

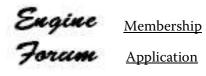


No. 41

Spring 2022

www.gardnerengineforum.co.uk





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| Gardner Engine Forum Philosophy | | | |
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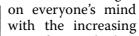
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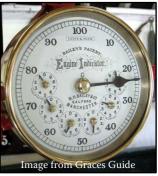
Chairmans Notes

Welcome to my spring notes. As I prepare these words of wisdom storm Eunice has arrived and with her more damage, we seem to be having more extreme weather conditions, is this to do with with climate change or is it to do with cyclic weather patterns? This is open for discussion. Back in November 1703 they had the great storm which is still regarded as the most destructive to ever hit the British Isles, as I write this the lights have just gone out.

It is always good to hear from members, be it to discuss engine problems or to have a general chat about my time at L.G.& S. Member Howard Evans wrote to me expressing his interest in the company and how in the late 1960's he was privileged to visit Barton Hall Works with his uncle, who was an employee of W.H Bailey & Co who supplied steam fittings to the plant. W.H Bailey was

formed in 1889, in Salford, before moving to Patricroft in 1940, so were essentially neighbours, the company still exists today as part of I.M.I (Graces Guide). I well remember the factory near Patricroft bridge, also Edmondsons (a subsidiary company ?) who made turnstiles along with other products. W.H Bailey manufactured equipment for Steam Plant including steam engines as can be seen by the picture of the stroke counter clock fitted to the Claverton Pumping Engine near Bath. The matter of heating is







cost of gas and oil. What must it have been like for L.G & S, if you look at the photographs you cannot see any insulation on the inside of the building. Yet I cannot remember being cold, if you were in the test area you were well looked after.

Another conversation that I have had with a member who in his working life was involved with road haulage, he experienced an LXB running backwards, it would be interesting to hear more, how many reverse gears did it have?.

I have also been told of an attempt to run an LW on steam.

In my spring 2020 notes I asked the question about the future of diesel. The I.W.A winter edition of waterways makes good reading, evidently the early biodiesel gave problems and earned itself a bad name. Hydrogenated Vegetable Oil (H.V.O) is, according to the article a different story, extensive tests have been carried out with regard to domestic use (heating) and fuelling historic engines, member Bernard Hales was one of the participants in the trials using the 1931



5L2 in narrowboat Enterprise, by all accounts the engine performed satisfactorily, it would be interesting to learn more.

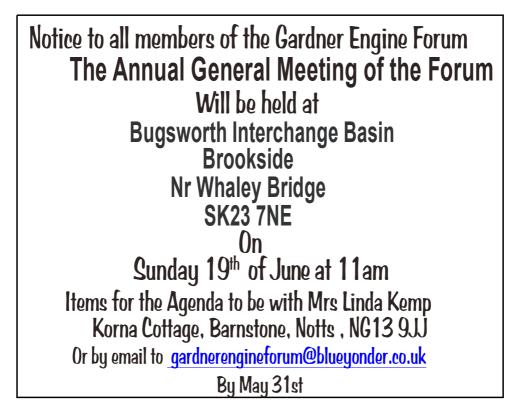
The rally at Bugsworth will soon be with us, I hope to see many of you there.

We will be holding our annual general meeting at the rally, the first for 3 years.

At this AGM we will be seeking two new members for the committee as Simon & Pat Roberts are standing down. We ideally need someone who could head up any further rallies, pretty much the same team has organised and run the last 5 events along with managing the other posts to keep the forum going. Please consider volunteering, and help lighten the load.

A warm welcome to new members David Hyde, Ken Norman, Steve Buckley, Robert Summers.

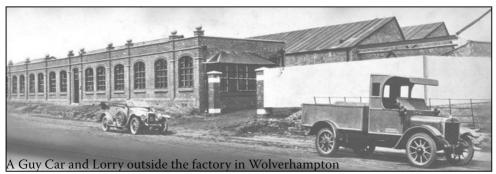
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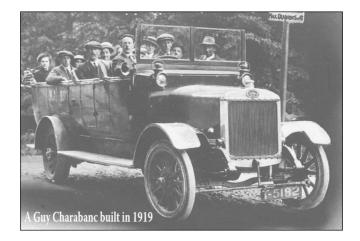
Guy Motors of Wolverhampton continuously produced powered vehicles for 68 years. It was the Black Country's longest surviving powered vehicle manufacturer. Guy was, and still is, well known both at home and abroad for its coaches, buses, and commercial vehicles, which are fondly remembered.Guy survived recessions and hard times thanks to its ability to produce innovative products, mainly due to its skilled design team. Industrial relations in the factory were second to none. Although wages in the factory were slightly lower than elsewhere, people were generally happy and contented during their time with the company, as can be seen from the high number of long service awards for people with 20 years service. Guy Motors became what it was thanks to the drive, enthusiasm, and engineering ability of its founder, Sydney Slater Guy, who founded the business in 1914, and ran it until retirement in 1957 at the age of 72.



