July 2010

# North Birmingham News

## NEWSLETTER

### Anchor Garage Run

With the weather set fair we expected a good turnout and we were not disappointed; 20 plus old hands and three new members started the third running of the Anchor Garage Run.

We had a new route which did seem to catch a few people out right from the start. The run to the first stop, the café on Cannock Chase, was well supported with much tea and bacon sarnies consumed. There was then a gentle amble through the South Staffordshire lanes to a new venue for us, the ice cream farm at Gnosall where roast beef sarnies and ice creams were the order of the day.

The final trip to the finish at the Bradford Arms was only hindered by tractor, trailer, and dog, but the farmer driving did move over to let us through

Thanks to all who came, and as usual a big thank you to Pete Mellor for his hospitality and the use of Anchor Garage, and also above and beyond the call of duty were Bob and Lizzies' effort to get new member Malcolm Sanders home before they rejoined us for lunch.

Norman's Return!

Over the Winter we had spent time re-fettling the infamous "Norman", which as most club members know is a much loved 1929 Ariel. The major problem being he dumped the contents of his sump down the exhaust. Once again thanks to Maurice Trupp for his patience and support and Bill Harley for his machining skills. Norman not only did a practise run around the route but also completed the route on the day, and we also had many comments at the start from members saying how nice it was to see him out again.

John


# Leading The Way in the 1950's

WHEN BMW won the Senior TT in 1939 it shook the British to the marrow. For only the second time since 1911, the race had been won on a foreign machine. The lightweight supercharged ohc flat twin seemed to point the way forward, and its attributes were dissected in boardrooms and bars.

One feature was already familiar, for this had been the second consecutive year in which a machine equipped with a telescopic rather than a girder front fork had won the premier race on the Isle of Man. Harold Daniell's 1938 works Norton had featured a telescopic fork strikingly similar to that employed by BMW on its production models.

A few insiders knew that appearances were highly deceptive. The Norton fork was not hydraulically damped like BMW's. Only after they had studied BMWs captured during the Second World War did British manufacturers – led by the London-based Associated Motor Cycles – arrive at anything approaching the sophistication of the German design. Even then some companies lagged behind the best practice for years.

Postwar fashion in front suspension saw telescopics become the accepted norm. Yet in 1953 BMW – arch-priests of the telescopic fork – unveiled a works racer whose long leading link front fork design had recently been patented by an English engineer.

Soon Munich was to confirm its belief in the superiority of the Earles fork. Twenty years after its adoption of telescopics on production machines in 1935, BMW began to standardise the new design throughout its range. It was to be 1969 before the launch of the /5 series BMWs saw a general return to telescopic forks on the flat twins. The classic BMW's front end therefore owes as much to Birmingham as it does Bavaria.

In some ways it's easy to see why – with the benefit of 20/20 hindsight – someone should re-invent the long leading link front fork in the early 1950s. Just as plunger rear suspension had led designers towards telescopics in the late thirties, so it seemed logical to adopt a Velocette-type pivoted fork controlled by twin spring-damper units at the front as well as the rear of the frame in the fifties.

The man who came up with the notion – and applied to patent it in January 1951 – was Ernie Earles. A tough little Brummie with a passion for motorcycle sport, Earles acquired an amazing range of metalworking skills at the Austin motor company. He had joined the car makers at the age of 15, and in wartime ran the sheet-metal and presswork shops in Austin's engine division.

Since Austin also made armaments and aircraft during the war, Earles was introduced to the latest in light-alloy technology. This sparked an enthusiasm for aluminium alloys that was to lead to such amazing racing specials as the alloy-framed BSA twin – now owned by Sammy Miller – ridden by Charlie Salt in the '52 Senior TT and recalled in *Classic Bike*, June 1985.

