February 2011

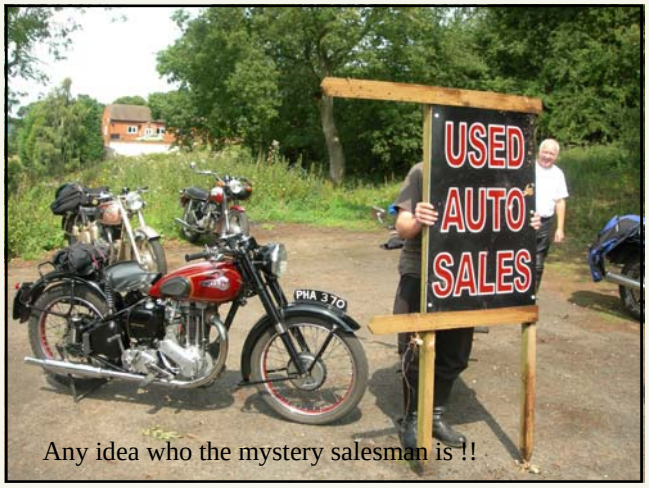
# North Birmingham News

## NEWSLETTER

### Review of 2010

Anchor Garage Run


Ride a Bike Night



Any idea who the mystery salesman is !!


Josie's Jaunt

Picnic Concours Run


Severn Valley Run

# What Happened to All the O.H.C. Roadsters

In 1924 the Scottish engineering firm Beardmore, whose motorcycles were usually fitted with Frank Baker's Precision engines, has put a cammy design in the hands of their own A F Francis, and car practice was very much in evidence.

The cylinder and the top half of the crankcase were in one piece, and cast in iron with an aluminium sump; the compact crankshaft assembly was supplemented by a small outside flywheel. The cylinder head was also of cast iron, with paired exhaust and inlet valves in a pent-roof combustion chamber, but the spark plug was about as badly located as it could be, slightly below the inlet valves. Each valve had its own port, so that there were two exhaust pipes and two inlet pipes (of great length), with twin Amac racing carburettors.

The single camshaft was driven by a vertical shaft and bevels, and opened the valves through forked rockers, but an absurdity to modern eyes was the magneto's situation on top of an already lofty engine, driven by an upward extension of the camshaft drive.

Beardmore had clearly tried to do too much in a short time, and were in every sort of trouble in practice. Despite much whistling in the wind they withdrew the ohc machines and substituted 246cc Precision engines at the last moment (one finished 11th).

Two firms were offering ohc motorcycles for sale to the public in 1924. Admittedly both companies were small and obscure, but bold decisions often come from such, rather than from larger, more ponderous organisation.

The 348cc New Scale used an engine designed by AA Sidney, and made in Coventry by the Dart Engineering Co. It had chain drive to its single camshaft and was otherwise unremarkable.

Not so an engine which Dart had made some time before and shown in a motorcycle of their own construction. That had featured a remarkably sophisticated drive to the camshaft by means of triple eccentrics And connecting rods, anticipating NSU's famous Max by thirty years or so. (closer in space and time, it also anticipated WO Bentley's use of eccentrics

*The Beardmore had it all – shaft and bevel camshaft drive, a four-valve head, an outside flywheel and a horizontally split crankcase*

to drive the single camshaft of his famous Big Six car of 1925, and we cannot help wondering whether Bentley a keen motorcyclist and a pre-war TT rider, copied Sidney's design or perhaps bought dart's patents. Triple eccentrics, though expensive to make, had the virtue, rare at the time, of complete silence—a great advantage in luxury motor car.)

The 250cc Morton-Adam, also made in Coventry, was another Sidney design, and again used chain drive to its single camshaft, this time tensioning the chain by way of a magneto. An outside flywheel was fitted and, unusually, an overhung crank and a long single plain main bearing. Thus the drive to the camshaft was by a forked coupling engaging the end of the crankpin.

