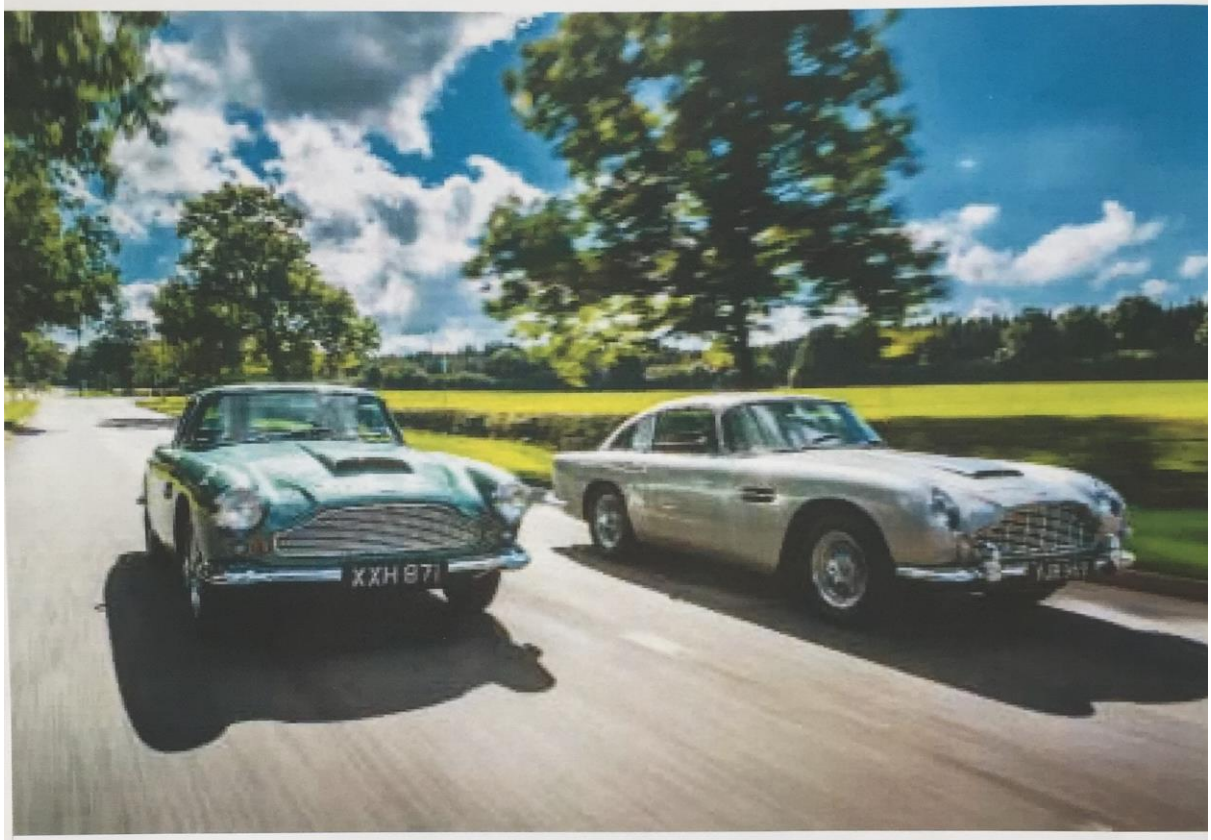
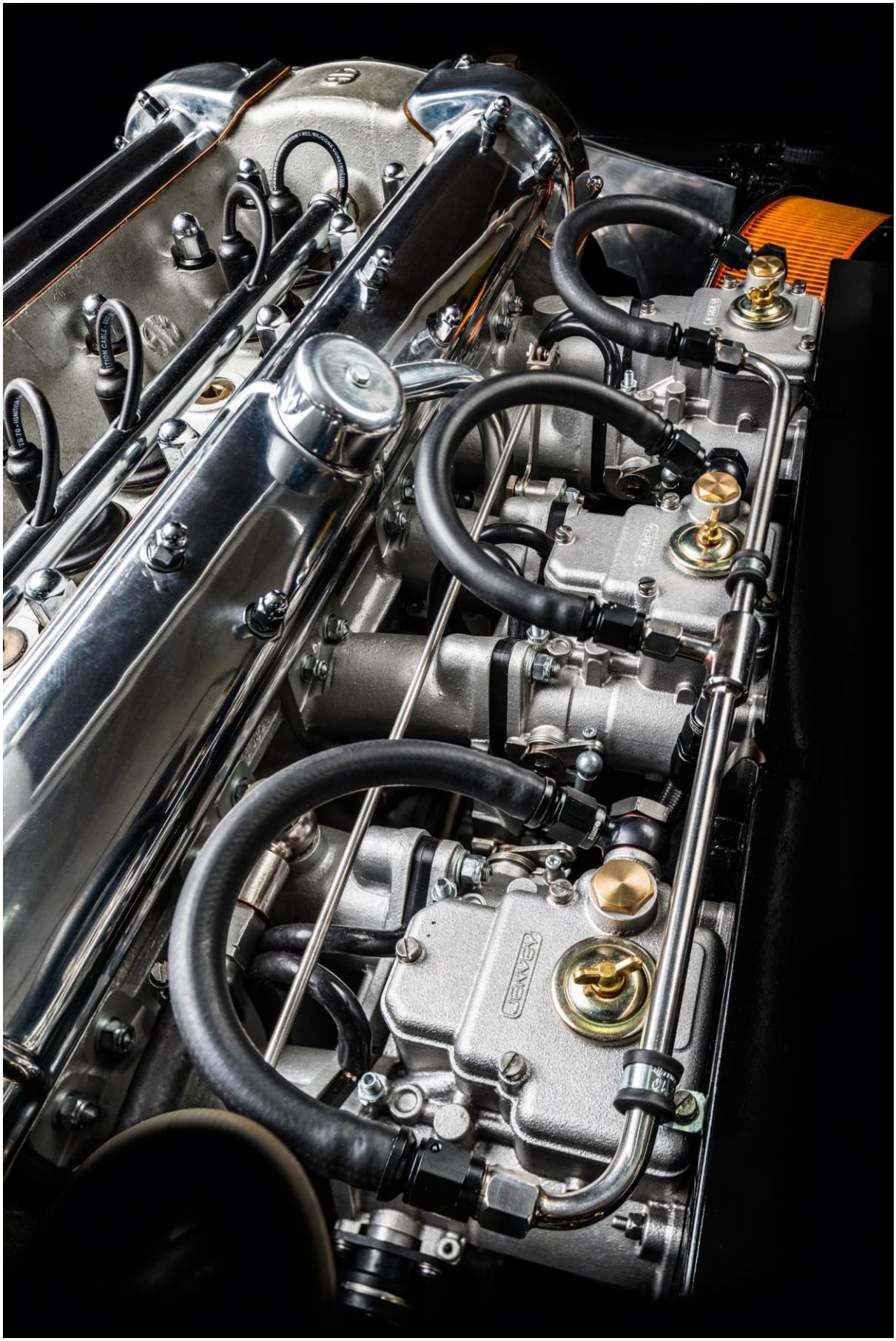