Following the war years of 1914/18 the market was flooded by ex military vehicles which made it almost impossible to sell new vehicles. Guy like many others found it difficult to survive, but the company continued to innovate, launching the first British V8 engine with inclined valves and inclined detachable cylinder heads. Between 1919 and 1925, 150 cars were produced

Production of the 30cwt chassis continued in a range of models including the Guy Charabanc, a 14 seater with a 4cyl engine 4 speed and reverse gearbox, cone clutch, double reduction rear axle and a pressed steel chassis. It was also fitted with carbide lamps. Early vehicles were powered by White and Poppe and Tyler engines with gearboxes supplied by Maudslay





Guy Motors were one of the first companies to get back to commercial vehicle production after the war, and in March 1920 they were expanding the buildings and plant on their 60 acre site, and had £2.5 million in orders. However, the post-war period was to prove difficult for the motor industry as military contracts were cancelled and military vehicles no longer required for service were sold onto the market at low prices. The Guy 4 litre 8-cylinder "Open Tourer" car was joined by a smaller model in 1921, the "Guy Saloon Car" with the 2465 cc four-cylinder 16.9 hp. A cheaper model followed in 1924 with the 1954 cc 13/36 with an engine from Coventry Climax. There is some uncertainty regarding the number of these cars made, but it is generally agreed it was in the 100s rather than thousands.

The main commercial interest of Guy Motors was production of the commercial chassis and engine ready for a variety of bodies to be fitted. This was available in different wheelbases and was used both for trucks and for buses, and still used the separate subframe to mount the engine and transmission as had been developed during WW1.

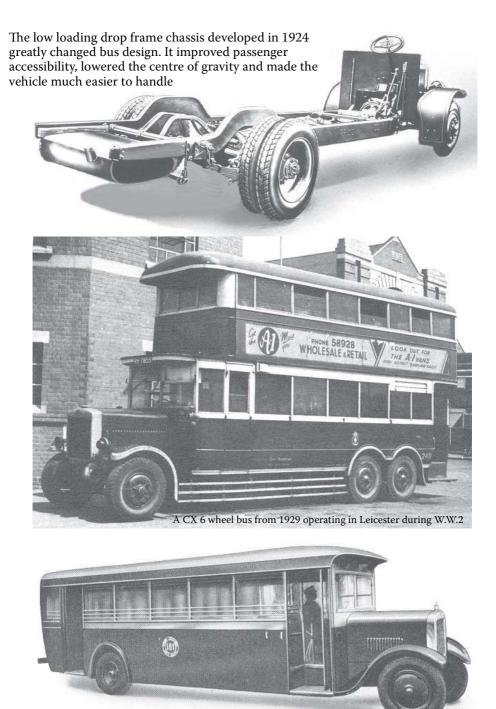
At the commercial show at Olympia in October 1920 two examples were shown, one having a single decker Mulliner bus body seating 28, the other with shorter wheelbase, but otherwise identical chassis and engine, having a 2.5 ton tipper wagon body.

