low floor, integral, single-deck Enviro200 MMC superseded the Enviro300.

It is available in numerous lengths from 8.9m (29ft 2in) to 12.8m (42ft). The standard engine is a Cummins ISBe with Voith, Allison or ZF transmission (Wikipedia (75)). Notice the same rear engine mounting with radiator on the right and position of the emergency exit as in the Enviro200.

SN67 XDU, ADL Enviro200 MMC, B39F, 2017

A recent addition to the range of Stagecoach liveries is the Distance colour scheme to be used on longer distance routes. SN67 XDU, fleet number 26225 (Bustimes.org (20), uk buses (3)) was photographed 14th May 2024 at the Coventry Trinity Street terminus having been recently repainted in the new livery. With the same luxury features as the previous bus Sn67 XDC.

YW68 PFK, ADL Enviro200 MMC, 2018

LandFlight Travel Services operates from Solihull. Primarily a coach service operator offering local and long distance tours with large, midi and mini size coaches. In conjunction with Transport for West Midlands, it also provides a local scheduled bus services from Solihull covering 7 routes using a fleet of 14 ADL Enviro200 MMC buses registered from 2018 to 2022 with one 2016 ADL Enviro200 (LandFlight Travel Services, Bustimes.org (21)).



SN67 XDU (left) in Coventry and YW68 PFK (right) in Solihull.

YW68 PFK was photographed on the 27th April 2024 at the Solihull Poplar Road terminus after a trip from Wythall. After a driver change, the bus is about to load passengers for a return trip.

SB 62 NG, Scania K360IB, Coach Design, C51D, 2017



SB 62 NG.

Fleet number 62 the single deck, step entrance, coach chassis K360 code indicates a longitudinally, straight-up mounted Euro VI DC09 (9 litres) 360hp (268kW) engine at the rear behind the rearmost axle. I indicates the chassis is designed to short to long distance intercity travel with normal comfort and B that it is a normal bus/coach (Wikipedia (76)). The Australia manufactured Coach Design body seats 51. Australian Bus Fleet Lists (4) says it has D, dual entrances. However, the author and my wife travelled on this bus during a day

Adelaide Sightseeing tour from Adelaide to Mannum on the Murray River and noted only one entrance with one emergency exit behind the driver. Incidentally, coach was very comfortable and air-conditioned. The tour also included a trip on the Murray River.

The coach is listed as owned by SeaLink, a large Australia marine transport company. Their base in Adelaide operates a large number of coaches and the ferry service to Kangaroo Island. SN 62 NG is one of 6 coaches in SeaLink livery with Adelaide Sightseeing signwriting, operated on behalf of Adelaide Sightseeing.

There is some confusion regarding the registration of the coach. The author's photographs on the 10th October 2018 clearly show the registration SB 62 NG. However, Australian Bus Fleet Lists (4) shows only registrations SB 61 NG and SN 62 HG, both indicated having Adelaide Sightseeing signwriting.

SB 19 MV, Scania K410IB, Coach Design, C52D, 2017



SB 19 MV.

SB 19 MV, fleet number 273 (Australian Bus Fleet Lists (5)), was photographed on the 10th October 2018 at the pleasant, clean and bright Adelaide Central Bus Station while waiting for the previously mentioned coach tour. Passengers board undercover inside the building.

It is a single deck, step entrance, 3 axle coach with a Scania K series chassis and a Euro VI DC13 (13 litres) 410hp (306kW) engine at the rear behind the rearmost axle. Same as SB 62 NG above, has an IB code. That is, a short

to long distance intercity bus/coach with normal comfort (Wikipedia (76)).

The Coach Design body number 946 constructed date is June 2017, seating 52 with dual doors, toilet and lift. Inspection of photographs on the operator Stateliner premier coach services, the

main door is at the front left with the second entrance being the wheelchair lift door on left side over the front rear axle.

Stateliner premier coach services, of South Australia has been in existence for over 50 years. It specialises in express routes services, charter, day tours and parcel freight in South Australia. At the time of writing, it possessed 8 of this model coach with a newer fleet of 10 (2002 to 2006) Scania K124EBs, all of which are full size coaches (Stateliner premier coach services).

BU18 OTK, Volvo B11RT, Caetano Levante 3, C59F, 2018



BU18 OTK.

The 2 and 3 axle Volvo B11RT chassis has an Euro VI Volvo D11K (11 litres) 6-cylinder 380hp (280kW), 430hp (316kW) or 460hp (339kW) rear mounted diesel engine with the radiator on the left. It has a Volvo I-Shift automated transmission and integrated retarder. An option is the ZF Ecolife automatic with integrated retarder on the 380hp (280kW) engine only (Volvo B11R, Wikipedia (77)). The rearmost axle wheels are powered.

The 3 axle, Single deck, step entrance, BU18 OTK, fleet number 273 (Bustimes.org (22)), was photographed at Coventry's Pool

Meadow bus station on the 1st July 2024 operating the route 707 from Birmingham via Coventry to London Heathrow Airport by Woods Coaches on behalf of National Express in National Express livery. The coach seats 59 or 57 with one wheelchair, no standing passengers. It has a hold for 1100kg luggage.

The Caetano Levante 3 is a coach body built by Salvador Caetano exclusively for National Express in the United Kingdom specifically designed to comply with the Disability Discrimination Act 2005. It enables “able-bodied and wheelchair passengers to enter the vehicle via the front door, using a combination of a front-mounted lift and two single pedestal-mounted seats in place of the traditional double at the front nearside of the passenger area” (Wikipedia (78)). See BV72 XGU below. There is an emergency door on the right rear and a rear toilet.

Grupo Salvador Caetano is a Portuguese company established as Salvador Caetano (UK) Limited in the UK in 1984 with a purpose-built facility in Heather, Leicestershire, England in 1989 (Wikipedia (79)).

BV19 XOH, Scania K360EB4 Caetano Levante 2, 2019

The 2 axle, Single deck, step entrance, front door, BV19 XOH (Bustimes.org (22)), was also photographed at Coventry's Pool Meadow bus station on the 1st July 2024 prior to departing on route 460 to London Victoria Coach Station via Heathrow Airport. It is operated on behalf of National Express by Chalfont Coaches in National Express livery.

This Scania K series coach has an Euro VI DC09 (9 litres) 360hp (268kW) longitudinally, straight-up mounted diesel engine rear of the rear axle. E indicates a long distance, high comfort



BV19 XOH.

purchasing Plaxton Elites (Wikipedia (78)).

YJ69 AAV, Temsa Safari HD12 RHD, C53+1D, 2019



YJ69 AAV.

and a toilet.

Temsa, headquartered in Adana, Turkey, manufactures buses, midi buses, coaches and light trucks distributed in Europe and the USA (Temsa).

YJ69 AAV, fleet number 7102, Arriva Midlands coach (bustimes.org (23)), was photographed at Coventry's Pool Meadow bus station on the 1st July 2024 prior to departing on route X6 to Leicester.

LG22 BBZ, BYD D8UR-DD ADL Enviro400EV, H39/32F, 2022

LG22 BBZ (fleet number E058) is a front door, double-deck National Express Coventry bus in Price Branding livery with a mid lower deck emergency exit door on the driver's side. Upstairs they have three emergency exit windows. One at the rear and one centrally on each side. Automatic interior lighting is activated by sensors. Numerous CCTV cameras are fitted. This bus was photographed on the 30th March 2024 on the route X1 from Coventry to Birmingham on the A45 prior to turning off onto a slip road to the Birmingham Road then passing through

coach. B indicates a normal bus/coach, that is, not articulated. It is a 4x2 two-axle bus/coach, that is 4 wheels with 2 powered on the rear axle (Wikipedia (76)).

As discussed for BU18 OTK the Levante body was built exclusively for National Express in the United Kingdom to comply with the Disability Discrimination Act 2005. In particular it has a front door combined normal step entrance and mounted wheelchair lift. There is an emergency door on the right rear and a rear toilet. The Levante is used by most National Express contractors, although some contractors continued

The single deck, 2 axle, six wheel, step up, front entrance and air conditioned Temsa coach has a rear mounted 6-cylinder E6 DAF 300kW (408hp) MX11 diesel engine with ZF Ecolife 6 speed automatic transmission. New to the author is a novel feature on this coach. A lane departure warning system that alerts the driver via an audio and vibrating warning whenever the coach leaves its current lane.

The coach seats 53 plus one wheelchair. It has a separate wheelchair entrance on the left side rear of the front wheel with a central right side emergency exit. Inside, it has double glazed side windows, USB chargers



LG22 BBZ.

configuration. It has 1 or 2 wheelchair spaces and a manual front door ramp. Central door buses have an electric ramp. It has two electric motors integrated in the drive axle. Maximum power is 2x150kW. The battery system is BYD lithium iron phosphate battery technology, 339kWh for the 10.3m length bus or 382kWh for the 10.8m bus. Operational range is up to 160 miles (257km) on a single charge (Alexander Dennis BYD). Low temperature is known to reduce the range (author). To date (9th June 2024) National Express Coventry operates 130 BYD D8UR-DD ADL Enviro400EVs (Bustimes.org (25)).

Promoted as cheap and clean electricity, as opposed to CO₂ producing fossil fuel, it is not mentioned that there are additional costs to producing these buses. There is the cost of coal/gas/oil/nuclear/hydro methods to power electricity power stations, plus the mining of precious metals for the batteries. Nevertheless, beautiful and comfortable buses.



LG72 DYC.

Millison's Wood and Meriden to Birmingham Airport then central Birmingham (Bustimes.org (24), uk buses (1)). Notice the tree branch protector on the roadside upper front left corner.

The BYD D8UR-DD ADL Enviro400EV is a twin axle, six wheel, low-floor full-electric double deck Alexander Dennis aluminium body bus on a welded steel BYD chassis with BYD battery technology. Length is either 10.3m or 10.8m. Passenger capacity is up to 85 with 71 seats in West Midlands Coventry

LG72 DYC, BYD D8UR-DD ADL Enviro400EV, H39/32F, 2022

National Express Coventry LG72 DTZ, fleet number E154, in Price Branding livery (Bustimes.org (26), uk buses (1)), was photographed on the 22nd March 2024 in a picturesque setting Meriden on the High Street passing Waterfall Close on the X1 route from Birmingham to Coventry. The emergency exit door is perhaps just visible to the left of the word Coventry. There are three knock out glass exits upstairs.



LG72 DTZ.