It is unlikely that either the Morton-Adam or the New Scale sold in anything but small numbers, but that they came to the market at all indicated the public interest. The use of chain drive for the camshaft certainly excited quite a lot of debate, eliminating as it did complicated


*Long inducation stubs and a magneto on top of the engine were features of the ill-fated 1924 Beardmore*

Expensive components. A letter to *the Motor Cycle* from Edward Turner, at the time engaged in a retail motorcycle business and describing himself on his letterheading as an engineer, shows that the future author of Triumph's fortunes was himself experimenting with chain-drive layouts.

Rather surprisingly, no one at this time appears to have used, or suggested using, a Weller chain tensioner, though the sohc A C cars of its inventor John Weller were well publicized. Such a tensioner seems to have first been used on a motorcycle on AJS' 1927 ohc racing machine - a design with which Weller was slightly involved.

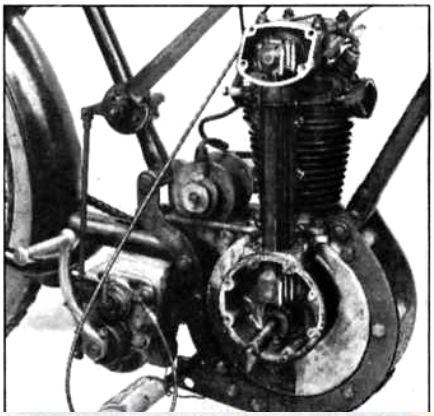
In his letter Turner remarked: 'The chief objection I found was backlash between camshaft and crankshaft, causing noise and variations in the timing at high rpm. When the arrangement was adjusted to minimize this, a fair amount of friction and consequent wear was in evidence.' He concluded, 'Undoubtedly, the ohc engine is the type of the immediate future'.

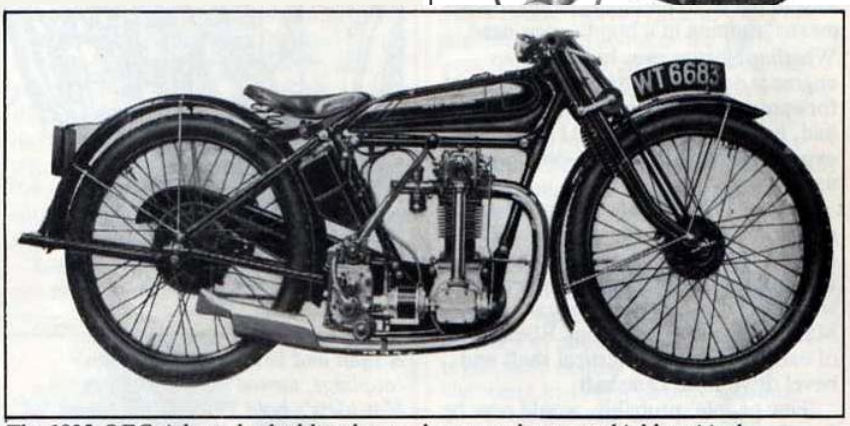
At the time that Turner was writing, he had not long built an engine with a single overhead camshaft driven by a Henry-type train of pinions. Later still he built the better known Turner Special, and it was a story about this bike in The Motor Cycle early in 1927 that led to his invitation by Vic Mole to join Ariel as what we would now call a forward planning designer. Then, of course, when he did complete a most original sohc design for Ariel—the 500cc Square Four—it featured chain drive, with a Weller tensioner, to the camshaft.

The Turner Special of 1926 had used a vertical shaft driven by a pair of bevels at the lower end. On top was a pair of cams, rotating on the end of the shaft in a horizontal plane, and short pushrods operated the valves via inverted bell-crank rockers. Though this saved machining a pair of bevels, the inertia (and lost motion) of the pushrods and rockers must have gone a long way towards negating any advantage. It was not one of Turner's best efforts and yet without doubt it brought him his big chance. Later, he appears to have acquired a positive dislike of ohc layouts which only left him at the end when, in retirement he submitted to BSA the dohc design developed by them into the ill-fated 350cc Triumph Bandit and BSA Fury twins in the early 1970's.

The Turner Special arrangement somewhat resembled an idea patented in 1924 by Lt Slater, RN ( and later developed to some extent by Chater-Lea) - the so called "face cam". Again the top pair of bevels was done away with, and The cam rotated in a horizontal plane.