In 1942 Earles had begun Elms Metals, a two-man metalworking company

In the early '50s it looked as if a new British design might oust the recently adopted telescopic fork

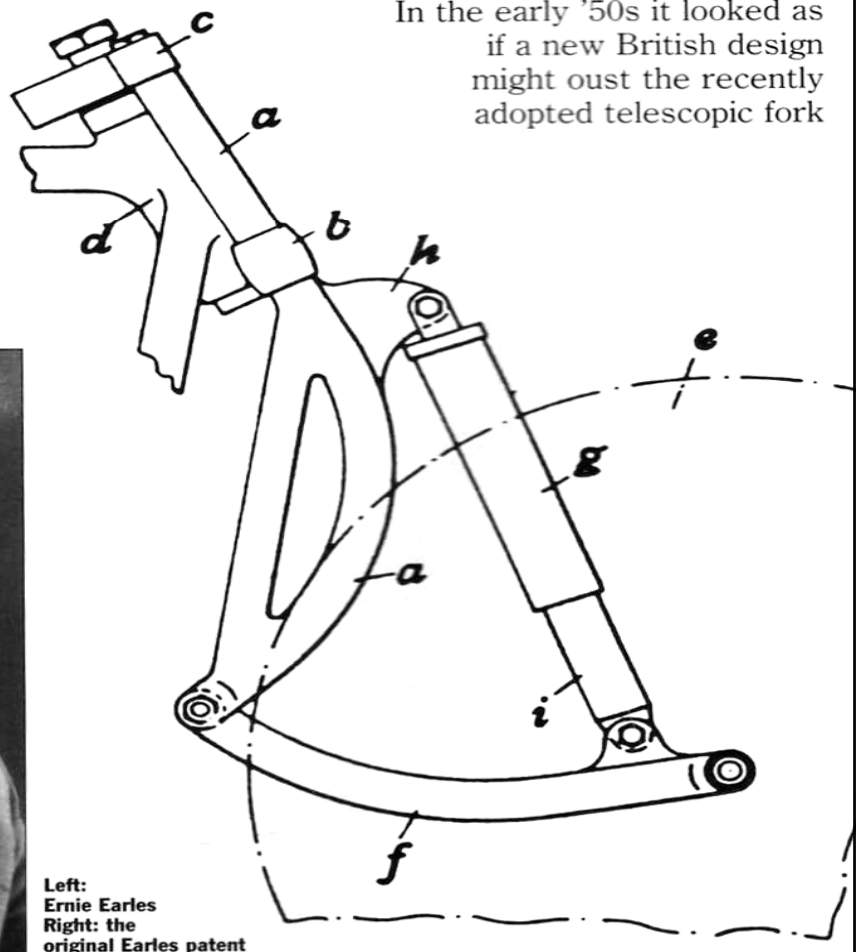
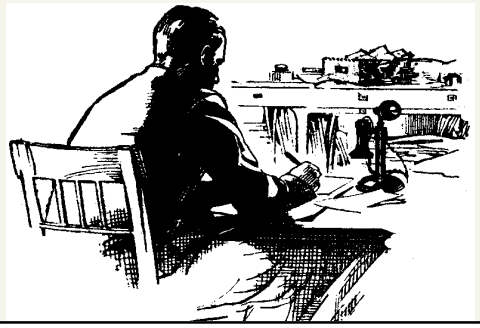



Fig.1

**Left: Ernie Earles**
**Right: the original Earles patent**
**Far right: Les Graham on the Earles-fork MV in '52**



based in a shed near his Birmingham home and to which he devoted his spare time. By 1948 the operation was large enough for this human dynamo to strike out on his own, and he quit Austin.

Earles's patent application merely claimed that he had succeeded in bypassing the telescopic fork's tendency to alter the wheelbase of a motorcycle on the move. Under braking and acceleration and over bumpy going this alternately shortens and lengthens, which hardly increases high-speed stability. His design would maintain a virtually constant wheelbase throughout the range of suspension movement and wheel travel.

The leading link fork has other basic advantages over telescopics. Better torsional and lateral stiffness commend it to sidecar drivers and solo racers alike. Its reduction in unsprung weight is another bonus.