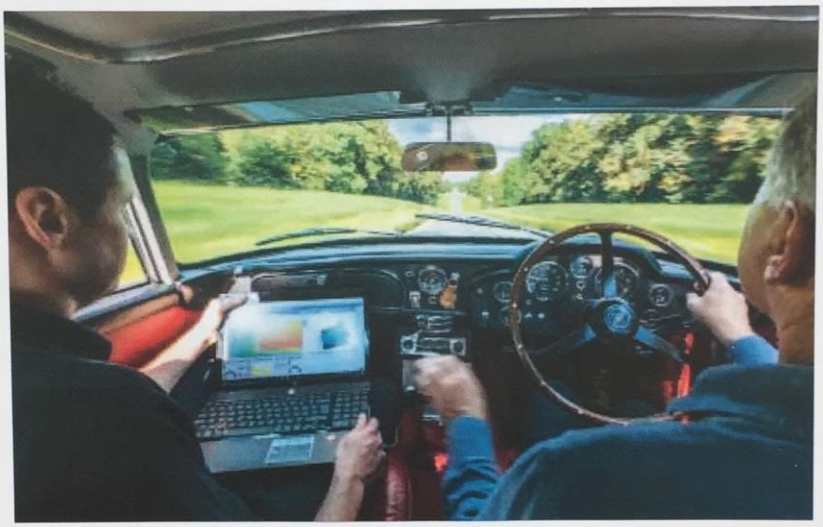
FUEL DUEL: CARBS v INJECTION

A new injection system cunningly disguised as carburettors could be a boon for owners of classic Astons. We compare the new throttle bodies (right) with traditional carburettors

WORDS JOHN SIMISTER | **PHOTOGRAPHY** TIM ANDREW



'Fuel injection brings better fuel economy, a cleaner exhaust, and more reliable starting and traffic-jam running'



'Only if you look closely will you see the Heritage Throttle Bodies for what they are'

position of the injectors. Then we wrapped the rest around those hard points.'

