GARDNER

Engine Forum

Spring 2024

No. 45 **www.gardnerengineforum.co.uk**

GARDNER Engine Forum Membership Application

Title	Mr / Mrs / Miss / Dr / Other		
Forename(s)			
Surname			
Address			
		Post Code	
Telephone No		Ex-Directory	Yes/No
Mobile Telephone Number			
Email Address *			
Engine Model			
Engine Serial No			
Engine Date			
Engine Application	Stationary	Road	Marine
Name of vehicle / vessel			
Any other information			
Signed		Dated	

Periodically we produce a membership list and circulate to members. The list comprises of the membership number, name and address only. To be included in the list and therefore receive a copy please indicate your preference.

Yes please include me ☐ No Thank You ☐

* To keep the cost of running the forum as low as possible we use email communication for the notification of renewal and confirmation of membership where possible. If supplied the email address will not be passed on to any third party and will only be used for communicating matters relating the the Forum.

Membership details are maintained on a computer database accessible to authorised committee members only.

Membership fee £10.00 per annum (UK) renewable on the anniversary of joining.
Payable by cheque, standing order mandate or electronic fund transfer.
Cheque's to be made out to Gardner Engine Forum.
For standing orders please complete the form below.download the complte form from the website

For electronic funds transfer please tick the box, ☐ we will contact you with the banking details

Send the completed form to
Mrs J M Gray - Treasurer.Gardner Engine Forum 29 Verity Walk, Wordsley, Stourbridge, DY8 4XS
Email:- gardnerengineforum@blueyonder.co.uk

Gardner Engine Forum Philosophy

The aims of the Forum are to promote and foster interest in all Gardner engines"

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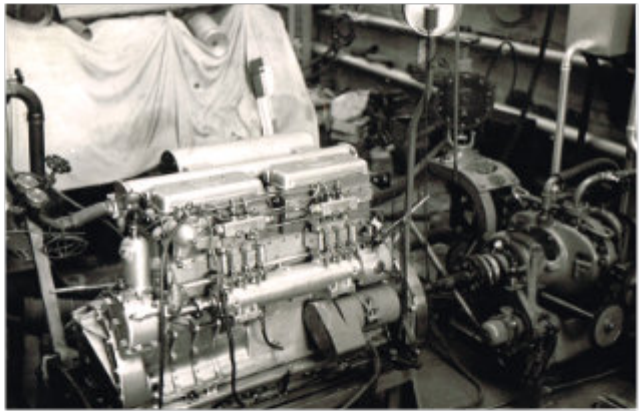
Cover Photo
The Clean Air Bus
Photo supplied by
H Evans

Chairmans Notes

Welcome to your spring newsletter. As I put my contribution together, leap-year day has just passed. Happy birthday to anyone who was born on the 29th February!. In my area it was very wet and it tipped the scales, some areas enduring the wettest February on record. Recently I was in conversation with a gentleman who had lived in Ireland for many years and had been involved with the peat industry. The subject turned to Gardner engines, he well remembered a number in use within the industry. This made me think, as I live a in peat bog area (Lindow Moss) I am told we were known as "The Bog Warriors"! Lindow Moss owes it genesis to the last ice age, the earliest inhabitants would have been the Ancient Britain's. Some of you may recognise the name and a mile from where I live was where "Lindow Man" was found some forty years ago this coming August. More can be found on the internet.

Moving away from my part of the world I apologise for a mistake in the last newsletter with reference to the 6LK. It was tested in 1934 and the 4LK went into production in 1935, the first being engine no 34405 tested on October 10th. One would imagine that the prototype 4LK's were tested in 1934 also. Records show that 38 LK's were delivered in 1935 against 1704 LW's. Production increased over the next 4 years reaching 473 engines in 1939, dropping during the war years before hitting a high of 509 engines in 1951. The 1950's saw the most engines per year being produced, averaging 427 per year between 1950 and 1957, tailing down to the last one in 1967 a total of 6279 units over its production lifetime.

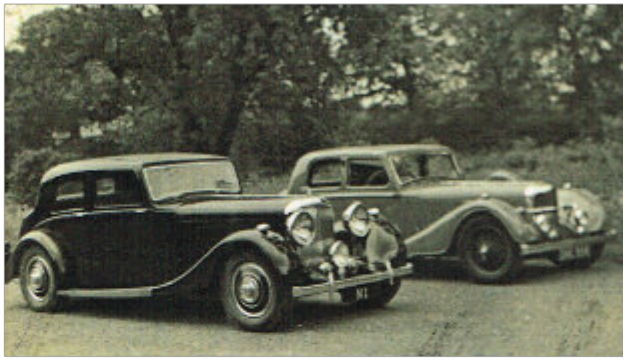


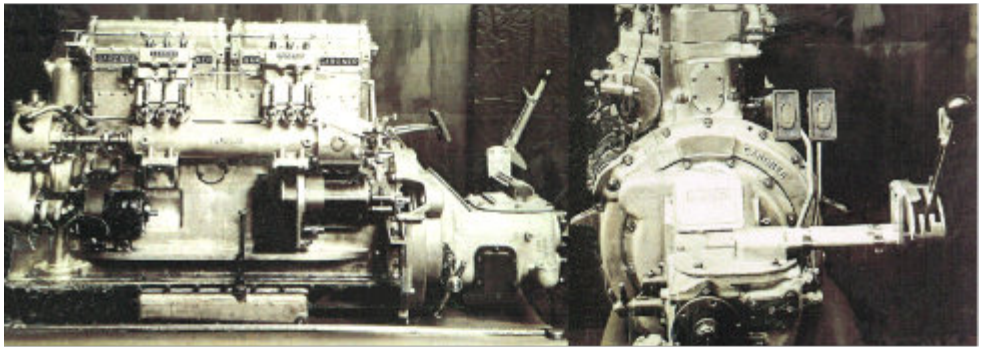
Geoff Challinor has perused the archive at the Anson Museum and supplied some photographs of the 6LK. The first shows the the 6LK on the dyno in 1954, perhaps testing a development. Another shows the engine with a gearbox attached showing Invicta cast into the gearbox cover and the letter "I" moulded into the pedal rubbers, note how close together the pedals are. You can see the car in Graham Edge's book. I have been doing some research and the car is still around. In the last newsletter, I did ponder if another 6LK was thought about, Mr Eric Gardner was appointed Managing Director & Deputy Chairman after Mr Tom had died. In 1937 Eric bought a speed 25 Alvis, this I was told on good authority was to be converted to take a 6 cyl Gardner, this would not have been a 6LW. Eric sadly passes away in 1947, the conversion which had been put off

during the war years never happened. The gentleman who took the Alvis on in 1952 approached Mr Hugh Gardner in the late 1960's re a conversion, the rest is history. The photograph of the Alvis was taken at the Swan Hotel, Newby Bridge in the Lake District. Please note the registration number on the Bentley, that is another story.