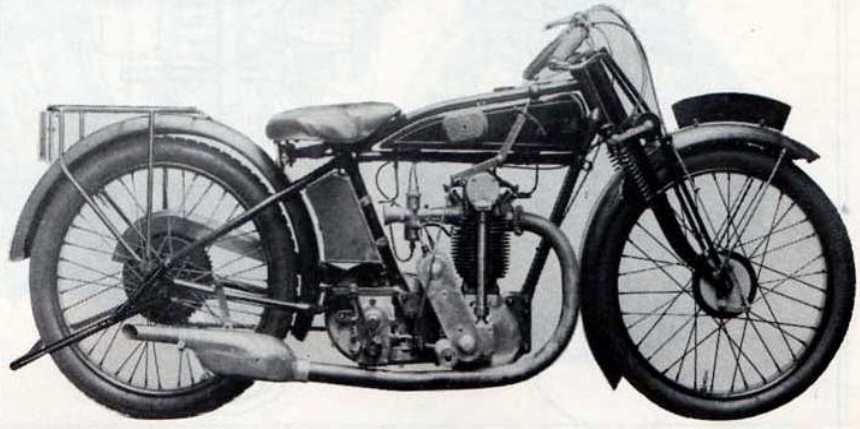
The lobes however, were formed on the upper surface of the disc and






*The 1925 OEC Atlanta looked handsome, but a road test was highly critical*

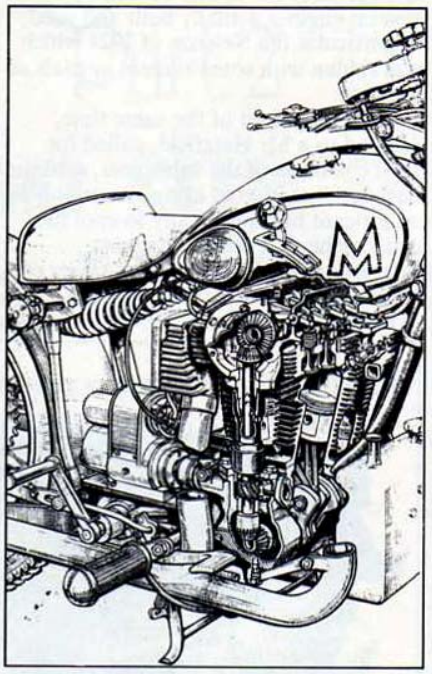
*1927 500cc ohc Calthorpe returned 80mpg and, it was claimed, 80mph*