In 1924, the company adopted the slogan 'Feathers in our Cap' which led to the addition of a Native American mascot to their vehicles. 1924 also saw Guy produce the first-ever dropped-frame chassis for passenger vehicles (the B-type). This design allowed passengers to enter buses in a single step and became extremely popular, Guy receiving an order for 170 from Rio de Janeiro alone. Growing populations in towns and cities meant larger capacity buses were a necessity, leading Guy to develop a 6-wheeled version of their dropped-frame



chassis, which allowed for the introduction of the first 6-wheeled double decker buses and 6-wheeled trolleybuses in 1926. Owen Silvers, the general manager of Wolverhampton Corporation, had pushed Guys to develop the 3-axle bus, and took delivery of the first production vehicle. He then convinced Guys to work with W. A. Stevens, who had developed the Tilling-Stevens petrol-electric bus, of which Wolverhampton had several, and Rees Roturbo Co Ltd, who were also based in Wolverhampton, on the design of a trolleybus. Guys modified their 3axle chassis, fitting a single 60 hp (45 kW) Rees-Stevens electric motor at the front of the chassis. Rees Roturbo produced the regenerative control system. The first BTX vehicle, with an open rear staircase, was tested on the Wolverhampton system in December 1926, and Silvers placed an order for a further 58, with enclosed staircases. The Hastings Tramway Co ordered 50 single-deck BTX trolleybuses and eight open-top double-deck versions, while Rotherham ordered five. Guy double decker buses and trolleybuses would prove popular, with a fleet of double deckers sold to the London Public Omnibus Company and exports supplied all around the world. Exports served as a major source of income for Guy with sales to South Africa, Pakistan, India and the Netherlands, their armoured vehicles proving particularly popular for covering difficult terrain, with 100 supplied to the Indian government in 1928

In 1926 much of the country's industry was brought to a standstill by the general strike, which lasted for 10 days, from the 3rd of May until the 13th of May. It was called by the TUC in an unsuccessful attempt to protect coal miner's wages and



One of the buses built for use in Rio De Janeiro



working conditions. Many companies were badly affected by the strike, but luckily at Guy Motors only a few employees came out on strike, due to the excellent industrial relations at the factory. After the strike, Sydney Guy formed a works committee to liaise with employees and management in a case of dispute. All employees had to sign a declaration stating that they would follow a standard procedure, and would not undertake any industrial action until the procedure had been completed. They agreed to notify the works committee in writing, about any dispute, and the works committee in turn, had to discuss the matter with management, and reply in writing within 48 hours. I wonder what would have happened at Gardner's in the 1970's had a similar system been in place, although the labour market was very different by then.

It would seem likely that the success of the L2 in other vehicles would have influenced Guy Motors in deciding to order from Gardners. In 1931, the first order was received on 7/10/31 for a 6LW. The engine, serial no 29252 was dispatched on the 20/10/31 to be fitted into a Guy Chassis with a lorry body, destined for Mr Barlow of Cheadle Hulme. In November 1931 Gardner's exhibited at the Commercial Motor Transport Exhibition held at Olympia, one vehicle on their stand was a 6LW powered Guy Chassis. Given the dates and the very short delivery period there must have been some arrangement in place to get the vehicle to the exhibition. Although not the first 6LW manufactured, it may well have been the first to leave the factory. As can be seen on the order card the uptake of engines was not great with only 10 units being ordered in 1932, some of which were not fitted with electric start, It must have been interesting hand staring a 6LW on a cold frosty winters morning.

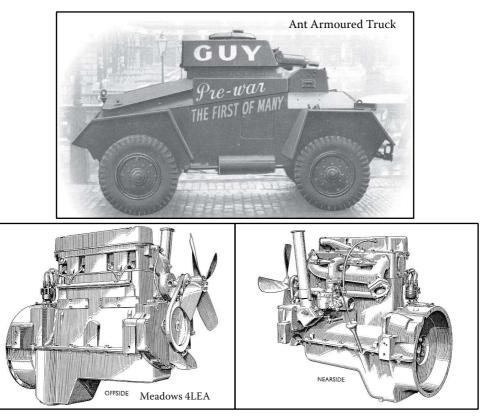
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| 6LW | Veric. | "GUY" phassis. | R5462 | 7.10.31 | GLW. E.S. | Vekic. | West Riding Automobile Lur | R6621 | 25.2 |
| и / | u | "GUY" Furniture Van. | R5679 | 1-2-32 | 61.W. E.S. | Vehic | "Guy" | R6648 | 20.3. |
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| 4LW | | "GUY" chassis. | R6061 | 20 .0.32. | 5LW. E.S. | Vehie. | GUY | R6706 | 20.4. |
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| GLW | 11. | "GUY" Chassis | R6146 | 5.7.32. | 61.W. E.S. | Vekie. | Blackpool Corp - Sur | R 6770 | 11.5. |
| ALW. | | "GUY" " | R6356 | 3.11. 32 | GLW. E.S. | Vehic | "hur " | R6859 | 23.2. |
| GLW. | Vehic. | GUY " | R6344 | 11.11.32 | ALW. E.S. | Velie. | GUY " | R6858 | 27 6. |
| ess Genr Ring GL.W | Vehic. | "GUY " Prepared For AUY " Elect. Starting | R6415 | 28.11.32 | GLW. Ring | Vehic | Leeds Corporation QUY | R 7093 | 26.9. |
| ess Grar Ring | Vehic | GUY " | R6418 | 10.12.32 | | | n | R 7095 | |
| AL.W.ES | Vehic | GUY D | R6482 | 11.1.33 | | " | п п | R 7096 | |
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LG&S order card showing orders between 1931 and 1933