But here we must make a distinction between 'long' and 'short' leading link designs. Earles's design is of the long type, with the links joined together by a tube running across behind the front wheel. This imparts lateral rigidity and its existence permits the amount of trail to be varied – more for solo use, less with a sidecar – in a matter of minutes if alternative pivot locations are provided at the lower ends of the main fork members.

This type of adjustment isn't possible with short links because they aren't normally connected in the same way. So why did Moto Guzzi and NSU prefer short leading link designs for road racing while both MV and BMW campaigned Earles-type forks?

The answer to that question concerns the so-called pendulum effect, which afflicts the long leading link fork to a considerable degree.

Think of a motorcycle's steering head as the pivot of a pendulum. Anything connected to the steering head that lies behind the steering axis will act as a pendulum. And the farther away from the pivot that you locate fork parts – such as tubing behind the front wheel – the greater the pendulum effect.

An engineer would merely remind you that the greater the radius of gyration for a given mass, the greater the moment of inertia of that mass.

Now if we examine an Earles-type fork we can immediately spot lots of weight located aft of the steering axis. This weight has to be steered, and an engineer would simply describe the design as possessing high steering inertia.

On the road or track this means that the steering may well feel heavy at low speeds. But the machine will also display a tendency to weave easily, the pendulum effect sustaining this unstable behaviour. Short leading link designs concentrate their weight more closely around the steering axis.

The first signs that the Earles fork was to find favour internationally came in 1952. Les Graham recruited Ernie Earles in his efforts to make the MV Agustas handle, and soon the 500cc fours were fitted with Earles forks.

But 1953 brought avid readers of the British motorcycling press even more remarkable news. Early in February Ariel development engineer Clive Bennett was spotted riding a very unusual VCH single at the Colmore Cup trial. It was

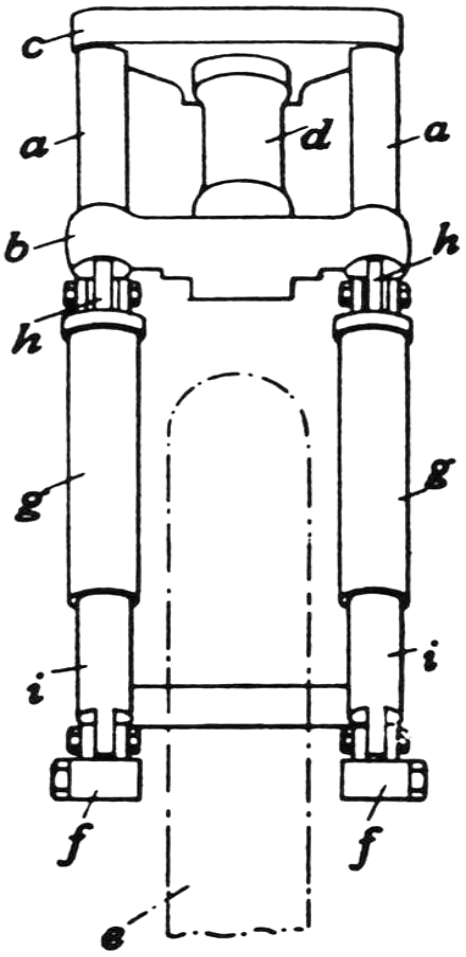
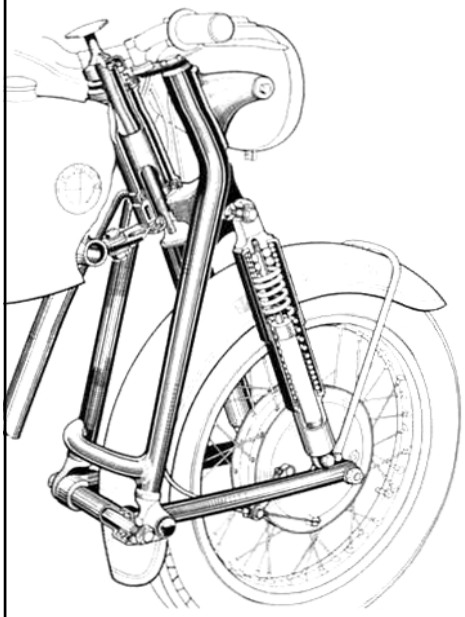



Fig.2

# LEADING THE WAY



equipped with an Earles fork in which the pivot could be moved fore and aft between three locations to alter the amount of trail. Two weeks later, a Mk II Square Four was photographed at the Victory trial complete with a similar fork, experimental twin-leading-shoe front brake and a headlamp nacelle.