Sounds simple when told like that (and when you have a SolidWorks CAD program in which to create your virtual throttle body) but every tiny nuance has to be calculated and drawn. Next came a pair of 3D-printed prototypes, from which moulds were made for Jenvey's in-house sandcasting. With the castings machined and assembled into throttle bodies, only a few minor changes to the design were needed.

Despite their carburetted looks, the HTBs function just like Jenvey's modern TBs. So they have a fuel rail, formed into the lid of the 'float chamber', and standard Bosch injectors. The throttle potentiometer fits invisibly between an HTB's choke tubes. The HTBs will be available with 38mm, 40mm, 42mm and 45mm diameters, and all standard DCOE-compatible throttle linkages, airboxes and fuel-pipe fittings will fit the HTBs. Fitted to an engine, they look convincingly 'right'; only if you look closely will you see the HTBs for what they are.

JENVEY DYNAMICS was finally convinced to develop the HTB by Aston Martin specialist (and Ferrari-fettler and Lamborghini-lover) GTC Engineering, based close to Silverstone circuit. Our DB5 belongs to a long-standing GTC customer; indeed GTC's co-founder, John Winsor, restored it back in the 1980s. 'It's the last car I painted in cellulose,' he observes. 'I see there's a bit of crazing in the lacquer on that front wing now, but it's lasted well.'

The DB5 is the test-bed for the first of Jenvey's finished HTBs, three of them in 45mm form. Their sandcast finish isn't quite as smooth as a diecast Weber's, but ironically this makes them look more retro. Their injectors' sequential squirts, and the sparks at the DB5's plugs, are controlled by a GEMS engine management system. This contains its own atmospheric pressure sensor and takes signals from sensors reporting engine speed, crank and camshaft position, throttle position, coolant temperature and – for fine-tuning of the air-fuel mixture – the exhaust's oxygen content or 'lambda' value.

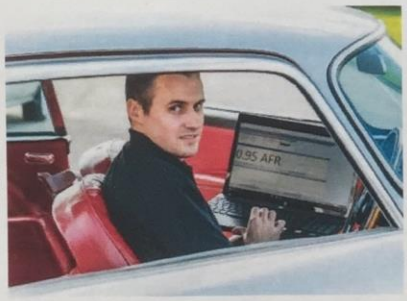
There's also provision to connect to an idle control valve, which admits extra air via small tubes under the HTBs to help with idling after a cold start, but that's not currently connected. 'At the moment we're using spark-scatter to regulate the idling speed,' says James Winsor, John's son and a self-taught guru of engine mapping. 'If the revs drop, it advances the ignition timing slightly, and vice-versa.'

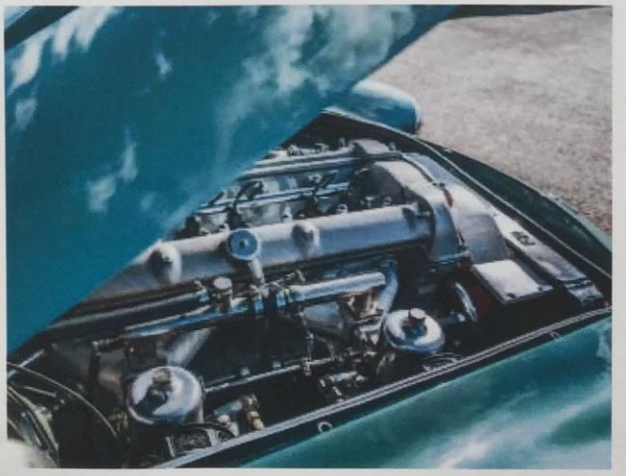
As well as GEMS, other systems such as Omex, DTA and Megasquirt could also be used – just as they can be with Jenvey's regular throttle bodies. The distributor is retained to house a camshaft-position sensor and, yes, to distribute the sparks.

It's early days for the DB5 installation, which means it's still a work in progress. So it will be exciting to try it out in this developmental stage. To help establish a benchmark, I have driven here in an example of the Newport Pagnell DB line that represents the opposite end of induction technology. Bryan Smart's 1959 DB4 Series 1 has the same uprated, 4.2-litre capacity that the DB5 has gained, thanks in the DB4's case to a recent engine rebuild by Oselli Engineering, but it's running on a simple pair of SU HD8s. Otherwise the engines are quite similar.