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In 1933 Guy launched the 'Arab' bus chassis, the first bus chassis designed for use with a diesel engine. It was designed for use with the Gardner 'LW' range of engines, and had vacuum-hydraulic brakes. Although sales were not very good in the 1930s, when around 60 were built.

In the years leading up to the second world war, Guy found themselves involved with the development and manufacture of military equipment, They developed a method of welding hard bullet proof plate. The government technical department had advised that it was impossible to commercially weld the material, Such was the confidence of Guy they offered to weld the first batch of orders and if proved unsatisfactory they would stand the cost, needless to say Guys methods were successful and became the standard method of construction It held the advantages of quicker manufacture, less chance of injury from splash and flying rivets in the event of a hit. According to one website, two prototypes were built, one Gardner powered the other was fitted with a Meadows 4LEA petrol engine developing 60 bhp, this was adopted for the production run, the choice may have been influenced by manufacturing and supply ability as they were all in armament manufacture for the war effort. Meadows however were just down the road from Guy.



By 1941 there was the need to manufacture buses as many had been lost in the Blitz, Guy who had been one of the major manufactures and innovators were commissioned by the Ministry of Supply to manufacture a chassis suitable to take a double deck body. The specification was drawn up and completed by September 1941 with the prototype chassis being completed by the end of March 1942. The new vehicle was called the "Arab" it was based on the 1933 chassis, due to the shortage of aluminium, cast iron had to be used which increased the weight by 20%. Improved design of the wearing components lead to longer time between overhauls.

The buses were supplied with either a Gardner 5LW or for use in hillier terrain a 6LW. Some 2700 buses were built during the war years, this established Guy as a major supplier to the bus chassis market.



http://www.historywebsite.co.uk/Museum/Transport/Buses/Guy. Images courtesy of Brian Shaw



GUY "ARAB" DOUBLE DECK OIL ENGINE CHASSIS

(War-time Specification).

 $T_{\rm HIS}$ vehicle is built under the instructions of the Ministry of Supply, to a specification agreed between them, the Ministry of War Transport and the Technical Committee of Operators in 1941.

The general design is based largely on the Guy "Arab" pre-war model, which proved, upon investigation, to have given a very good account of itself, many vehicles now having run over 500,000 miles. In the years that have elapsed since these vehicles were first produced, naturally some detail improvements have been made, but owing to war-time conditions, the Company was instructed to eliminate all "frills". The use of elektron and aluminium had to be discontinued, and this, together with other details, resulted in a considerable increase in weight of the chassis, an increase of approximately 18-5 per cent., and on the complete vehicle (depending on the make of body) anything from 13-9 per cent, to 19-5 per cent, for the more difficult routes in view of this increase in weight, we recommend a 6-cylinder Gardner Engine.

This increase in weight, together with the much larger number of standing passengers allowed during the war, affecting as it does the power-weight ratio, raust inevitably detract from the performance of the vehicle compared with the pre-war models, and operators are asked to beer this very important point in mind. Where vehicles are operated by drivers who have previously only driven buses with an epicyclic gearbox, we would point out that it is estimated that only about one per cent. of all the motor vehicles on the roads have such a type of gear fitted, the other 99 per cent. are of the crash type box, which is successfully driven by the general public, including a large percentage of women drivers. The simpler construction of the crash type box (which incidentally has 59 fewer parts compared with the epicyclic) is of great importance, particularly in war-time from the point of view of manufacture and maintenance.

