

# RULE OF THUMB

*Bill Blydenstein's name is synonymous with performance tuning. Here he talks to Mike Taylor about tricks with water and other secrets*



learnt to drive on an old tractor and my father's 1936 90hp Chrysler 6 Cabriolet. When the Germans came during the Second World War it was hidden away in a barn where it quickly became covered in dust and dirt. Luckily, the German soldiers took one look at this ostensibly rotting banger and quickly passed by. With the war over, a good clean and a new battery were all that were needed to make it like new."

Anxious to gain professional status, Bill considered university, but his lack of first-class qualifications and the fierce competition for places precluded entry into one of the Norwegian colleges. "While I decided on where my future lay I took a machine shop course in Oslo," explains Bill. "Fortunately, my father happened to be in London on business and came to hear about the Aeronautical and Automobile College in Chelsea (a notable ex-student being Mike Hawthorn), where I eventually managed to secure a place."

Not the most academically-minded of men, Bill says he found Part I of the Royal Aeronautical Society course tough going because it was purely theoretical. In contrast, his practical aptitude was more suited to Part II; it included 10 weeks on jet engine design at Farnborough. With careful exam preparation, he passed. "In fact, I won the Baden-Powell Award for the Best Commonwealth Student," laughs Bill, "much to everyone's surprise—including my own. After all, I wasn't even from the Commonwealth!"

So ended five years of intensive study. If he was to remain in the UK, the next hurdle was to arrange for a work permit. He had been offered a job as a draughtsman/stressman with Sir George Godfrey and Partners of Feltham, but it wasn't until the job title was changed to "Technical Assistant"—some eight months later—that the permit was granted. "I began work on air conditioning equipment and high-speed turbine compressor design, calculating stresses on gears and the design of oil pumps, all of which would be of considerable help to me in the future. In those days there were no computers so I began adopting a 'rule of thumb' approach to my stress analysis which cut potentially a week's work down to a day."

During his student days Bill's financial situation restricted him to riding

**B**ILL Blydenstein's talent for giving—among others—staid Vauxhall saloons an outstanding turn of speed has gained considerable acclaim. Blydenstein cars have enjoyed more than 130 outright wins in national and international races and rallies.

Blydenstein was born in Hengelo, Holland, in March 1929. His family moved to Oslo, Norway, when Bill was just a boy, his father taking heed of medical advice that the Norwegian climate would be better for his health. "There was no history of engineering in my family, so I cannot say I had any parental influence," Bill admits. "I

*Above, cylinder heads have been central to Bill Blydenstein's business for 30 years*

*Right, earlier days at the kitchen sink, timing water flow to test head design. Don't laugh, it works. The biscuit barrel is optional*





Aintree, 1961, and there was no faster Borgward than Blydenstein's, then developing around 84bhp at the wheels. Here Bill tackles one of the nimbler Riley 1.5s

motorbikes. In 1955, the year he started work, Bill was able to buy his father's Borgward Isabella. He was also gaining an interest in motor sport, and at the *Daily Express*-sponsored meeting at Silverstone in April 1956 Bill watched Reg Parnell outstrip the opposition in a Borgward. Bill was determined to learn what had made Parnell's car so effective. He called Borgward's British concessionaires, Metcalfe and Mundy, who suggested he contact Henry Meier of the company's service department. Blydenstein managed to catch Meier at the 1957 Motor Show in October. "Meier was very enthusiastic and helped me a good deal," recalls Bill. "In February the following year I took my standard car down to Brands Hatch to measure its performance. By the end of the day I was lapping in 1min 25sec, with a protesting and overheating engine."

Bill then spent three or four hours every night preparing the car. "It was stripped down, checked, lightened and rebuilt. I was very lucky in having a friend, John Winter, to help me. When the car was finished I took it back to Brands where my lap times were down to 1min 19sec. Then I went to Norway on holiday. On my return through Germany I bought some Isabella TS parts – special inlet and exhaust manifolds and a downdraught carburettor – which increased power to some 75bhp. This reduced my lap times still further to 1min 16.5sec."

Resplendent in its olive green coachwork, the Isabella's first race was the MG Car Club's Sprint at Brands in September 1958 where, much to his surprise, Bill found himself competing against another Borgward, which he managed to beat by two seconds. "That year I raced four times, winning my class three times and finishing second once." Bill reckons his white-water canoeing

and ski jumping in Norway – to say nothing of his thousands of miles on a motorbike – helped him develop an acute sense of control.

During the following season Bill concentrated on increasing the Isabella's power by modifying the cylinder head and fitting a high-lift camshaft. The suspension was lowered and Koni dampers (set on their hardest position) fitted all round. With just one season behind him, he managed a very creditable fifth place in the BRSCC Saloon Car Championship. Friendship with Henry Meier had helped produce a 4.1:1 final drive while the car's voracious appetite for tyres had been partially cured by changing to Michelin 'X' radials. "People who tried the Borgward seemed to find it a bit 'twitchy'," says Bill, "although I thought the handling just about right."

