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TWO WHEELS

JUNE, 1979

STEPTHROUGHS:
A Shootout
To Find What's
Sacrificed For
Economy

**THE '79 STYLE
DIRT IRONS**

- MONTESA 360
- YAMAHA IT400F
- HONDA'S
XL/XR500s

Plus:
ANA BRANCH:
**OUR WILDEST
SOCIAL
TRAIL RIDE**



two wheels

Volume 20, No. 4, JUNE 1979

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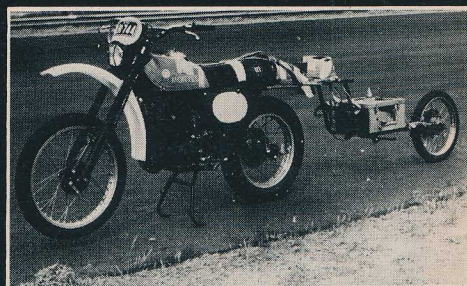
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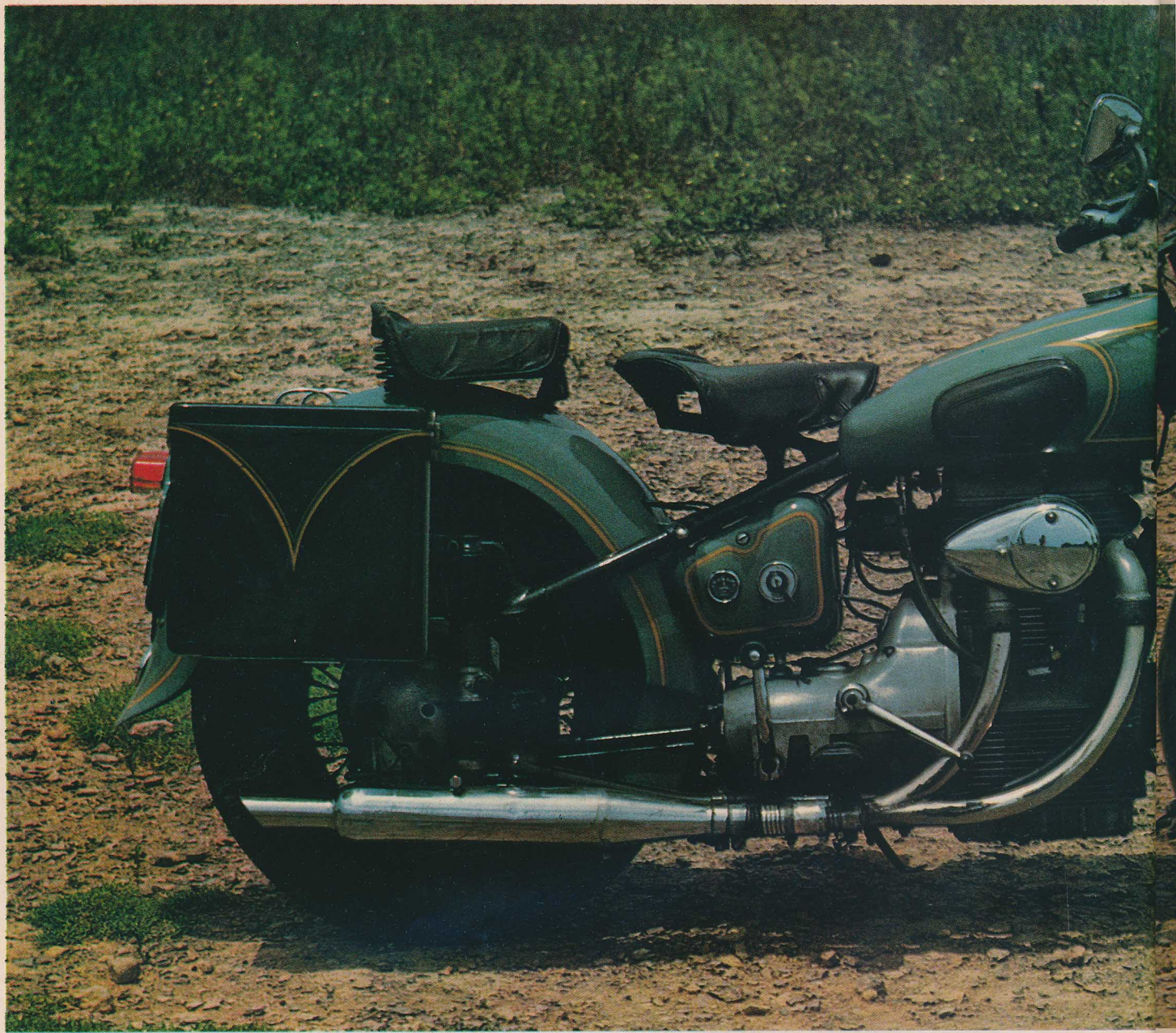
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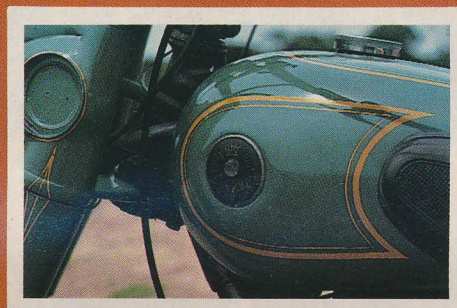
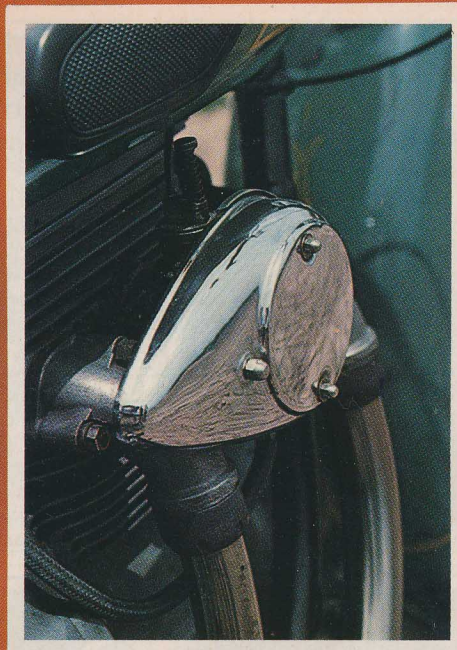
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SUNBEAM Short-Lived Luxury!