LG72 DTZ, BYD D8UR-DD ADL Enviro400EV, H39/32F, 2022

National Express Coventry LG22 DTZ, fleet number E070, in Price Branding livery (Bustimes.org (27), uk buses (1)), was photographed on the 6th June 2024 at the Coventry Pool Meadow bus terminus having

arrived from Birmingham on the X1 route. Passengers have just disembarked. Seen on the rear of the bus above the destination board is written Powered by Zenobé. Zenobé is a UK based battery storage company that provides services to bus operators to convert to and operate electric fleets, including the necessary depot equipment. It is not limited to electric buses. It also includes assisting truck fleet managers, school bus transport operators and transit organisations (Zenobé).

BV72 KKY, Volvo B11R 9700, 2022



BV72 KKY.

Coach BV72 KKY was new to Sky Coaches of Rusholme, Greater Manchester in December 2022. It was the last of three Volvo B11R 9700s delivered. The other two are registered BV72 KKW and BV72 KKX, all three in white livery. The fourth generation model was officially launched in the UK and Ireland Wednesday 28th April 2021 (Peco59 (1), Bus Fleet Lists at Quack77, Volvo Buses United Kingdom & Ireland (1)).

It is a 2 axle, 12.4m length, single-decker with an Euro 6 emission standard Volvo

D11K, 343kW (460hp), 6-cylinder inline diesel rear engine with common rail injection. Transmission is a Volvo I-Shift, automated gear changing system with integrated retarder. Gearbox oil heater is optional. It has front and rear stabilisers with electronically controlled air suspension with optional kneeling function. When cruising above 80 kph the coach is lowered by 20 mm, thus reducing air resistance. It seats 49 or 53 with an extra row of four seats. The 13.1m version seats 53 or 49 with lift, or 57 with an extra row. The high floor coach has a front step entrance door with a central driver side emergency exit door where there is an on board toilet, accessed by steps down from the high floor (Volvo Buses United Kingdom & Ireland 2), Volvo Buses Global).

The author travelled in BV72 KKY when our flight from the Isle of Man to Birmingham was cancelled. We were flown to Manchester airport then by coach to Birmingham airport. A very comfortable hour and forty minutes evening trip. The coach was photographed prior to boarding the coach on the 28th June 2023.

BV72 XGU, Scania K410EB6, Caetano Levant 3, 2022



BV72 XCU.

BV72 XCU, fleet number 357, is a single deck, 3 axle, front step entrance, and long distance (E code) coach. The air conditioned coach has an emergency door on the right rear and a rear toilet. It was photographed at Coventry's Pool Meadow bus station on the 4th July 2024 operating the route 707 from London Heathrow to Birmingham via Coventry operated by Woods Coaches on behalf of National Express in National Express livery. It was back at Heathrow at 15:30 British Summer Time (BST) (Bustimes.org (22)).

Comparison of the photographs of this 2022 coach with that of BU18 OTK if 2018 vintage, the Levante bodies show no discernible difference. The hidden difference is the chassis. BV72 XCU has a Scania K series chassis and a Euro VI DC13 (13 litres) 410hp (306kW) centrally mounted longitudinal diesel engine at the rear behind the rearmost axle (Wikipedia (76)). That is, the same as the Australian SB 19 MV, Scania K410IB shown previously.

As discussed for BU18 OTK the Levante body was built exclusively for National Express in the United Kingdom to comply with the Disability Discrimination Act 2005. In particular it has a front door combined normal step entrance and mounted wheelchair lift. The lift extends outward to ground level outside the bus from the lowest of three steps seen on the right. When the wheelchair is in place, the lift is then raised inward to flush with the top step, thereby gaining access to the interior and a location at the front nearside passenger area (Wikipedia (78)).



PR73 EMA, Scania Touring K410EB6, C59F, 2023



PR73 EMA, in Megabus livery, is new to Prospect Coaches, Lye, West Midlands operating on contract to Megabus since October 2023. It was photographed 4th July 2024 departing from Pool Meadow bus station.

The coach is a single deck, step entrance, 3 axle and 13.7m length coach with a Scania K series chassis and a Euro VI Scania DC13 (13 litres) 410hp (306kW) centrally mounted longitudinal diesel engine behind rearmost axle. Probably with an automatic ZF Ecolike transmission.

It has a front door with separate wheelchair lift door. Seating is for 59 plus a courier seat or 55 plus wheelchair. Air conditioned with tinted and double glazed side and rear windows and centre positioned sunken toilet (Scania Touring, Peco59 (2)).

TROLLEY BUSES

When electric trams needed replacing, there were city and town councils that turned to trolley buses (or trolleybuses) for replacement public transport. Similar to trams, they drew electricity from overhead wires. Support equipment such as sub-stations to supply cheap electricity and overhead wire infrastructure were already in place. All that was required was to add a parallel wire to the existing single overhead wire. Electric trams draw electricity from an overhead wire via a spring-loaded single trolley pole, or a bow collector, using the metal tramline to earth, or complete, the electrical circuit. Trolley buses use two spring-loaded poles to draw power from one positive wire returning via the second negative wire thereby completing the electrical circuit. While trackless trolley buses still had to follow the overhead wires to maintain connection via the free swivelling poles, it meant they were less restricted on the road than trams. An added bonus considering the increase in road traffic. In the UK, nationalised electricity in 1948 resulted in increased operating costs compared with petrol and diesel buses. The last trolley bus to run in the UK was in 1972, longer elsewhere abroad. (Keeley, et al. 2009).

In 1948 Guy Motors acquired Sunbeam Commercial Vehicles Limited. Henceforth all Guy trolley buses carried the Sunbeam name. Their three-axle and two-axle trolley buses were popular, particularly in South Africa where, by the mid 1950s, there were more Sunbeam trolley buses than the total of all other buses. Three-axle Sunbeam S7 and S7B trolley buses seated up to 70 passengers. Two-axle Sunbeam MF2B and MF2R chassis trolley buses seated 30 to 44 passengers with ample space for standing passengers. The two-axle Sunbeam F4/A had seating for up to 62 passengers (History Website, Wikipedia (80)).

DKY 735, Karrier W or W4, East Lincs, H37/29F, 1946



DKY 735.

Double-decker, front door, DKY 735 was photographed at the Black Country Museum in the 1st September 2006.

References give conflicting information regarding the chassis and body. They agree that it was delivered new March 1946 with a Karrier chassis, either a W or W4 with conflicting chassis numbers and body numbers. References agree regarding its fleet number, 735, final body and seating. The electric motor is unknown. An older source (Bruce 1999) states it has a Karrier W chassis 50680 and an East Lincs body number 5594.

Conway (2023) gives more information, stating it has Karrier W4 (50256) chassis and initially a Roe body (G02096) seating 30 upstairs, 26 downstairs with a rear entrance, delivered in March 1945. However, it received a new East Lincs body (5594) in October 1959 seating 37 upstairs and 29 downstairs with a front entrance door.

Another reference (Crewcastrian 2016), correctly says that although DKY 735 is in the livery of Walsall Corporation, it never served with the corporation, rather it was at Bradford Corporation. It also states it was fitted with new East Lincs front entrance body in 1959, replacing its original Roe semi-utility body. It was in service until the Bradford trolley bus

system was closed in 1972. Repainting the bus in Walsall colours is consistent with the Museum's Black Country theme.

FJW 616, Sunbeam F4, Park Royal H54R, 1949



FJW 616.

Double-decker FJW 616, two axle chassis, number 50647, has a Metro-Vickers 95hp (71kW) motor. The Park Royal rear platform entrance body (number B33173), seated 54 (26 downstairs, 28 upstairs). It was delivered new to Wolverhampton Corporation in 1949.

Wolverhampton Corporation was a prolific trolley bus operator from the 1920s. Needing to replace its now well-worn pre-war fleet, ninety-nine Wolverhampton built trolley buses were bought between 1948 and 1950 with Guy and Sunbeam chassis and Park Royal bodies to the newly permitted 8 feet (2.4m) width.

The corporation decided to scrap its trolley bus system in the 1960s. FJW 616 was withdrawn from service in November 1963. It was safely stored until arriving at the Transport Museum Wythall in 2004 where it was tidied and repainted in 2006 and 2007 (Transport Museum Wythall (36)). It was photographed 8th August 2013 at the Transport Museum Wythall.

VRD 186, Sunbeam F4A, Burlingham H38/30F, 1961



FJW 616.

Double-decker Sunbeam two axle F4a chassis VRB 186, has a Burlingham front door body number 7078, seating 38 upstairs, 30 downstairs. Chassis number TFD74783. Its motor is unknown.

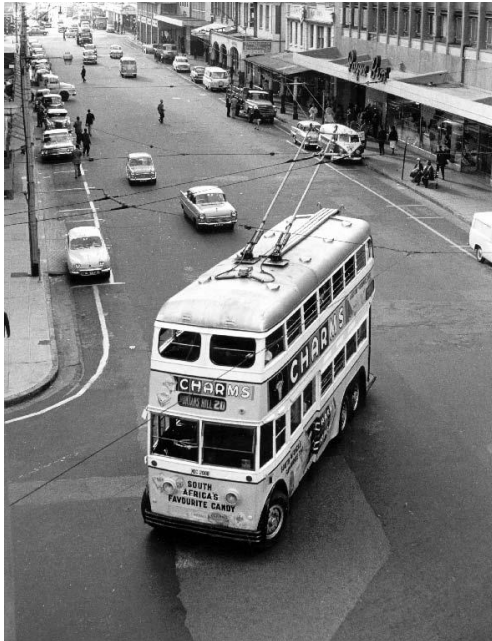
It was delivered new to Reading Corporation in July 1961, passing to the Tees-Side Rail-less Traction Board in November 1968. It is now believed to be at the Beamish Museum (Conway 2023). VRD 186 was photographed 19th July 2007 partly visible alongside DKY 735 at the Black Country Museum.

Trolley buses in Durban, South Africa

In Durban, trolley buses operated from 1935 to 1968. They were also used in Johannesburg, Pretoria and Cape Town. Durban eventually had a total of 117 imported trolley buses. Manufacturers were mostly Sunbeam, as well as Leyland and AEC. They had two or three axles depending on the model. I liked to sit at the front and watch the driver, especially to see when he accelerated too fast and the electric motor would trip. He would then have to reset the fuse box by reaching up and behind and to the left of his head. It was also interesting when one of the poles detached from the overhead wire. To keep tension on the wire the pole was sprung to push upward. When the pole detached it would spring skyward. The conductor would then have

to extract a long pole with a hook from under the bus, snare the pole, pull it down and get the adjustable attachment to straddle the wire again. This usually happened when at an intersection changing from one route to another. The bus would then be stuck in the middle disrupting traffic until it was fixed. Fortunately, traffic was not like it is these days.