I look forward to seeing members at the A.G.M.

John Naylor





The 2024 Annual General Meeting

Will take place at
The Anson Engine Museum on
Sunday 12th May at 2pm.
Entry cost will be covered by the forum.
The Museum opens at 10 am.
Items for the Agenda to be sent to the Secretary by the 1st May.
By post to the address inside the cover or by email to
gardnerengineforum@blueyonder.co.uk
We have not held our meeting here since 2018,
so it will be a good chance to see the latest additions to the collection.

More Inspection Department Memories

John's editorial in the Spring 2023 newsletter, evoked memories of the time when I started work at Royce's in 1969. At the time, as well as the L 410 V8 car engine, we manufactured the B series range of Overhead Inlet Side Exhaust valve petrol (and gas) engines in 4, 6, and 8 cylinder variants, the K 60 2 stroke cycle tank engine and a range of light aircraft engines under licence from Teledyne Continental. As an aside, of possible relevance to Gardner at the time was the experimental fitment of a B81G LPG engine to a Tees-side Daimler Fleetline. *(Cover photograph)* This took place in the mid 70s in the aftermath of the Yom Kippur war fuel price rises, and it was also targeted at reducing emissions, being advertised as the 'Clean Air Bus'. *(a short video can be found at)*
https://player.bfi.org.uk/free/film/watch-clean-air-bus-1973-online
I don't know how well it performed, but from time to time some of my colleagues would rush off 'up north' to deal with problems as they emerged. The bus was run for 3 years before reverting to the 6LX prime mover and the project faded into obscurity. I had a very minimal involvement in 'Tees-side Bus' project by designing a 24/12V converter (zener diode and 2N3055 emitter follower mounted in a Radiospares alloy box as a heatsink) to allow a Lucas 12V Opus electronic ignition system to be used with the standard Fleetline 24V electrical system, in the interest of reducing maintenance.

Back to inspection, in those days, the proud claim was that 10% of the workforce comprised inspectors and every 10th engine built was stripped down and measured. There was an inspection area adjacent to the main machine shop, inhabited by a species of elderly, bespectacled men donned in white labcoats, with numerous pens and pencils in their breast pockets. All this in the all-pervading aroma of 'suds'. Taking prospective customers around this facility was a highlight of any factory tour!

Then came Toyota – 'you can't inspect quality into a product' - and we were introduced to the Toyota Production System, SPC, capable processes, 'Total Quality', 6ς and the like, and the world changed forever.

Subsequently, 'main shop' (allegedly a quarter of a mile long – I walked it often but never paced it) was emptied of all its machine tools (mainly pre-war Herbert lathes and Cincinnati millers, borers/honers etc.) and turned over to a store! Eventually the complete engine manufacturing process was outsourced to Cosworth. This latter aspect was later reversed but Rolls/Bentley had essentially become a screwdriver' operation by then.

Of course we now have levels of body tooling, quality and consistency that allow all parts to fit together 'right first time,' but I do, on occasions, miss the days when the desired panel fit was achieved by lead loading, filing round holes oval, and aligning the doors by bending the hinges or vent frames!

Happy days
Howard Evans

The following article is taken from the Wythall Transport Museums Omnibus magazine which is circulated to members . Written by George Luke titled Part 9 Saving the Planet, it charts the use of Compressed Gas as Fuel. The museum hosted us for our 2022 AGM and is well worth a visit for anyone interested in Passenger Transport and early electrical powered vehicles.

omnibus
https://www.wythall.org.uk/
July 2022
No.272

The next batch of buses were a leap into the unknown and an attempt to not only be environmentally responsible but to be industry leaders in the latest technological advances, gas powered buses.

Powering buses by gas was not new, some of the first attempts being made during the First World War to help alleviate fuel shortages when several operators, including the BMMO, fitted collapsible, gas tight. bags on to the roofs of some buses and ran them in service on coal gas The Second World War saw a resurgence in gas fuelled bus operation, once again to minimise fuel usage. This time the gas was produced by burning solid fuel in a gas producer trailer towed behind the bus, Birmingham converted several petrol engine Regents, based at Perry Barr, to this system but it was dropped as soon as practicable due to the extremely poor performance of the buses. All the aforementioned were tried due to the need to reduce consumption of imported fuel in wartime. However. in 1933, Birmingham City Transport converted a Guy Conquest single deck bus to run on town gas and it ran in this state until 1935 when it was withdrawn along with all the other Conquests. In the mid 1990s there was a tot of interest in alternative fuels and the government provided grant funding for trials, similar to the funding for today's hybrid and electric vehicles. The majority of buses built, or converted, for alternative fuel used Liquid Petroleum Gas (LPG) and most were either Dennis Dart or Optare based, although there were some DAF SB220s built, and Stratford-on-Avon based Guide Friday converted several double deckers.

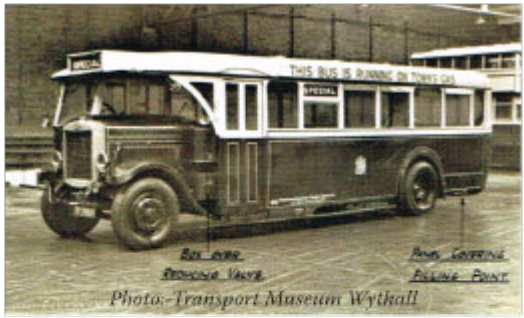


Photo:-Transport Museum Wythall

Guy Conquest BCT&OD60 in its final gas bus state. It was new in 1929 as a 25 seater normal control bus for one man operation, but was rebuilt two years later as a 32 seater half cab configuration. All the Conquests were replaced by Daimler COG5 single deckers in 1935

LPG was, and still is, a fuel used for cars with large thirsty petrol engines and conversion kits were available, although converting a diesel, compression ignition, engine to a spark ignition one is not so easy. There is one problem with LPG, it is heavier than air. This is not normally an issue for cars, but for buses, parked overnight in garages with pits and pit drains, leakages presented a potential hazard.

