The Roads & Road Transport History Association

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Commercial vehicle engineering's British history

John Dickson-Simpson

This paper was presented at the Association's March meeting in Coventry

Dominance of railways fed by horse-drawn vehicles did not begin to be challenged by road transport until late in the 19th century, and even then the commercial-vehicle technology in Britain revolved around the established rail devotion to steam power, in which expertise and innovations were at an enviable level. Actual use of road steam traction was rare, horse-drawn wagons serving railway stations and depots. This persisted for at least 25 years despite the emergence in 1896 of a petrol engined lorry by Daimler in Germany (following the work of Carl Benz who concentrated on personal transport).

Thus, it was still steam power that ruled when the potential superiority of freight transport by road was demonstrated in a competition organised in 1898 by the Liverpool Centre of the 'Self Propelled Traffic Association' under the Presidency of Earl Derby. This event marked the meaningful origin of commercial-vehicle operation in Britain and the companiable enthusiasm that has driven progress.

From that century can be seen the roots of attitudes, political prejudices, regulations and economics that

Above: The cart-converted petrol powered lorry by Daimler, at the Mercedes-Benz museum in Stuttgart.

have enveloped road transport through the years to the present. Unladen weight and carrying capacity, taxes on fuel, and controls on maintenance and emissions: they all developed from popular

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John Hibbs

We regret to report the death on Friday 7 November of Professor John Hibbs OBE, founder of this Association. He played an active role in many aspects of transport studies. Following experience in the private sector of the bus and coach industry in the 1950s, he subsequently worked for British Railways in market research, and then moved into the academic sphere, initially based at the City of London Polytechnic (now London Metropolitan University), and subsequently at Birmingham Polytechnic (later becoming the University of Central England), of which he was an Emeritus Professor up to the time of his death.

He played a notable role in the study of the history of the bus and coach industry including close involvement with the Association's Companion to Road Passenger Transport History, and was also widely-known as a critic of the regulatory framework established under the Road Traffic Act of 1930, especially in respect of the route licensing and fares control aspects, leading to number of papers advocating the cause of deregulation.

A full obituary will appear in our next issue.

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(continued from page 1)
perception of heavy vehicles as original sin – and all in the context of continual political effort to protect the railways, which even in 1898 were offended at their rates being undercut by road transport, which emerged undeniably cheap and versatile in an entrepreneurial culture – yet actually mainly complementary to rail's role.

The Liverpool trials of 1898

It is significant that the vehicles in the 1898 road transport competition were judged on fuel consumption, cost per mile and reliability. These are still the priorities in the 21st century. They set the scores in the 1898 trials over a Liverpool to Manchester route aping the railway trials of 1829 won by Robert Stephenson's Rocket locomotive.

The winner of the first Liverpool-Manchester road trial was the Leyland made by the Lancashire Steam Motor Company. Based on the trial performance its operating cost was calculated to be 3.94 old pence per mile per ton of payload. Intriguingly that figure, but in new pence, is today still typical – taking account of present payloads that are 10 times as much and intrinsic efficiency having trebled over the years. Significantly in the light of today's scene, one of the Liverpool entries competing with the Leyland was an articulated lorry. It was a product of Thornycroft.

The Liverpool trials were repeated in 1901 when again a steam Leyland won – against lorries that included two Milnes-Daimler petrol-engined competitors. They set the future. By 1914 all manufacturers except Foden, Fowler, Atkinson and Sentinel had changed to petrol engines. Their adoption received impetus from their obvious suitability for passenger transport, in rapid replacement of horse drawn buses. Most petrol engined buses of that vintage owed their design to German and French engineering, predominantly Daimler and de Dion. It took until 1905 for Leyland to market a petrol engine using Crossley technology, while bicycle maker Dennis Brothers introduced engines bought from de Dion and, later, from White and Poppe in Coventry.

Above: The Leyland steam powered lorry at the 1898 Liverpool trials [Source: report of the first Liverpool trials by the Self Propelled Traffic Association]

The War Office took close interest in successive Liverpool-tradition trials of commercial vehicles. For military operations it wanted standardisation and quantity production so it drew up preferred specifications rewarded with government subsidy in exchange for requisition in time of hostilities. This spelt financial success for manufacturers, but rather dampened innovative ventures.

The shift to diesel

In the First World War technical progress concentrated on reliability. After the war attention to design refinements was throttled by financial problems, plagued by an economic slump in 1922 and the General Strike of 1926. Not until 1928 was progress clearly resumed. Then it spurted, chiefly from the introduction of pneumatic tyres for heavy vehicles and then quite rapid development of engines harnessing the German diesel principle of ignition just from the heat of air compression. The diesel step-change was the perfection by Robert Bosch of high-pressure pumps injecting oil into an engine's cylinders as a mist through sprayers having tiny holes only a quarter of a millimetre in diameter.

Diesels soared in popularity – noisier, slower and dearer but using 25 per cent or so less fuel that, in the 1930s, was anyway about half the price of petrol. Unsurprisingly, diesels bewitched commercial vehicle operators. To-day petrol engines are extinct in the commercial-vehicle world (although advent of cheap gas might yet resuscitate spark ignition).

Fig. 58.—The Milnes Lorries at Warrington.

Above: Two Milnes petrol engined lorries at the 1901 Liverpool trials [Source: report of the Third Liverpool Trials of Motor Vehicles for Heavy Traffic]

The early diesels on the British scene, firstly as replacement fitments by operators, were Dorman, Mercedes-Benz, Saurer and Gardner. The Gardners were the world's most economical, durable and reliable, and held that honour until turbocharging enabled cheaper diesels to be just as efficient yet twice as powerful in the 1990s.

From 1931 onwards chassis manufacturers brought their own diesels to the market, led by AEC and Leyland. Over the ensuing years the diesel principle cascaded to smaller and smaller engines along with the ever widening need to save fuel that was getting increasingly expensive and more heavily taxed. In 1930 the tax on diesel was half a modern penny a gallon; in 2010 this had exploded to 272p.

The demand for diesels from 1932 to cut the cost of operation dragged up the sales of heavy commercial vehicles as a whole. That then generated the wealth to invest in improved designs, not least in buses. Operators clamoured for quieter performances, easier access for passengers, less arduous driving and mechanical durability in continued stop-start service.

Bus development

Double-deck buses gained roofs. Staircases were enclosed. Floors were lowered. The driving position was moved forward, beside the engine. Braking became power assisted. First moves were made to arrange the entrance alongside the driver and to obtain more interior area by having the engine under the floor. To extend the economic attraction of double-deckers to more routes, Leyland introduced in 1934 an optional low-bridge layout with a sunken gangway down one side.

The Gilford company had an even more radical idea – front wheel drive, so that the length of chassis behind the driver was not encumbered by transmission. Rather unfairly it was short lived, though. The customers were wary of costly unfamiliar engineering. That said, a previous excursion into the unorthodox, the Tilling Stevens driven by an electric motor energised by a petrol-engine driven generator saw production lasting from 1924 to 1932.

Much attention in the 1930s was paid to transmissions – lowering and offsetting the driveline to afford a lower gangway (the key to this was to use an underslung worm gear to drive the back axle). For goods vehicles the worm-gear had the attraction of simplicity – being able to provide the low gearing needed to move heavy loads and, when two axles were arranged one behind the other for the tandem rear bogies of six- and eight-wheelers, meant a straightforward propeller-shaft connecting the worms.

In the early days of petrol power it was understandable that rear axle drive was, following steam-engine practice, often done by chain, the sprockets of which conveniently provided a step-down from gearbox speed to wheel speed. This weighty arrangement was soon simplified by embodying a bevel-gear drive within the axle. Consequently movement between the axle and the

power unit had to be accommodated – done by running the propeller shaft inside a long tube bolted to the axle and then jointed to the chassis. Much later, when a telescopic splined section was incorporated in a propeller shaft with universal joints, the tube-enclosed transmission was abandoned.

In the 1930s some bus operators had become large enough to have their own huge workshops. They grew impatient with the pace of design progress and began to try making their own buses. London General had already set the example, forming its Associated Equipment Company (AEC). Almost concurrently came the early Bristol buses of Bristol Tramways, where production lasted well past the Tilling group's takeover in the 1930s and continued after state-ownership from 1948 ; and that widened the Bristol model range to include eight-wheeled lorries and two-axle tractive units, essentially for British Road Services.

In-house manufacture of buses became a successful activity of the Birmingham and Midland Omnibus company (Midland Red) whose board was rich in engineers keen to preen their prowess. They had association with Northern General where engineering enthusiasm repositioned the engine low in the side to release the whole floor area and afford an entrance by the driver – an arrangement also offered by AEC which called it the Q type. After some years of making their own conventional front engined buses Midland Red also explored side engines and then tried underfloor and rear-engined layouts. Enterprise extended to making their own engine, a six-cylinder diesel. All designs had an eye to saving weight – a company tradition that reached its zenith after World War 2.

