

JAP Engines

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Founded by John Alfred Prestwich

Factory based at Tariff Road, Northumberland Park, Tottenham, London N17

Primary distributor in the 500 period appears to be Alec Jackson, 1006 Harrow Road, London NW10

Timeline

Date	Activity
1874	John Alfred Prestwich born
1895	Forms JA Prestwich, specialising in producing scientific instruments, experimental apparatus, and machines for making and showing cinematographic films.
1896	Moves to Tottenham and starts JA Prestwich Motors
1903	First motor cycle engine launched (used by Triumph)
1911	Moves from the Lansdowne Road site to a purpose-built factory at Northumberland Park.
1912	JAP engines proved for the first Morgan three-wheeler cars
1913	Former motor cycle racer Stan Greening joins the company as Technical Advisor.
1937	Vivian, eldest of John Prestwich's five sons, and former Brooklands racer dies after surgery for appendicitis (6 th February).
1945	Production work taken over by Villiers Ltd.
1947	Becomes a public company as JA Prestwich Industries
1948	Millionth engine built.
1951	Reincorporated as a publicly listed company, J.A. Prestwich Industries, to take over J. A. Prestwich and Co Ltd and Pencils Ltd. Prospectus for the public company. Directors are: <ul style="list-style-type: none"> • John Alfred Prestwich, Chairman and MD • John Edgar Vincent Jobson (of Villiers Ltd.) • Edward Stuart (Teddy) Prestwich (son of JA) • Douglas Percival Prestwich • Gerald Winfrid Stanfield Bagshawe (probably a banker) • Percy Gyllenship Langford. William Dodsworth Hine is Works Manager. Other positions believed correct at this time include: Stan Greening: Chief Technical Officer Joe Rolando: Chief Draughtsman Mr. Howard: Chief Experimental Draughtsman JA Prestwich sell the manufacturing rights to the JAP speedway engines to Alec Jackson
1952	John Alfred Prestwich dies (28 th November)
1955	Sales of engines to motorcycle manufacturers has almost ceased. Remaining stationary engines (and similar, such as lawn mower engines under the JAP brand name) were being manufactured by Villiers at Wolverhampton. The speedway engine is the only engine now produced at Northumberland Park.
1957	Company merges with Villiers Engineering (in June), although the JAP name survives. All Prestwich family involvement ceases (17 th September)
1962	All engine production moves to Villiers at Wolverhampton
1963	Northumberland Park factory closes (21 st August)
1964	Remaining assets of JA Prestwich are incorporated into Villiers Engineering. Villiers in turn is taken over by Manganese Bronze Holdings

The 500cc Engines

The Speedway Engine

Speedway first came to the UK in 1928. Longtime JAP rider Stan Greening convinced John Prestwich to visit Stamford Bridge races, seeing a new opportunity. Prestwich was less than impressed, seeing it as a fad, but Greening (who was now involved in the sport) did not give up.

Nothing came of this first exposure, but at the 1929 Motor Cycle Show at Olympia, the Stamford Bridge team captain Bill Bragg got into conversation with John Prestwich's son Vivian. Bragg presented his ideas for a JAP-based engine that would have the power and responsiveness he wanted for a premier speedway motor, but much lighter than the existing 500cc racing engine. Vivian agreed and counselled his father to authorise initial development.

Bragg's proposal was a bitsa engine, fitting a 500cc barrel and piston on the 250cc crankcase, and topping it with the twin ohv 350cc cylinder head from a standard, roadgoing engine. The crankcase proved too small, and the first prototype adopted the 350cc bottom end. However, it was still too heavy, and down on the 28hp of the leading Rudge.

For reasons now lost to time, JAP normally restricted themselves to a series of standard cylinder sizes with consistent bore & stroke (this was not even a case of using the same parts, as one cylinder size could appear on a range of air-cooled barrels or even water-cooled blocks). The original Speedway motor used the J-series dimensions for a 500cc cylinder, 80mm bore x 99mm stroke, equal to a swept volume of 497.6cc. This classification would remain unchanged on all production engines as far as the 4B in 1967, only changing with the 84S in the 1970s).