In 1960 Blydenstein began to apply a more scientific approach to tuning the Isabella's engine. A simple water-flow test rig was set up in the kitchen sink of his home to time fluid as it flowed through the cylinder head port, past the open valve and out into the combustion chamber. By careful use of the rig Bill was able to ascertain the effect he was

A rare shot of Chris Lawrence at Spa, 1963, with Bill Blydenstein and Vauxhall behind



having as he ground away metal inside the head. Eventually, his efforts paid off with an increase of 6-8bhp – all for the cost of a few pence.

After a further four wins and two second places, suddenly the engine's performance began to deteriorate. It wasn't until Bill began replacing the pistons every five or six races that power was kept at its peak, the car finishing the season by winning the BARC Cibie Cup.

With over 100,000 hard-driven miles on her clock, Bill arranged with Metcalfe and Mundy that for the 1961 season the front and rear axles would be replaced. "I am a rotten mechanic and I knew Metcalfe could do the work in hours. After all, I was still working an eight-hour day at Godfreys." He still found time to modify the engine ("development work is what I enjoy most"), chamfering the cylinder block walls directly below the inlet valves. By now the engine was giving a healthy 84bhp at the wheels.

Bill says the most memorable event of the year was the May meeting at Spa. "It is my favourite circuit," enthuses Bill. In the Touring Car event the Isabella beat off tough opposition from Volvos, Rileys and Alfas and came home 40 seconds ahead of the field at an average race speed of 93mph. Bill finished the 1961 season third in the hard-fought BRSCC Saloon Car Championship. "As a direct result of the performance at Spa I received a cheque for £300 from the Borgward Managing Director and went over to Bremen, where I spent ten days on tuning engines in their service department. The Borgward engineers were amazed at the power recorded on the dynamometer. I also developed three stages of tune for Borgward engines, arranging to have the machining done by a Guildford engineering company, the kits being marketed through Metcalfe and Mundy."

Blydenstein's first link with the legendary John Cooper came back in 1959 when, while reading reports of the F1 championships, he learnt of the gear and bearing failures which were plaguing the top drivers; Moss was ruining the bearings in his Callotti 'box while Coopers had squeezed five forward gears into a Citroën casing which was also proving unreliable. Bill equated these failures with overstraining and wrote to Cooper offering his services. "It was

still mid-season and John was very busy; it wasn't until the Gold Cup meeting at Brands that we eventually talked," recalls Bill. "Later, back in John's office in Surbiton, I was able to inspect the broken gear teeth. Armed with all the figures I calculated that the root stress on each tooth was a huge 20 tons per square inch. It's no wonder they failed. I then looked at the gearbox being designed by Owen Maddox and Cooper himself (a brilliant, intuitive designer) and offered suggestions to improve its reliability, including a low-pressure oil pump to lubricate the teeth." The following season Jack Brabham won five GPs and the World Championship.

1960 was also the year Bill married his long-suffering girlfriend Frances-Mary. With the need for a greater income he put in a request to Godfreys for an increase of £3 to his £17 per week pay. The request was denied so Bill promptly quit and set up WB Blydenstein Ltd, a freelance design consultancy.

"Cylinder head gas flowing became an increasing aspect of my work," Bill remembers. "I recall meeting gas flow expert Harry Weslake and explaining my water flow technique to him. 'Must be a very messy business with all that water about,' said Weslake. I also took on transmission design work for – among others – the Australian FJ team and the Chequered Flag racing team."

It was during this period that John Cooper began developing the idea of the Mini Cooper (JC loved the Mini's handling and was convinced there was a market for a 'hotter' version.) "We began testing a 1,100cc FJ-engined Mini, which developed around 70-80bhp, at Brands. I remember suggesting to John that the Mini Cooper ought to be 1,000cc to be competitive in European events."

In 1962 Cooper contracted Bill to become a works driver, fourth in line to John Love, Tony Maggs and John Whitmore. "I was the old man of the team." Even so, his was the first outright victory in a Mini Cooper, at Brussels in

**"Paddy asked John for a drive, and within three laps was down to my times"**

April. "In October we were at Silverstone doing trials in a prototype hydroelastic Mini at the same time that Paddy Hopkirk was testing a Healey 3000. Paddy asked John for a drive (reputedly his first in a Mini) and within three laps was down to my times."

However, Bill's frustration at not having any say in car preparation began to show. He left to pursue his development business, designing and patenting a hydraulically operated eight-speed gearbox for racing. Sadly, the design was never tested.