Braking systems

Braking was poor on big commercial vehicles. Not until the late 1920s did brakes begin to be fitted at the front as well as the back, and even then they were narrow. Brake fade from heat was common, even when the assistance of vacuum cylinders was added. Hydraulic operation was an improvement except that the hydraulic oil could boil when the actuation was within the brake assemblies – which was why Kirkstall axles, popular with the smaller manufacturers such as Atkinson and ERF, had external hydraulic cylinders pushing the levers of cam-expanded brakes. It took the development of compressed air cylinders after the Second World War to bring braking power to an acceptable and reliable standard.

A development of the 1930s that was quite momentous was the spread of America's General Motors to Britain. Thus came Bedford trucks for carrying up to 5 tons (and frequently overloaded) with a light bus derivative, the OB 20-seater. The engineering was not scintillating but the significance lay in the application of mass production methods based on standardised components. The resulting value brought the production numbers to a scale that justified investment in pressed steel. In only their first year on the British market Bedford sold 11,000. A quarter of a million were made for the Ministry of Supply between 1939 and 1945.

The need to raise production volume and emulate the Bedford economics became obvious to other commercial-vehicle manufacturers. Individually they could not do that from the start, so they began collaborative redesigns or shared proprietary products to justify investment in steel pressings. In the Midlands Willenhall pressed cabs for Austin, Morris and Commer. At Dagenham in 1947 Briggs evolved a pressed-steel short bonneted cab for Ford, Dodge and Leyland. The design allowed style variations in the bonnet to distinguish different makes of truck.

The Leyland Comet

For Leyland this brought an opportunity to offer a fresh range, competitive at weights lower than had been traditional for the company. This was the Comet, for which a new 5-litre six-cylinder diesel was designed in conjunction with Napier, featuring direct injection into toroidal-bowl pistons after the pattern that had been so successful in larger postwar Leyland

engines. Transmitting the power was a new gearbox with helical-tooth gears and a hypoid-bevel rear axle (then novel for commercial vehicles). Subsequent development brought progressive enlargements of the cylinders' swept volume to 6.5 litres and eventually turbocharging; altogether steady power increase from 75 to 150hp (and preparing to be doubled again by the time of sale to DAF in 1987).

After the war came an era of furious development in commercial vehicles. Not all the concepts were successful in monetary terms. But oh, what exciting times. Two pieces of technology had momentous impact on the general scene. One was the virtually international adoption of American fifth-wheel couplings by which a fat pin under the front of a semi-trailer slotted into the retractable lock of a rocking plate on the hauling chassis. This standardised coupling system put articulated lorries on the world map – helped by regulations that allowed artics to be longer and carry heavier loads.

Artics presented their own technical challenges, especially in a search for a distribution of braking power along a combination's length that would provide straight line stability. British researchers found that the fundamental solution was to make the front brakes work harder and that the tractor unit's rear wheels should not skid (and to make sure of that Dunlop perfected its Maxaret slip sensing control in the mid 1960s). Later refinements by other makers achieved faster control electronically – the more necessary because European Community compromises detuned British regulations for fail-safe air-brake systems that still assured stability.

The other big advance post-war was glass-reinforced plastics – the plastics being usually polyester resin, pasted in liquid form into a mat of glass fibres laid in a mould and then left to set solid. This method enabled bodybuilders to make strong panels with double curvature or ribbing or with all shapes of projections without time-consuming panel beating, riveting or welding. Stylists enjoyed artistic release at affordable cost.

Stiff double-wall mouldings of reinforced polyester sandwiching foam of polystyrene or polyurethane soon followed, eliminating much internal framework. It was a relatively simple way of making seamless refrigerated vans. Colouring the resins could make painting redundant, and the technology eliminated corrosion. Weight was comparable to aluminium.

For vehicle manufacturers who could not afford die pressed metal, reinforced plastics enabled cabs and other bodywork to be streamlined and elaborately styled. It was nothing short of a revolution. It brought attractive and distinctive cabs from Atkinson, ERF, Foden and Scammell, plus a new generation of imaginative coach bodies. It also was an important factor for Foden to introduce the first production-line cab that could be tilted forwards to expose the engine and under-bonnet auxiliaries for maintenance access. In due course all other manufacturers of heavy trucks followed with tiltable cabs (pioneered in the United States).

Advances in the 1950s

Technological advances came speedily in the 1950s. At Leyland the engineering ideas spawned new concepts. Some of its pioneering was disappointingly allowed to lapse, left to others to pursue. Prodded by a highly educated and persuasive engineer from Daimler-Benz, affectionally known as Doctor Mueller, the Leyland experimental department of 1950 made turbochargers in which an engine's exhaust pressure spun a supercharging impeller at 100,000 revolutions a minute. Experienced research engineer Gerry Waring supported the doctor with his own infectious enthusiasm. He geared two Comet engines in horizontal form to a shaft between them (gearing the engines directly, to be counter-rotating might have been a smoother outcome). An underfloor engined bus chassis was the test bed for Dunlop disc brakes and air suspension.

A ball-jointed independent front suspension package sprung with torsion bars was made. It had excellent geometry and became a feature of a new low-slung double-decker designed as a stress-panel platform

rather than a chassis (a configuration now basic to car manufacturers). It had a turbocharged Comet engine transversely across the back, transmitting through an angle-drive epicyclic gearbox. The bus saved more than a ton.

Over the next five years drastic cost-cutting altered the design to an ordinary chassis with a 9.8-litre engine across the back, not supercharged and not with independent front suspension. But what it did was put the entrance beside the driver and ahead of the front wheels. Thus was born the Atlantean, which set the pattern of double-deck buses from then on.

Elsewhere Albion tried a horizontal eight-cylinder engine using the parts of two of its four-cylinder diesels. Foden produced supercharged two-stroke diesels in six- and four-cylinder forms. They had as much power as four-stroke competitors twice as big. Tilling Stevens invented its TS3 opposed piston two-stroke diesel in which ingeniously one crankshaft was rotated via rocker-levers on the connecting rods of opposite pairs of pistons. This was a cost effective alternative to other opposed-piston designs needing two crankshafts, Junkers style.

The TS3 was the most reliable and economical of "power from every downstroke" engines. And deservedly it was the most successful – a pity the owner, the car-focused Rootes Group, would not proceed with a four-cylinder version.

Two-stroke diesels were the Army choice for future development once it was discovered that they would run on any hydrocarbon fuel, including petrol. The military commissioned two-crankshaft opposed-piston two-strokes from Coventry Climax, Rolls-Royce and Leyland in three ascending sizes. The Rolls-Royce rear-powered an experimental Thompson chassisless tanker for BP.

Military support of two-stroke diesels waned when diesel fuel became available practically worldwide. Rolls-Royce made a big rotary Wankel multifuel engine but this too foundered, defeated by the prospect of alarming development cost.

Multifuel capability was one of the attractions of gas turbines, and Leyland for a short time joined a fashionable throng of mainly American manufacturers who devised gas-turbine powered heavy trucks. The British thought they should have a flying start technically because Leyland could draw on 1940s Rover experience with a gas-turbine car. But poor fuel consumption, slow accelerator response and unreliable heat exchangers eventually made the development cost unsustainable despite three going into service with the progressive oil companies, leaving frustrated Rover's Noel Penny and Leyland's Roy Aston (both now deceased).

The Bedford TK

Back to earth, as it were, a landmark truck design emerged from Bedford in 1960. This was the forward control TK, shepherded into outstanding success by chief engineer John Alden. A purely British venture by General Motors, this. It set standards in driver access, comfort and interior room. The engine was set back to leave clear cross-access from one side to the other. This cab layout was later applied to the refuse collectors of Dennis Eagle, which became the popular choice in that field.

The Bedford easy access theme was extended to coaches by using smaller wheels but more of them: the VAL twin-steer six-wheeler.

In double-deckers the effort to reduce the floor height so that, besides a lower step the upper saloon could have normal double-row seating, was rewarded by Bristol with its low-slung Lodekka chassis that ran a propeller shaft tucked along each side-member and then to a back axle with two final drives connected by a cross shaft within the axle tube. The neat but complicated arrangement invited the attention of value engineering, the result of which was to contrive a single transmission line by creating a drop-centre rear axle with step-up gearing to reach wheel-hub line.