These inspired leaks were followed up in early April by press impressions of both a 997cc Ariel four and an Earles-fork 498cc parallel twin. Three new models were to be launched – a 500cc VHA Mk II Hunt Marshal single, a 500cc KHA Mk II Hunt Master twin and a 1000cc 4G Mk III Royal Hunter – with production commencing immediately. Prices released a week later revealed that Ariel was to add a premium of about £6.40 to Earles-fork models.

The original Earles design was little altered, although the line of the main fork stanchions had been reversed to blend in with the curve of the front mudguard. Trail on Ariel's telescopic fork was 3¼in, a compromise between solo and sidecar equirements. The 62° head angle of the frame had not been altered, but the trio of pivot points set at quarter-inch intervals on the Earles fork permitted a variation in trail of from 4in to 2½in.

As usual, the press reports were fulsome in their praise. Criticism was limited to the heavy steering at low speed and the manner in which the front end sometimes *rose* under braking.

The reason for this is simply explained, for the brake torque reaction was resisted by the right-hand link, to which the brake plate was secured. If the upward reaction was greater than the downward force supplied by weight transfer under braking – as it might be at low speed – then the front end rose. This effect could have been cured by fitting a floating brake plate and separate torque arm.

On the surface, everything looked right for Ariel's new models. The sidecar market was still of considerable importance; by 1955 there would be no less than 160,000 outfits on Britain's roads. It was easy to alter trail and as simple to detach the Girling suspension units to fit stronger springs. In 1952 Armstrong, Woodhead-Monroe and Girling had all announced new shock absorber designs for motorcycles based on their automotive experience. Ariel might need to experiment with damping and spring rates, but other firms would be supplying the hardware.

Yet despite press reports in April that 'a limited number of machines are available for immediate delivery', this was far from being the case. While the press had been primed, brochures printed and prices struck, the development programme was in disarray. Production had not even been costed in detail.

Clive Bennett recalls a series of problems with the new fork. Using the standard 7in sls drum, braking proved poorer using the Earles fork. Worse still, it was discovered that the very high loads transmitted to the steering head by the new fork were resulting in unacceptably rapid wear in the cup-and-cone bearings. 'The tracks were being indented,' says Bennett. To cap it all, a high-speed weave could not be eradicated.

Bennett accepted the tight deadline for full scale production as part of his lot. 'That was the way you did things in those days,' he recalls. 'As a development engineer you had to meet the deadline. Ariel wanted something different, but it wasn't a fork for all seasons.'

Where the Earles design really scored, says Bennett, was in trials or scrambles where you could run downhill on greasy going at full tilt and still steer your way out of trouble at the bottom. But once a series of bumps had upset it, the pendulum effect would keep that tank-slapper going from lock to lock.