The Durban trolley buses were unique in that they had fishing rod racks fitted on the outside rear of the bus. Fishermen used to head to the Point to the North Pier to fish and bring their catch home on the bus. I cannot remember if the combustion engine double decker buses had the rack as well.



A 1962 photograph of a Durban Sunbeam MS2 3-axle trolley bus. (Courtesy of Jackson 2003)

March 5th 1941, the Durban Transport Management Board had the distinction of a world record as the only trolley bus operator ever to have a trolley bus overturn. It happened on the corner of West Street and Farewell Street injuring 37 passengers. A feat believed to be impossible by the manufacturers and experts (Jackson, 2003).

Trolley buses in Durban were double-deckers with a rear platform entrance. In total the Durban Corporation owned 117, consisting of mostly Sunbeam MF2s and MS2s, as well as much less Leyland TBD1s and TTB5s, least of all AEC 664Ts. The system was in operation from 1935 to 1968, eventually operating 24 routes starting with routes from the Central Post office to the Marine Parade, South Beach and the Point, eventually serving in total 28 routes within the more central part of Durban.

Below is the list of trolley buses owned and operated by the Durban Corporation (Durban Trolleybus Fleet). The Sunbeam MS2 and AEC 664T were 3-axle buses, while the Sunbeam MF2 and Leyland TBD1 and TBD5 were 2-axle. All of them had a rear platform entrance while, if the author's memory is correct, the 3-axle MS2s had a front sliding door that was never used. Seating capacity varied from around 54 to 70.

Sunbeam MF2, electrical British Thompson Houston, Park Royal body seating 55 plus driver, 1935 to 1950, 11 purchased.

Sunbeam MS2, electrical British Thompson Houston, Metro Cammell Weymann body, 1939 to 1967, 8 purchased.

Sunbeam MS2, electrical British Thompson Houston, Metro Cammell Weymann body, 1940 to 1967, 4 purchased.

Sunbeam MS2, electrical British Thompson Houston, Metro Cammell Weymann body, 1948 to 1968, 27 purchased.

Sunbeam MS2, electrical British Thompson Houston, Bus Bodies SA, 1948 to 1968, 20 purchased.

Sunbeam MS2, electrical British Thompson Houston, British Mining Services SA, 1948 to 1967, 5 purchased.

Leyland TBD1, electrical General Electric, Park Royal body, 1935 to 1950, 11 purchased

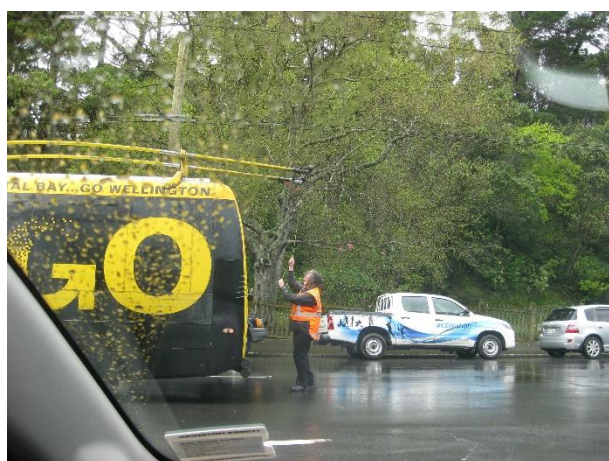
Leyland TBD5, electrical General Electric, Metro Cammell Weymann body, 1941-1942 to 1967, 18 purchased.

AEC 664T, electrical and body English Electric, 1939 to 1955, 13 purchased.

Trolley buses in Wellington, New Zealand

The first trolley bus route in Wellington existed from 1924 to 1932. A second more extensive route system operated from 1949 to 2017. This was the last commercially operated trolley bus system in the Oceania area and the last country where driving is on the left side of the road. The second system was chosen in 1945 to replace trams. Trolley buses were also regarded as better on steep slopes than petrol or diesel buses. Dismantling the infrastructure began in October 2017 with completion late in 2018. The author was fortunate to see them still in operation early in October on the 5th and 9th.

The trolley buses in operation at the end the system were known as DesignLine, built by New Zealand Motor Bodies at Ashburton, South Island. After trials with three prototypes, delivery of 57 3-axle trolley buses, numbered 331 to 387, began in December 2007 until 2009. The trolley buses were almost a complete rebuild of earlier Volvo buses, with components from the previous Volvo fleet retained. The re-build was sufficient for them to be regarded as DreamLine made. The new buses were low-floor with increased passenger capacity. They were also able to operate for short distances disconnected from overhead wires using batteries. Electrical equipment was provided by Eletra Industrial of Brazil (Wikipedia (81), Ward 2010).



Lowering the poles in wet weather.

The photographs show Go Wellington DesignLine trolley buses. Two parked at the Lambton Interchange next to Wellington railway station and one passing nearby. The author also witnessed one having the poles lowered and secured off-line preparatory to travelling using battery power.

EPD794, Designline Citybus, Eletra Industrial, DesignLine B43DW, 2008



EPD794.

A front and centre door, 3-axle single-deck trolley bus, chassis number 7A874010908008216 and fleet number 338 in Go Wellington livery. Based at Kilbirnie depot. It was photographed in Lambton Quay passing Wellington railway station on the 5th October 2017.

It was stored later October 2017 and put up for sale by Coastal Bus and Coach Ltd, Riverhead, Auckland in December 2019 (Australian Bus Fleet Lists (6)).

EJ396, Designline Citybus, Eletra Industrial, DesignLine B43DW 2008

A front and centre door, 3-axle single-deck trolley bus, chassis number 7A874010908008244 and fleet number 366 in Go Wellington livery. Based at Kilbirnie depot. It was stored in October



EUJ396 (left) and ETB425 (right).

depot. It was stored in October 2017 and for sale by Coastal Bus and Coach Ltd, Riverhead, Auckland, by December 2019 (Australian Bus Fleet Lists (8)).

It was photographed parked at Lambton Quay next to Wellington railway station 9th October 2017.

2017 then sold by Coastal Bus and Coach Ltd, Riverhead, Auckland, by December 2019 (Australian Bus Fleet Lists (7)).

It was photographed parked at Lambton Quay next to Wellington railway station 9th October 2017.

ETB425, Designline Citybus, Eletra Industrial, DesignLine B43DW 2008

A front and centre door, 3-axle single-deck trolley bus, chassis number A874010908008232 and fleet number 354 in Go Wellington livery. Based at Kilbirnie

TRAMS

This section on trams, is based on photographs taken on single visits to the Crick National Tramway Museum, Blackpool and Manchester, with more frequent brief visits to Birmingham or passing through, the Isle of Man and Adelaide, Australia.

The history of trams began in the early 1800s when the first horse drawn tram ran on track from Swansea to Mumbles in Wales in 1807. In 1860, Wirral Peninsula's Birkenhead was the first town to operate a horse drawn tram on track from Woodside Ferry to Birkenhead Park Main Entrance.

The problem with lots of horse power is that the horses had to be housed, fed, groomed and produced lots and lots of manure. One horse could only cover about 12 miles (19km) per day for about 4 or 5 hours. In practise, to offer a regular passenger service, ten or more horses were needed per tram hour. That is a lot of horses needed by tram systems considering the need to stable ten or more horses per car Wikipedia (82)).

While there were experiments with small steam engines and even trams pulled by a cable from a powerhouse, the most practical solution was electrified trams. Although, cable cars remained most effective in hilly terrain in cities where wheels would lose traction. By the late 1880s and early 1900 with the invention and development of overhead wires, horse drawn trams were replaced by electric-power. The last horse drawn service was in New York, USA, in 1917. Horses continued to be used for shunting at depots. By the early 1950s there had already been a worldwide rapid decline in tram networks. Manchester closed theirs in 1949, which was also when the last tram operated in Durban, South Africa. Here, the author remembers track still being visible in places in the city centre in the early 1960s. Sydney, Australia, held on until 1961. Blackpool and the Isle of Man continue to operate trams to this day with a limited public tram service, albeit mainly as a tourist attraction in the warmer months on the Isle of Man (Wikipedia (83)).

An interesting fact. At the time of the introduction of trams and the earlier part of its history there were still significant numbers of people for whom literacy standards were rather rudimentary. To accommodate this, many tram operators used specific colour trams for specific routes. Although, later when local city corporations became the norm, tram operators adopted an individual livery for their trams. Furthermore, while new electric trams cost more to manufacture than early internal combustion engine motor buses, they lasted longer in service.

To recap from the section on trolley buses, trolley buses use two spring-loaded poles to draw power from one wire returning via the second wire thereby completing the electrical circuit. Electric trams draw electricity from an overhead wire via a spring-loaded single pole, or pantograph, using the metal tramline to earth or complete the electrical circuit. For a while during the transition from tram to trolley bus, trams with a single trolley pole were able to operate using only the positive trolley bus wire.

A safety hazard occurred if the tram lost contact with the rails while the trolley or pantograph remained in contact with the overhead wire. This could happen when a section of track was heavily sanded by a previous tram to prevent wheel slip, or derailment. Anyone stepping off the tram while still in contact with the tram completes the circuit and could receive a nasty electric shock. Before anyone could alight, the driver had to jump off the tram, avoiding contact

with the tram and ground at the same, then safely lower the trolley or pantograph before passengers could safely disembark (Wikipedia (84)).

Significant Tram components

Obviously, there are specific components of electric trams, or cars, that are different from those associated with internal combustion engine buses, although similar to trolley buses. This section serves to provide brief explanations of these tram components.

Collectors

Electrical power from an overhead wire is collected by the tram via a trolley pole, a bow type, or a pantograph. Bow type and pantographs were probably less trouble with a wider surface sliding against the underside of the wire than a trolley pole with a swivel or fixed head that had to slot either side of the wire and could lose contact and sway about in the air. An added bonus of the trolley pole, as already mentioned, was that with the introduction of trolley buses, the positively charged wire of the two wires could still be used by the tram trolley pole head. This was not possible with the bow or pantograph collectors (Wikipedia (84)).