*A 1924 prototype of the trend-setting ohc Velocette*

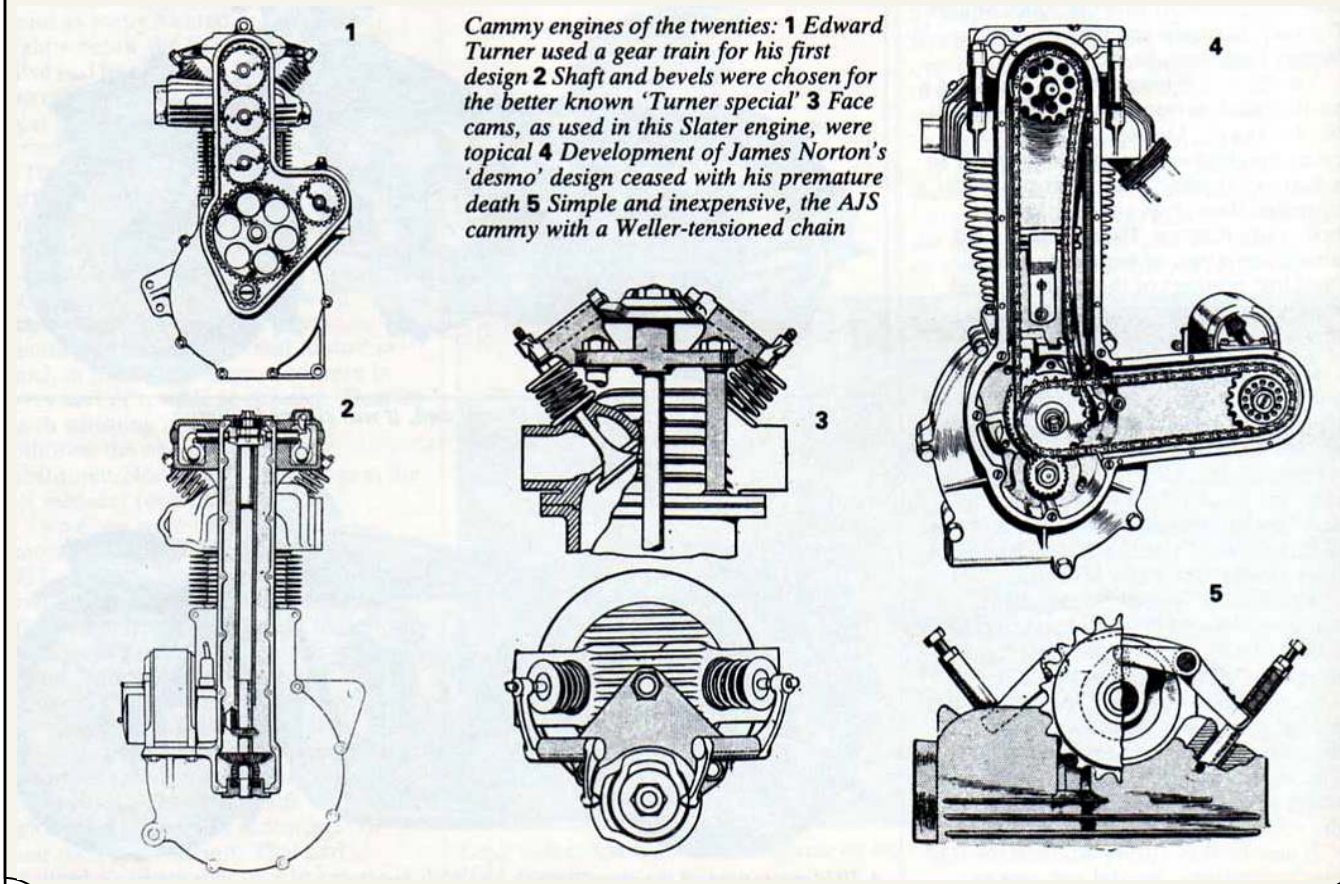
operated the valves by way of ordinary rockers. It may be that Turner admired the face cam's simplicity, but did not care to infringe Slater's patent, and so incurred extra and unnecessary reciprocating weight in his own design. In fact it is extremely doubtful if the Slater patent was really valid—it is unlikely that a court would have upheld it if challenged, and certainly it was anticipated by several engines actually built and used, in particular the Newson of 1921 which was ridden with some success in trials of the day. Another patent of the same, granted to a Mr Hatzfield, called for total enclosure of the valve gear, with the declared intention of using oil not only as a lubricant but specifically to cool the cylinder head. Perhaps the most interesting patent of 1924 was taken out by James L Norton, calling for the overhead camshaft to be driven by chain, with the valves not only opened by the camshaft but closed as well.

In Norton's design an annular cam form surrounded the opening cam to form a track engaged with a peg on The end of the rockers. To allow for Expansion of the valve stems, there was a certain amount of free play, and to ensure that the valve seated, a very light spring was specified. Norton's purpose was to eliminate valve bounce, and the use of heavy, duplicated springs. Though by a different method, he anticipated the desmodromic valve gears of Ducati and Mercedes-Benz by thirty years, and indeed the word desmodromique—which means 'running in a bond' - was used. Whether Norton ever built such an engine is doubtful, but he was a practical forward-looking engineer who certainly had, between 1909 and 1911, experimented with a chain-driven sohc unit.



*A shaft and bevels, with Oldham couplings, turned the camshaft in Matchless's bold 597cc Silver Hawk V4. Only 550 were made between 1931 and '35. AJS also promised, but never sold, a V4 roadster in the thirties*

In May 1925 The Motor Cycle tested an ohc motorcycle, the new 350cc OEC Atlanta, product of a small, though well-known manufacturer. The engine was closely based upon Dougal Marchant's record-breaking Blackburne of early 1924, with a vertical shaft and bevel drive to its camshaft.