In 1948 BSA proudly advertised its distantly-related Gentleman's Touring Machine as "the bike which will be modern 10 years hence". But when 10 years had elapsed the Sunbeam's innovative lines and fascinating engine had been out of production for more than five years. It was expensive, distinctly overweight and catered for a diminishing market to which was offered less obscure machinery of significantly better performance. And what of the bike — the ultimate luxury machine? LESTER MORRIS stepped aboard an example, from the marque's last year.





ONE OF THE most unusual motorcycles ever constructed by the British, and certainly the most unusual in the immediate post-war period, was the Sunbeam S7 "Luxury Tourer" and its sportier S8 derivative.

It appeared in the very late '40s bearing the advertising slogan "The Machine Which Will Be Modern 10 Years Hence", but in 10 years it was out of production. If ever a way-out engine appeared with a thunder and a splash then disappeared with barely a whimper it was the S-series Sunbeam. In terms of technical innovation alone it may have deserved a better fate, but motorcycling doesn't work that way.

The Sunbeam featured shaft-drive which was certainly rare on a British motorcycle (though the pretty little sidevalve LE Velocette featured this type

of drive unit) but by far the most unusual aspect of the machine was the technically interesting powerplant.

It was an all-alloy 500 cm³ vertical twin with chain-driven single overhead camshaft (which was rarer still on a road-going British motorcycle). This excited much comment at the time, but was still not the most unusual of its several unusual design features. The oddest feature of the machine was the manner in which the engine was constructed, and its layout in the frame: the Sunbeam engine was essentially a two-cylinder car engine and its designer borrowed very heavily on current automotive practices for his basic design. The cylinders were in-line, with the rear pot directly behind the one in front, and both in a distinctly car-type single casting for the engine block.