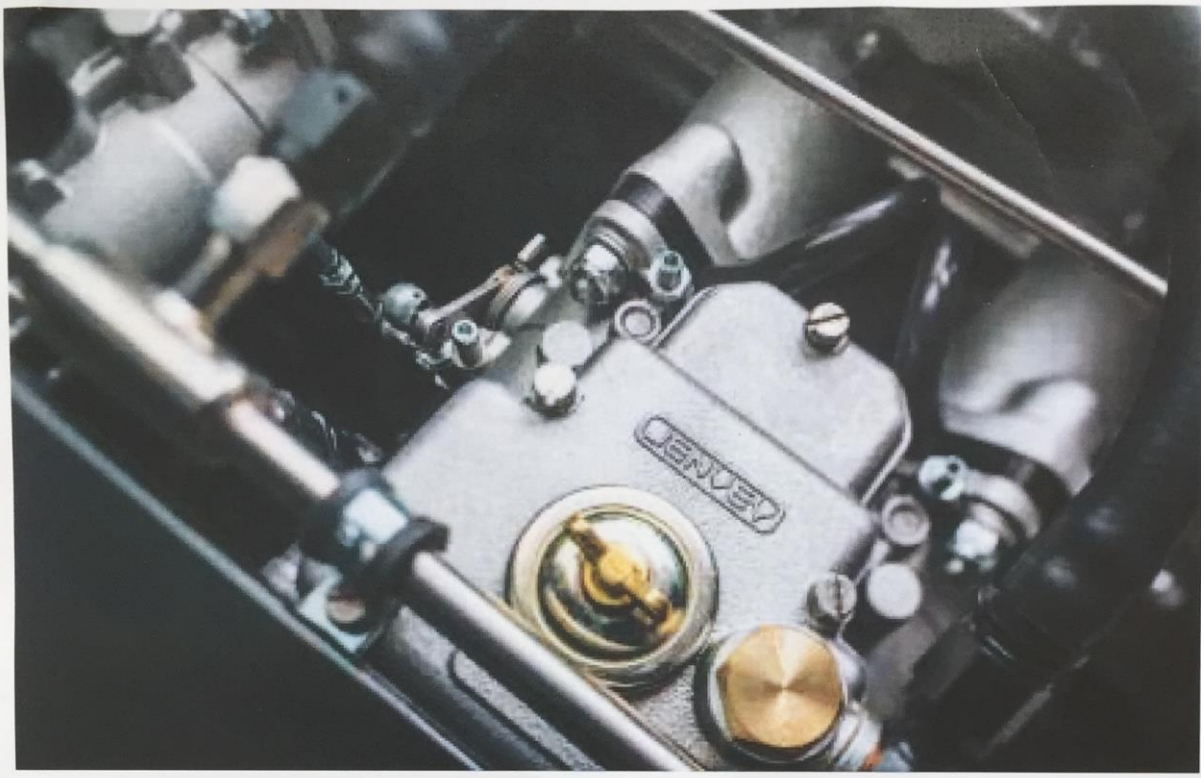
I know Bryan's car well, having sampled it several times over the years. It runs beautifully, pulling with a smooth rush of torque and never showing any signs of flat spots or hesitation. But it's quite a thirsty machine, and apt to emit a puff of blackness from its exhausts under sudden acceleration. Its throttle response is delicious, its rich, sonorous bark the stuff of boyhood fantasy (there was no car I admired more as a small child than a DB4). Frankly, it's hard to see how the driving feel of this engine could be bettered. The same cannot be said for its efficiency in converting fuel into motive force, however.

THE TIME HAS come. The old world of analogue appeal is about to meet the brave new one of digital precision, and the generations need to co-exist. I settle myself in the startlingly