*Cammy engines of the twenties:* **1** *Edward Turner used a gear train for his first design* **2** *Shaft and bevels were chosen for the better known 'Turner special'* **3** *Face cams, as used in this Slater engine, were topical* **4** *Development of James Norton's 'desmo' design ceased with his premature death* **5** *Simple and inexpensive, the AJS cammy with a Weller-tensioned chain*

Few people would now be found to dispute the prophecy that the ohc engine will in the future oust the push rod type of engine as the overhead valve has at the present time proved its superiority over the side valve reported the tester. But he then proceeded to paint a different picture of the OEC, complaining of bad slow running, distinctly disappointing acceleration, roughness in the pick up, an uncomfortable saddle, and diabolical clatter from the valve gear! Of roadholding, brakes, fuel consumption and top speed there was not a word, but there was some muttering about the stiffness of the engine, and the fact that the appraisal only lasted for 75 miles may speak volumes in terms of the old time road tests.

A happier test was one of the handsome 1927 500cc ohc Calthorpe, which received praise for its smooth slow running and rapid acceleration, and the engine was remarkable for its absence of mechanical or exhaust Noise. The handing was 'rock steady'steering and 'outstandingly effective' brakes all round were much appreciated. The fuel consumption was carefully measured at 80mpg. As for the top speed, the machine was fast there was no doubt. Exactly what maximum it is capable of it is not possible to say, but it is certainly way ahead of anything practical during the 450 miles of road work.

The Calthorpe came straight to the test from the ACU 1000 mile stock machine trial, during the test it used less that a pint of oil. Except for tightening of the footrest nuts no further adjustments were necessary. Priced at £75, expensive at the time when £5 a week was a fair wage for a craftsman.

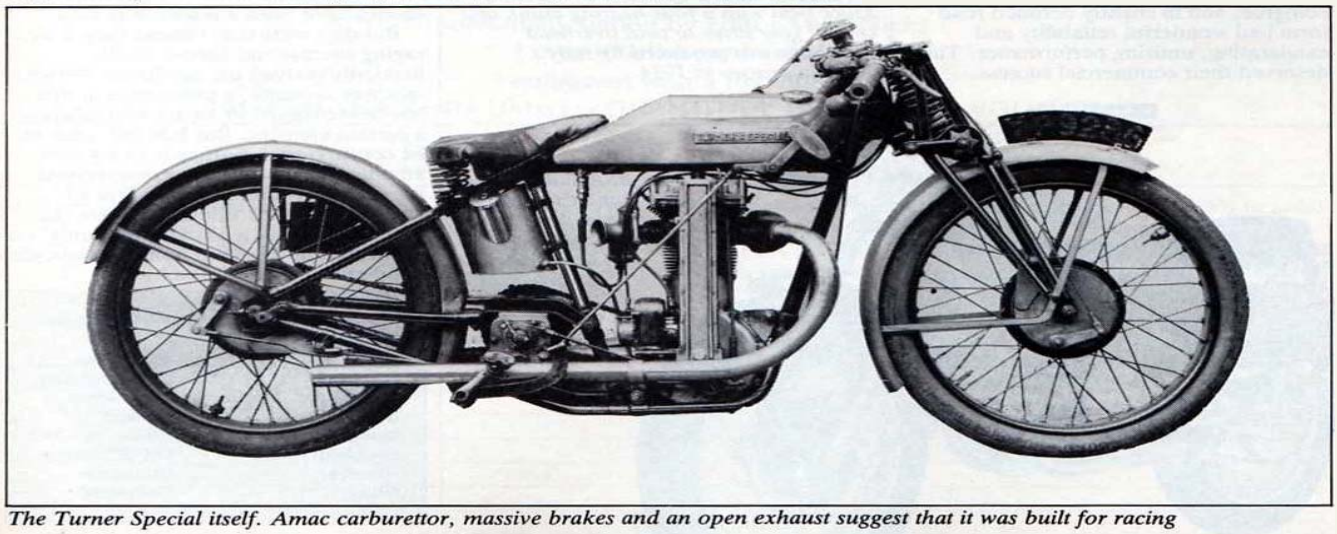
At the end of 1924 Velocette known for dependable but unremarkable two strokes, made an announcement of a 350cc prototype machine with vertical shaft drive to a single ohc. This prototype was eventually Developed into the model K. Whilst many other ohc designs withered away and are now forgotten ? The answer seems to be that each time a problem arose at Velocette and many did, Percy Goodman solved it in such a way that it stayed solved.