Another option was Compressed Natural Gas (CNG), this had been promoted by several companies overseas including Volvo and Mercedes and has the advantage of being lighter than air so any escaping gas floats upwards. CNG is the same gas as supplied to homes throughout the UK but to carry enough to power a vehicle for a full day's service it has to be compressed to liquid form Volvo had been promoting CNG and been courting West Midlands Travel (shortly to become Travel West Midlands), who placed an order for fourteen B10LNGs in June 1996 Volvo provided a demonstration bus, from the Swedish Linjebuss operation in Malmo, and had it delivered to Perry Barr for inspection

Photo: George Luke

An LPG powered DAF SB220 operated by by First on the Chester Park & Ride , the gas was stored in tanks on the the roof under the two covers

The Travel West Midlands main board had, by this time moved offices to St Pauls Square in Birmingham and promptly insisted the demonstrator be driven to St Pauls Square for them to evaluate A couple of minor snags reared their head; the bus was obviously left-hand drive, and it was built to EU regulations width of 2.55m, wider than any bus in the fleet. and nobody wanted to drive it: even the Volvo representative backed out of driving it through the Jewellery Quarter into central Birmingham. Unluckily I had been at Perry Barr when the bus was delivered and got the delivery driver to go through the controls in case the bus needed to be moved, finding myself volunteered, after a bit of sweet talking, the garage engineering manager supplied a set of trade plates in return for a drive around the test track at the back of the garage, which nearly cost a wing mirror and a couple of jobs. The Volvo representative and I set off, very cautiously, in the bus, to St Pauls Square.

It was planned the new gas buses would replace the Volvo B10Bs on the 529 service and for the official announcement of the order, it was arranged for the Mayors of Walsall and Wolverhampton to be taken on a demonstration run, along the 529, on the Monday. The bus was picked up from Hartshorne Motor Services, where it had spent the weekend being checked over, and the assembled gathering was taken for a ride. It was a great success with everyone being impressed especially when a white handkerchief was held across the exhaust tailpipe, with the engine running, then removed and shown to be still white with no particulate contamination If the truth be known if it had been held there much longer it would hate turned brown and caught fire due to the heat of the exhaust. The fourteen B10LNG buses ordered had Alexander. Ultra bodies, built in Belfast; these were a licence built version of Volvos Saffle body that was fitted to the Swedish demonstrator.

Saving the planet is never easy, as these gas buses proved. A new fuelling facility

had to be installed at Walsall Garage. Although the gas is piped to most homes in the West Midlands without too much difficulty, it needed to be compressed to approximately 200bar pressure, or nearly 3000psi, which makes 120psi tyre pressures look a bit weak, so the fuelling facility involved the installation of a high capacity main and some special high-pressure compressors. The liquefied gas by its very nature., is very, very cold so the fuelling hoses had to be well insulated This expensive plant could only refuel two buses at once and each bus took between fifteen and twenty minutes to refuel. To spread the cost, it was arranged that Walsall Corporation would also have use of it for fuelling its small fleet of CNG powered refuse trucks during the day, when we weren't using it. The onboard gas storage was in six roof mounted tanks and in order to save weight these tanks were made of aluminium with a spun carbon fibre outer casing, even so they were no light weight, and there was a system of valves to allow the gas to be vented in an emergency when the released gas would just float away. Because any gas that escaped would rise upwards the buses were always parked outside and only allowed in the garage for inspections and maintenance. A strange anomaly with these buses was that because they were considered trials vehicles and CNG powered, they were operated on a special licence and legally were exempt from annual testing other than a gas system test, although once in service they were all subjected to the normal inspections and MOTs. With such a major change from the normal buses it was decided to start another new series of fleet numbers for these buses, they were to be 1501 to 1514. The first one arrived, as did all the others, on a low loader, as there was nowhere in Northern Ireland to fuel these buses. I believe there was some arrangement with a company In Dublin who supplied filled tanks and it was these that were used to test the buses before dispatch. Shipping was also a problem as the ferry company had very strict rules regarding the carriage of gas cylinders and insisted that only a minimum of gas be left on board when they were shipped. Unusually nobody had been over to sign this first bus off at Alexander in Belfast. It was a miserable wet day and we got soaked getting the bus off the low loader, unfortunately it was no drier inside the bus as water was dripping from several joints in the ceiling not an auspicious start!

The situation was not improved by a phone call from head office at St Paula Square demanding the bus be taken there as soon as it had been gassed up, for the directors to have a run out in it; they all got very wet and the phone line glowed between Birmingham and Belfast. To be honest Alexander ,bodies are normally not bad, but these Ultra bodies were not their design, and I think they had trouble coming to terms with a totally alien method of construction, not helped by the fitting of a huge trough In the roof, to take the heavy gas tanks. I'm sure this flexed as the bus travelled along the road resulting in the leaks. A team from Alexander Falkirk arrived at Walsall and spent some time rectifying the bus which was then used for driver and garage training, this also coincided with a spell of dry weather. The next wet day saw the arrival of the second bus. I got to it before unloading, took one look inside, refused to accept it as it was leaking worse than the first, and suggested arrangements be made to return it to Belfast. Whilst these somewhat heated discussions were going on, 1501 returned

from a driver training trip with the trainees complaining about getting wet, a quick look confirmed that it too was still leaking and Alexander was informed that once the second bus had been returned to Belfast, they could send the low loader back to collect the first one as well. Alexander spent a lot of time and effort trying to stop these leaks and eventually got the situation under control, but it was an exercise everyone could have done without.

The gas buses had been sold as a fully tried and tested design based on operational experience in Sweden, hence the fact the bodywork fitted was based on the Volvo Saffle design similar to the Swedish buses. We soon discovered that this was not quite the case. Very quickly we found the heat from the was softening and melting the plastic floor covering and the aluminium step nosings at the rear risers were becoming extremely warm. This was due to the fact the engine, based on the good old TD100 diesel series, ran a lot hotter when running on gas. More time was spent adding extra insulation. Initially spark plug life was very short and a series of adjustments were made to the ignition timing and gas valves, this was not helped by the fact a spark plug change could take a couple of hours due to access issues.

Another unforeseen seasonal issue reared its head was the gas source. Natural gas comes from several sources, including different fields in the North Sea and Morecambe Bay. The gas from each source has a different calorific value and, depending on the time of year and general demand, British Gas would change the supply to favour different fields This is not greatly noticeable in a domestic situation but for vehicles it could be like changing from 95 to 85 octane fuel, or the other way around, with no notification or warning, so all of a sudden, the buses started being reported as down on power or running hot and pinking. All this was making these buses some of the most unreliable and expensive vehicles in the fleet. Having invested in the fuelling plant TWM was committed to operating these buses for the period of the fuelling plant agreement with British Gas, but all we really wanted to do was ,run a good service carrying passengers. After a white a deal was struck with Volvo, to have all the maintenance and adjustments done in return for a monthly fee based on standard B10L costs, they were very keen to see the buses operating in service and not to have a failure on their hands.