Amortising the investment justified finding customers beyond Bristol's narrow catchment, so

Dennis also made the Lodekka under Bristol licence and called it the Loline. Similar low-floor, front engined models followed from AEC and Albion. The greater significance of the drop-centre driving axle lay in its widespread subsequent use in rear-engined double-deckers – and, on the Continent, single-deckers with full length low gangway.

It was big operators who pushed design progress in the formative fifties. They wanted lighter, more economical buses. The pace setter was Midland Red, with its own model S14 steel framed chassisless single-decker with underfloor 8 litre engine that in some had a Hobbs multi-clutched epicyclic gearbox. All four wheels had Girling hydraulic disc brakes. Metalastik rubber springing saved maintenance as well as weight. The front wheels were independently sprung. The bus was light enough to have single rear wheels. It weighed only 5.5 tons.

Metalastik's rubber springs that combined shear as well as compressive movement later became a huge success for lorries' tandem bogies, thanks to the efforts of Ron Wragg who managed innovative North Derbyshire Engineering at Matlock. He made a fast artic tractor that had AEC axles on rubber suspension and was the first truck in Britain to have a 14-litre Cummins engine. For its inaugural run I drove it at 60 mph down the newly opened M1 motorway.

The Midland Red CM5

I had another fast-travel test when it came to the turbocharged coach version of the S14 Midland Red, denoted as the CM5. It conquered the M1 at a steady 80 mph. These were heady days before motorway speed limits. The speed did put tyres on the brink of contemporary technology so for safe sustained service the top speed was scaled back to 70 mph.

The obvious easy path to weight saving is aluminium, so much design work went into its use beyond mere body panelling, decking of lorry bodies and tanker manufacture. An incentive to pay more for aluminium was sharpened when affected by legal influences. Until mid-1956 there were frustrating limits on gross weight and speed. Twelve tons was the total allowed on two axles. A goods vehicle had been limited to 20 mph if it weighed, empty, more than 3 tons. To get within that 3 tons, lorries tended to be fairly short and petrol engined. But from Jensen came a carefully structured aluminium chassis that had a Perkins diesel engine. It weighed within 3 tons even as a big furniture van or with a platform of length more appropriate to an eight-wheeler.

In buses, the initiative came from operators in applying aluminium structures that dispensed with separate chassis. Notable was an aluminium single-decker made by Scottish Motor Traction. In today's indication of size it would be termed a midibus; nevertheless its 3.6 tons weight is enviable by any standard. It had a four-cylinder Albion diesel under its floor.

The London Routemaster

More involved design of a full-size bus required a lot of money and a guaranteed market size. The operator to fulfil both those conditions was London Transport. Along came, therefore, the Routemaster double-decker. The Routemaster saved about three quarters of a ton. It was not just in its aluminium structure that it was clever. Maintenance considerations figured large. The mechanical drive and suspension were divided into two portions on sub-frames removable for maintenance. The front suspension was independent. The rear sub-frame's coil springs were spaced wide apart so that they reacted straight into the stressed-skin sides of the bus – aircraft technology learned from London Transport's manufacture of Handley Page bombers during the war. Stability was as good as a single-decker. Rusting was banished. Many Routemasters were still running after 50 years.

It takes financial muscle and management patience to see innovation from prototype to proven service, so many inspiring ventures did not succeed commercially. Outstanding in bus design was the Wulfrunian low double-decker made by Guy Motors at Wolverhampton. It had independent front suspension, air springs, disc brakes and a simple

driveline from a Gardner engine on the front overhang next to the driver. It saw service with West Riding, but sustained development attention was beyond Guy's resources. The broad layout with a front engine was later copied by Volvo's Scottish plant and, with its otherwise conventional chassis, gained meaningful popularity; but it was a niche product for a large manufacturer hooked on economy of scale.

The Leyland National

Scale was the aim of Leyland, with its National chassisless single-decker. World appeal was in mind and with the backing of a huge British nationalised bus operation the planners had the confidence to create a new factory using fast, jig-guided welding and assembly. Claimed was a build time of 200 hours, which beat any bus manufacturer in the world.

The National was on the whole a big engineering success except for the new horizontal 8-litre engine with head and block combined in one casting, Bentley car style of old. It was troublesome for quite a few years. Some operators eventually fitted a Gardner replacement. The Gardner ruled the bus roost in those days but Leyland pride opposed the urge for a Gardner option.

The National designers' devotion to passenger convenience and the steel structure's durability ensured by epoxy-resin coating all brought well deserved plaudits for the mastermind behind the project, Joe McGowan. Over the seventh and eighth decades of the twentieth century thousands of National buses were made.

Then a political dogma of "competition is the key to economic prosperity" intervened so the National Bus Company was split into myriad small enterprises in the process of privatisation, until there was a fever of consolidation again. These changes revived the delight in having chassis and bodies as separate entities. One-person operation (then known as 'one man operation') of double-deckers – legalised nationally in 1966 – also became much more widespread. The demand for the National single decker petered out.

The design team was diverted to a modernised heavy truck range, called the T45, incorporating curvaceous cabs supplied by Motor Panels. That enterprise ended when the Dutch took over Leyland, only to go bankrupt in a few years and then be snapped up by America's Paccar on 15 November 1996, for a sum of £350m

By the end of the 20th century bus design was deeply affected by a transport ministry (by now called the Department for Transport) code of practice to enable passengers in wheelchairs to get on and off, rolling along most of the length of a bus unhindered. Floor height was reduced to the doorway-step level. A rear engine was essential. The width between the wheel arches, at least at the front, had to be enough for wheelchair passage – which meant either smaller wheels or an extended width of 2.55 metres (over 8ft 4in). The chassis had to be so shallow that structural contribution by the body was obligatory. Stress calculations were forced to be more sophisticated – computer-aided indeed.

Coaches, still forced to have a high floor to accommodate luggage, had to be equipped with foldaway electro-hydraulic lifts. To restore seating capacity the regulations on overall length were eased. Further than that there was European pressure to permit lengths up to 15 metres. That meant six- and eight-wheeled buses and coaches so that in practice it was only road conditions that determined length.

Increased goods vehicle length

Getting more length for goods vehicles has been more of a battle, because politically lorries are not popular. There is a refusal to accept that, right from basis, lorries have to carry shipping containers. They are frequently 45ft long and some shipping routes use 53ft long containers (16.17 metres). An artic's semi-trailer is legally limited to 44ft 7in (13.6 metres), or 13.7 metres (44ft 9in) if the body has chamfered or

rounded front corners. Special permission can now be obtained for a limited number of longer semi-trailers, but no longer than 15.6 metres, which is not enough to suit either neat multiples of standard pallets, let alone 53ft containers.

Long trailers are comparatively heavy and expensive because at least one axle has to steer automatically to negotiate corners. So operators have to need the extra load volume very much to justify the price. Even greater volume can be obtained by having double-deck trailers with low bottom deck, and this is the preferred option until lengths suit the loads that the freight consignors want carrying.

Another looming problem is that big container weights have gone up from 30 to 34 metric tons – too heavy to carry legally within the allowed 44 tonnes gross vehicle weight. It needs to be 48 tonnes. That is another issue facing political resistance.

Tractors close-coupled to two semi-trailers so that fewer lorries are needed to transport the freight are being tried in Europe but not in Britain despite demonstration 10 years ago of a prototype by Lincolnshire haulier Denby. Once again political caution is holding back efficient development.

Above: The Denby Transport double articulated trunking lorry {Source: test report by TPS Design 2004]

Meanwhile, though, there have been many advances in body and trailer design. Quick loading through the whole side of a lorry has been given by development of sliding curtains, as pioneered by Gerald Broadbent in 1969 when he headed bodybuilder Boalloy in Cheshire.

To the same end a big market has developed for vans with full length doors – heavier and more expensive but giving good load security. To get rapid turnround of lorries at depots some operations have specified bodies that can be detached and supported on retractable legs – equipment dominated by a Peterborough firm called Ray Smith Demountables until its financial plug was pulled when the 2008 economic recession took hold.

Fast loading and unloading with less manual effort is now general thanks to the development of electro-hydraulic tail-lifts at the backs of lorries. Sometimes lorries now carry their own cranes or fork-lift trucks. Trailers with sliding chassis have been devised to make them telescopic to carry different lengths of containers.

Power-consuming air resistance when travelling has been cut with streamlining methods. Stability has been raised by using air suspension with trailing arms that use the trailer-axle tube as an anti-roll bar. Heights have been cut by adopting low-profile tyres.

Brighter and more durable lighting has resulted from introduction of lamps with light-emitting diodes instead of bulbs (which have flimsy filaments for the 24-volt system that prevails on heavy commercial vehicles).