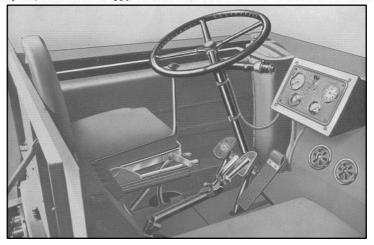
The particular gear ratios in the gearbox are rather different from those in the pre-war Guy vehicles, and make for much easier changing. In the more recent productions the third speed gear is in "constant mesh" and this, together with the top gears (which between them do most of the work) are both engaged by dog clutches, which in combination with the clutch we employ (which gives a delightful take-up) can in the hands of an average driver, give results as good as any fluid transmission, with the advantage of a better fuel consumption.

Of these Guy war-time double deck buses, approximately some 2,000 have now been produced, many hundreds have run over 150,000 miles, and are giving general satisfaction in spite of the war-time difficulties and handicaps in manufacture and operation.

As we have already informed the operators of our vehicles, it is our intention, as and when the light alloys and other materials which have been perforce substituted in war-time are available, and when any detail improvements can be incorporated in the chassis as a result of experience, that all such improvements will be made at the earliest possible moment, and some have already taken effect.

We are making a special point of seeing that any improvements of any nature which are effected are interchangeable with the original design, so that as and when supplies are available, the user will be given an opportunity of replacing such parts on special terms, which will ensure his fleet being brought up-to-date in accordance with the very latest practice, and it will give an added advantage of standardisation.

The Company will, at all times, be happy to receive any suggestions with a view to improving the "breed".



The 'Arab' driving compartment. Courtesy of Brian Shaw.

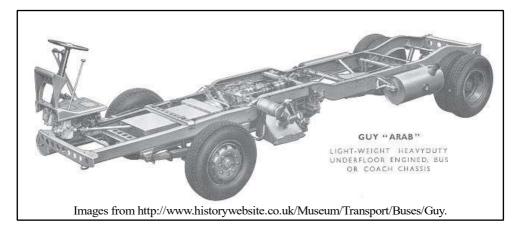


At around the same time a new version of the "Otter" chassis was introduced for 30 seater bodies. This was available with either a Perkins P6 or a Gardner 4LK, the lighter LK offered a weight saving of $\frac{1}{2}$ cwt. A 5 speed gearbox, semi-elliptical springs and telescopic shock absorbers were fitted as standard to both front and rear.



"Arab" chassis were configured to use a conventional layout of a vertical engine mounted at the front, with a remotely mounted gearbox lower down in the chassis. This provided ease of access for maintenance, but limited the number of passengers that could be accommodated within the overall length allowed by the construction and use regulations.

Guys solution to increasing the passenger capacity, was to move the front axle slightly behind the driver position with the passenger entrance next to the driver.







This allowed the driver to supervise passenger loading and unloading, this meant that the engine would have to be located under the floor. Guy and Gardner worked together to develop the horizontal version of the 5&6 LW. The new chassis was designated the "Arab UF" and was promoted at the 1950 Commercial Motor Show. On show were a bare chassis and a completed 40 seat bus utilising a Park Royal supplied body. To meet the tough "rough terrain" market of the East and South African markets where Guy had a robust market share they developed a new model in the mid 1950's naming it the "Warrior", the same as their lorry of the same period. It was available in both conventional and under floor versions, this was offered with a Meadows 4HDC330 engine, or alternately could be fitted with an AEC AH470 6Cyl or Gardner 5HLW, the front engined chassis was offered with a 4LW all being coupled to a five speed gearbox, for the AEC top gear was direct drive but for the Gardner fifth gear was over-driven presumably to give the same top speed as the AEC unit which had a top rpm of 2000 against the Gardner at 1700

In 1958 Guy announced a new model aimed at the luxury coach market, the "Victory" with an 18ft wheelbase was suitable for bodywork up to 36ft, it was initially offered with a Meadows 6HDC500 engine, following customer feedback the Gardner 6HLW was offered as an alternative. Transmission was a Meadows five speed gearbox with either direct or overdrive top gear with the option of synchromesh, another alternative was a five speed semi-automatic epicyclic arrangement with fluid flywheel. A third engine was offered this time a Leyland UE680. Another development with the "Victory" was the option of Disc Brakes and Air Suspension. Disc brakes had been slowly finding their way into the car market but were still in their infancy for commercial and passenger carrying





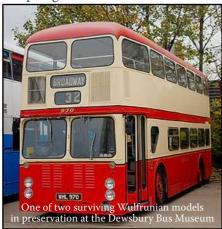
vehicles. The suspension used an air pressure boosted hydraulic system. The disc braking system was seen as giving an improved braking efficiency and was well suited to long distance operations with limited stops.