Eventually at the end of the fuelling plant contract some of the buses were converted to diesel and the remainder scrapped. Whether we were unlucky i do not know, but some years later I had dealings with Northampton Transport, the only other UK operator of B10LNG gas buses and their experience had been no better than ours.

In hindsight. I think everyone involved expected too much too quickly with the gas bus project and the hype that it would save the planet was more about political correctness and ill-informed optimism. No repeat orders were forthcoming for any of the gas buses. either LPG or CNG, and gas power quietly dropped off the radar for twenty years.

The only place I have seen where gas powered buses are operated in any quantity is Perth, Western Australia, where there is a fleet, at the time of writing, of over

five hundred made by Mercedes. However., even there, new bus purchases since 2011 have reverted to diesel.
In the last few years there has been a resurgence of interest in gas powered buses with MAN offering and demonstrating CNG powered vehicles and Scania getting involved in Bio Gas.
By 2017, Nottingham City Transport had nailed its colours to the gas bus mast as part of its preparations for a proposed Clean Air Zone, but only time will tell if this proves more successful.
In other developments, an entirety different form of gas power is the hydrogen fuel cell vehicle, where hydrogen gas is combined via a catalyst with oxygen, from the air, generating electricity directly.

Possibly the future of gas power? This is the prototype Wrightbus Street Deck H2 Hydrogen Fuel Cell bus at the NEC in 2018. This technology dispenses with an internal combustion engine , but at the time its costs were far greater than other "green" options

Nottingham City Transport has taken delivery of its first new bio-gas double deck buses from its latest £7 million investment in 23 brand new buses.

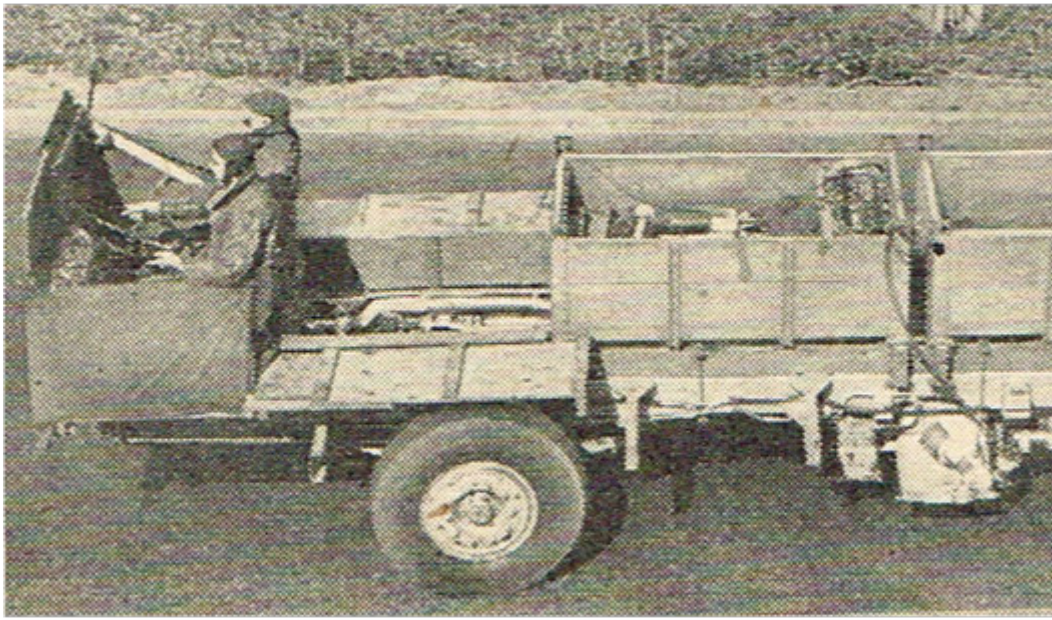
NCT already operates the world's largest fleet of bio-gas double decks at 120 buses. Bio-gas is produced naturally through anaerobic digestion, using food waste, farm waste and sewage. The methane emitted from the digestion process is captured, treated and turned into fuel and the use of bio-gas has enabled NCT to halve its diesel consumption from 8 million litres to 4 million litres per year. The bio-gas buses already run on three quarters of NCT's double deck services and the current fleet has clocked up over 15 million miles in service since first appearing on Nottingham's streets five years ago, in July 2017.In addition to their smart, stylish design and comfortable ride, the bio-gas fleet has contributed to improving Nottingham's air quality. The existing buses have prevented over 26,000 tonnes of CO2 being emitted, as well as reducing NOx emissions by 180,000kgs.NCT's Head of Engineering, Liam O'Brien said, "NCT is committed to minimising its impact on the environment and we already operate one of the greenest bus fleets in the country. Our bio-gas fleet has contributed to much improved air quality in and around Nottingham and this investment in 23 further bio-gas buses will improve it further". The engines and chassis of the sleek Enviro400CBG City bio-gas buses have been developed by Swedish giant Scania and are bodied in Britain by the country's largest bus manufacturer, Alexander Dennis Limited (ADL).
https://www.nctx.co.uk/23-new-bio-gas-buses-way