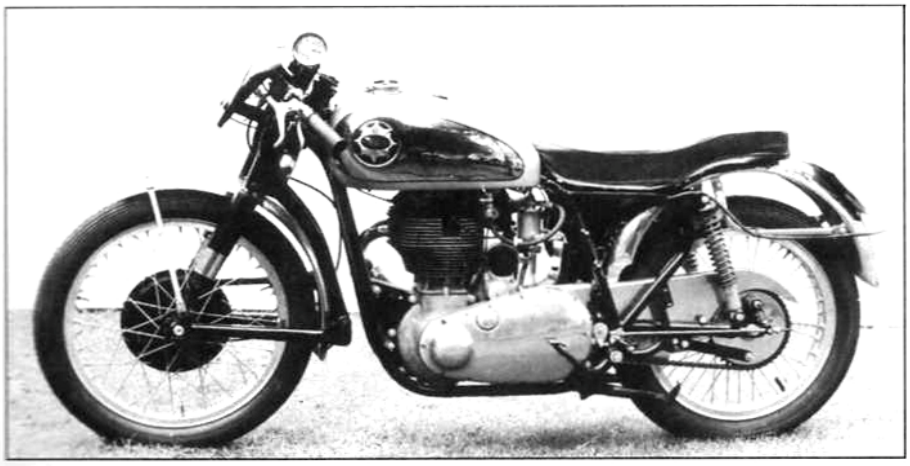
Outside events now sealed the fate of Ariel's dalliance with the Earles fork. Late in April, general manager Ted Crabtree died as the result of a car accident. Ken Whistance, brought in to replace him from Ariel's parent company BSA, is said to have been less enthusiastic about the project. In June Les Graham died after crashing at the foot of Bray Hill in the Senior TT. Perhaps unfairly, rumour associated his death with the Earles fork employed by MV Agusta.

Nothing more was heard of the new Ariels and there never was a Mk III Square Four with the unlikely name of The Royal Hunter. The Leaders of

**Above left: good detail design from BMW included tapered roller bearings at the pivot**

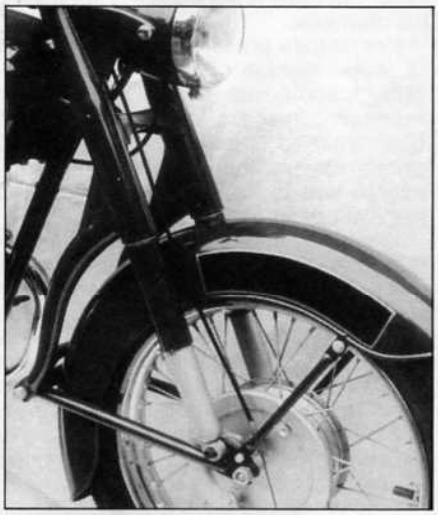
**Left: prototype Ariel KHA Mk II Hunt Master twin on test. Both ugly and unstable**

**Below: this 1954 BSA Gold Star was *one of many British* and foreign machines Reynolds Tube tried out with the Earles fork**



# LEADING THE WAY

**Many scooters used the Earles fork. This is the Dayton Albatross**



**Panther twin fork from Reynolds shows how neatly the suspension units and stanchions could be styled as one**


**Reynolds-Earles design on the Douglas Dragonfly features separate torque arm**

**Below: DMW, with its Metal Profiles-Earles fork, stuck closely to the original**

Design had set off in another direction – towards a short trailing link front fork on the 1958 Leader.

Meanwhile, Ernie Earles had passed over the manufacturing rights in his design to the Reynolds Tube company, which had the facilities to make the forks in quantity. Ken Sprayson, formerly with Reynolds and now engaged on classic frame production with BSA, recalls that the technical director Tony Reynolds and Earles were good friends. 'It was probably agreed over a pint,' he says. Reynolds then passed on the rights to Earles fork production of machines of under 250cc to Metal Profiles Ltd in Dudley.

It's interesting to see how the original Earles design was now altered and improved upon by the various concerns – BMW, Reynolds and Metal Profiles – associated with its manufacture. The most obvious change was the almost universal adoption of straight rather than curved tubing for the links, while the stanchions were often straightened. The curved bracing tubes that contributed so little to their stiffness were generally deleted. At the same time, an extra bracing tube between the stanchions and above or below the pivot was added.

In fairness to Earles himself it must be said that he had already made many of these changes himself. You have only to examine drawings of the front fork he designed for a special racing sidecar outfit for Bill Boddice early in 1954 to appreciate that his mind was open to both major and detail improvements.

BMW employed tapered roller bearings at the fork pivot, while other makers made do with Metalastik steel-sleeved rubber bushes. Reynolds experimented with many different bearings – such as Oilite and Railco bushes – but normally settled on these as well. It's also interesting to note that the largest British production machine fitted with Reynolds-Earles forks, the 350cc Douglas Dragonfly flat twin, features a separate brake torque arm.