Environmental issues

The future is fraught with environmental causes. Diesel engine exhaust emissions mean in practice microscopic specks of soot (particulates) and nitrogen oxides. In 2014 they are only a twentieth of what they were in 1992. It has been a challenging business, sapping resources both technical and financial. For buyers of vehicles it has added at least £5,000 to prices. The add-on treatment package suffers weight and size comparable to a fuel tank. On short trucks such as artic tractors it is extremely hard to find space for the equipment.

Until 2013 Scania, MAN, Caterpillar and Hino achieved the legal emission limits by refining the

combustion, fuel injection and turbocharging flow also sucking back some exhaust gas to adjust the oxygen intake – all under electronic control. Others, however, took the easier way out of piping the exhaust through two filters containing platinum catalyst and mixing with ammonia in a solution in a separate small tank that had to be refilled from time to time. Operationally this was clumsy and put extra responsibility on the vehicle operator. Yet those who preferred the chemical-treatment route prevailed, with EU Directives forcing in 2014 all exhaust systems to include such aftertreatment.

The virtual elimination of pollutants has brought extra complication in turbocharging no longer just to boost power. Typically two turbochargers are now needed in series to keep emissions within legally enforced limits right through an engine's range of speed and load.

An alternative approach is to run engines on gas, but up to now this has meant converting a diesel to run on methane. The cost is dismaying. It might not be so if beginning with a spark-ignition engine, but that has not been tried yet: "too many vested interests" it has been alleged.*

Now the great political enthusiasm is for hybrid source of power with a battery and electric motor assisting a diesel (or a petrol or gas engine). Again the cost is absolutely daunting. A similar result can now be achieved with a power booster that comprises a high speed flywheel interposed in the transmission. This, a development by engine researcher Ricardo, is a cheaper form of hybrid and is rid of the gloomy prospect of having to renew very expensive lithium batteries after between five and ten years ("like buying your fuel in advance").

Either hybrid-power method can reduce fuel consumption, and hence carbon dioxide emissions, by about 15 per cent; but only on stop-start duties where braking stores energy that is then released to help subsequent acceleration. Not much prospect for normal open road use, therefore.

Taking a broad view of over a century of engineering progress for transport of goods and passengers, overall constructional form has mostly not changed.

Chassis are still essentially a steel ladder. Leaf springs still reign. It is in the details where engineering progress has been driven – of late in harness to electronics. Even gear-changing can now be done automatically by electronics.

Too often adventurous technical proposals for raising transport efficiency and safety have been repeatedly frustrated by short-term financial priorities. Timid politicians play the popular game of searching for reasons why something new should not be done. There are many examples within and beyond this incomplete review.

*A fuller account may be found in 'Transport News Digest;' (issues of May 2008 and September 2009.

The paper above has drawn on contemporaneous notes, conversations and involvements over more than 60 years. They include summaries of Leyland research reports covering 1951 to 1956, articles and news reports in 'Motor Transport' and 'Bus and Coach' from 1956 to 1990, minutes of the author's two years as the Leyland Motor Corporation's Product Planning Engineer from 1964 to 1966, his editorship of 'Transport Engineer' from 1977 to 1994 (and subsequent editorial contributions), and his editing and publishing of the news summary 'Transport News Digest' from 1966 to 2010.

Sutton & Co

As Dave Bubier points out (*Journal* 77, page 7), this contractor was omitted from the road haulage *Companion* (possibly due to constraints on time and space). However, one of the contributing editors, the late Gordon Mustoe, together with his colleagues Arthur Ingram and Robin Pearson, included a chapter devoted to Sutton & Co in *BRS Parcels Services and the Express Carriers* (Roundoak, 2008) pp 57-62.

RAS

R&RTHA November 2014 Report

Association News…Droitwich calling

The Show moves on

The Management Committee met on November 5, not at Cowley House, Oxford, but at the Kithead headquarters in Droitwich, following Philip Kirk's translation from the Managing Directorship of the Oxford Bus Company to that of Kithead Archivist [and indeed much else!]. Its previous meeting was held at Oxford on 24 July.

Whither the route and whence we came

The Committee plans to give further consideration to the discussion paper on the Association's development, a summary of which was included in the last edition. It is anticipated that attention will focus upon reactions and ways in which the Association might work more effectively with other organisations. Consultations are taking place on a number of fronts with initial responses proving to be positive. There is clearly much overlap with the Omnibus Society with many common interests and indeed shared members. Various ideas have been put forward for consideration. Likewise, it makes good sense to explore how we and the Kithead Trust might work together.

The OS, of course, focuses upon road passenger transport, whilst the Association seeks also to honour its wider brief which includes the highway itself and freight. Accordingly, and quite properly, discussions have also embraced so far Coventry Transport Museum, which hosts many of our meetings, and with Garry Turvey, formerly Chief Executive of the Road Haulage Association and, crucially, former Chairman of the R&RTHA. No less importantly, we have been exploring how we might work more closely with the world of higher education and, in this connection, we have high hopes of links with the University of Wales Trinity Saint David whose Pro Vice Chancellor has agreed to be one of our directors. The very exciting article by Amy Graham, a new member, has prompted consideration of how we might reach out to students poised to take forward their studies to a higher level.

It must surely rank as a special achievement: a recent article in the Journal by Roger Atkinson, who has so splendidly 'returned to the colours', was reprinted in 'The Oldie'! Of note, too, is the first of an occasional column for the transport researcher by David Harman whom we most enthusiastically welcome back to membership. Of equal importance for the serious student was Tony Newman's Research Co-ordinator report.

Dates for the Diary

The Spring AGM and Conference will take place in the refurbished Coventry Transport Museum, which will surely be worth seeing, on Saturday, March 28, 2015, when the theme will be 'Transport and the City Region, in History and in Prospect'. Devolution is making the topic particularly pertinent and it would now be useful explore what might now be appropriate taking on board the lessons of history. A number of specialist speakers have already agreed to participate.

The Autumn Conference will take place in the Coventry Transport Museum on Saturday, October 3, 2015, on the theme of 'Maps in the History of Transport'

As ever, should you suppose that, as far as you are concerned, the bus has taken the wrong turning, please ring the bell. The Committee would be pleased to consider your comments.

Robert McCloy, chairman

Summer Conference at Brooklands 2 August 2014

The summer conference took place at Brooklands, near Weybridge, Surrey, on Saturday 2 August. Following the closure of aircraft production some years ago, the site has housed the Brooklands Museum, devoted both to the history of motor racing (a section of the track remains *in situ*) and of aviation. The area now also includes the Mercedes centre and a hotel.

A small number of members took part in a visit on the Saturday morning to Guildford Cathedral, at which a guided tour was provided. Transport between Brooklands the Cathedral was kindly provided by our member Reverend Simon Douglas-Lane in his preserved RT3491 as illustrated *below (left to right: Simon Douglas-Lane, John Ashley, Paul Lacey, Peter White, Robert McCloy) [Pat Campany].*

The opportunity was provided to view the London Bus Museum, relocated from its former site at Cobham to the Brooklands Museum, enabling a far more spacious layout to be adopted, giving both more space for the vehicles and extensive explanatory displays on each period of bus development in London. Of particular note were the recently restored AEC Regal IV underfloor-engined single decker which formed the basis of the RF fleet delivered in the early 1950s, and a recently-acquired 1920s double-decker from the auction of the Mike Banfield collection.

Two talks were provided at the Museum, by our members Paul Lacey (who is also chair of the Provincial Historical Research Group of the Omnibus Society), and Ian Yearsley, as reproduced below.

PRW

Influences on Transport Developments in the Newbury district by the Great War

Paul Lacey

Having studied the development of road transport operations in the extensive rural area surrounding the west Berkshire market town of Newbury, I already understood how much the Great War had influenced progress of such facilities. I also knew the backgrounds of those involved in such developments, and again the war loomed large in every respect.

It was therefore without too much inconvenience that I found myself having to present my talk without the aid of pictures due to technical difficulties! For the benefit for all members I will recount what I said and accompany that with some of the illustrations, using a few examples from my extensive studies locally.

Before the war the area was being served by some 40 Country Carriers, with every village and hamlet having some service at least twice a week, the Thursday and Saturday market days dominating the pattern of service, albeit limited by what was practical using mostly horse-drawn wagons. Some carriers had already gone over to motors, which had seen an increase in frequency and the carriage of more passengers to include purely pleasure trips to the cinema etc, a sign of the future to come.

One early effect of the Great War was the requisition of horses by the military authorities, so William Thomas and his two large wagons, along with his farming activities lost those in his large stable other than the two they left him.

This horse-drawn carrier's wagon was one of two operated by William Thomas of Leckhampstead.