Another form of providing power to an electric tram was the much less popular and more complicated centre slot conduit system. Although most of London's inner tramway network entirely used the system. The system was somewhat similar to the present London underground tube system whereby power is obtained from an electrified third inner rail, except the conduit system is a slot that is flush with the road surface, the same as the tram tracks. Furthermore, the conduit track was safer. It was electrically inactive except where the tram "plough" connector passed over. Trams had a plough fed underneath and attached to the tram when entering the conduit system by a person using a two-pronged fork. There was always an overlap between changing from overhead to conduit power so the tram was never without power. Once passed the transition, the tram stopped and the trolley pole was lowered. From the other direction the process was reversed. In the transition area, the tram stopped, the pole was raised and the tram moved forward. The end of conduit diverted across the tram track causing the plough to follow the conduit and fall into a pit, thereby disengaging from the tram. A tedious process where trams had to transition, but not necessary where most of the network used this system, such as inner London (Garrett 2007).

Controller

The controller controls the voltage flow of electricity and therefore the power to the motors via a handle operated by the driver. Somewhat like the accelerator pedal in modern vehicles. Resistors determine the current flow to the motors. The more resistors activated, the less power available to the motors and slower speed (Wikipedia (84)).

Motors, trucks and bogies

The traction motor is the electric motor that provides the power to drive the wheels of the tram.

A truck is a chassis that supports wheels, axles and the motors. The body is attached to the truck. There are two types of truck. Firstly, there are trams with four wheels on two axles with the wheels fixed in line with the body. Secondly there are tramcars that have two or more smaller trucks where each can swivel in relation to the body. As on trains, these are called bogies rather than swivelling trucks.

Four wheel trucks have two axles, each axle driven by a motor. When motors became more powerful, trams could become bigger with a longer wheelbase. Increased wheelbase made it

more difficult to negotiate tight curves with increased wear and tear and uncomfortable ride. Hence the use of bogies (Wikipedia (84)).

Swivelling bogies on longer trams make it much easier to negotiate tight curves. There are two types of bogies, equal wheel and maximum traction. Equal wheel bogies have four equal size diameter wheels on two axles. Each axle has its own motor. The tram would have a front and rear bogie with a total of four axles and four motors. They were common on early bogie cars when motors were less powerful. They were also useful on steep hills. The maximum traction bogie has two large wheels on one axle with two smaller wheels on the other axle. This bogie became possible when more powerful motors were developed so that each bogie could be powered by one motor, not four, with the motor nearer to and driving the large wheels. Thereby providing maximum power to the driving axle plus more weight on the axle improved traction. Although ironically, less traction than an equal wheel bogie with four motors. For example, most of the London trams were maximum traction type, but on hilly routes equal wheel bogie trams were used (Garrett 2007).

A short glossary of other tram and tramway components

Catenary: A system of overhead wires used to provide power to trams.

Grooved rail: Type of track used where there is other traffic using the same road.

LRT: Light Rail Transport. A type of tramway that operates on dedicated track and provides rapid transit service to urban or suburban areas.

Low-floor tram: A type of tram that has a lower floor height, making it more accessible to passengers with disabilities or limited mobility.

Open vestibule: Where the driver sits does not have a roof.

Point: A device used to divert a tram from one track to another.

Points: A point where two or more tram tracks intersect.

Sleeper: Railway sleepers are large heavy beams that support the rails of a railway or tram track (Voice and Prentice, Seaton Tramway).

Crich National Tramway Museum

The museum is at the Crich Tramway Village, near Matlock, Derbyshire. The visit on the 3rd June 2006, included a 20 minute return trip tram ride.

There are about 70 trams, mostly from the UK, but as far afield as Porto in Portugal, Prague (Czechoslovakia, now the Czech Republic), Germany, Belgium, New York and one from Johannesburg, South Africa. The museum features a recreated period village laid out in what was Cliff Quarry. Buildings have been recreated from the late 1800's to early 1900's with a pub and café open for business and even a bridge over the tramline has been imported from elsewhere and rebuilt on site.

The tramline goes about 1 mile (1.6km) out into open country. The day we were there, there were three trams running plus one being used for training. The tram we rode on, upstairs in the open of course, was No.106 from the London County Council built in 1902. The other two used for the visitors were No.7 from Chesterfield built in 1904 and No.45 from Southampton, built in 1903, while No.74, built in 1900, operated by the Sheffield Corporation Tramways, was used for training a driver.

The trams photographed on the 3rd June 2006 are listed chronologically according to the year of manufacture.

Oporto Tramways No. 9



Oporto No.9.

Starbuck Car & Wagon Co. of Birkenhead with a Trunnion truck. Withdrawn from service in 1960 it was placed in storage and painted in a different colour scheme. It was restored and repainted to its original condition at Crich in 1971 (Crich Tramway Village (1)).

Photographed in the exhibition hall, yellow, white and red livery, single deck Oporto No. 9 is an important preserved example of one of the world's oldest and longest-serving tramcars. Built in 1873, it served in Oporto, Portugal, where it had Portugal's first urban tramway that opened in 1872. Propulsion was provided by at least two mules with four or six required for a steep section of the track. It was later converted to a trailer to be used with a steam and electric tramcar to convey workers to and from sardine fisheries, to which it owes its survival and preservation.

Seating 18, the body was manufacturer by

Chesterfield Tramways Company No. 8



Chesterfield No. 8.

Chesterfield No. 8, photographed in the exhibition hall complete with replica horse, was an addition to the Chesterfield Corporation's fleet when built in 1899 and made redundant December 1904 upon the conversion to electric trams.

It is a single deck horse tram in Prussian blue and yellow livery, seating 16. Made by G F Milnes & Co with Trunnion truck.

At one stage in its existence, it served as a summer house. It was fully restored in the 1980s, although not presently used operationally, it was used seasonally between 1982 to 1993 (Crich Tramway Village (2)).



Sheffield Corporation No. 74 with No. 45 (left) and No. 106 (centre) behind.

Sheffield Corporation No. 74

An attractive tram, No. 74 was photographed a few times at Crich. This photograph shows the tram on a training trip in the village street.

Originally an open-topped 4 wheel electric tram, built in 1900, by the Electric Railway and Carriage Company in Preston, it had a short top cover added in 1909. It was sold to Gateshead in 1922 where it was extensively rebuilt with a conventional top cover and given the trucks and electrical equipment

from a scrapped Gateshead tram circa 1923. In the 1990s it was restored by the museum. The top cover was replaced with that of a 1904 Sheffield tram with the truck from an ex-Leeds tower car. Early in the 1950s the lower deck was a garden shed.

The cream and Prussian blue tram has a Peckham Cantilever truck (originally Brill 21E), GE52 2x27hp (20kW) motors, a BTH B18 controller and a trolley pole collector. The tram seats 51 (lower deck 22, upper deck 29). It was finally withdrawn from service in 1951 (Crich Tramway Village (3)).

London County Council Tramways No. 106



London County Council Tramways No. 106.

Crimson lake and cream liveried No. 106 of the London County Council, built in 1903, is typical of the standard four-wheel, open top, double deck design of the time. It seated 56 (lower deck 22, upper deck 34). It was withdrawn from service in 1925 then used as a works car until 1952.

The body was manufactured by Electric Railway and Carriage Co., Preston, for Dick, Kerr & Company. It has a Brill 21E truck with conduit, Westinghouse 220 2x42hp (31kW) motors, Westinghouse T2C controller and a trolley pole collector. Originally it had plough type collector that

obtained power from the centre slot conduit system.

By 1906 it had a fully enclosed top cover. Also, interestingly, the so-called reverse stairs had to be replaced by direct stairs, apparently on the orders of the Metropolitan police, because the reverse staircase obscured the driver's nearside rearward vision, making it very difficult to see traffic approaching from behind.

Restoration began in 1971, completed in 1983 when it started operation at Crich. While still in operational condition as of late it is not in service ((Crich Tramway Village (4)).

Southampton Corporation No. 45



Southampton Corporation No. 45.

No.45 is a low height, open top, double deck electric in red and ivory. It seats 56 (lower deck 24, upper deck 32). Built and entered service in 1903 when it was number 48 prior to rebuild in 1929 as No.45. It was withdrawn from service in 1948.

No. 45's body was manufactured by Hurst Nelson Co. Ltd for Southampton Corporation. It has a Brill 21E truck, Dick Kerr DK9A 2x25hp (19kW) motors, DK DB1 K3 controller (originally Westinghouse 90) and trolley pole collector.

It arrived at Crich in 1960, after being re-trucked and repainted free of charge in the Southampton Corporation workshops. It started operation at Crich in 1964 (Crich Tramway Village (5)).

Leicester Corporation No. 76



Leicester Corporation No. 76.

Glasgow. The electric motors are BTH GE58 2x30hp (22kW) with a DK DB1 Form B (originally a DK DB1) controller and trolley pole collector. The top cover was added after 1913 and fully enclosed in 1929. It was withdrawn from service in 1947.

The body (minus controllers and truck) was sold to become a cricket pavilion and change room at East Cowick, Yorkshire. Brought to Crich in 1960, restored to 1920s condition in 1969, although no longer in operational condition (Crich Tramway Village (6)).

Chesterfield Corporation No. 7



Chesterfield Corporation No. 7 and London County Council Tramways No. 106 (right).

Carmine red and primrose yellow Chesterfield No. 7 was originally an open top, double deck electric tram built by the Brush Electrical Engineering Company at Loughborough in 1904. It was repaired after damage in a tram shed fire in 1916 and received an open vestibule type top canopy in 1919. It seats 56 (lower deck 22, upper deck 34). It was built in 1904 and in service the same year.

The body manufacturer was Brush Co. with a Peckham P22 truck (originally Brush, Lycett & Conaty), BTH RGE20 2x40hp (30kW) motors (originally 2x25hp (19kW) Westinghouse motors), a Westinghouse T2C controller (originally Westinghouse 90) and a trolley pole collector.

No. 7 was withdrawn from service in 1927 when the tramway was closed. Sold as a holiday cottage, the semi derelict tram was bought in 1973, restored 1993 to 1996 to operational condition and began use at Crich in 1997 (Crich Tramway Village (7)).

No. 7 was photographed on the 3rd June 2006 from the imported bridge travelling away out of the village while passing N0. 106.

Prague No. 180 (originally 266)



Prague No. 180.

An interesting feature of the Prague No. 180 (original number 266) tram built in 1908, is that it was one of fifteen that, in addition to a fixed head trolley pole, was originally also fitted with equipment to collect current from surface contact studs laid at intervals between the tracks. At the time, they were used on a route that crossed the historic Charles bridge dating back to around 1357-1362 that had no overhead wiring. This changed later. At some stage the pole was replaced by a pantograph and entrance doors were added.