After the Ariel debacle British opinion swung round to feeling that leading link forks were only suitable for lightweight machines. DMW fitted Earles-type forks from their associated company, Metal Profiles. Reynolds equipped the lightweight Panthers but could not convince Phelon & Moore that the 600cc sloper would benefit from a change, although a Model 100 was fitted with a Reynolds-Earles fork as an experiment.

Reynolds' involvement with the Earles design concentrated the company's attention upon leading link front suspension in general. So it was perhaps hardly surprising that Reynolds should develop its own short leading link fork in 1956. Yet this superb design only went into series production in a batch of 50 for the short-lived Royal Enfield GP5 racer.

Meanwhile, telescopic fork design advanced. Stanchions and sliders were enlarged; seals improved in efficiency; two-way damping became the norm. Styling, rather than engineering, won the day □

Fourteen riders met outside 'Clarke's Garage' at Bluntingdon and amongst them were the pre-war machines of Maurice Trupp [Scott], Martin Griffiths [Triumph] and Mark Homer [Sunbeam and 'Fag – Packet' Sidecar].

Our usual route had been changed a little with the George Hotel coffee stop moved to the Eagle and Serpent – Kinlet where we received a warm welcome from the Landlord who provided tea, coffee and biscuits on the bar and then enthused over the sight and sound of the machinery outside. We lost Maurice Withers at this point – he succumbed to a roast chicken lunch and another coffee.

Our route, a reasonably short one of about 50 miles, used mainly 'B' roads to Kinlet but then launched into the 'yellow' roads towards Bagginswood and the hamlet of Prescott – were we crossed the old railway – did anyone spot it? From there we climbed on through Farlow village and up over Wheathill, a bit of a climb but thankfully Paul Harris's Autocycle proved 'man enough' for the job.

We have previously lunched at the Three Horseshoes on the main road but renovation work in the kitchen is as yet unfinished so a change of route took us through Ditton Priors and then via Middleton priors, and more hill-work to Bridgnorth and Tony's Diner.

All in all the run went well on what was probably the hottest Sunday so far, a day of open collars, lighter clothing, molten tar and late May blossom. Many thanks to all who rode.

Safe riding

Martyn.

# PROVISIONAL FORTHCOMING ATTRACTIONS FOR 2010

| | CLUB NIGHTS |
|---|---|
| JULY 28TH | Fish and Chip Supper |
| AUGUST 25TH | Arrive on Your Bike Night |
| SEPTEMBER 29TH | Social evening |
| OCTOBER 27TH | Book Swap |
| NOVEMBER 24TH | Talk by Phillipa Wheeler from the NACC |
| DECEMBER | No Meeting |

| DATE | RUN | ORGANISER | Tel No |
|---|---|---|---|
| JUNE 27TH | Severn Valley Run | Bill Danks | 01562-67103 |
| JUNE 30TH | Ride A Bike Night | Paul Harris | 01902-842732 |
| JULY 4TH | Trent Valley Run | Brian Empsall | 01543-264968 |
| JULY 7TH | Mid Week Run | Roger Greening | 01562-730464 |
| JULY 25TH | Long Mynd Run | Colin Lloyd | 01384-371835 |
| AUGUST 1ST | Breakfast Run | Rob Pell | 0121-624-7674 |
| AUGUST 4TH | Mid Week Run | Ian Harris | 01952-299118 |
| AUGUST 15TH | Anniversary / Concours | Peter Ashen | 01562-882854 |
| SEPTEMBER 5TH | Flight of Fantasy Run | Trevor Bull | 01905-778917 |
| SEPTEMBER 19TH | Roger's Run | Roger Greening | 01562-730464 |
| OCTOBER 3RD | Levis Cup Road Trial | Paul Harris | 01902-842732 |
| OCTOBER 10TH | Autumn Run | Andy Briggs | 0121-544-5938 |
| NOVEMBER 7TH | Winter Wander | Paul Harris | 01902-842732 |