Thus after an early spate of apparently inexplicable crankshaft failures, he purchased a stroboscope, and after adjusting this in and out of phase of the engine revolutions discovered the apparently rigid crankcases flexed like cardboard. Needless to say these were scientifically stiffened.

The primitive oiling system at first employed was hastily changed to a gear type oil pump and dry sump. The splined vertical shaft was replaced by one with Oldham couplings, and the gears taking the drive from crankshaft to drive shaft to camshaft were changed to incorporate a 'hunting tooth' to reduce stress—which incidentally made the drive considerably quieter. The original small front brake was enlarged and the frame stiffened before production began.

Valve spring trouble plagued early production Model K's, but was overcome by patient development work. A heavier clutch and sturdier gearbox soon followed, and the early use of Druid forks gave way to Druid-Webbs, then to a pure Webb design. Such willingness to improve paid dividends.


*Transmission flaws rather than engine faults marred the postwar sohc Sunbeam twins*

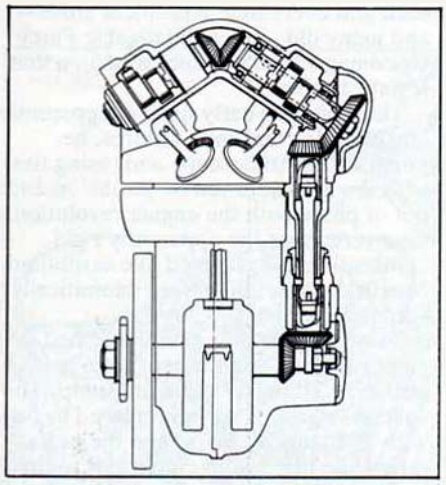


*The Turner Special itself. Amac carburettor, massive brakes and an open exhaust suggest that it was built for racing*

A year after their disastrous TT debut of 1925, Velocette achieved the immortal distinction of being the first manufacturer to win an Isle of man race with an overhead camshaft engine. Alec Bennett was first home in the 1926 Junior race at 66.7mph, with a fastest lap of 68.75mph. Gus Kuhn was sixth and Len Povey ninth, enabling Velocette to win the team prize. The following year Norton won the Senior race with their new Walter Moore-designed ohc engine, the rider once again being Alec Bennett.

Between 1926 and 1939 Velocette won five TTs and Norton fifteen, using ohc engines. Nevertheless in the years between 1926, when Norton won the Senior race, and 1936, when new Imperial won the Lightweight, there were twelve victories by pushrod engines. After that the ohc engine really did reign supreme in racing—but by no means so on the road.

The Motor Cycle's 'prophesy' of 1925 had been wide of the mark, Throughout the late thirties and the early post-war years the ohc layout actually declined in popularity. With the 'cammy' Velocette in 1949, the only sporting model on the road was Norton's International in 350 and 500cc versions. Sunbeam's ohc S7 and S8 twins could never be called sporting by any stretch of the imagination, nor were they ever really popular. By the end of the fifties both the International and the Sunbeams were dead, and no other British roadster ohc motorcycles were made during the classic years.