It was withdrawn from Prague service circa 1949, going to Olomouc where it was withdrawn in 1967 when it was offered to the National Tramway Museum. Restored to its original 1905 condition with trolley pole and no doors, among other changes, although now numbered 180, it was shipped to the museum in 1968. It was photographed in the exhibition hall. Since about 2001 it is in non-operational condition (Crich Tramway Village (8)).

Glasgow Corporation Transport No. 22



Glasgow Corporation Transport No. 22.

Built in 1922, No. 22 is a double deck, open balcony, vestibuled four-wheel electric tramcar in orange and cream livery with a white route colour band. It seats 62 (lower deck 24, upper deck 38). It was built in-house with a Glasgow Corporation body and Brush made Brill 21E 2x60hp (45kW) electric motors and GEC Traction CDB2 controller with a fixed head trolley pole current collector.

Withdrawn from service in 1960, it was mostly restored to its original 1922 condition, although retaining its last fitted truck and motors and the original storm covers on the top of the stairs were not refitted (Crich Tramway Village (9)). It was in operational condition at the time of the photograph.

Leeds City Transport No. 399

Photographed in the shed, next to Leeds No. 180, was Leeds No. 399 built by Leeds City Transport in 1925 entering service in 1926, withdrawn from service in 1959. It seats 70 (lower deck 24, upper deck 46).



Leeds City Transport No. 180 behind left is Leeds City Transport No. 399.

Loughborough, with a Peckham P35 truck, BTH 509 A12 2x 70hp (52kW) motors, BTH B525C controller and Fischer bow collector. The bow collector was replaced by a trolley pole in 1938. It seats 60 (lower deck 23, upper deck 37). It was withdrawn from service in 1957.

The distinctly red with white trim livery tram (originally red and yellow), has at various times been red and cream, blue and white and in 1942 it was painted wartime khaki. Operational at Crich since 1969, it received initial restoration in 1969 with a major overhaul in 1989 and another overhaul in 2009 (Crich Tramway Village (11)).

Liverpool Corporation No. 869



Liverpool Corporation No. 869. Behind is Sheffield Corporation No. 74 prior to a training trip.

currently restored in operational condition (Crich Tramway Village (12)). Photographed parked outside the shed, in the background is No. 75 ready to start a driver training trip.

Blackpool

The Blackpool Tramway extends 18km (11 miles) along a non-road reserved track from Blackpool Star Gate in the south to Fleetwood Ferry in the north along the England Lancashire coast. Dating back to 1885 and operated today by Blackpool Transport Services, it is the second

The four wheel, fully enclosed double deck electric tramcar has a Peckham P22 truck, Dick Kerr 30B1 2x50hp (37kW) motors, DK DB1 K4B controller and a trolley pole collector. In 1938 a bow collector was installed. After transport to Crich in 1959 it underwent extensive truck and body restoration, including replacing the trolley pole collector. It has been operational since 1990 (Crich Tramway Village (10)).

Leeds City Transport No. 180

Photographed in the shed, No. 180 is a fully enclosed double deck electric tram manufactured in 1931 by bodybuilders Brush Electrical Engineering Company,

Liverpool became the third largest tramway system operator in England with 97 miles (156km) of routes by the end of World War II and a fleet of about 744 tramcars.

Built in 1936, No. 869 is a double deck, fully enclosed, streamlined, bogie electric tramcar in olive green and ivory white livery. It seats 78 (lower deck 34, upper deck 44). The body builder was the Liverpool Corporation with an EMB Class 8 radial-arm bogies truck. It has GEC WT184 4x36hp (27kW) electric motors with a Metropolitan Vickers Electropneumatic controller and trolley pole collector with a swivel head. It served in Liverpool until going to Glasgow in 1955.

Withdrawn from service in 1960 it is

oldest electric tramway in the UK. The oldest being Volk's Electric Railway in Brighton that opened in 1883 (Wikipedia (85)). All of the photographs were taken when visited on the 11th September 2010.

Until 2011 the service was operated by what is now called Heritage Trams running trams 362 days of the year. Since 2012 a fleet of 16 Bombardier Flexity 2s has operated the system with 6 Heritage English Electric double deck Balloons built in 1934 to 1935, in operation since 1934, refurbished 2009–2012. The remaining veteran Heritage trams now operate, mostly by volunteers, throughout the year during weekends, certain weekdays, bank holidays and during the Blackpool Illuminations. The Fylde Transport Trust provides support to Blackpool Transport insure the future of the Heritage Trams (Blackpool Heritage Tram Tours (1)).

Blackpool and Fleetwood No. 2



Blackpool and Fleetwood No. 2.

No. 2 was built in 1898, the same year the Blackpool & Fleetwood tramway opened. The single deck, high capacity, transverse open bench 'toast-rack' type car was ideal for a local service, plus it gave a good view of the coastal scenery. Seating was 48, but increased to 56 later by allowing four passengers on each platform by the addition of a bench at each end behind the driver. Originally the tram had a single oil lamp at each end, subsequently replaced with electric headlights. Later these were removed, as is evident in the photograph of the tram on the Promenade next to the Blackpool North Pier with the Blackpool Tower in the background.

The brown and cream livery tram body was manufactured by G.F. Milnes & Co. The truck has Milnes Plate frame bogies with 2x35hp (26kW) GEC 1000 motors. The controller is a BTH B18 (originally K10) with a trolley pole collector.

It was withdrawn from service in 1938 then used as a works car and snowplough until around 1951. When it became the property of Crich Tramway Museum in 1963 it was restored to operational condition, although not currently commissioned for service (Crich Tramway Village (13)).

Blackpool & Fleetwood No. 40

Single deck, fully enclosed saloon, Blackpool & Fleetwood No.40 was one of four so-called Box trams (due to its shape) built in 1914. It was one of 11 box cars built in 1898 and 1899 by United Electric Car Company of Preston for the Blackpool & Fleetwood Tramroad Company. They served on the route from Blackpool North Station to Fleetwood from 1898 to 1919.

No. 40, in cream and teak livery, seats 48. Its body was manufactured by United Electric Car Co. with a Preston McGuire equal wheel bogies truck, BTH 509D1 2x40hp (30kW) motors (originally 2x40hp (30kW) GE 67 motors), a BTH B510 controller (originally BTH B18) and a fixed head trolley pole collector.



Blackpool & Fleetwood No. 40.

It was renumbered 114 when the tramway was taken over by Blackpool Corporation Tramways in 1920. It was also repainted red and white while the paraffin headlamp was replaced with an electric headlamp. In 1926 wooden seats were replaced with upholstered seats.

No. 40, now number 114, was withdrawn from service in 1936. Around 1943 it was renumbered as works car No. 5 and painted green until around 1957 or 1958. It was restored to its original livery and No. 40 in 1960. It was donated to the National Tramway Museum Society at Crich in 1963

and ran at Crich in the early years before being placed in store in 1970 with later return visits to Blackpool. It is currently in operational condition on long-term loan to Blackpool where it was photographed on the Promenade next to the Blackpool North Pier (Crich Tramway Village (14)).

Standard No. 147



Standard No. 147.

Built in 1924, double deck No. 147 was one of a seven (numbered 146 to 152) built by Hurst, Nelson and Co Ltd of Motherwell. Of the 42 Standards built, 35 of them were built by Blackpool Corporation Transport. No. 147 was photographed on the northern part of the Promenade.

The Standards seated 78 on wooden seats, 32 on the lower deck, 46 on the upper deck. The truck was Preston McGuire equal wheel bogies with 2x35hp (19kW) BTH B265C motors. The controller was a BTH B510A with a trolley pole collector.

Initially, the Standards were built with open balconies and open vestibules, providing no protection to the driver from strong wind, wind-blown beach sand and rain. In the 1930s, the trams were fully enclosed with a windscreen for the driver. Also during the 1930s, the tramways red and white livery, with gold fleet numbers, was changed to the present green and cream livery.

Most of the Standards were withdrawn from service in the 1950s. No. 147, the last of three Standards withdrawn in 1966, went to the Gerald E Brookins Museum of Electric Railways in Ohio, USA in the same year, where it was never used. It returned to Blackpool in 2000 and returned to service in 2002. It is currently non-operational (Blackpool Heritage Tram Tours (2), Blackpool Trams (1), Crich Tramway Village (15), Fleet)

Double Deck Streamliners (Balloons)

The 27 double deck, bogie Streamliners (nickname Balloons) were built in 1934 and 1935 by the English Electric Company in Preston. Thirteen were open top numbered 237-249 and Fourteen enclosed top numbered 250-263. The nickname Balloon arose possibly due to a rounded similarity to the World War II barrage balloons. All double deck Streamliners were rebuilt during their existence, many becoming unrecognisable as having been Streamliners. 717 (ex-254) discussed below has been restored as near to its original state as possible and is in the Heritage Fleet.

Specifications for the Streamliners are: body manufactured between 1934 and 1935 by English Electric, Preston, with 84 to 94 seating, English Electric equal wheel bogies, English Electric 2x52hp (39kW) 305 motors, English Electric Z6 controller and pantograph collector. Approximate top speed 56kph (35mph) (Blackpool Heritage Tram Tours (3), Blackpool Trams (2), Simply Blackpool (1)).

Double Deck Streamliner No. 717



Double Deck Streamliner No. 717.

Owned by Blackpool Transport Services Ltd., Streamliner 717 was built in 1934 or 1935 depending on the reference used. It was one of the 14 closed top Streamliners ordered. It was refurbished in 1977. During 2004, No. 717 was selected for restoration to its 1934 condition in its green and cream livery to operate on regular Heritage tours and is available for private hire. It was photographed on the Promenade north of the North Pier. It seats 94. 40 on the lower deck, 54 on the upper deck (Blackpool Heritage Tram Tours (4), Blackpool Trams (3), Simply Blackpool (2)).

Double Deck Streamliner B Fleet No. 711



Double Deck Streamliner B Fleet No. 711.

No. 711, originally No. 248, was photographed at the same location as 717. Rather than being restored to the same livery as 711, it is an overall advertisement for the Blackpool Zoo in 2007. Two years later it was one of nine Streamliners selected to be converted to the Streamliner B Fleet. The numbers were 700, 707, 709, 711, 713, 718, 719, 720, 724.