For the overseas market the "Victory Trambus" was introduced. The "Trambus" version was a forward mounted vertical engine type to give the required ground clearance needed for the rough terrain generally encountered. This was the first chassis to be offered with the newly introduced Gardner 6LX, once again the gearbox had an overdrive top gear to accommodate the lower max rpm of the Gardner.

The next model to appear was the Wulfrunian, it was developed with the West Riding Automobile Company, it retained the front engine style with the engine next to the driver, with the passenger doors being in front of the axle a low entry and a low flat floor gave an overall height of 13ft 4", amongst the lowest on the market. The standard power unit was to be the recently introduced Gardner 6LX, options were the 6LW, AEC AV590 and Leyland 0.600 and 0.680. An unusual feature was that there was no conventional radiator for cooling the

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engine. Instead a number of smaller radiators were mounted either side of the destination screen, from which it was possible by the uses of grills and ducts to heat the passenger compartment. This was not the first time that it had been used, having been developed by Professor Cave-Brown-Cave between 1949 and 1951 and fitted to Guy Arab buses operating in Southampton. The new design featured a number of innovations. There was no conventional front axle, instead it had independently mounted suspension with a rolling lobe air spring. Brakes were discs all round with air-hydraulic actuation.



The new design proved to be problematic, heavy steering, insufficient cooling of the braking system that lead to overheating of the brake pads, requiring more frequent changes, the pads were unique to to this vehicle so were more expensive. The airpak system proved to be expensive to maintain, and was replaced with a conventional airhydraulic system. The drivers suffering from a hot left leg, no doubt from a hot exhaust manifold next to the engine cover, this having be exacerbated by mounting the engine to oneside, to the detriment of room in the drivers cab. Engine maintenance was

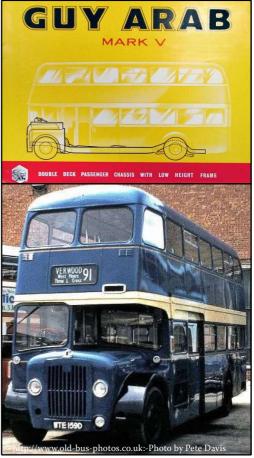
more difficult due to fitted panelling which required the undoing of fasteners. In someways the Wulfrunian was ahead of its time. Disc brakes and air suspension were to become the standard in the coming years. Despite its shortcoming a total of 137 were built with 132 of them ending up in the service of the West Riding Fleet.

By the end of the 1950's, Guy were running into financial trouble, an expansion into South Africa where they undertook to supply vehicles on credit terms with part exchange as well, lead to the company losing £300,000 per year. In 1961 the financial position had deteriorated to the point that the receivers were called in. Leyland showed an interest but ultimately rejected the purchase. In 1960 Jaguar under the leadership of William Lyons had purchased Daimler from B.S.A, although this may have principally to get the Daimler vehicle brand it came with a bus division. Leyland had not long introduced the Atlantean and Daimler were close to market with the Fleetline, both were rear engined and represented the future of bus design. Daimler were like Guy, bus and coach builder's of repute with a long and fine history. Looking to keep his expansion plans local William Lyons purchased Guy Motors for £800,000. One week before the purchase a new company Guy Motors (Europe) was formed and the assets transferred leaving the debt with the old company. The employees were made redundant and then re-

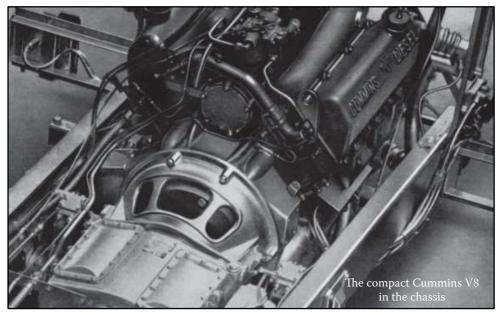
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employed by the new company. As with any new broom changes were made initially, the goods vehicle side of the business was rationalised.