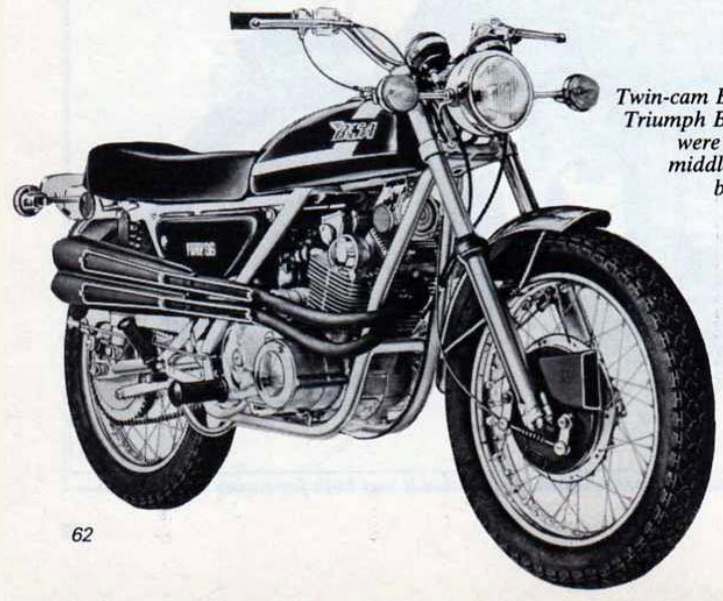
*Designers Doug Hele and Bert Hopwood hoped that their ingenious layout for a radial four-valve single, using shaft and bevel drive and a pair of camshafts set in a wide-angle V, would be used for racing and roadsters in the fifties. But BSA cancelled the MC1 project*

*What the British should have made? This 350cc twin with a four-bearing crank and central gear drive to twin overhead camshafts was produced by Italy's Azzariti factory in 1934*

It is easy to seize upon the cost of making ohc engines as the reason for their demise, and there is some truth in this when the task of precision cutting pinions, bevel gears and vertical shaft couplings is involved. Not only is such precision machining expensive. A badly made or assembled ohc engine is worse than useless.

What is something of a puzzle is why chain driven ohc designs really caught on either with manufacturers or customers. Ariel soon dropped the ohc valve operation of the square four in favour of pushrods. Only AJS and briefly Levis persisted with a chain driven model for any period of time with poor sales.

When you consider that for many years car engines were made in considerable numbers with chain driven ohc valve gear, it's rejection by motorcyclists at that critical time is hard to understand. You may draw an opinion that in the early thirties tensioned chain drive was considered cheap and nasty in comparison to the three most successful sports bikes at that time—Norton International 500cc, K-series Velocette in 350cc, and the 250cc Excelsior Manxman—all employed a vertical shaft and bevels. Cost seems to play an important part to most people at that time far more than it did in post war times. The small but genuine market for cammy machines was easily supplied by the three manufacturers, all three has racing pedigree, and in slightly detuned road form had wonderful reliability and exhilarating



*Twin-cam BSA Fury and its Triumph Bandit stablemate were intended to rival middleweight Hondas, but never reached production*

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**Makers of catalogue British ohc roadsters 1924-70**

| | |
|---|---|
| AJS | Matchless |
| Ariel | Morton-Adam |
| Calthorpe | New Scale |
| Chater-Lea | Norton |
| Dunelt | OEC |
| Excelsior | OK-Supreme |
| Humber | Sunbeam |
| Levis | Velocette |

Performance. They deserved their commercial success.
Alas, after the war Excelsior chose to make nothing but cheap and cheerful two strokes for the mass market, and Velocette had their eyes turned towards the huge sales of the ultra-civilised LE. Only Norton's International held the ohc principle mainly for the export markets.
Then it was America that discovered British Bikes in general and the vertical twin in particular. But American distances and riding soon called for more power. Easy enough said the factories—bore out that 500cc model to 600cc, then to 650cc. Eventually we had the spectacle of 500's appearing as 750's, all without a basic redesign. The appeal of using sophisticated ohc valve gear lost any attraction while the easy option of increasing capacity and compression ratio. Some engineers were appalled as they watched before their very eyes the unfolding of the process that turned smooth reliable 500's of the early 1950's into dreadful, self destructing, vibrating models of a dozen or so years later.
Ironically, at almost the very same time that this demise occurred, ohc models from Japan made a tentative appearance onto the British market, and judging past performance should have been a resounding flop.