Certain other carriers left for the forces, so Freddie Spanswick, a cycle repairer and paraffin dealer, found himself having to cover his brother-in-law's carrier's service from Thatcham to Newbury. That man did not survive the conflict, so Freddie then continued, also acquiring the laid-up van of another nearby carrier who was also a casualty, a career that would grow to become Thatcham's largest bus and coach operator.

Charlie Durnford

Charlie Durnford had been a cowman pre-war, but had 'decided that motors were the future', and although by then rather old to be apprenticed, the lack of younger men gave him the chance to train at Vincent's of Reading, the largest motor garage and coachbuilders in Berkshire at the time. After the war, in which he did not serve due to poor health, he saved up money from motorcycle restoration projects done at home to buy a lorry, which coincided with the return of peace.

Before the war very few people had gone beyond their village area, maybe to Newbury, and almost none to the coast, so a pent-up demand soon emerged, with Durnford using his lorry fitted with seats that first year, adding a charabanc body the next year. His business developed to include a number of ex-WD Dennis, Daimler and Hallford chassis which could be used with lorry, removal van and charabanc bodies as required. The expansion over the 1920s followed the involvement of his four sons as they were old enough to drive. Indeed, in interviews, reflecting the language of less enlightened times they recalled how he 'worked them harder than blacks', and it was not unknown for him to send one of them on a 2-day round lorry trip to (say) Manchester, then tell him on returning to get the chara ready for Bournemouth the next day!

Charlie Durnford ran this ex-WD Hallford with a charabanc body and also as a lorry.

We have already seen how ex-WD vehicles assisted in rapid post-war developments, especially with the famous Slough Dump located at the other end of the county (actually in Buckinghamshire then of course).

Not all those involved in the local scene emanated from west Berkshire, and here again the war was the cause of the moves they made.

Theo Denham came from the West Midlands, where he was a cycle mechanic but had served with the French Army as an ambulance driver from the start of hostilities. After returning to England he was ill and in the Royal Berkshire Hospital in Reading, where he met a nurse from Newbury whom he duly married. That led to him opening a motor garage, then to start charabanc and then local bus services, some of his early vehicles being ex-WD types.

John Prothero

Also displaced by the war was Kent-born John Prothero, who was a trained driver-mechanic and

had been chauffeur to the Bishop of Llanduff before army service. However, with such situations now in less supply, and the war also changed people's attitudes to domestic servitude, he found it difficult to get a job.

Denham Bros. used this ex-WD Talbot to counter the attempts of the Great Western Railway to establish bus services in the Newbury area. Boss Denham is with his brother-in-law's cousin Douglas.

On the invitation of his brother-in-law Ralph Revell, who after Royal Veterinary Corps service found an opening with a stud farm on the Berkshire Downs at West Ilsley, John came to that area.

Prothero and Revell then started up a carrier's service serving the Ilsleys, Chieveley and Beedon into Newbury, though they fell out a year later. Ralph continued with the goods carrying and John started a bus service which expanded well to serve the area.

Denham, Durnford, Prothero and Spanswick are just four examples of the personal stories behind those who expanded throughout the 1920's and, in due course would join together to form the co-operative operation which became Newbury & District Motor Services Ltd., formed in June 1932 to counter the burdens of the 1930 Road Traffic Act, and also to successfully keep the large territorial operators from establishing at Newbury!

My book *The Newbury & District Motor Services Story* was reviewed in Journal 69 (August 2012), whilst other aspects of local operations were covered in No.71 (February 2013).

As can be seen from the above, the story has many strands which reflect the wider developments in transport and social changes at that time, whilst the book is fully illustrated with some 310 half-tones gathered over 45 years research. A map is also provided of the routes and settlements, as well as a full fleet list and details of premises.

The retail price is £25, but R&RTHA members can obtain a copy direct from the author for half price + P&P, so please send cheque for £15.50 to Paul Lacey, 17 Sparrow Close, Woosehill, Wokingham, Berkshire, RG41 3HT.

Road Transport in Britain 1914 to 1924

Ian Yearsley

The period 1914 to 1924 includes some events having much wider significance: the 1914-18 War: the peace settlement under the Treaty of Versailles and all the social, economic, political and industrial changes that were taking place, changes that may well have laid the foundations for the conflict of 1939 to 1945.

One of the commonly-held myths is that, right up to June 1914, Britain was enjoying a period of peace and prosperity, as a logical continuation of the Edwardian era. Professor Toulmin at Sheffield University is among those who have pointed out that industrial unrest was growing in 1913 at a rate that would probably have resulted in the General Strike of 1926 happening as early as 1915, had it not been for the outbreak of war. If you add to that the growing campaign for votes for women, the demand for Irish Home Rule, and many other causes of concern, then the myth was a far from accurate picture of Britain at that time.

Sources

I have used several texts as a framework for this presentation, particularly G.M.Trevelyan's History of England, and the more recent 'Short History of England' by Simon Jenkins. D.L.Munby's 'Inland Transport Statistics Great Britain 1900 to 1970' was,

as so often, an important source, as well Bett and Gillham's 'Great British Tramway Networks, Brian Thackray's 'AEC Story', and the LRTA publication 'Tramway London'.

Germany and her allies were attempting to blockade Britain. From their point of view, Britain was significant because it carried on supplying France even after 80% of its coal-mining and industrial areas had been invaded. So the Germans were trying to prevent the movement of supplies, particularly foodstuffs and fuel, and for fuel, read mainly coal. London's largest electric power stations and also gasworks, were located along the Thames. While a great deal of coal was delivered by rail, waterborne coal down the east coast was vulnerable to German naval attack. Submarine attacks sank hundreds of ships, but adoption of the convoy system by the Royal Navy immediately reduced merchant ship losses. As Simon Jenkins put it, "the reckless decision by Germany" to target all shipping in the Atlantic, including American, brought America into the war, with troops from May 1918.

Attacks by naval gunfire were suffered by towns on Britain's east coast, from Sunderland down to Dover. Trams and buses were destroyed in several places. Blackout against attacks was quite minimal by later standards: vehicles ran with discs of white paper behind the glass of headlights, and there were no headlights mask of the kind associated with World War Two. Air raids in London began in 1915, the first bombs being dropped by Zeppelin airships on 31 May, and then continued throughout the next two years, supported increasingly by conventional aircraft such as the twin-engined Gotha. The route taken into London by these raiders was fairly standardised, and so the War Department was able to commandeer two tramcars from Ilford Council Tramways, fit them with searchlights on the top decks, and send them out each night to termini at Chadwell Heath and Barkingside. Whether these trams remained static or actually chased the Zeppelins is not known. They certainly represented one of the more bizarre weapons of war, the sort that inspired the cartoons of W Heath Robinson. The Ilford cars were part of a ring of twelve searchlight trams surrounding London.

Growth in tramway usage

Passenger loadings on trams increased, especially in London, where nearly one third of the bus fleet had been commandeered for military use, initially in Belgium, but later mainly in France. This was possible only because of the peculiar situation in London. Elsewhere, in urban areas of Britain the electric tramway reigned virtually unchallenged, but in the cities of London and Westminster it was excluded. Here the motorbus was encouraged in a forcing-house of design development where stringent weight and noise regulations were imposed by the police. One curious byway of this standardisation was that in 1919 when the National Steam fleet of white and green buses was taken over by London General, it was possible to transfer the steam bus bodies straight over to B-type petrol-engined chassis returning from the war.

Petrol restrictions

Restrictions on use of petrol were formidable, and Roger Fulford's official history of BET records that in 1916 buses started running on a mixture of petrol and paraffin. However in 1917 the government stopped this and also prohibited all charabanc excursion traffic. In Manchester the Corporation revived some horse-bus services. Some operators used town gas, carried in roof-mounted gas bags, but gas operation was generally less widespread than in World War Two. Vehicle manufacturers had undergone a series of upheavals during the War. Under the Munitions of War Act of 1915, for instance, AEC's Walthamstow works had been declared a government-controlled establishment. Materials had been ordered from America to replace most of the buses sent to the war, but by 1916 the Army Council decided to purchase the entire output of the AEC company, which resulted in this material being diverted to Russia.

Developments in vehicle design

At the end of the War there was a great need for new buses. London General had already envisaged the development on the K-type bus, with driver alongside the engine, and passenger capacity increased from 36 to 46. Pending this, the Metropolitan Police sanctioned the building of a

further 250 B-type buses, known as B7, or type 7 within London General. In London about one third of all the buses, some 1,185 in all, had gone overseas, and only one quarter of these came back. Some went into service still painted khaki, while others simply had lorry bodies with canvas tilts fitted, known as 'lorry buses'. This shortage encouraged a movement to operate independent buses in London, the so-called 'pirates'. These proliferated from 1922, operating on existing bus routes, but 'Restricted Streets', so designated under the London Traffic Act 1924, largely kept them away from tram routes. Only at the end of the 1920s did LGOC gain control of most of the independents.