Reprinted from " The Commercial Motor" June 20 1958

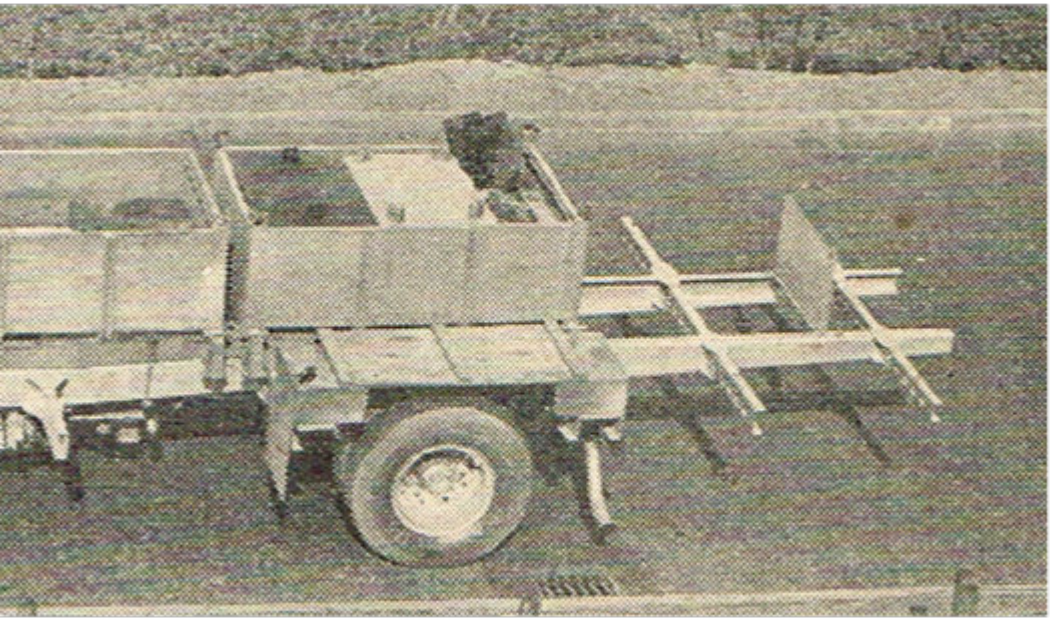
A RESOUNDING VICTORY

Guy Motors Limited
Fallings Park, Wolverhampton

THREE series of tests were conducted with the Guy Victory Gardner-engined overseas passenger chassis, running at different gross vehicle weights and with different gearbox and rear-axle ratios. The conclusions to be drawn are that the addition of a ton payload has little effect on the remarkable fuel economy shown by the engine, whilst the higher axle ratio gives the vehicle a maximum speed of nearly 55 m.p.h., with the possibility of higher average speeds without losing anything in fuel economy. Running at 13 tons 6 cwt. gross, over an undulating course of more than 16 miles, 11.8 m.p.g. was returned at an average speed of 41.5 m.p.h., giving a time-load-mileage factor of 6,516—a most commendable figure. This throws a new light on the renowned economy of Gardner engines, as it shows that, despite a maximum governed engine speed of 1,700 r p m, a high speed passenger chassis can be built round. the unit whilst the relatively low governed speed, which gives fuel economy, is retained. Admittedly, the use of a high axle ratio and an overdrive-top gearbox causes some reduction in acceleration performance, but this is not of great importance in a chassis such as



the Victory, which is primarily intended for long distance coaching. For stage carriage work, for which good acceleration is essential and 'high maximum speed of minor importance,an extra low ratio axle is available. The Victory was first introduced to the public at last. year's Amsterdam in The Commercial Motor on February 15, 1957. At that time it was offered as standard with the Meadows 6HDC 500 six-cylinder oil engine, which has a net output of 150 b.h.p. Because of the continued demand for Gardner engines, however, particularly in Belgium, the option of the Gardner 6HLW 112-b.h.p. unit was recently. made and the chassis tested was the first one to be produced. It is almost identical to the Meadows-engined version, except that packing pieces have had to be interposed between the springs and the axles to raise the frame height slightly and thus ensure adequate ground clearance beneath the Gardner's sump. Difference in frame height is only 1" giving 10" sump clearance. The Gardner engine is unit-mounted with a Meadows 350 CS5 five-speed gearbox which has Porsche synchromesh units. The standard gearbox was used with forward ratios of 6.13,3.38,1.45 to and 0.789 to 1, but the large gap between second and third gears, although suitable for the high-speed Meadows engine (governed at 2,400 r.p.m.), was found to be unsuited to the slower Gardner engine as originally tested. It was arranged, therefore, that I should have an opportunity of testing , the chassis with a gearbox with an alternative third-gear



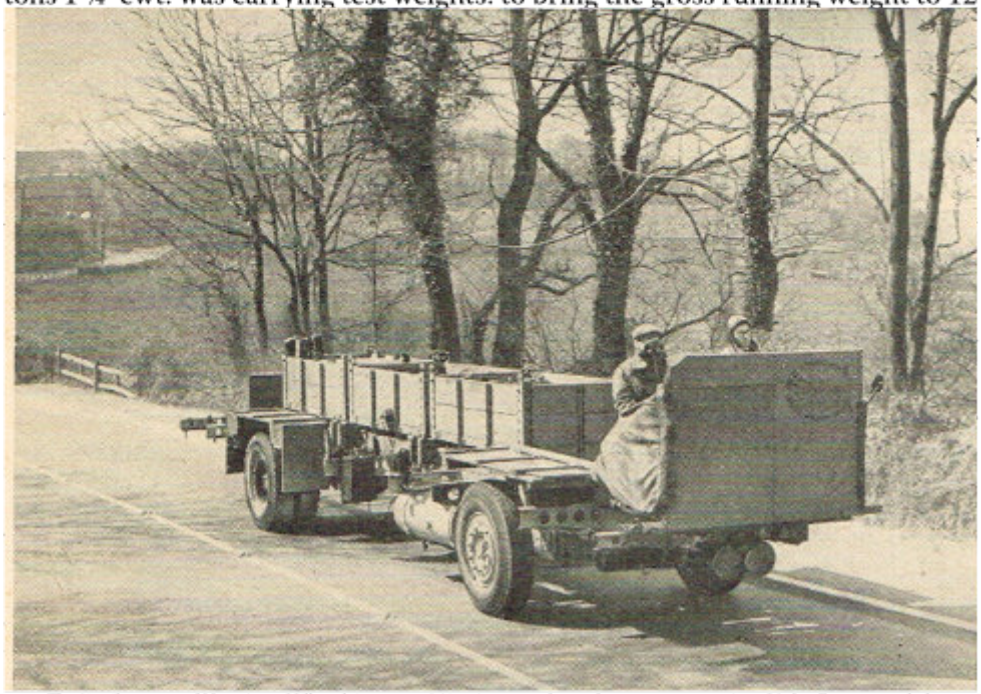
ratio of 1.78 to 1. This made an appreciable difference to the performance particularly from the driver's aspect. Other alternative gearboxes include four and five-speed semi and fully automatic transmissions. gearbox unit has a three-point mounting, using spherical rubber bushes. There is a single bush on the front of the crankcase, whilst at the rear a special bell housing, designed by Guy Motors, is employed. This contains a bush at each side, through which passes a frame mounted cross tube. This arrangement successfully cuts out any transference of engine vibration to the frame and dispenses with the need for additional damping and torque reaction linkages.