2012 was the year of the introduction of the fleet of sixteen modern Light Rail Transport (LRT) system Bombardier Flexity 2 trams. The concern was that these would not be enough trams to cope with the summer and

illuminations traffic. The nine Streamliners were modified with plug type doors to use the new LRT system platforms. However, it was discovered that the converted trams were not needed, resulting in them either falling into disrepair, taken into the Heritage fleet, or kept operative if

there is public service demand. These are not fully compliant with current regulations, but legislation allows them to be used on the LRT system, if necessary (Blackpool Heritage Tram Tours (5), Blackpool Trams (4)).

Millenium Cars No. 707



Millenium Car No. 707.

No. 707, built in 1934 was originally No. 244 an open top double deck Streamliner that later received an enclosed top.

During 1993 it was withdrawn from service for major overhaul. After a couple of years in storage, work commenced on its overhaul and returned to service in 1998 in a much changed state, particularly noticeable externally. Gone was the streamline appearance. It now has flat fronted ends with rounded edges. The upper end corner windows were added later, giving improved view for passengers.

It also received enlarged driver cabs with twin high visibility headlights. The high visibility headlights meant much better visibility at night on the poorly lit northern section of the tramway to Fleetwood. Internally, central heating was installed with bus style moquette seats. It was painted in the Millennium style green, cream and black livery. When it was photographed it was an overall advertisement for the Coral Island pirate themed amusement arcade.

Specifications remained the same as for Streamliners. Currently, it is part of B fleet to be used in normal service if required. It seats 92 (lower deck 40, upper deck 52) (Blackpool Heritage Tram Tours (3), Blackpool Heritage Tram Tours (5), Blackpool Trams (5)).

Jubilee cars No. 762



Jubilee car No. 762.

No. 762 was originally a closed top No. 251, renumbered No. 714 the Streamliner was withdrawn from service in 1971, being rebuilt and emerging totally difference in appearance as No. 762 in 1982.

Overhaul of No.762 began during the earlier part of 1979. Because this was also the year of Her Majesty the Queen's 25th Jubilee Anniversary on the throne, this model tram became known as Jubilee cars.

No. 762, along with No. 761 (ex- 725, ex- 262), was given a major overhaul between 1979 to 1982 that included being stripped to

a shell. The underframe was extended, strengthened and straightened. The body frame was extended with load bearing windows fitted and flat fronted ends. Front entrances were added on the left sides at either end. Staircases were relocated to behind the driver's cab at each end.

Although designed for one man operation, unlike No. 761, the central doors were retained as exits to improve passenger flow. Total seating capacity 90.

Specifications changed somewhat. The 1982 rebuild justified the re-manufacture of the body and truck bogies. The motors were still two English Electric 305s although now 50hp (42.5kW) with Brush Chopper controller, but still a pantograph collector.

Both trams were refurbished between 2000 and 2002. This included moquette seats and the destination displays made bigger to make them more visible. A more noticeable external change on 762, visible in the photograph on the Promenade, was the upward extension of the sides at the roof edge to prevent pantograph grease running down the side of the tram.

In 2005, as seen in the 2010 photograph, No. 762 was painted all over as a Reblackpool advertisement. Reblackpool was a restore and reconstruct Blackpool Project formed in 2003. Closed in 2010 it was replaced by the Fylde Coast Economic Development Company.

Prior to both Jubilee trams being withdrawn in 2011, No. 762 its livery was changed to an all over, predominantly purple, advertisement for Nickelodeon Land. In November 2011 it moved to Crich as part of its operational fleet (Blackpool Trams (6), Crich Tramway Village (16), North West Place).

Twin cars

To make twin cars double ended, the rear set of controls was moved from the Railcoach/towing car to the rear end of the trailer car, thereby enabling the pair to travel forward or backward without having to turn around.

Twin Car 675/685



Twin car 675/685. The trolley pole belongs to another tram behind the twin car.

Railcoach 675 (originally 275) was one of ten numbering 272 to 281 built in 1935. Trailer 685 (originally T5) was one of ten numbering T1 to T10 built in 1960 to 1961.

Owned by Blackpool Transport Services Ltd, single deck electric Railcoaches 275 and 276, built by English Electric, were successfully rebuilt into a twin car prototype in 1958, although they both retained controls at each end so that they could still operate separately. From 1960 to 1961 Metro Cammell Weymann supplied 10 trailer cars numbered T1 to T10. Railcoach 275 was permanently coupled to T5 as a twin car being renumbered 675 and 685 in 1968. Originally in green and

ivory livery they were in red and yellow livery when photographed in 2010 on the Promenade next to the Blackpool North Pier.

Very much an English Electric tram. The English Electric built body towing cars, with 56 swing over seats, have English Electric equal wheel bogies, English Electric 305 2x52hp (39kW) motors and an English Electric Z4 controller with a pantograph collector. The converted

trailers, built by Metro Cammell Weymann, have 66 non swing over seats with Maley and Taunton equal wheel bogies truck (Blackpool Heritage Tram Tours (6), Simply Blackpool (3)).

Twin Car 671/681



Twin car 671/681.

Railcoach 671 (originally 281) was of the same batch as 675 described above and trailer 681 (originally T1) from the trailer batch described above. Both with the same specifications as mentioned. Although both sets have a somewhat varied more recent history, having been moved elsewhere, returned, been neglected, renovated in different liveries and stored. 671/681 was briefly returned to service during the 2010 summer illumination season when it was photographed on the Promenade. It was withdrawn again in November at the end of the season (Blackpool Heritage Tram Tours (6), Simply Blackpool (3)).

The Blackpool Illuminations is an annual summer festival of lights consisting of traditional festoons, tableaux and purpose built illuminated trams in forms such as a Western Train, a ship the HMS Blackpool, the Trawler and the Rocket. In 2024, the Blackpool Illuminations are from 30 August, 2024 to 5 January, 2025 (Visit Blackpool).

While the two sets appear identical, apart from the different liveries, comparing the photographs reveals a difference. Green and yellow 671/681 has curved roof edge windows that are absent on 675/685. Both were operating on the Blackpool to Pleasure Beach route.

671 is believed to now be at the North West Museum of Road Transport at St Helens (Prior 2021).

Centenary cars



Centenary car No. 643 in the background.

Centenary Cars are single deck, electric bogie tramcars with offset centre doors. They were bought in the 1980s to replace thirteen OMO (One Man Operation) cars. The problem with the OMO cars was that even though they were built in the 1970s, they were built on 1930s Railcoach trucks that had become worn.

East Lancashire Coachbuilders of Blackburn delivered eight new single deck cars capable of OMO between 1984 to 1988. Blackpool tramway celebrated its centenary in 1985, resulting in the fleet of eight being named the Centenary class. Owned by Blackpool Transport Services Ltd., they were the last were the last UK built trams for commercial

mainline passenger service. They operated on scheduled service from Blackpool to Fleetwood until 2011 when the change was made to the present Bombardier fleet (Blackpool Heritage Tram Tours (7)).

Fleet numbers 641 to 648, were built by East Lancashire Coachbuilders, had Blackpool Transport bogie trucks with 2x57hp (42.5kW) English Electric 305 motors, Brush Chopper controller with the more modern Thyristor Controls and pantograph collection. Seating was 54 with 18 standing. Bearing a close resemblance to current single deck motor buses they even had compatible parts. High utilisation and high mileages (7 of the 8 often used daily) resulted in numerous faults and breakdowns. No. 643 was photographed on the Promenade with Box No. 40 in the foreground and Blackpool Tower in the background. After transport service, it was used as a café by Caravan Parks, was stored at Fleetwood Docks and then bought by a Midlands school (Blackpool Trams (7)).

Isle of Man

Douglas Corporation Tramway



Douglas horse drawn tram No. 29.

A horse drawn tramway 1.6km (1 mile) long at Douglas on the Isle of Man along the seafront promenade was the world's oldest operational tramway. In operation since 1877 it was closed in January 2016. Operating at a continual loss and in view of projected future costs, the Douglas Borough Council decided that the financial cost could no longer be justified. The decision was made in spite of protest from the Manx Electric Railway Society and argument that the short line should be regarded as being of World Heritage Status. The purpose of the Manx Electric Railway Society is the protection and

promotion of the retention and development of the island's tramways (Manx Electric Railway Society)

Most of the Manx crossbench seat tramcars were built by G.F Milnes & Co. Ltd., at Birkenhead 1886 to 1902 and Hadley, Shropshire from 1900 to 1905, as were single deck saloon numbers 27 and 29 built in 1892 that seated 30 passengers (Local Transport History (5)).

Tramcar No. 29

Photographed on the 15th September 2013, number 29 was built in 1896 by George F. Milnes & Co., Ltd. It was rebuilt from 2017 to 2019 (Wikipedia (86)).

The Manx Electric Railway

The Manx Electric Railway is a tramway northward from Douglas to Laxey and onward to Ramsey on the Isle of Man. At Laxey it connects with the Snaefell Mountain Railway (another tramway). The Manx Electric Railway is the oldest electric tram line in the world still with original trams. Begun in 1893 the tramway reached Laxey in 1894, extending to Ramsey in 1899 (Basnett 2006).

It is officially referred to as a railway with cars, not a tramway with trams. Similarly, the Snaefell Mountain Railway. This is with justification, because the tracks are not inlaid along

roads. They are laid along open ground as railway line with sleepers and only crosses roads at level crossings.

All references to Manx Electric Railway cars and trailers below can be found at Manx Electric Railway Online (1).

Manx Electric Railway Car No. 22



Car No. 22 (right) with trailer No. 44.

seating. Photographed on the 14th September 2013 with trailer No. 44 at the Derby Castle Station next to the depot in Douglas and at Laxey on the 26th June 2023 with trailer No.48.



Trailer No. 48 (left) with car No 22.



Car No. 9 (right) with trailer No. 41.

No, 22 is a winter saloon in red, teak and white livery built in 1899, rebuilt in 1992. It was built by G.F Milnes and Co. Ltd. Originally with Milnes Series 3 (E.C.C Frames) trucks, from 1904 it has Brill 27Cx trucks. Powered by 4x20hp (15kW) E.C.C (Electric Car Company, Wolverhampton) motors. Since 1904, it has 4x25hp (19kW) SEHC (Societe l'Electricite et l'Hydraulique) motors. The controller was General Electric K11 units, from 1936 General Electric K12 units, with a trolley pole collector. It is larger than any of the previous saloon designs, accommodating 48

seated passengers with transverse reversible

Manx Electric Railway Trailer No. 44

Built in 1899, trailer No. 44 is in red, white and teak livery with open crossbench tram seats for 44 passengers. It was built by G.F Milnes & Co. Ltd. Photographed 14th September 2013 with car No.22 above.