If you can't beat them, join them. Or in Stan Greening's case, copy them. Stan heard that rider Wal Phillips was about to upgrade to the 4-valve Rudge, and somehow convinced him to let JAP strip and inspect it. Stan and Wal worked late nights at the Tottenham works developing and testing tweaks and developments (until the neighbours complained about the noise from late-night engine runs), and eventually a new prototype appeared in August 1930. One of the more obvious developments was the removal of most of the cooling fins as, even on a 10:1 compression ratio on methanol, cooling was excessive.

This 3-valve motor produced 33bhp on the JAP test bed (more than the Rudge), and weighed just 53lb against the 97lb its 500cc TT sibling, and even the 68lb of the 350cc parent. It was immediately successful, and several replicas quickly joined it on the cinders.

For reasons unclear now, a 2-valve version of the engine was developed in the Winter of 1930/31, both remaining available through the 1931 season. This used a brand new cylinder head, almost bereft of cooling fins. By the end of that season the JAP was the dominant engine, both in popularity and performance. It was also being used in road racing, Wal Phillips gaining a Brooklands Gold Star for lapping at over 100mph.

Further developments in the 1931/32 Winter were new crankcase castings (stronger and stiffer), another development of the cylinder head (and operation of the valves), simplification of the oiling process, including accepting total loss, and increasing the compression ratio to 12.5:1. General strengthening was necessary throughout, as performance had increased to 37.8bhp @ 5,750rpm (guaranteed, as every engine was now bench tested before despatch). The 3-valve model was dropped.

Also at this time, a small but significant change was made to confuse historians. The factory decided it was inappropriate to be dealing directly with all the customers. So marketing and sales were hived off into a separate company – at this point Victor Martin & Co. Victor had been a member of the speedway engine development team, and the new business remained on the Tottenham site, albeit a distinct organisation.

Further developments for the 1933 season included another new head casting (moving the inlet port 12.5 degrees off the previous horizontal), and a longer conrod to reduce big end loading. This

necessitated a slightly longer barrel so as to maintain the bore and stroke at 80x99mm. That also led to the first unofficial naming of the engine types, the new engine becoming the “long 4” (for the four studs holding the head and barrel to the crankcase) as opposed to the earlier “short 4”. The engine now delivered 40bhp at 6,000rpm (on methanol).

Whilst successful in performance, this led to a major problem. The new cylinder head was rather thin near the exhaust valve, and tended to warp, potentially causing a leak from the combustion chamber. This was solved with the 1935 development. A fifth stud was added (and all studs repositioned to be equally spaced around the barrel) to improve clamping, necessitating new cylinder head, barrel and crankcase halves. This became known as the “5-stud” motor.

Another minor but visual change around 1936 was the fitting of cast valve spring covers, around 1936.

Jumping to post-War, the factory sought to solve the 5-stud problem permanently by casting another new cylinder head (still in iron), beefed up in the area of the leak, but still able to run the lengthened conrod and barrel. First versions were being run in 1947, but would not become standard until 1949. Some engines in this transition period had an interim modification. This 1949 engine became known colloquially as the 4-stud (in contrast to the outgoing 5-stud, and ignoring the 4-stud design that had run 1931-1935), sometimes incorrectly referred to as the “Type 4” – “Type” was a designation reserved for JAP’s stationary engines.

This required new cylinder heads, barrels and crankcase halves, although a 5-stud crankcase could comfortably be recycled with plugs and new tapped holes.

Like many companies of the time, JA Prestwich would designate engines by their RAC hp rating – which had little to do with actual performance, rather the piston diameter. As a competition unit, the speedway engine was not subject to such rules, but would have qualified as a “4”. In a similar vein, the JTOR & KTOR Twins were based on roadgoing engines of “8” designation (although technically the Mk2 qualifies as a “9”).