The period I am considering ended in 1924, and right at the end of that year, 190 miles to the north of London, the small town of Keighley completed the conversion of its tramway system to trolleybuses. This was its second attempt at trolleys. I saw the Keighley single decker of 1922 undergoing reconstruction at Beamish Museum a few years ago. The chassis incorporated something I had read about but never expected to see 'in the flesh', so to speak: a 'Holden pneumatic suspension'. This was a kind of half-way stage between the solid and pneumatic tyre, an inflatable rubber tube inside the chassis frame instead of within the tyre itself. Keighley used them on its single-deck trolleys. Ashton-under-Lyne fitted them to buses and trams. It demonstrated that, at that time in 1924, it was still thought unlikely that a heavy-duty pneumatic tyre could ever be developed, and double-deckers would have to continue on solid tyres. The technological breakthrough that took place in heavy-duty tyre design between 1924 and 1927 is one of those crucial stories of the commercial motor industry that has yet to be told. Maybe someone here today would like to have a go at it?

An important outcome of the war was standardisation. In one form or another, subsidies had been paid to enable horses and vehicles to be commandeered for military use, right back into the 19th century. In 1905 a military subvention scheme meant that suitable motor vehicles could be registered with the War Office to gain a subsidy of £250 toward the purchase cost and £20 a year toward operating cost. But in 1911 this resulted in a pool of only 100 vehicles compared to 600 in the much simpler scheme in Germany. Many features were standardised, for example the War Office subsidy required left to right, clutch brake and accelerator.

Tramways were still growing, albeit slowly. The last two major electric tramway systems were opened, at Edinburgh (replacing the cable system in 1921-22), and in the Dearne District in South Yorkshire (in 1924). Reserved sleeper-track extension were being made in Liverpool, Manchester, Birmingham, Leeds and elsewhere, but by the end of the decade they would be overtaken by tramway closures in the Potteries, the Black Country and elsewhere, as the general economic decline discouraged investment in fixed-track systems.

The 'Slough Dump'

The 'Slough Dump' also deserves comment. The Companion to British Road Haulage History records that at the end of the First World War the military authorities were left with a large number of surplus vehicles, many still overseas. These included some 42,000 goods vehicles. Vehicles handled included various UK makes, but no Leylands at all, for that maker bought back all 6,411 that were available and overhauled and reconditioned 2,914 of them to a high standard to protect its reputation. Some 3,000 American-made Peerless lorries were also refurbished at Slough.

The position in 1924

Road transport in 1924 was very different from what it was in 1914, but many still did not realise the biggest changes were yet to come. In July 1923 a Manchester Corporation Tramways report on the 'Comparative Utility of the Motor Bus and Tramcar' said that "many efforts have been made to design a covered top bus, and it is doubtful if ever a satisfactory safe vehicle can be evolved for use in urban districts, as, having to operate on cambered roadways, its liability to overturn will be ever present, and the cant due to such camber renders it liable to strike lamp posts and other erections on the footpath edge..". However, designs like the NS in London were already featuring cranked chassis to

lower the centre of gravity. Already in 1924 the work of Sir Eric Geddes and others in the Ministry of Transport and the Institute of Transport, both of them dating only from 1919, was preparing the ground for that instrument of monopoly in return for service, London Transport. In 1924, the streets might look the same, but the future was going to be very different.

Making use of Census data in road transport operator research

Tony Newman

This report was presented at the Autumn conference in Coventry

I thought you might be interested to know the extent to which minutiae can now be drawn collectively out of Census Records. I have a cheap monthly sub into 'Find My Past' running at present.

This is how the process started: beginning with an 1851 Exeter Directory, pulled offline, I found there were 8 Omnibus businesses (in addition to named Coaches) running to and from Exeter on a regular basis. The departure days and times were shown, together with loading points in Exeter.

The idea was put to me that in order to dig deeper, I might try Census records which, despite my interest in family histories, had not occurred to me.

So I then went to the 1851 Census via Find My Past and searched for the surnames of these Omnibus businesses listed in the Exeter Directory. The search was free but to see the details of each entry cost 5 units. After several unsuccessful trawls, I found William Kimp who was 60 years old in 1851 and described his occupation as 'Omnibus Driver from Hatherleigh to Exeter' and he lived at 17 Market Square, Hatherleigh; that might well have been his base. This degree of detailed information was well worth the effort.

Thus encouraged, I found that I could search the 1851 Census - and any subsequent decennial Census - filtering out the term 'Omnibus – followed by an asterisk*' for the 'Occupation' box which would produce a list of Omnibus Drivers, Omnibus Owners, etc. This flushed out 25 names, which could be viewed for 5 units. per name, but I went no further.

I then tried 'Coach*' and this produced 501 names, which I realise would include private Coachmen; so clearly some other filter is needed to select the commercial ones.

It has often seemed to me that compared with horse trams, not a lot is known about the 19thC horse bus services, apart from those in a few major towns and cities. My trial run indicates that a systematic search would not be difficult and not very expensive but it would be time consuming for just one person to undertake.

So I am sending this proposal to three organisations (R&RTHA, PHRG and LHRG) of which I am a member, to gauge the reaction to my idea. Would it be possible to organise a small group of three or four people who would be willing to share the process of trawling through the Census records of a selection of major towns and see what results?

Book reviews

Ayrshire Buses David Devoy July 2014. 96pp paperback. ISBN 978-1-4456-4175-1. £14.99. Amberley Publishing, The Hill, Merrywalks, Stroud GL5 4EP www.amberley-books.com

The Ayrshire area was well-known for many years for the operator co-operatives than survived into an era dominated by larger regional companies, notably Al, AA and Clyde Coast. This book is essentially a series of illustrations from the 1960s onward (all in colour), up to the absorption of these businesses by Stagecoach. A wide variety of vehicles was operated (although some illustrations of rear-engined double-deckers from the 1960s onward are very similar). A map of the area would have been helpful for those not familiar with it.

PRW

Buses of Clydeside Scottish and Clydeside 2000 David Devoy 2014, 95pp paperback. ISBN 978-1-4456-3970-3. £14.99. Amberley Publishing, The Hill, Merrywalks, Stroud GL5 4EP www.amberley-books.com

Covering a somewhat more recent period that most of the Amberley Press books, this follows the usual style of a brief introductory text, followed by extensive suitably-captioned illustrations, in this case all in colour. Clydeside Scottish was a product of the break-up of larger SBG companies (in this case Western SMT), covering the Clyde coast from Largs into Renfrewshire and Glasgow, formed in 1985. Intensive competition with Strathclyde Buses, and also local independents, followed in the years just after deregulation, with a wide variety of vehicle types being operated. The company was merged back into Western SMT prior to privatisation, from 1989, although largely retaining its separate livery [for an in-depth understanding of the processes behind formation and management of the company a very useful account is given in an extended interview with Ian Manning, the then traffic manager, in *Coach and Bus Week* 16 July]

Clydeside 2000 was the company set up at privatisation, initially a management buy-out and then acquired by Arriva. A wide variety of vehicles in the operating area is shown, including express operations on behalf of Citylink. The number of high-floor vehicles unsuited to intensive urban operation is noteworthy. Today, following the merger of Arriva and McGill's operations far less variety is to be seen, Paisley being dominated by the blue and white of McGill's livery.

PRW

Midland Scottish Buses Walter Burt August 2014. 96pp paperback. ISBN 978-1-4456-3466-1. £14.99. Amberley Publishing, The Hill, Merrywalks, Stroud GL5 4EP www.amberley-books.com

In a very similar format to other Amberley series books, this is essentially a series of photographs (most in colour) with a brief introductory text. The period covered is mostly that under Alexander's and SBG ownership with its distinctive blue livery, from the early 1960s to the First Group era. Coaches as well as local bus operations are covered. Illustrations also provide street and bus station scenes of the period.

PRW

Note

A somewhat contradictory reference was made to the price of the Western Welsh history reviewed in our last issue (page 21). The correct price is the £30 figure shown at the head of the review, not the £40 mentioned in the text below.

Obituary:
David St John Thomas

We regret to report the death of Association member David St John Thomas on 19 August.

He was best known for his role in transport history publishing, through the firm David & Charles (formed with Charles Hadfield), established in 1960. While railway history formed the greater part of its transport production, it also played a to noteworthy role in publishing road transport history, including 'The History British Bus Services' by John Hibbs (1968), 'The Independent Bus' by Keith Turns (1974) and volumes in the regional history of British bus services (such as that of the North East by David Holding, 1979). The firm was subsequently sold to Readers Digest in 1990. He was also noted as an author in his own right, both in transport (notably the first of the Regional History Railways of Great Britain series, covering his home area in the West Country) and in other fields. For the last twenty-five years he had lived beside the Moray Firth.