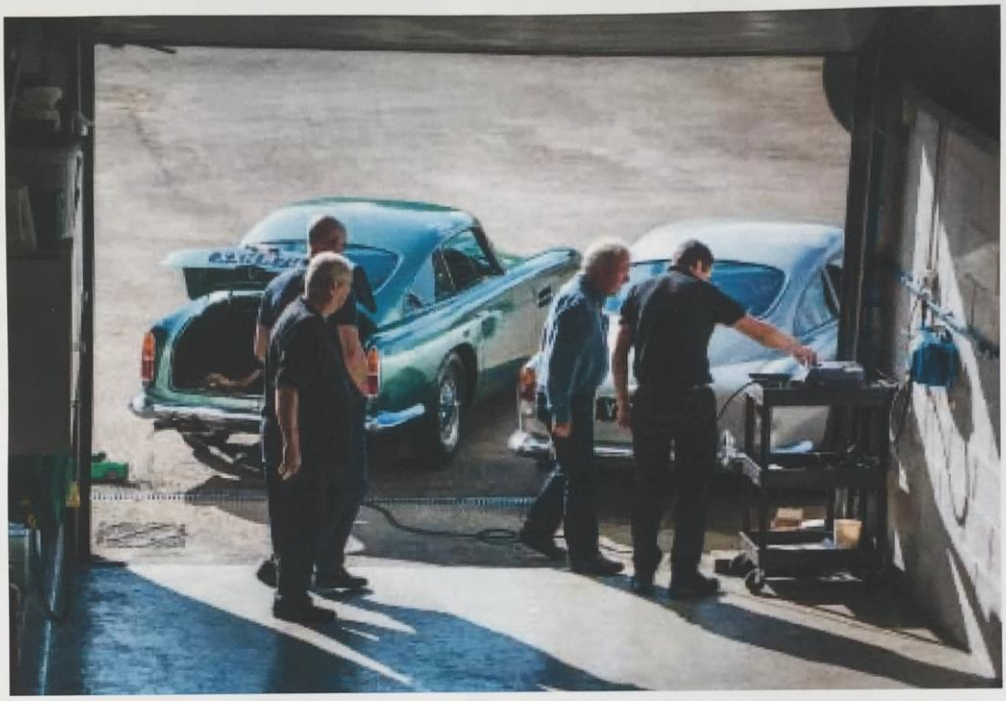




Above and right
James analyses the air fuel ratio: the DB5's throttle body set-up is still a work in progress, but it's already showing clear gains over a carburreted car, particularly on emissions. Right: DB4 engine is a 4.2, just like the one in this DB5


DENVER


SLOW



magenta-coloured driving seat of the DB5 – it's the original leather – and fire up the engine. It catches with an enthusiastic growl, quieter than the DB4's because a DB5 has an extra silencer, and then stops. Try again.

I need to keep the accelerator tickled, because there's a dead spot followed by a snatch as the engine comes off idle. We ease out of GTC's yard and out onto the Dadford-to-Silverstone road, and once out in the open spaces the Aston can better show what it can do.

Moving up through the five gears – it has a ZF gearbox, whereas the DB4 has a David Brown four-speed – it pulls as smoothly as the DB4 and nearly as strongly. If we remember that this later car weighs about 90kg more than its ancestor, the torque increase with the HTBs becomes evident; James tells me that during the mapping session on Tim Samways' dynamometer the engine was producing up to 235lb ft at just 1600rpm, rising to a peak of 289lb ft. The same engine fed by Webers would make about 214lb ft at those low revs.

The throttle-body engine is also very vigorous at high revs, with a sense of free, unfettered breathing, and it is crisply blippable for downshifts. Not so good is the surge when the overrun fuel cut-off reinstates the fuel supply at 1800rpm as I slow down. So it's back to base for some adjustments to the mapping.

James tapping a laptop in a DB5's cockpit makes for a surreal sight, and he continues with some digital tweaks as we set off for another drive. 'It seems happiest running at lambda 0.91,' he's saying, 'which is slightly richer than stoichiometric.' That's to be expected of an old hemi-head engine design, optimised for pace rather than air purity. James has already shown me complicated engine-management maps with much evidence of that 0.91 figure, but it's the transient response that needs some fine tuning. And on this second drive it's definitely better, helped by the management system's ability to 'learn' the movement patterns of the DB5 driver's right foot as it goes.

Back at base again, with the engines of both DBs properly hot, we compare exhaust emissions at idle. It's hardly a definitive test, but it does quantify the differences. The DB4 on SUs produces 4.1 per cent CO, with unburnt hydrocarbons fluctuating between 550 and 700 parts per million. The DB5 idles between 2.1 and 2.5 per cent CO, with hydrocarbons in the 200-250ppm range. Its fuel is combusting more completely; it's a significantly more air-friendly Aston. With that transient trouble eliminated, as it will be (probably via the idle control valve), it will be gains all the way.

Above
Back at base at GTC Engineering, with the engines properly hot, the team compares the exhaust emissions of the two Astons at idle

The Jenvey HTB can, of course, be used in any car originally fitted with Weber DCOEs or the Dell'Orto or Solex equivalents, and Jenvey is also planning an SU-shaped HTB range for the future. Meanwhile, the HTB will cost £288 per twin-choke unit when it goes on sale in January, plus £120 for the potentiometer and £89 per injector. To that you must add the engine-management system and its sensors, and a session on a rolling road.

So, is this the future for classic cars? If air-quality regulations start to place lower emissions limits on historic machinery, it could be. The HTB conversion is also good news for those who use their cars infrequently but expect instant life when they turn the ignition key. Either way, an obvious niche has just been rather effectively filled.