JAP does not seem to have used project or brand names for its roadgoing or competition engines. Rather, the engine was designated by its RAC hp rating and its actual performance. The 8.80 designation often used for twins refers to an earlier development of the engine – 8 RAC hp, 80bhp on methanol (or more probably “JAP Racing Fuel”). Using this rule, the 1952 speedway engine (aka the original “4A”) would be 4.46, while the 1950 Mk 2 1096cc Twin would be “8.95” or “9.95”.

In 1946 the 500cc national racing car formula came into being. John Cooper and Eric Brandon had chosen, and were quite lucky to obtain, one of these Speedway JAP engines for their special. In a forgotten piece of history most engine manufacturers were unwilling to sell engines to these enthusiasts - a consequence of a lack of raw materials, government incentives to sell everything abroad to raise cash, and undoubtedly some hubris. In April 1947 Gregor Grant, soon to establish Autosport magazine, visited the factory and met Stan Greening. He was introduced to Teddy Prestwich (son of John) and encouraged him to maintain a supply to the new racers as well as the speedway riders. Uniquely amongst the British manufacturers, JAP supported the 500s, not just allowing sales but developing the engine to suit.

To further confuse nomenclatures, in 1952 JAP introduced the “4A”. This gained an Alfin aluminium barrel. We can only guess that this was at the instigation of former speedway rider Alec Jackson, who in 1951 had taken over worldwide rights for the speedway engine. The barrel proved prone to distortion when clamping down, and this took a while to solve by thickening the wall. It is also notable that the Formula 3 specification of 4A gained more finning than the standard speedway engine. This presumably indicated both that the enclosed engine was at greater risk, and acceptance that the 4-wheeled pound had to be listened to.

Developments continued under Alec Jackson. It appears that, with the death of John Prestwich in 1952, and eventually the merger with Villiers in 1957, factory interest in the speedway engine declined. Jackson took over manufacturing as well as distribution, hand-building engines at his works on the Harrow Road, near Wembley.

Historical records are contradictory at this time. On the one hand, Alec Jackson was reported as holding manufacturing rights for the speedway engine, and later is confirmed as building the engines at his Harrow Road workshop. On the other hand, at the same time in the early 1950s the Northumberland Park factory is reported as not only producing speedway engines, but producing nothing but speedway engines.

Our best guess is that Jackson actually held global distribution rights with for the engine, and therefore dealt with orders, deliveries and all requests from drivers around the world. He then managed these into production orders for the factory to build. He probably took over all aspects of manufacturing after the site closed in 1957, and there is no indication of Villiers manufacturing this engine. This presumably covered racing, speedway and grasstrack.

We have no information for how the Twins were handled.

Whilst the engine would continue to dominate speedway and grasstrack racing into the 1970s, its racing career was effectively over. The Norton was not only more effective on track, but becoming more available under new owners Associated Motor Cycles.

In 1967, when the Amal track racing carburettor ceased production, Jackson had to re-engineer the head to take its replacement, the 932 concentric carburettor. He took the opportunity to improve on the great weakness of the engine, opening the inlet port and improving breathing. This was effectively the final derivative of the 1930 engine and was accepted by the newly formed 500 Owners Association as the baseline specification – being powerful, reliable and available new, albeit ironically not actually period...

A further development of the motor was the 84S in the 1970s. This motor fundamentally changed the specification with a shorter stroke, providing more power at peak revs. It proved popular with grasstrack racers but being so far developed from the original design it is not used by the 500 Owners Association.

The 4-Cylinder

At the Motor Cycle Show in November 1953 at Earls Court, JA Prestwich demonstrated their complete range of competition engines, with two new prototypes of note. One was a V-twin 500cc engine, already claiming to match the current single on power. This engine was apparently based on one used by Cooper a year earlier in an aborted attempt at land speed records.