*It's a road-going 490cc International of 1936. There was a display of machines from the Richards and Wallington collection*

Excelsior (UK) G12 Manxman 1937

Velocette Model K 1925

# New Years Day Meet and Run 2011

Machines began arriving at around 10.30am to form a line up boasting a collection of motorcycles from a ’28 Scott through to a ‘2000’ Triumph, the latter ridden by Gary Langman a welcome visitor from the Triumph Owners Club, whilst Paul Raybould’s beautifully turned out Honda CB160 was a clear reminder, if we needed it, as to why that marque gained favour within the motorcycle market at the time. Though not riding the route, we were pleased to see and catch up with Alan and Jonathan Jinks, Bob and Mrs Spruce and also Ray Salisbury who came out on his lovely twin port BSA. Others joined us for the initial gathering which gave the event quite a ‘social’ opening.

A ‘just after 11.00’ start from the Seven Stars at Seisdon saw some sixteen riders, lead off by Josie and John on their Honda CT90s on a route which took us into Pattingham and then a ‘gentle tootle’ through the lanes of Patshull back to the Rabbit Run. A quick blast in a Dudley direction took us to Ludstone where the field of riders, which included Martin’s ’44 ex WD Triumph and Roger’s trusty ’38 MSS Velo, dived into the lanes around Claverley and thence towards Wombourne, through Trysull and ‘home’ to the pub.

Back in the pub, we had chance to catch up with Bob and Lizzy whilst others listened to Dave Williams’ account of crank balancing and saw his pictures of the bench set-up used, so gaining an understanding of the term ‘percentage balance’. After talk of rebuilds, restoration progress (and maybe tales of daring-do! ) during which coffee and hot chocolate were consumed, and in some cases - lunch, members began to disperse;

Pat and Brian Empsall probably having the furthest to travel back to Litchfield on their ’61 Triumph Speed Twin.

Our thanks go to Paul Harris for sorting out the route, Fiona and the Seven Stars for their hospitality and all who came along for the pleasure of riding or just to look-in and catch up with old mates.

*Martyn Round*

# PROVISIONAL FORTHCOMING ATTRACTIONS FOR 2011

| | CLUB NIGHTS |
|---|---|
| JANUARY | A.G.M. And presentation of annual awards |
| FEBRUARY | Scott Motorcycles. Lewis Onions |
| MARCH | Quiz night |
| APRIL | Early Cycles. Douglas Pinkerton |
| MAY | TBA |
| JUNE | No Meeting. Ride a Bike Night |
| JULY | Fish and Chip Supper Night |
| AUGUST | TBA |
| SEPTEMBER | Birmingham's Pearl button Industry. George Hook |
| OCTOBER | Cyclemotors. Phillpa Wheeler |
| NOVEMBER | Bring and Buy |
| DECEMBER | No Meeting |

| DATE | RUN | ORGANISER | Tel No |
|---|---|---|---|
| APRIL 10th | Anchor Garage Run | John Aston | 01543-452695 |
| MAY 15th | Girder Fork Run | Martyn Round | 0121-550-1547 |
| JUNE 8th | Mid Week Run 1 | Bill Danks | 01562-67103 |
| JUNE 12th | Josie's Jaunt | Josie Stanley | 01543-452695 |
| JUNE 26th | Severn Valley Run | Bill Danks | 01562-67103 |
| JULY 3rd | Trent Valley Run | Brian Empsall | 01543-264968 |
| JULY 6th | Mid Week Run 2 | Roger Greening | 01562-730464 |
| JULY 24th | Long Mynd Run | Colin Lloyd | 01384-371835 |
| JULY 31st | Breakfast Run | Rob Pell | 0121-624-7674 |
| AUGUST 3rd | Mid Week Run 3 | Ian Harris | 01952-299118 |
| AUGUST 14th | Picnic & Concours Run | Martyn Round | 0121-550-1547 |
| SEPT 4th | Flight of Fantasy | Trevor Bull | 01905-778917 |
| SEPT 18th | Clun Run | Ian Harris | 01952-299118 |
| OCTOBER 2nd | Levis Cup Road Trial | Paul Hutton | 01902-713147 |
| OCTOBER 9th | Autumn Run | David Spencer | 01746-762957 |
| NOVEMBER 6th | Winter Wander | Paul Harris / Bill Danks | 01902-842732 / 01562-67103 |

Contributions from Martyn Round