Manx Electric Railway Trailer No. 48

Trailer No. 48 is in white and blue livery with open crossbench trailer tram seats for 44 passengers. It was built in 1899 by G.F Milnes & Co. Ltd. Originally with Milnes Series 1 trucks at Ramsey and Derby Castle ends, in 2011 it was fitted with a Milnes Series 2 truck at the Derby Castle end. Photographed 26th June 2023 with car No. 44 above at Laxey.

Manx Electric Railway Car No. 9

Built in 1894, winter saloon No. 9 is in red, teak and white with seating for 36 on transverse wooden benches. Built by G.F Milnes & Co. Ltd. with the truck by Milnes Series 3 (Milnes Frames) it now has Brush type D trucks. The original 2x25hp (19kW)

Mather and Platt traction motors were replaced by 4x25hp (19kW) SEHC (Societe l'Electricite et l'Hydraulique) in 1903. It originally had Mather and Platt controllers. Since 1948, it has General Electric K12 units. The bow collector was replaced with a trolley pole in 1898. Photographed 15th June 2013 at the Derby Castle Station next to the depot in Douglas with trailer No. 41.

Manx Electric Railway Trailer No. 41

Trailer No 41 in red, teak and white livery with open crossbench trailer tram seating 44 is seen with blinds lowered. It was built in 1903 by G.F Milnes & Co. Ltd. It is seen at the Derby Castle Station on the 15th June 2013 next to the depot in Douglas with car No. 9 in the above photograph.

The Snaefell Mountain Railway

The Snaefell Mountain Railway, opened in 1895, goes from Laxey to the summit of Snaefell, at 621m (2036 feet) above sea level the highest point on the island. The 8km (5 miles) track uses a Fell Incline Railway System centre rail for braking on the steep gradients. The trams connect with the overhead wires using bow collectors. Operation is from March to early November. In winter the overhead wires on the upper portion of the track are dismantled to avoid ice damage.

Five of the six wooden-bodied electric railcars are still in use, numbered 1 to 6. Number 3 was destroyed in 2016. Number 5 was badly damaged by fire and rebuilt to similar design in 1971. The original livery, until 1899, was cream and Prussian blue. The current red, teak and white livery being in use for over 100 years (Wikipedia (87)).

All references to Snaefell Mountain Railway cars below can be found at Manx Electric Railway Online (2).

Snaefell Mountain Railway Car No. 1



Car No. 1.

Built in 1895, by G.F Milnes & Co. Ltd., No. 1 was the first of a batch of 6 vestibuled saloon cars, also known as winter saloons because they are entirely enclosed. The new cars were delivered without glazed windows and clerestories (the windows in the raised section on the roof). There were considerable complaints of wind that the canvas roller blinds did little to prevent. Glass was fitted to all six in 1896. Then the cars became too warm in summer.

The six cars were fitted with bow collectors with Mather and Platt electrical equipment, trucks and controllers, as well as the Fell Rail braking system. The Summit end controller of the car was replaced with a General Electric K11 controller in 1904 and a K12 controller in 1954. The Laxey end remained the same due to its being used for short spells, such as shunting and starting the car downhill. By 1976 the Mather and Platt traction motors were much worn. The six cars' motors were replaced with equipment from German Aachen Tramcars, receiving Aachen motors, new replica 1985 trucks built by London Transport and a rheostatic braking method with the fell brake retained for use only in an emergency.

2010 to 2013, No.1 was withdrawn for a full overhaul at the Laxey Snaefell Car Shed. Having been painted red, teak and white earlier in its service, it was restored to its original Prussian blue and white livery with the original Snaefell Mountain Tramway lettering. It was photographed on the 14th September 2013 at Laxey. It is still in service.



Car No. 3.

Snaefell Mountain Railway Car No. 3

Built in 1895, winter saloon No.3 had a similar history to No.1 with its last major overhaul as per No.1 in 2014. Earlier in its service it too was painted red, teak and white. March 2016, No. 3 was destroyed above the Bungalow (a place where the track crosses Mountain Road), following runaway at Snaefell Summit. Fortunately, it was stabled awaiting passengers when the runaway occurred. Apparently, a new steel body and underframe was received in 2020 for reconstruction of No. 3. It was photographed on the 14th September 2013 at the Summit three years prior to its runaway.



Car No. 4.

Snaefell Mountain Railway Car No. 4

Also built in 1895, has the same history as No. 1. It had an overhaul in 1993 to 1995 with a full overhaul at the Laxey Snaefell Car Shed in 2017. Earlier in its service it too was painted red, teak and white. However, in 2018 it appeared in a green, teak and white “version of Snaefell Muntin Railway to commemorate 50 years of Nationalisation.” It is still in service. No. 4 was also photographed at Summit with the restaurant building behind and height above sea level.

Snaefell Mountain Railway Car No. 5

Also built in 1895, has the same history as No. 1 until 1970, apart from swapping trucks with work’s car No. 7 in the early 1950s. 16th



Car No. 5.

August 1970, while at the Summit, an underfloor short circuit started a fire that reduced No. 5 to its “frames, trucks and one cab end.” Using the frames and trucks a new body was built in 11 months, albeit without the clerestory and with modern bus-like windows and cushioned bench seats. As was the case with car No. 1 and the other cars of the batch, materials and control equipment from German Aachen Tramcars were installed along with new replica 1895 trucks built by London Transport and returned to

service in 1979. During its overhaul in 1996, the aluminium bus-like windows were replaced with wooden windows. No. 5 was photographed on the 26th June 2023 in its teak and ivory livery, loaded and waiting to depart after an incoming car arrives on the single track. In this instance it was awaiting the arrival of car No. 4.



Car No. 6.

Snafell Mountain Railway Car No. 6

The last of the 1895 batch of six, No.6, in red, teak and white livery, has a similar history to No. 1. Upon withdrawal for overhaul in 2017, it was discovered that the body and underframe needed new steel replacement. This was delivered in 2020. Presumably it is now back in service. No. 6 was photographed at Summit while stabled prior to transporting passengers back to Laxey with a good background view. The track twists down the south of the mountain to buildings just visible to the left of the car. This is the Bungalow mentioned when No.3 ran away.

Manchester

The Manchester trams were photographed on the 25th June 2011 while on a return trip from Manchester Piccadilly Railway Station to MediaCityUK, Salford, primarily to visit The Lowry Theatre complex and the permanent gallery/museum that houses the L. S. Lowry art collection, as well as walking in the area.

The Manchester Metrolink LRT system has 106km (64 miles) of track with 99 stations covering the city and suburbs with a fleet of 147 Bombardier M5000 trams. Initially the Bombardier M5000 trams were ordered to supplement the existing Firema T-68s and T-68As with the first batch ordered in 2007. The first M5000 entered service in December 2009. In 2011, Transport for Greater Manchester decided it would be more cost effective to replace the entire 32 Firema T-68/T-68A fleet with Bombardier M5000s. The last ordered M5000 was constructed in 2022 (MetroEasy.com, Wikipedia (88)).

Firema T-68 1013



Fiema T-68 1013. The destination board has already changed to Piccadilly.

No. 1013 was photographed arriving at the MediaCityUK station's so-called Blue Line terminus at 13:24 British Summer Time (BST) when we had returned to the station in the afternoon. It parked next to our return trip Bombardier M5000 tram already waiting to depart.

The articulated bi-directional Firema T-68 tram first operated on the Manchester Metrolink network in 1992. The tram was constructed with a high-floor specifically to operate on the Manchester Metrolink system. Twenty-six T-68s were manufactured by Firema in Italy. Six modified T-68A variants

were manufactured in 1999 jointly between Firema and Ansaldo. The 26 T-68s were built during 1991 and 1992 with fleet numbers 1001 to 1026. The 6 T-68As were built in 1999 with fleet numbers 2001 to 2006. Both variants have the letter A at one end and B at the other end. They were refurbished between 2007 and 2010. The 32 trams were replaced by Bombardier M5000s from 2012 to 2014.

The 29m (95ft) long 2 carriage trams seat 82, plus 4 pull down seats with 122 standing and a crush-load of 250. Maximum speed 80kph (50mph). The T-68 was manufactured by Firema, the T-68A by Firema and Ansaldo. The traction system is GTO–VVVF, while the traction motors for the T-68 are 4x105kW (141hp) separately excited direct current (DC) motors and the T-68A are 4x120kW (160hp) 3-phase AC motors. The collector is a Brecknell Willis high reach pantograph. Each tram had three bogies; the two outer bogies were powered. The unpowered centre bogie supported the articulation gangway (Wikipedia (89), Williams).

Bombardier M5000 3005



Bombardier M5000 3005.

No. 3005 was photographed at the MediaCityUK terminus station when we arrived in the morning at 10:18 British Summer time ST. Coincidentally, when we returned in the afternoon it was on the same tram.

The articulated bi-directional Bombardier M5000, is a Flexity tram built specifically with a high-floor to operate on the Manchester Metrolink system. The Metrolink system is the only tram network in the UK capable of running multiple trams, that is, two M5000s can be coupled together to form a double unit. This is useful if a tram

becomes unserviceable. Instead of blocking the track, it can be coupled to the serviceable tram and removed.

Fleet numbers are 3001 to 3147 with the letter A at one end and B at the other end. They were built in Bautzen, Germany and tested in Vienna, Austria. Numbers 3001 to 3074 have 52 standard seats plus eight perch seats with two wheelchair spaces, while numbers 3075 to 3147 60 standard seats and six perch seats with four wheelchair spaces. In addition, they can accommodate 146 standing passengers. At peak times the maximum capacity is 206 passengers. Maximum speed is 80kph (50mph).

The 28.4m (93ft) long Bombardier M500 is manufactured by Bombardier Transportation Alstom with a Kiepe Electric UTA 111 IGBT–VVVF traction system (IGBT = Insulated-Gate Bipolar Transistor), 4x480kW (160hp) Traktionssysteme Austria TMR 36-30-4 motors, three FLEXX Urban 2500 bogies (of which the outer two are powered) and a high reach pantograph collector that looks more like a bow collector (Wikipedia (90)).

Birmingham

West Midlands Metro is a LRT system that operates a single line of 23km (14 miles) from Edgbaston Village in Birmingham, through the city centre to Wolverhampton with 33 stops. The line originally ended at Snowhill Railway Station in Birmingham. Operation began in

1999. The track is laid in existing road in central Birmingham and in Wolverhampton with no longer used railway track in open areas. The system is owned by Transport for West Midlands and operated by Midland Metro Ltd. Both owned by the West Midlands Combined Authority.