More intriguing was a water-cooled 4-cylinder 500cc engine, specifically built for car racing. It had long been proposed that a multi-cylinder, and specifically a four, should offer a performance advantage in both cars and motorcycles, with the ability to reach sky-high revs outweighing the extra weight. Sleeved-down 750cc engines (mainly Fiat) had failed to deliver, and in reality it would be a few more years before the Gilera and MV engines finally overtook Joe Craig's Norton Manx.

The lack of hard claims for the engine suggest this was not a working prototype, but the design was certainly well-advanced and serious. A crossflow design, with chain-drive double overhead cams (operating single inlet and exhaust valves), and separate Amal carburettors feeding each cylinder, the unit was estimated to weigh about 150lbs versus –twice the weight of a Speedway motor, but a rev limit of around 10,000rpm would be more than 50% higher. Surprisingly, the engine was designed for chain drive as displayed, and therefore presumably was meant to be installed transversely.

In truth JA Prestwich were in trouble by now. There is no evidence either the twin or 4-cylinder were ever developed for further, and there are no follow-up reports in the trade magazines.

Other 500cc Designs

A selection of other JAP engines were tried in 500 guise, including:

- A 2-cylinder engine tried by Paul Emery in the original Emeryson
- Several attempts at “slopers”, using the 998cc Twin with a complete cylinder (usually the back) cylinder removed. This was done either for performance or to be able to run the same

car in two classes on the same day. Clive Lones, Stirling Moss and John Cooper all tried this idea.

- Other works development engines. This includes at least one 'sloper' using a custom crankcase to cant the barrel forwards.
- All manner of attempts to create better cylinder heads on the basic speedway motor.
- Several combinations of parts from different manufacturers, such as the 500cc NorJAP used by Fred Tuck and the JAP-BSA used once by Jack Brabham.

Larger Engines

The 8/80

A key part of the Cooper story is the success achieved with the JAP Twin – in 998cc & 1098cc variations, and sometimes with a supercharger.

JAP were producing Vee-Twin engines from 1904, and ohv versions by 1906. Their reputation was cemented with the Morgan 3-wheelers, and providing the engines for the Brough Superiors. In the 1920s JAP were almost exclusive suppliers of large motorcycle engines. But by the mid-1930s, in a world damaged by the depression, many manufacturers had dropped the larger-engined models, or had begun manufacturing their own, most significantly Vincent-HRD.

The life of the big Twin seemed to be over after the War, when Morgan decided not to reintroduce the 3-wheeler (apart from a short run with Matchless engines) and Brough was wound up.

Legend has it that Spike Rhiando first suggested shoehorning a big Twin into one of the original production Coopers. This was hardly an original idea as cars like the Lightweight Special, Mitchell-JAP, Djinn, and the Iota-based Freikaiserwagen were already very successful on the hills & sprints (at this time, of course, there were almost no races), but these were all specials and no one was offering a turnkey package. In the end this required a lengthening of the wheelbase (just an inch) and a rejuggling of the location of the driver and other parts. With Rhiando, and soon after a works car driven by John Cooper, initial promise was tempered by unreliability as the rear cylinder repeatedly overheated and seized. This was eventually solved with the 'big ear' inlets on the engine cover of the 1949 Mk III.

At the end of a super-successful debut season, Stirling and Alf Moss made plans for 1949. Alf's idea was to test his son with the promising Cooper Twin, with which they could still run as a 500, but also run in the larger classes. It would also be practical to do a European tour to see how he coped. For the big engine, first choice was the Black Lightning engine, but Vincent-HRD gave him short shrift. Once again, it was Stan Greening who saw the potential. He offered Stirling an informal "works-preferred" deal, supplying both 500cc and 1,000cc engines. He would also be offered prototype developments.