A spiral-bevel rear axle with a reduction ratio of 6.14 to 1 is offered as standard in. the Victory, and here again, . although this relatively low ratio suits the high revving Meadows unit, my initial tests showed that improved performance, particularly respect of maximum speed, would be obtained where the alternative high-ratio axle (5.375 to 1) was fitted. Subsequent tests showed this to be so and this high axle is now standard in Gardner-engined chassis for coach purposes. In other respects the specification of the Victory is by now well known. As a coach it is suitable for a gross vehicle weight of 13 ½ tons although up to 15 tons can be permitted as a spasmodic maximum load for bus working and bodies up to 35 ft. 9 in. Long and 8 ft. 2 in. wide can be mounted. Girling wedge-operated

On the 1-8 section of Hermitage Hill, a smooth bottom gear restart was made at about one eighth throttle opening and without clutch slip

two-leading shoe brakes are actuated-by a Bendix Westinghouse split circuit air-pressure system with diaphragm chambers, and the long progressive-rate semi elliptic springs have lever-type dampers at the front only.

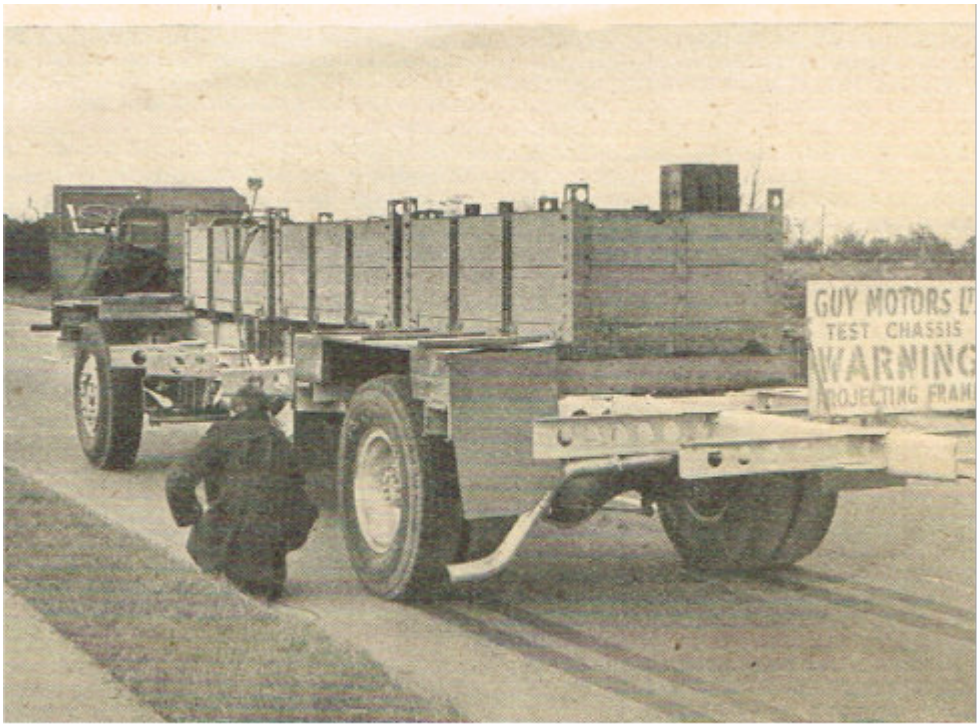
As originally supplied for test, the Victory chassis, which had a kerb weight of 5 tons 1 ¼ cwt. was carrying test weights. to bring the gross running weight to 12



The ¾ mile ascent of Hermitage Hill took just over 3 ½ minutes and a coolant temperature rise of 9 deg F was recorded. Because of the high third gear, second gear had to be used for most of the ascent, the road speed being 10 ½ m.p.h

restricts' the 'road speed in this gear to 37.5 m.p.h. Two sets of fuel figures were taken, the first' being over an' undulating 16.2-mile out-and return route between Coven and Hatherton. During this run the vehicle was driven at up to 46 m.p.h. and reasonably clear traffic conditions resulted in an average speed of 39.2 m.p.h., the fuel-consumption rate being 11.9 m.p.g.

Figures were then recorded over a 29.5-mile course from the Guy works to Bridgnorth via Shifnal. The outward journey was completed at an average speed of 31.8 m.p.h and a consumption rate of 12.2 m.p.g. Following the hill-climb test at Bridgnorth the return run to the. Guy factory gave a consumption rate of 11.3 mpg., the average speed being 31.7 m.p.h. Thus the overall distance of 59 miles produced an average consumption rate of 11.7 m.p.g. the overall average speed being 31.75 m.p.h. These figures show excellent fuel economy, particularly on the

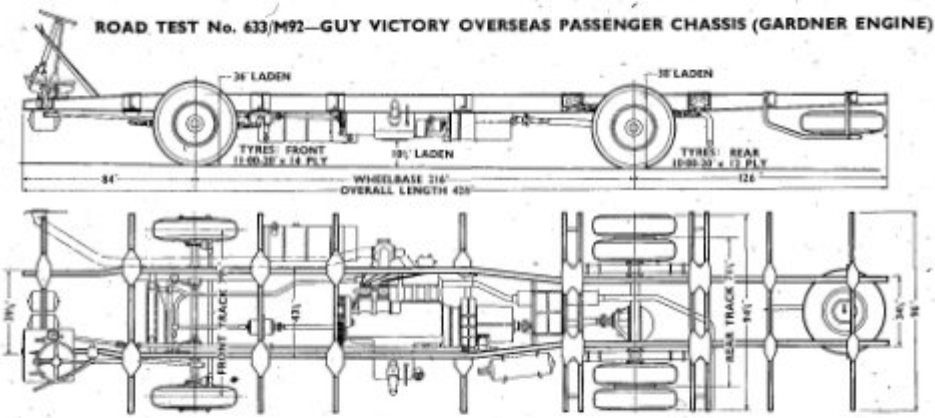


On the 1-8 section of Hermitage Hill, a smooth bottom gear restart was made at about one eighth throttle opening and without clutch slip

longer run, which was made over some hilly sections of road. Hill tests were conducted on the three quarter-mile gradient known as Hermitage Hill. This has an average gradient of I in 12 and its steepest part is 1 in 8. The ambient temperature during the tests was 44° F. At the bottom of the hill the radiator header tank temperature was found to be 118° F. The ascent was made,in 3 minutes 34 seconds,second gear being used for all but a quarter of a minute of this time. It was impossible to change up into third because of its high ratio. Had the alternative box subsequently tested been fitted in the chassis for this climb it is probable that third gear would have sufficed for most of the ascent and the climbing time would have been appreciably reduced. As it was, the speed throughout most of the ascent was a mere 10 ½ mp.h with the engine running on the governor but hardly working at all.The use of a Low gear and high engine speed caused a temperature rise of only 9° F. The Gardner is never a hot-running engine, so it is obvious that the cooling system is adequate for climbs which can be made at lower engine speeds and full torque output. Two fade tests were made, the chassis being driven down the hill in neutral with the foot brake lightly