A fuller obituary (from which some of the material above has been drawn) appeared in the *Daily Telegraph* on 2 October.

PRW

Viewpoints and opinions expressed by contributors to this Journal should be seen as personal, and do not necessarily reflect views of the Association.

EARLY ROADS & TRAVELLERS IN CHESHIRE

John Edser

We know that people have been travelling through Cheshire since at least Roman times, for they set up a legionary centre at Deva - modern Chester. There have also been discoveries of Roman salt pans at Nantwich, which shows that this industry has deep roots. The fact that Roman soldiers were often partly paid in salt (or salarium - our modern salary) makes their presence in this county unsurprising.

With Romans came Roman roads and figure 1 shows their extent, some of which were very long-lasting.

On OS Landranger Maps 117 (Chester - Wrexham area) and 118 (Stoke - Crewe – Northwich) the Chester - Whitchurch road forms a minor road from Tilstone to Malpas and the B5395 from there and is marked as such; the Chester - Northwich - Manchester road is the modern A51/A54/A556/A56 and is marked as such in several places; the Northwich - Middlewich road is the modern A530 - also known as King Street and the Middlewich - Worleston (west of Crewe) road is shown as a dotted line marked 'course of Roman Road' .

While their condition was allowed to run down after the Romans left, the system was still used by the native tribes since, as we all know, the Roman roads were built to last.

There is one medieval trackway/highway known in the 11th century as 'Peytefynsty', which is roughly the modern A49 between Tarporley, Cuddington and Weaverham. This formed the ancient boundary between the two halves of the medieval Delamere Forest. The northern and western area from the Mersey to the Delamere area was originally known as 'Mara' and the remainder to the south and east as 'Mondram' - remembered by the present-day village of 'Aston-juxta-Mondram' west of Crewe.

Medieval roads in Cheshire

The map on the next page (figure 2) gives an outline of these.

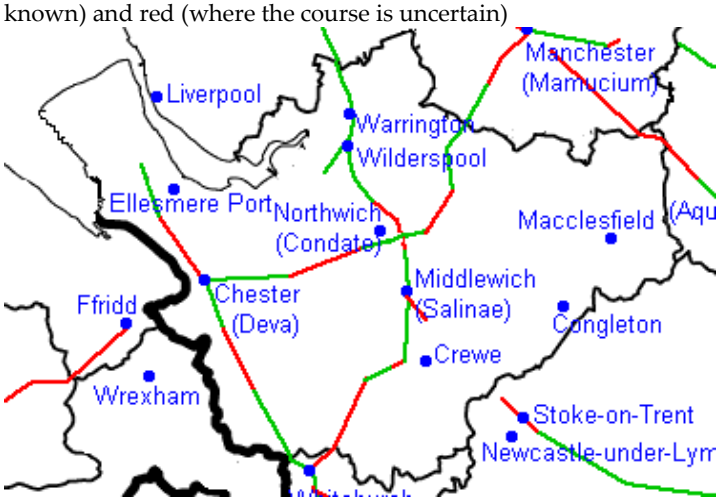
As can be seen from the medieval map, many of their roads follow the Roman ones but there are more of them. Whether they were in as good a condition as their predecessors is open to question but, if contemporary accounts of medieval travellers all over the country are true, probably not.

The antecedents of the modern A51 Chester - Nantwich - Stone (the London Road in Nantwich); the A49 Tarporley - Whitchurch; the A534 Nantwich - Wrexham; the A54 Kelsall - Middlewich roads all have medieval roots. The Northwich - Macclesfield road, if drawn accurately, only matches the modern A537 from Chelford to Macclesfield.

So, apart from the Roman legions and the very many local farmers, market traders and the general public, used these roads and, more importantly, recorded their travels.

One of the early records is that of Gilraldus Cambrensis, a Welsh monk who accompanied the Archbishop of Canterbury on a journey through Wales in 1188 raising men and money for the 3rd Crusade (1). They arrived in Chester on Maundy Thursday and spent Easter there. They then returned to Hereford at what, for medieval travellers, was a punishing pace. They left the City and travelled via Whitchurch to Oswestry, where they spent the night. Their route was almost certainly by the 'uncertain' road to Tilstone and then the traceable one to Whitchurch. They ended by covering the 50 miles from Shrewsbury to Hereford in a day!

Figure 1 (below): Roman roads in Cheshire [source: <www.romanbritain.org>]. Although the illustration below appears in black & white, the version on the source website shows roads in green (where the course of the road is known) and red (where the course is uncertain)



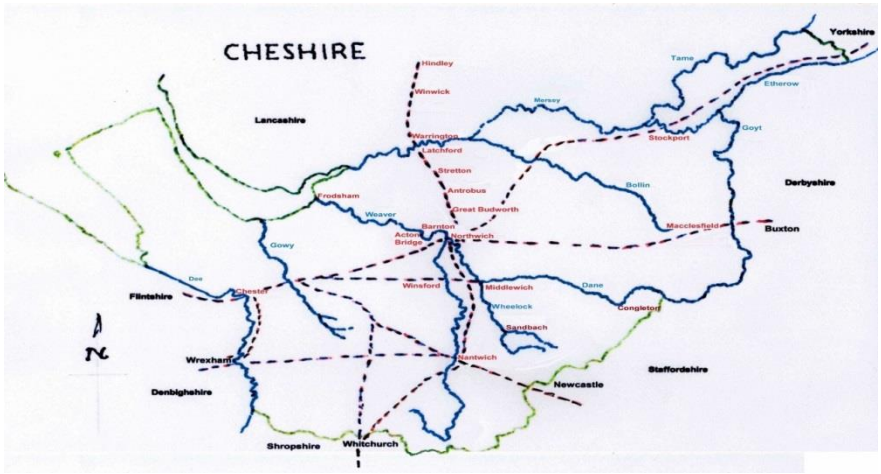


Figure 2 (above): Medieval roads in Cheshire [*source* www.manchester2002.com]

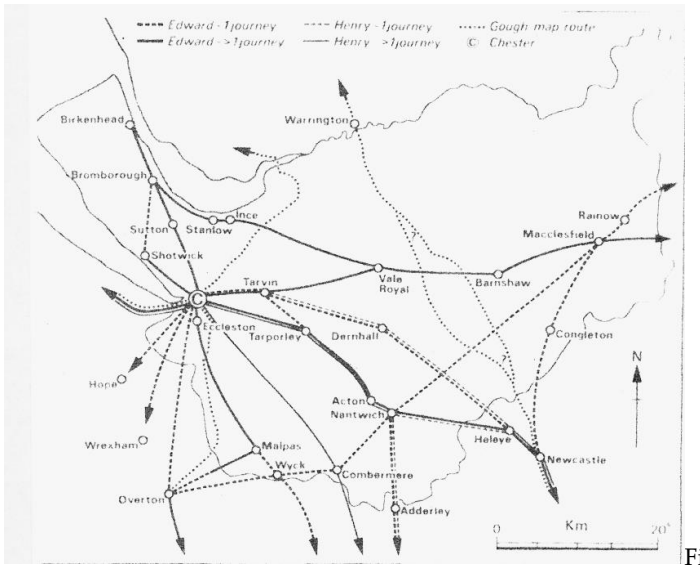


Figure 3: Royal Journeys (source: reference 2)

As the medieval map (figure 2) shows, the east of the county was badly served by roads, simply because there were no Roman precedents apart from a road from Buxton towards Manchester.

Their condition was everyone's despair. The roads across the valleys were of soft clay in winter and hard ruts in summer; across the sandy areas soft blown sand in summer would be worse than the firm sand of winter. By the 15th century most roads were little more than tracks.

As Chester was a major port and often the stepping-stone en route to Ireland and the North Wales coast, royalty often crossed the county. Various itineraries by Henry III (1216-72) and Edward I (1272-1307) have been plotted and are shown on the map. ('Barnshaw' is modern Goostrey and 'Wych' either Higher or Lower Wych just south of Malpas).

It is clear that they both used two major routes across the county from Newcastle-under-Lyme in Staffordshire via Heleye (Highley Castle near Madeley - Staffs) and then either via Darnhall - south of Winsford - with no modern direct route - and then on to Tarvin and Chester or via the A51 via Acton, Nantwich and Tarporley. As you might expect, the energetic Edward went all over the county and into the border areas. Henry confined himself to the major routes but, more in keeping with his strong religious feelings, made more than one visit to the Cistercian Abbey at Combermere (2).