Barrels and crankcase were cast in one piece, with the cylinder head bolting to the top and the wet-sump oil-pan bolting to the lower face of the large alloy casting. Completely assembled, the engine looked remarkably like some very short car power-plant.

Inside detail

Nor did car similarity end there. The engine block was mounted in the frame on a set of diagonal, rubber-sprung engine mounts, with a separate spring-loaded mount atop the cylinder head. To carry the automotive theme still further, the inlet and exhaust ports were on the same side of the head, while a unique, car-type squish combustion chamber was incorporated.

The single inlet port on the side of the head was siamesed to open into separate

"Single bumps are merely floated over but corrugations will cause the machine to leap about all over the place. If it is not absolutely square-on to the direction of travel the whole bike can pivot around the steering head when the rear wheel clears the ground."

ports which fed the two adjacent inlet valves, and all four valves were carried on the right side of the thickly-finned head casting. The chain-driven overhead camshaft sat alongside the valves rather than directly above them, with inverted V straight line rockers controlling the valves, which, although parallel, are angled well into the centre of the squish combustion chamber.

In the design the valve heads are, in fact, *directly below* the camshaft, though the valve stem contact area which is operated by the rocker is actually *above* the camshaft!

Driven by its own set of gears at the rear of the engine in a compartment directly

ahead of the clutch plate, the camchain has a semi-automatic, spring-loaded spring-steel slipper tensioner on its thrust face to control backlash. The clutch, which keys directly to the tapered mainshaft, is a single, dry car-type component. It is driven at engine speed, of course, with the friction plate keyed to the gearbox mainshaft.

Shaft final drive is taken from an offset shaft which emerges from the rear of the gearbox, the offset allowing the exposed worm-and-worm wheel diff in the rear hub. A normal car-type Hardie-Spicer universal joint is at the rear hub, with a rubber/metal univer-

sal joint at the front. The centres are precisely 292 mm (11.5 in) between joints.

Modern enthusiasts who glance casually at the bore × stroke dimensions of the engine would naturally assume a potent engine, particularly in view of the ohc design, but it was never intended to be particularly potent — in fact its main claim to fame was to be its longevity and its comparative ease of maintenance.

Bore and stroke are 70 × 63.5 mm, for an engine capacity of only 487 cm³, but the very low compression ratio and basic "cooking" tune produced a handy 26 bhp at a casual 5800 rpm. A single-throw crank of massive proportions thrust both pistons up and down together, the squish band limiting compression ratios to just 6.8:1 (or 7.5:1 in "sports" trim).

The crank was cast-iron in Meehanite, a very fine-grained high quality material (none of your old melted-down gas rings here, mate!) with the short, thick connecting rods bolted on around white-metal slippers.

The crankshaft, also short and chunky, was supported at the front on a special deep-groove ball bearing designed to take up the thrust when the clutch was disengaged while the power take-off at the rear was carried in a very large white-metal plain bearing in a detachable cast-iron "spider". This bearing case was detachable to allow easy removal of the crankshaft in major overhauls.

A pancake-type generator bolted to the front extension of the crank where it protruded from the castings and the overall "mini-car design" of the engine was completed by a deep oil pan under the crankshaft for the wet-sump oiling system.