applied to keep the road speed down to '20 m.p.h. Each descent lasted approximately 1 minute and a crash stop from 20 m.p.h. at the bottom of the hill produced Tapley meter readings of 71 per cent. on the first occasion and 66 per cent. on the second occasion. Good Anti-fade Brakes These figures compare favourably with the 78 per cent. maximum retardation recorded earlier with cold drums and show the Victory, which has moulded brake facings, to have good anti-fade properties.Returning to the I in 8 section of Hermitage Hill, the chassis was stopped and the hand brake fully applied, although, because the drums were still warm, an excessive amount of pressure had to be exerted on the lever to prevent the vehicle from rolling backwards.A smooth bottom-gear restart was then made with about one-eighth throttle opening and without clutch slip. Had the gearbox design made it possible to engage second gear when stationary I am sure that this restart could have been made in that gear without any trouble. On

ROAD TEST No. 633/M92—GUY VICTORY OVERSEAS PASSENGER CHASSIS (GARDNER ENGINE)



MODEL: Guy Victory 18-ft.-wheelbase underfloor-engined left-hand-drive passenger chassis with Gardner oil engine.

WEIGHTS:

	Tons	cwt.	qr.
Unladen chassis only (kerb weight)	5	1	1
Payload and body	7	19	3
Driver, observer, etc.		5	0
	13	6	0

DISTRIBUTION:

Front axle	4	13	0
Rear axle	8	13	0

ENGINE: Gardner 6HLW six-cylindered direct-injection oil-engine; bore 108 mm. (4.25 in.); stroke 152.4 mm. (6 in.); piston-swept volume 8.4 litres (511 cu. in.); maximum output 112 b.h.p. at 1,700 r.p.m.; R.A.C. rating 43.5 h.p.; maximum torque 358 lb.-ft. at 1,300 r.p.m.

TRANSMISSION: Through 16-in.-diameter single-dry-plate clutch to Meadows five-speed synchro-mesh gearbox, chance by one-piece propeller shaft to the fully floating spiral-bevel rear axle.

GEAR RATIOS: 6.13, 3.38, 1.78, 1 and 0.798 to 1 forward; reverse 6.13 to 1; rear-axle ratio 5.375 to 1. (Also tested with 6.14-to-1-ratio rear axle.)

BRAKES: Girling wedge-operated two-leading-shoe units at all wheels, actuated by Bendix-Westinghouse split-circuit air-pressure system.

FIRING ORDER 1 - 5 - 3 - 6 - 2 - 4

COMPRESSION RATIO 13:1

VALVE CLEARANCES

INLET	EXHAUST
0·005"	0·012"

Hand brake linked mechanically to rear wheels only. Diameter of drums, 15.5 in.; width of facings, front, 5 in., rear 7 in.; total frictional area 724 sq. in., that is 54.5 sq. in. per ton gross weight as tested.

FRAME: Pressed-steel channel section with one tubular and eight channel-section cross-members bolted in position.

STEERING: Marles cam and double roller.

SUSPENSION: Semi-elliptic springs with lever-type dampers at front axle.

ELECTRICAL: 24v. compensated-voltage-control system with 135 amp.-hr. battery.

FUEL CONSUMPTION: (a) 13.3 tons gross, 5.375-to-1 axle, 11.8 m.p.g. at 41.5 m.p.h. average speed; (b) 13.3 tons gross, 6.14-to-1 axle, 11.7 m.p.g. at 39.5 m.p.h. average speed; (c) 12.3 tons gross, 6.14-to-1 axle, 11.9 m.p.g. at 39.2 m.p.h. average speed, that is 157 gross ton-m.p.g. as tested (a), giving a time-load-mileage factor of 6,516.

TANK CAPACITY: 38 gal., range approximately 450 miles.

ACCELERATION: 13.3 tons gross, 5.375-to-1 axle; through gears, 0-20 m.p.h., 14.75 sec., 0-30 m.p.h., 30.1 sec., 0-40 m.p.h., 54.4 sec.; direct drive, 10-20 m.p.h., 19 sec., 10-30 m.p.h., 43 sec., 10-40 m.p.h., 69 sec.

BRAKING: From 20 m.p.h., 20.5 ft. (21.1 ft. per sec. per sec.); from 30 m.p.h., 43.5 ft. (22.3 ft. per sec. per sec.)

WEIGHT RATIOS: 0.422 b.h.p. per cwt. gross weight as tested.

TURNING CIRCLES: 65 ft. both locks.

MAKERS: Guy Motors, Ltd., Wolverhampton, Staffs.

returning to the Guy works the test load was increased by a ton to bring the gross weight figure nearer to the maximum recommendations of the manufacturers.

Higher Load—Better Braking

The first test to be made at this weight was for braking efficiency and, as I had expected, appreciably better figures were obtained from '30 m.p.h. because the additional weight on the rear axle reduced the tendency towards locking. Under these conditions the stopping distance was 43.5 ft, the maximum Tapley meter reading being 74.25 per cent. From 20 m.p.h. The stopping distance was found to be 20.5ft.slightly greater than was obtained at the lower weight. The difference of less than 8 percent. between the maximum deceleration rate and the average deceleration rate showed there to be only a slight lag in the braking system, which is praiseworthy with an air-pressure layout. Hand-brake efficiency as tested from 20 m.p.h. produced a deceleration meter reading of 24 per. cent, The 16.2-mile fuel-consumption route on the Coven-Hatherton-Coven road was employed again and tie overall average speed was about the same as that obtained when running at 12.3 tons gross, the extra load reducing the fuel economy by a mere 0,2 m.p.g. Similarly, there was little appreciable difference in the acceleration times obtained with the higher loading. Shortly after this series of tests the Victory was fitted with the higher axle ratio and the more evenly spaced gearbox ratios, the chassis weight remaining at 13.3 tons. A difference in performance was immediately apparent in terms of ease of driving, smoother acceleration and higher maximum speed. The chassis was now capable of near 55 m.p.h.compared with the 47 m.p.h. obtainable with the 6.14-to-I axle.The usual fuel-consumption route was followed and despite much heavier traffic than was encountered during the earlier runs, the overall average speed was 41.5 m.p.h. and the fuel consumption rate worked out at 11.8 m.p.g. showing a noticeable improvement in respect of high-speed fuel economy. Acceleration tests revealed, as might be expected, a slightly worse performance, 0-40 m.p.h. taking 67 seconds. Had it been possible to engage second gear when stationary with the engine idling, this figure would have been improved, as was later to be confirmed. The direct-drive figures, which could be recorded up to 40 m.p.h. because of the higher-ratio axle, were adequate for the type of service envisaged for the chassis. So far as handling is concerned, the Victory chassis attains a high standard and I was particularly pleased with the light but positive feel of the steering. Even at low speeds the chassis is easy to manoeuvre and over indifferent road surfaces there is no harsh kicking at the wheel. Sufficient castor action is