In the beginning the system operated with 16 AnsaldoBreda T-69 trams. Between 2014 and 2015 they were replaced by Construcciones y Auxiliar de Ferrocarriles (CAF) Urbos 3 trams. The new fleet of Urbos trams provided an increased service of 10 trams per hour in each direction, with an increased maximum capacity of 210 passengers per tram, compared with the 156 passengers on the T-69 trams (Wikipedia (91)).

AnsaldoBreda T-69 No. 03



AnsaldoBreda T-69 No. 3 at Snow Hill.

The T-69 was manufactured by AnsaldoBreda, in Italy. 16 were built between 1996 and 1999. Refurbished in 2013 they were withdrawn during 2014 and 2015 with 13 scrapped in 2018. The T-69 is a 24.36m (80ft) long, two section, articulated tram seating 56 and 100 standing. Its maximum speed is 70kph (43.5mph). It has two 210 kW (282 hp) separately-excited DC traction motors. The electric system is 750 Volt DC from a Brecknell Willis high reach pantograph (Wikipedia (92)).

When delivered, they had a livery of a purple body with red fronts, a grey skirt and yellow doors. Several were refurbished and repainted in Network West Midlands' silver and pink. Officially magenta, although definitely looked pink. Tram 03 in the photograph was photographed 24th August 2008 at Snow Hill Railway station where the line ended at the time.

Nos. 23 and 56, Construcciones y Auxiliar de Ferrocarriles (CAF) Urbos 3/100

Urbos 3 trams, built between 2012 and 2012, were delivered from 2014 to 2015. In October 2019, an order was signed for 21 new Urbos 100 trams, with the option of a further 29. Building of the 100s commenced in 2019. Eight of the 100s were delivered in 2021. Latest available information is that the present fleet is 29, including 8 100s with 13 100s due in 2023. Fleet numbers are for the Urbos 3 are 17 to 37 and 38 to 58 for the Urbos 100. The total fleet should be 41.

The bi-directional Urbos 3/Urbos 100 trams, manufactured by CAF in Spain, have a maximum speed of 70 km/h (43 mph). They are 33 m (108 ft 3 in) long; 9 m (29 ft 6 in) longer than the former T-69. Hence the higher seating capacity of 54 seated 156 standing. The low floor tram consists of five sections with four articulations. Three of the modules are mounted on bogies with the remaining two suspended. They have 8 Traktionssysteme Austria TMR 36-18-4 70kW (90hp) traction motors. The electric system is 750 Volt DC from a high reach pantograph collector.

The original livery was white with pink (officially magenta) and silver trim. The photograph on the 10th January 2015 shows recently introduced Urbos 3 No. 23 at the Royal terminus in Wolverhampton. This was before the line was extended to Wolverhampton St Georges Street and then to Wolverhampton Railway Station from September 2023. From 2018, the present

blue livery with front and rear silver trim was introduced. This can be seen in the Urbos 100 No. 56 leaving the library stop in Broad Street photographed from the Birmingham library building.



No. 23 at the then Royal terminus with the pantograph raised. No 56 (right) travelling with the pantographs stowed and no overhead cable network visible.

The Urbos 3 fleet were retrofitted with an onboard energy storage system. 'Greentech Freedrive' lithium-ion supercapacitors and batteries. It is standard equipment on the Urbos 100. This enables them to operate briefly along extensions of the network where there are no overhead power lines. For example, the section of track in Birmingham between the Grand Central railway station and Edgbaston Village at the end of the line, thereby eliminating the need to attach cables to historic listed buildings along the section. The first tram was fitted in 2017 and the last one in 2020. Included in the contract is technical support and battery management services for 30 years. To achieve low noise, that is, the squeal of wheels on the track when turning tight curves, the trams have a self-lubricating system (Wikipedia (93), Wikipedia (94)).

Essen, Germany



Twin car 5105 in a cutting leaving the Essen Exhibition Centre station.

5105, Duewag Stadtbahnwagen typ B, 1973-2002

The tram is a 5000/5100 series Stadtbahnwagen B. 5101 is one of the trams operating the three routes on the Stadtbahn Essen 19.6km (12.2mile) light rail vehicle network. The system's thirty-one Stadtbahnwagen Typ B (B type wagen) trams were manufactured from 1976 to 1985 by a consortium of Duewag, Siemens and Kiepe. They are still in use on the three lines. Twenty-four B-Wagens, numbered 5101–5111, 5121–5128 and 5141–5145 were owned by EVAG. The remaining seven were owned by MVG until merger in 2017. September 2017, EVAG and MVG, along

with Via Verkehrsgesellschaft, become Ruhrbahn.

Built by Duewag, in Lierenfeld, a better word in assembled because it involved numerous suppliers, namely, Siemens, Kiepe, Waggon Union, BBC, ABB, Adtranz. Its length is 28m (92ft), maximum speed 80kph or 100kph (50mph or 62mph) depending on subtype. The

traction system is semi-automatic SIMATIC camshaft resistor control (B80S/B100S subtypes), or computer-based DC GTO thyristor control (B80C/B100C subtypes). The traction motors are DC (B100S / B80S, B80C / B100C) and AC (B80D).

The EVAG operated 5105 twin car tram was photographed 12th February 2014 leaving the Essen Exhibition Centre station in Norbert Straße on the U11 route from GE-Horst Buerer Str., in the north, to E-Messe West-Süd / Gruga in the south. In the north it is not fully separated from other traffic, then runs underground and under the city centre, from II Schichtstr. to Messe Ost / Gruga, except that the southern terminus at Messe Süd / Gruga is in a cutting. It is a fact connection between the city centre and the exhibition centre (Wikipedia (94), Wikipedia (95)).

Adelaide, Australia.

Adelaide had horse trams from 1878 to 1914 and electric trams from 1909. From 1950 to 1958 the extensive tram network was progressively reduced to one line. The Glenelg tram line was the only one to survive these closures and has remained in operation ever since. Extensions in 2007 and 2010 resulted in the Adelaide Metro Glenelg line operating from Glenelg Moseley Square to the city centre and the Royal Adelaide Hospital while further to the Adelaide Entertainment Centre at select peak times. Another line runs from the Botanic Gardens to the Entertainment Centre. On weekends and Adelaide Oval event days there is a service from Glenelg to the Adelaide Festival Centre close to the Oval (Wikipedia (96)).

No. 114 and 115, Bombardier Flexity Classic (100 series)

The photographs on the 11th October 2022 show No. 115 in North Terrace Road departing from



No. 115 (left) and 114 (right) Bombardier Flexity Classic (100 series).

the Adelaide Railway Station tram stop and 4 minutes later the arrival of No. 114. Trams numbered 101, 103 and 110 were also photographed either at the station stop, the South Terrace stop en route to Glenelg and the Glenelg terminus.

Fifteen Bombardier Flexity Classic trams operate on all three main routes on the Adelaide Metro tram network with fleet numbers 101 to 115. Hence known as the 100 series.

Nine Flexity Classic trams were ordered from Bombardier in 2004 with the first three arriving in November 2005, entering service in 2006. The rest of the order arrived in September 2006 with an additional two in 2007 and another four in 2008.

The 70% low-floor Bombardier Flexity Classic is a three section articulated tram built by Bombardier Transportation, Bautzen, Germany for Adelaide Metro. It has four VEM DKCBZ 0211-4 105kW (141hp) traction motors with four Bombardier FLEXX Urban 2000 pivoted

trucks or bogies. One truck at each end and two under the central section. Power is from a 600 Volt DC overhead wire with a high reach pantograph. The 30m (98.5ft) length tram seats 64 with 115 standing (Wikipedia (97), Wikipedia (98)).

No. 201 and 202, Alstom Citadis 302 (200 series)

The photograph on the 11th October 2018 shows No. 201 arriving at the Glenelg terminus.



No.202 was also photographed at Glenelg, although rather distorted through a motor car windscreen.

Nine Alstom Citadis 302 trams also operate the three main routes on the Adelaide Metro tramway, although primarily on the Botanic Gardens to Entertainment line during peak periods due to their higher capacity. Fleet numbers are 201 to 209. Hence known as the 200 series

No. 201, Alstom Citadis 302 (200 series).

Six of the nine arrived later in 2009. Manufactured by Alstom, La Rochelle, France, for the Madrid, Spain tramway they were surplus to requirement. In 2017 the last three arrived.

The 100% low-floor Alstom Citadis 302 tram is a five segment articulated tram seating 54 and 132 standing. At 32.3m (106ft) length they are 2.3m (7.5ft) longer than the Flexity Classic and the five segment 100% low-floor, due to the absence of truck axles, they can accommodate more standing passengers with a crush load of 186 standing passengers compared with 115 for the Flexity Classic. The tram has four Alstom 4-HGA-1433 120kW (160hp) traction motors with three rigidly attached Alstom Arpège trucks. One at each end and one under the central section. module. Power is from a 600 Volt DC overhead wire with a high reach pantograph (Wikipedia (99), Wikipedia (100)).

Egypt, Cairo, March 2001

Finally, an afterthought. Sometime after compiling this document, I remember trams I saw many years ago. During March 2001, more specifically the 19th to the 23rd, I was sent to Cairo to attend a WMO meeting of the Africa Region Working Group on Planning and Implementation of the World Weather Watch (what a mouthful!), where I presented a report in my capacity as Public Weather Service Rapporteur for Africa. The meeting was hosted by the Egyptian Meteorological Authority (EMA).

It was very different and interesting experience. The people were friendly and one did not feel threatened, like one did in South Africa. The logistics of running such a large place must be incredible. Although I gather it is divided into sub areas. I suppose something like London.

The traffic was unbelievable. Within one day our EMA bus to and from the hotel was in an accident. The way you have to go around star shaped intersections and compete with the commuter trains and trams is intriguing. The traffic cops are masters of energy conservation. One gets the impression they are there to stand at the corners talking to each other. As I heard then the police are drafted, three years compulsory national service, hence the lack of conviction (excuse the pun).



I was able to photograph a three car Kinki Sharyo tram, with its distinct raised pantograph, on a street in the Helwan suburb. Based in Osaka in Japan, Kinki Sharyo have made railroad vehicles since 1945, previously known as Tanaka Rolling Stock Works from the 1920s. Over time the trams in Cairo were withdrawn in favour of motorised vehicles. Around the time of the photograph Helwan was probably the only part of Cairo to still

have them. All of them being removed, track and overhead electricity lines, between 2011 and 2019 (We Are Railfans).

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