Despite the new design rear engined buses coming onto the market, there was still a strong demand for the conventional front engine versions. To meet this market the "Arab V" was introduced, this featured a chassis that was 2.5" lower than the Mk IV and only 4" higher than the rear engined models. Full air brakes using diaphragm brake chambers were now standard. In standard form the chassis had a wheelbase of 18ft 6" both longer and shorter versions were available for overseas markets where single deck bodies would often be fitted. The standard engine offered was the Gardner 6LW with the option of either the 5LW or 6LX. As with Guys usual practice, the gearbox was mounted mid chassis and was either 4 speed constant mesh with a friction clutch or a pneumatically operated epicyclic with electro-pneumatic valve block.



Not long after the purchase of Guy by Jaguar a new model of chassis was introduced, the "Conquest" this was essentially a Daimler chassis and was sold as the Daimler Roadliner in some countries. Initially powered by a rear mounted turbo charged engine of Daimlers own design, but there was a desire from operators for the Gardner 6HLX. At this time Gardner were working to full capacity, so could not meet the demand. They were already supplying LX engines to Daimler for the Fleetline bus. Instead there was a move to Cummins utilising their V6 engine which was at 9.63lts, smaller than the Gardner but more powerful, with different gearing it allowed the chassis to be used in stop start bus work or as a long distance coach chassis. However both the engine and transmission proved to be unsuitable for stop start work in the UK but were suitable for the duty cycle of continental routes. Eventually the chassis was offered with a choice of a Perkins V8 or AEC/BL V8, had Gardner's been in a



position to supply the HLW then the chassis would have needed modification to accommodate its size. Jaguar had recently brought up Henry Meadows so had the facility to build engines available within the group, part of the Cummins deal was that the V6 engine could be built under licence at the factory in Wolverhampton. This part of the deal didn't happen and the engines were built at Cummin's own production facilities in the north of England and Scotland.



In the 1960's the whole of the motor industry was undergoing changes with mergers between the major players, Leyland had taken on Standard Triumph., AEC, Thoryncroft, and the body builders Park Royal and Charles H Roe and a number of other small manufacturers. With Jaguar having taken on Guy and Daimler, the market place was effectively being shared between the two groups.



Despite their buoyant position in the market place Jaguar were facing a potential problem with their supply of bodies. The British Motor Company (BMC) had acquired the body manufacturer Pressed Steel Fisher who were the supplier of Jaguar bodies. BMC had previously bought up Fisher Ludlow who had stopped supplying BMC's rivals. It was at this time that Jaguar and BMC merged creating British Motor Holdings. With a shortage of new models BMC were heading into difficulty, this was having a knock on effect with funding for the Jaguar range. In a further rationalisation, British Motor Holdings merged with Leyland Motors. The inevitable rationalisation took place. The group now had three bus manufacturing divisions, Leyland's own bus division, Daimler and Guy.

Under Jaguar ownership Guy had developed another front engined chassis that was to provide good sales overseas. The "Victory" which was based on the Big J commercial vehicle chassis and initially aimed at the single deck overseas market. South African City Tramways were experiencing difficulties with rear engined buses, so arranged for a local body builder to modify a "Victory" chassis to take a double deck body. In 1973 this lead for an order of 80 chassis and within a couple of years over 100 were in service. A Mk 2 version followed with the front axle moved forward allowing the entrance door to be fitted behind the axle, also improving the loading on the axle and reducing tyre wear. A further 152 were ordered. The was to be the last "Guy" chassis. A "Victory 2" series 11 double deck chassis was to follow, it was an amalgamation of Leyland and Guy sub assemblies. This was powered by a Gardner 6LXB and an order for 152 was fulfilled for the Kowloon Motor Bus Company of Hong Kong.

The last "LW" engines supplied were ordered in May 1968. 34 ½ years after the first, a total of 4810 units. A further 20 had been ordered but were cancelled in April 1969. Guy's bus production was topped and tailed by Gardner Engines, although they couldn't be considered a volume user at 130 engines per year average, their products were exported around the world where they gained a reputation for ruggedness and reliability.

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The Museum holds many records of Gardner and other makes of engine and also offers a dating service. Go to <u>http://www.enginemuseum.org/news.html</u> to find the downloadable enquiry form

Special events occur throughout the year normally at Bank Holidays See the Museum Website www.enginemuseum.org for up to date information

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