In 1963 Bill began his legendary association with Vauxhall. On more than one occasion he'd come up against Chris Lawrence and his indecently fast Triumph-powered Morgans ("when they stayed together," Bill laughs) during his Cooper days. One day in the paddock at Aintree, Lawrence was peering under the bonnet of a Vauxhall. "The cylinder head was off and I could see that there was a great similarity to my old Borgward, with the inlet valves set very close to the cylinder wall. I concluded that by adapting the same sculptured block idea this would increase power. I suggested the notion to Chris and I began spending around 90% of my time working on Vauxhalls, preparing a race car and a road car."

Development of the race engine was restricted to cylinder head gas flowing and engine assembly blueprinting, all of which brought power output up to around 75bhp. Suspension-wise, the ride height was lowered by 3in and Koni dampers fitted. During the first few races unreliability seemed to dog their chances, but at Spa later in the year (with power increased to 90bhp) the Vauxhall finished third overall with handling at least matching that of the

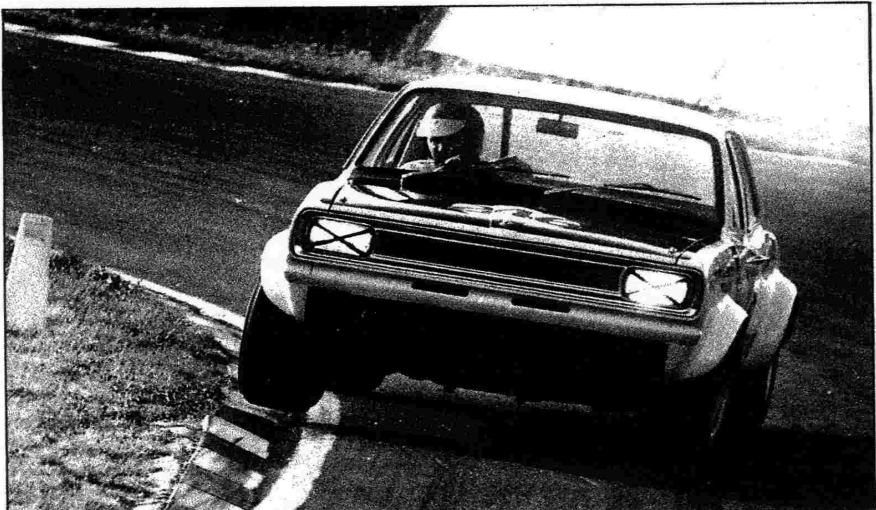
opposition. However, lack of power was still the biggest handicap so the engine was increased to 1,548cc, which with camshaft and exhaust modifications boosted output to a respectable 103bhp, although this was still some 20bhp less than many of the works cars.

That year (1963) Bill and Frances-Mary moved to Therfield, Hertfordshire, setting up Blydenstein Power Ltd to produce quality conversions on production cylinder heads and camshafts – Bill working from a large garden shed! More racing followed, this time in his sister-in-law's modified Elan.

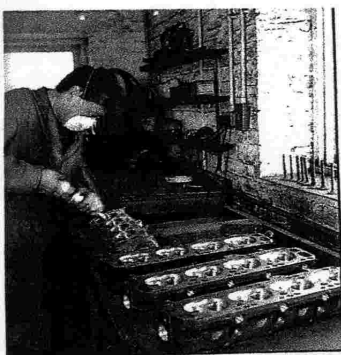
In 1965 Bill began racing Frances-Mary's Mini. "The whole world seemed to be racing Minis, so we began developing tuning parts." The Mini was arguably the fastest of its time, lapping Snetterton in 2min 6.8sec. Built in conjunction with John Aley (the well-known roll-over bar manufacturer) the little screamer weighed just 9.5cwt. Using an overbored block and an ingenious American 'weld and grind' technique on the main bearing journals, overall size was brought back to 850cc. With a highly modified 997cc Cooper head and Blydenstein's own camshaft, the engine developed 80-85bhp at 6,000-9,000rpm. Unfortunately, the considerable cost of racing became too expensive and the Mini was sold to the talented race driver Gerry Marshall (who was to drive for Bill later).

Bill's first contacts with the Vauxhall Viva came in 1964, when Dutch rally champion Dries Jetten invited him over for a working holiday in Holland. But despite trying all his usual tuning tricks, Dries' Group 2 Viva refused to give more than 70bhp. Undeterred, back in Therfield, Bill began to develop a road-tuned HA Viva, and eventually his 'lab model' 1,280cc engine was producing a healthy 64bhp. The car was timed at 98mph with a 0-60mph sprint of 10 seconds. A feature in Vauxhall's house magazine, followed by a letter to Mick Marr, Vauxhall's Public Relations Manager, resulted in an interview with Vauxhall's Sales Director, Geoff Welby. "I explained that everyone was campaigning Fords and Minis, and that to develop a race-winning Viva would be good for my business as well as Vauxhall's. Since, at the time, GM had a policy not to become directly involved in racing, the idea was to use Shaw and Kilburn as the sponsor because they were based in Luton – almost on Vauxhall's doorstep."