The next recorded arrivals must have used every existing road and trackway in the county. Edward I set about subduing the Welsh with his massive castle-building programme and Hawarden, Harlech, Conway and Caernarfon were all started in 1282-83. A massive workforce was required, far beyond local resources, and the following were all summoned to Chester (3):

Diggers came from Yorkshire, Lincolnshire, Norfolk, Suffolk, Surrey, Sussex, Essex, Hertfordshire, Northants, Hampshire, Berkshire & Bedfordshire.

Carpenters came from Shropshire, Staffordshire, Yorkshire & Lincolnshire.

Masons came from Shropshire, Staffordshire, Derbyshire, Nottingham, Yorkshire, Rutland, and Lincolnshire. Masons from Gloucestershire, Somerset and Dorset were sent to Bristol and then by ship to North Wales - the only craftsmen that did not go to Chester.

1600 woodcutters came from Wiltshire, Herefordshire, Gloucestershire, Warwickshire, Leicestershire, Shropshire, Staffordshire, Derbyshire and Nottingham.

This huge force enabled Edward to start work on several sites at once but it must have had a profound effect on both the roads and the local populace.

Henry VIII

Henry Vlll commissioned John Leland to 'search' after England's Antiquities and peruse the libraries of all Cathedrals, Abbeys, Priories etc and also all places wherein Records, Writings, and secrets of Antiquity were reposed', in other words, a kind of literary and artistic Domesday. John travelled widely and passed through Cheshire in 1539 - en route from Whitchurch to Manchester on mainly country roads through Marbury, Bunbury, Northwich, Rostherne and out of the county - a very rough approximation to the modern A49/A556. It is strange that he avoided most of the towns, including Chester, but he wrote about the salt workings, gives a detailed town-plan of Northwich and a paragraph on all the market towns plus, of course, a detailed list of all the gentry' houses. There is very little on any 'antiquities' (4).

Road maintenance

In Medieval and Tudor times the responsibility for the upkeep of the roads lay with the manor or parish and, with no coordinating authority, maintenance was very badly done.

The variability of the road system was highlighted in two ways.

Some individuals left money for repairs in the county. In 1496 John Hawarden of Chester left 10 marks for the repair of 'bad roads' and in 1499 John Norris - also of Chester - gave 20/- for improving the road between Chester and Eaton. Other roads mentioned include 'the horse pavement' between Clutton and Tarporley in 1540 (now A51); 'the ways at Wybunbury ((near Nantwich) in 1542 and Dog Lane and other roads at Congleton in 1544.

Money was also left for bridge repairs.

Local courts gave other answers. In 1574 there were 19 complaints about Knutsford roads. Today's A51 also had problems between Chester and Tarporley. Cotton had a bad road but Hockenhall had not mended the stretch from Cotton towards Duddon. From Duddon to Tarporley, Clotton was at fault. Willaston had neglected the road towards Nantwich; between Middlewich and where Crewe is now the road was 'poor'. Most of central Cheshire had bad roads and Acton - near Nantwich - and Sandbach were accused of neglecting their roads. Randle Hurler of Church Coppenhall (now part of Crewe) was accused of 'stopping a common waie lyeing after the side of the nightmare lane leading to Coppenhall mosse' (5 & 6).

The seventeenth century

In 1634 three members of the Military Company of Norwich - a kind of 17th Century TA - arrived in Chester from Lancashire via Warrington. They did not stay long and were soon on their way to Derby via Nantwich and Newcastle-under-Lyme. Another brief visitor was John Taylor, known as the 'Water Poet' - ex navy and a Thames waterman who supplemented his income by writing doggerel verse. He did, however, travel all over the country and in 1652 arrived in Chester from London via Stokenchurch, Abingdon, Warwick, Coventry and Lichfield (7). Another brief visitor, he was soon on his way to Flint.

I am sure that many other records were made of journeys through the county but very few have survived or been put into print. However, my last traveller is well-known, recorded the journey in detail and, even more unusual for the late 17th century - was a woman. Celia Fiennes (1662-1741) was a very independent lady who travelled widely throughout England. Although London based, she had another centre in the Midlands at Wolseley Park Lodge just north of Rugeley at the junction of the A51/A513.

Celia went through Cheshire twice during her 1698 'Great Journey', which took her from London to East Anglia and then across country via Wolseley to Chester, Liverpool, the Lakes, Newcastle, Leeds, Manchester, through Cheshire to Shrewsbury and then great loop to Penzance before returning to London - a remarkable woman in every way. Celia entered Cheshire for the first time from Newcastle-under-Lyme via Betley to Nantwich and then on to Chester, commenting on both the coal mining at the start and the lush pasture and cheese making on the Cheshire Plain. Like most travellers, she comments on Chester's famous 'Rows'.

We know Celia was an astute businesswoman as well, for she held a mortgage on a piece of land near Northwich which contained the first rock salt found in England, commenting how much easier it was to produce high quality brine than by the older traditional methods. She describes the mine herself but this is the first general reference to it in what could be called an 'ordinary' account.

Leaving Chester, Celia went into Wales and visited Flint and then on to her huge northern loop. Her return journey across Cheshire was not without incident. She left Manchester and travelled down roughly today's A556 passing Dunham Massey before going to Northwich, where she again mentions the salt industry, including the newly discovered rock salt. Leaving Northwich via Sandy Lane Head (? modern Sandiway) she continued on to Whitchurch and had a very interesting experience.

In her own words " I baited to Whitchurch, 16 long miles, over a long heath 4 or 5 mile then to Beeston and came by Beeston Castle on a very high hill with walls remaining round it, which I left on my right hand just at the foot of the hill and so I crossed the great Road which comes from Nantwich to Chester (A51) being then just the midd way to either being 7 mile to each; and here I think I may say the only time I had reason to suspect I was engaged with

some Highway men; 2 fellows all of a suddain from the wood fell into the road, they look'd all trussed up with great coates and as it were bundles about them which I believe were pistols, but they dogged me one before the other behind and would often look back to each other and frequently jostle my horse out of the way to get between one of my servants horses and mine, and when they first came up to us did disown their knowledge of the road and would often stay a little behind and talk together then come up again, but Providence of God so order'd it as there was men at work in the fields haymaking, and it being market day in Whitchurch as I drew neer to that in 3 or 4 mile was continually met with some of the market people, so that at last called each other off and turned back; but as they rode with us 3 or 4 mile at last they described the places we should come by, and by a high pillar finely painted in the road about 3 mile off Whitchurch which accordingly we saw as we passed on, which showed them noe stranger to the road as they at first pretended". A redoubtable woman indeed and a fitting place to end this article (8).

References

1. Giraldus Cambrensis. The Itinerary through Wales, 1188, translated by Sir Richard Colt Hoar 1806, edited by Llewelyn Williams. J.M.Dent 1912 (Everyman edition).
2. Brian Paul Hindle PhD, FRGS. Medieval Roads, Shire Archaeology Series - Shire Publications, 1989
3. John Goodall. The English Castle, Yale University press for the Paul Mellon Centre for Studies in
4. John Chandler. John Leland's Itinerary - Travels in Tudor England, Sutton Publishing, 1993
5. J.T.Driver. Cheshire in the Later Middle Ages. History of Cheshire Vol 6, Cheshire Community Council Publications Trust Ltd, 1971
6. Joan Beck. Tudor Cheshire. History of Cheshire Volume 7, Cheshire Community Council, 1969
7. Richard Trench. Travellers in Britain - Three Centuries of Discovery, Aurum Press, 1999
8. Christopher Morris (editor) The Journeys of Celia Fiennes, Cresset Press, 1947

Best Wishes to our readers for Christmas and the New Year

2015 AGM

The 2015 Annual General Meeting of the Association will be held in the Bettmann Room at Coventry Transport Museum on Saturday 28 March, 1100 to 1600. Fuller details will be placed on the Association's website.

Autumn 2014 Conference in Coventry

The Autumn Conference took place at the Herbert Art Gallery and Museum (the Transport Museum being under redevelopment) on 4 October. The morning session comprised four presentations by members and guests:
Roger de Boer on how his interests in buses developed
John Edser on Accessible Transport
Malcolm Dungworth on his Career in road transport
Tony Newman on Use of Census data in research (reproduced elsewhere in this issue)

In the afternoon two comprehensive presentations were made:
Louise Allen on Stage and Mail coach travel – the passenger's viewpoint.
John Minnis of English Heritage on the Development of Road Transport in the inter-war era, illustrated by extensive photographs from the Aerofilms archive now owned by English Heritage.

A full report will appear in our next issue.

PRW

British Art, 2015

Deadline for the next issue (February 2015) is 21 January