present. Braking also is good, and the use of a conventional brake pedal, rather than a super-sensitive treadle, gives fully controllable braking, an essential feature with. a powerful system such as this.So far as can be judged, the suspension is good on one of the fuel-test runs I rode in one of the weight boxes approximately midway down the chassis and could detect no uncomfortable suspension characteristics at this point. Even at the front of the vehicle the ride was reasonably smooth, although a certain amount of pitching, not unnaturally, can be felt over rough surfaces. Although the chassis as initially tested caused me to complain about the gearbox, because of the heaviness of the change caused by the over efficient synchromesh mechanism, the excessive gear knob travel, the poor reverse stop spring and the inability to engage second gear when stationary with the engine idling, I was later able to drive the Victory with a modified gearbox. This had less strong synchromesh cones, a closer gate at the base of the gear lever, a stronger reverse-stop spring, and a selector-fork modification making it possible to engage second gear for starting.

Improved Gearbox

These modifications lightened the work of gear changing without making it easy to " beat " the synchromesh when changing gear quickly. The gate successfully cut out the vagueness of the change and it might even be possible subsequently to reduce the knob travel because of the smaller leverage required by the lighter synchromesh spring cones. Appreciably better acceleration times were recorded with the modified gearbox when the chassis was tested at 13 tons 6 cwt. gross weight. The time up to 40 m.p.h. was reduced by 12.6 seconds from a standing start when compared with the figures obtained at the same weight and with the same axle, but with the unmodified gearbox. This was partly because of the ability to start off in second gear and partly because of the quicker changes possible with the lighter synchromesh mechanism. The modified gearbox had the high third gear as originally tested, but because of the higher axle ratio, this did not present such a disadvantage with the Gardner engine as it did when used with the 6.14-to-I axle. Thus, it would. appear that in flat countries, such as Holland, the high-third box would be satisfactory, whereas in hilly areas the low-third gearbox would be a better proposition, as the close second and third ratios would give improved hill-climbing

Website

The website has recently been updated with a page for manuals and spare parts lists as detailed below. They are all in PDF format and can be downloaded for printing From the home page open the publications page from there the link to the manuals

1L2 Supplement
L2 Multicylinder Operation & Maintenence
L2 Spares
L2 & LW Tools Book

L3 General Instructions
L3 Supplementary Instructions
L3 Tools Book
L3 Spares Plates
L3 Spares List Pt1
L3 Spares List Pt2

3UC Service & Maintenance
3UC Spares List
3UC Working Instructions

LK General Directions
LK Parts Plates
LK Parts List
LK Tools Book

LW Operations & Maintenance
LW Parts Book
LW & L2 Tools

LXB Operation & Maintenance

2UC Servicing & Maintenance
2UC Reverse & Reduction
2UC Parts Book

Amal Lift Pump Instructions
Amal Lift Pump Spare Parts List

CAV Axial Starter Motors

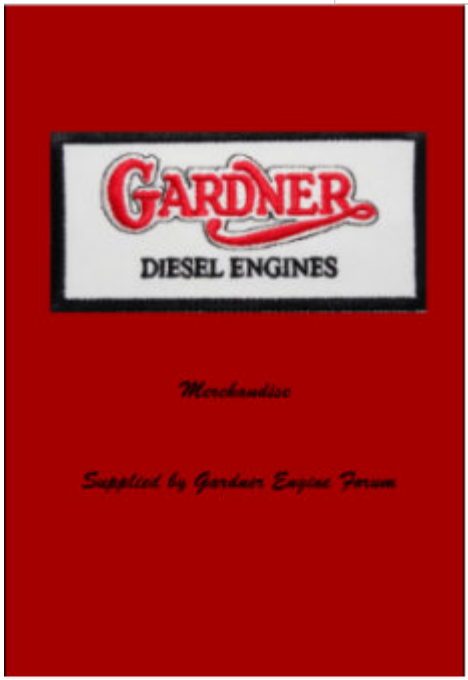
In addition to the manuals there is a HISTORY section, this is an outline of the early history of L Gardner and sons, it includes pages from brochures depicting the range of engines produced in the company's lifetime. Included is a list of production dates for engines produced between 1927 and 1978.

Electronic Newsletter

Copies of each newsletter can be emailed to members who wish to receive it by this method, either with or without a paper copy as well. Any email address used for this purpose will not be made available to any third party. If you would like to receive your newsletter this way please email the editor at gardnerengineforum@blueyonder.co.uk with your request and preferred email address.

The file will be in PDF format (usually around 2 Mb) so is universally readable

Merchandise



It has been a while since we put together a booklet detailing the range of merchandise that the Forum has for sale, inevitably prices change and availability of items from our supplier also changes, so rather than reworking the merchandise booklet and distributing the updated version with the newsletter, it has now been updated and added to the website, this will allow any future changes to be implemented without the need to re-distribute it to members.

Ordering items will remain the same as before, either email your request to gardnerengineforum@blueyonder.co.uk or telephone 01384 827745

Included with this newsletter is a revised price list to accompany the old booklet.

We still have some of the old booklets available for anyone who doesn't use the internet, just call and we will post one out to you.

For Sale

1L2 engine with integral 2:1 Hydraulic Marine Gearbox.
Engine rating is 16 B.H.P @1600 R.P.M.
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For opening times check the website

The Museum holds many records of Gardner and other makes of engine and also offers a dating service. Go to http://www.enginemuseum.org/news.html 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

Anson Road,Poynton,Cheshire,SK12 1TD

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Our season runs from March 27th to November 3rd 2024. We are open on Saturdays and Sundays plus Wednesdays during local school holidays 10.30am-4pm.
On Bank Holidays and our other main event days we open 10.30am-4.30pm

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