Although it was common knowledge that Vauxhall was developing a 2-litre engine, the first Blydenstein-prepared Shaw and Kilburn car was fitted with a 1,258cc engine which, with its monster 46IDA Weber carburettor, produced 95bhp – sufficient for *Motor's* Roger Bell to reach 100mph along Snetterton's Club Straight. "By this time, the team had expanded," continues Bill, "and in 1968 we were joined by Gerry Johnstone, a very capable engineer who took over as workshop foreman and whose input was considerable. To satisfy the need for more space we moved operations to



Gerry Marshall lifts a wheel of the Viva GT at Brands Hatch in 1969



*bove, Blydenstein at work, gas-flowing under heads*

*ght, Pentti Airikkala pushes the ydenstein-prepared DTV Chevrolet to ccess in the 1977 Welsh Rally*



Shepreth where we set up Blydenstein racing Ltd. Then came the 2-litre Vauxhall engine, which led to a 2.3 and 2.6-litre race engine. We won our class the Osram Championship in 1970 and 1971, the following year winning the Shepreth Trust Championship in the 2.6-litre Firenza sponsored by Thames TV. (This car became well known later as 'Old Nail'.)

Vauxhall was considering a V8 version of their Ventora saloon using the Australian Holden-built engine. By this time Gerry Marshall was driving for Blydenstein and much of his strongest competition came from Mick Hill's 8-cylinder Capri. With help from Vauxhall's design studio, Blydenstein racing produced 'Big Bertha', the dramatic-looking Ventora-based super saloon (the entire body was widened to take the huge racing wheels and tyres). Much of the chassis and suspension design was done by top aerodynamicist, Frank Costin. Powered by a 475bhp Repco V8 the car won three out of six races during 1974 until a brake caliper failed off at Silverstone, writing off the car and very nearly Gerry Marshall, too.

Dramatic as it might have been to see racing, it was certainly hot to handle. So Big Bertha was smartly replaced by Baby Bertha using a similar Repco engine but this time in a much-modified Firenza shell. 'BB' won the Tricentrol Super Saloon Championship in 1975 with 18 outright wins, repeating the record the following year with another 2 wins; the Shepreth-built 'Old Nail' won the Scottish Championship, driven by Bill Dryden.

1976 was also to prove a successful year with Bill preparing a Group 1 Magnum saloon, the car gaining a class win and third overall in the British Saloon Car Championship. BB had another victory in the Tricentrol Super Saloon Series. In 1977 DTV notched up an impressive second overall in the Spa 24-Hour race although, sadly, Bill says Vauxhall made little of this Group 1 success, perhaps because by this time DTV were beginning to concentrate

their efforts on rallying.

By now, Bill's performance tuning business had become well established, offering a wide selection of parts for the domestic market. Meanwhile, with the introduction of the three-door hatchback Chevette, DTV began campaigning the 2300HS and, as the records show, between 1977 and 1983 there wasn't a year when the team did not achieve success. In 1981 they won the UK Manufacturers' Championship and were second overall in the British Open Championship two years later. "We would have won the Driver's Championship in 1981, too, had it not been for poor radio reception in the Circuit of Ireland Rally," recalls Bill sadly. "That was also the year Gerry Johnstone left and we were joined by Wynne Mitchell. Meanwhile, Frances-Mary had taken over as Team Manager, which involved planning everything in conjunction with DTV Rally Manager, Colin Francis." (1982 saw the amalgamation of DTV and Dealer Opel Team into GM Dealersport.)

With the demise of the contract with General Motors Dealersport in 1983, Blydenstein Racing signed an agreement with Nissan and in 1984 and '85 they promptly won the Autosport National Rally Championship. "1984 was the best commercial year for my company, because I was given the franchise worldwide for the Nissan 240RS and we sold 42 cars," says Bill. Then came a year with Honda Dealer Team Norway which resulted in a second place in the 1,600cc Group A Class in the 1986 British Open Rally Championship.

"There are several moments which stand out clearly in my memory," recalls Bill with great satisfaction. "1975 when Gerry Marshall dominated the saloon car race at the British GP; Tony Pond winning the Manx Rally in 1981 (we did a lot of development work that year at MIRA), and 1983 when, despite lack of funds, Russell Brookes won the Circuit of Ireland. Nowadays, I'm becoming more involved with Classic cars, doing more of what I want to do."



*Last-minute preparations on Gerry Marshall's Repco-engined Baby Bertha Chevette*