Moss (and others back in the UK) showed the enormous potential for a 600lb car with nearly 100hp – nudging 300hp/ton with the driver aboard. In July 1949 he tried to enter the Dutch Grand Prix. Whilst he wouldn't have won, the likely performance may well have led to a different history for Stirling, Cooper Cars, and rear-engined formula cars. Harry Schell had a similar idea and in 1950 started the Monaco Grand Prix, though only as far as the famous lap 1 accident.

After Moss ran a development engine in 1949, JAP launched the "Mk 2" 1096cc engine for the 1950 season. Tailored for car racing (a 998cc version was also available for motor cycle racing, many of which would also find their way into hillclimb Coopers), it was built to use methanol fuels. Where the 998cc engine retained the J-series cylinder dimensions, the car version was bored out to 84mm. It also gained Wellworthy Alfin barrels (steel barrels with bonded aluminium finning), and more generous finning to improve cooling and long-distance durability (the same development only reaching the Speedway 500 three years later). Big Cooper-JAPs (and it was normally Coopers) were an ideal option for the prospective racer who wanted something more than a 500, but couldn't afford a Maserati or Ferrari. The 1950 developments of both car and engine made the car more reliable for long races, not just short sprints & climbs. Although not truly competitive against the best Formula II

cars, it more than held its own in FLibre races. On the hills it was rapidly becoming unbeatable. Cars were sold not just in the UK, but notably to Australia and New Zealand.

This trend continued through the 1950s. Unable to make use of the full 2.0l engine capacity, the Cooper-JAPs were gradually outclassed in racing, especially when the World Championship was held to Formula 2 regulations in 1952 & 1953.

But on the hills the Cooper chassis remained superbly nimble and spritely for the tight corners and short straights. Ken Wharton used a range of cars to win the British Hill Climb Championship 1951-1954, but Tony Marsh using Cooper Mk VIIIs won three years straight, followed by David Boshier-Jones (1958-1960, in a Cooper Mk IX) and then David Good once, 1961 in a Cooper Mk VIII), all with big twins. Only in 1962 were the Coopers finally outclassed, by the much more advanced rear-engined FJuniors, and similar Formula 1 cars.

Supercharged Twins

It is not clear who was the first to fit a supercharger. They were regularly seen by 500 drivers, who often ran against supercharged Austin 750s on the British hills. For several years there was equivalence between supercharged and naturally aspirated cars in many categories. By 1951 Joe Potts had a supercharger on the 1,000cc JP and Ken Wharton was considering adding one to his Cooper

A likely candidate is Bertie Bradnack, who fitted a supercharger to his Cooper Mk IV for September Prescott, 1951. In 1953 he upgraded to a mighty twin-wheeled Cooper Mk VII, which would impress and scare subsequent owners Dickie Henderson and FH 'Bing' Crosby.

Because all the supercharged cars were specials, details and performance are uncertain. It seems quite common that the supercharger made set-up more complicated and could be unreliable. Some reverted to a naturally aspirated set-up for confidence and reliability.

Other Large Engines

In 1949 Peter Collins took a slightly different route to Stirling Moss, with similar objectives. For 500s, he was uniquely able to secure a Norton dohc TT motor from the company where his father was a director. They also created their own 750cc Vee-Twin to exploit the hillclimbs that still ran a 750cc class (and giving Peter an automatic advantage over the 500s that were obliged to run in the larger class). They also developed a second Twin that gradually increased to 1260cc, proving competitive in 1300 and 1500cc classes. The parentage and specifications of both engines are uncertain. The latter, fitted to Peter's Cooper Mark III was sold to a young Tony Marsh.

The other engine of note is the 1132cc NorJAP, originally developed in 1951 by Robin Jackson for Ray Merrick. This used a heavily modified JAP 8/80 crankcase to support a pair of Norton sohc Manx heads. It was sold on to Bill Sleeman, who promptly fitted a tidy but frightening supercharger. This one-off survives today.