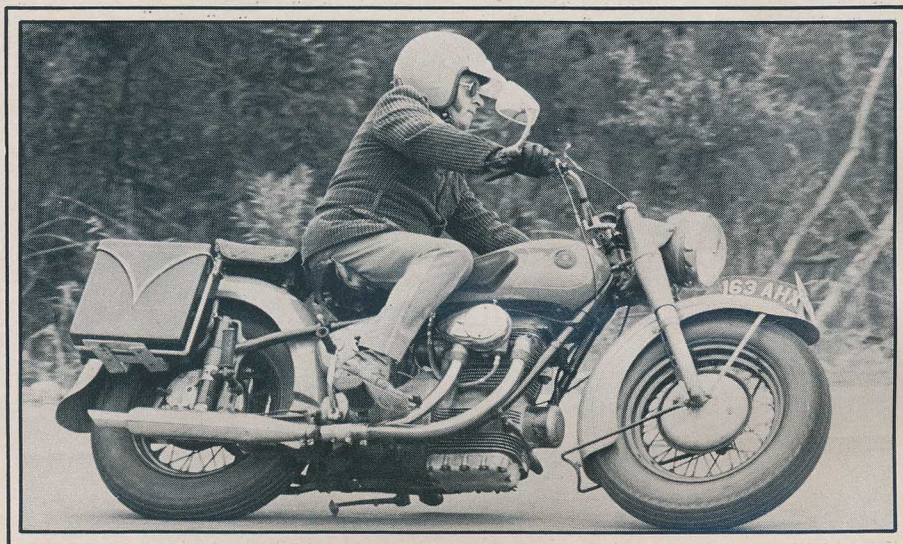
The small two-cylinder distributor sat at the rear of the cylinder head, driven at half-engine speed by the overhead camshaft.

Luxury with wiggles

From every point of view the Sunbeam ohc engine was, and remains, an odd engine design for a motorcycle, but it was intended to be very much the last word in luxury machines, with a standard of smoothness and comfort without precedent. The frame featured the typically undamped plunger rear suspension, which of course limited the rear wheel movement, but the single saddle was hung from a pivot point behind the fuel tank by its nose, with its own cantilever movement allowing an extra measure of comfort.

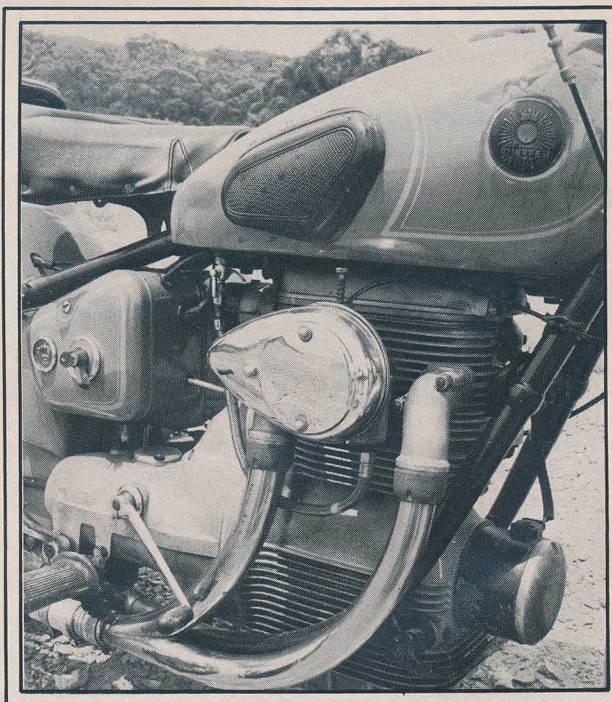
Arguably, the spring-base single saddle was abandoned at some compromise to the motorcyclist's comfort for the dualseats which followed were not sprung. Very few dualseats of any make were fitted with springs, though the Denfeld or Meier examples fitted to BMW and early Zundapp motorcycles were very notable exceptions. Clearly, a softly-padded seat which is embracing but will in itself move through some 60 mm of "suspension" adds immeasurably to the comfort of a machine ... no matter how well sprung the bike itself may be.

And if the bike is *plunger* sprung it's damn near a *life-saver*! A solo-seated Sunbeam's pillion passenger could only be carried on one of those bullet-proof rubber pads bolted to the rear guard, and this allowed even the most hardy to make rude



Above: A modest angle of lean, but you can't get it over any further. The prop-stand is touching while there's still plenty of daylight under the footrest.

Right: The engine room. Twin exhaust pipes frame the single carburettor and its streamlined air filter, while the distributor hangs out where the carburettor normally would be. Deep oilpan produces a very low-slung mass, above which the pancake generator protrudes between rubber engine mounts.



remarks about the efficiency or otherwise of contemporary plunger rear suspension, whether Sunbeam or not.

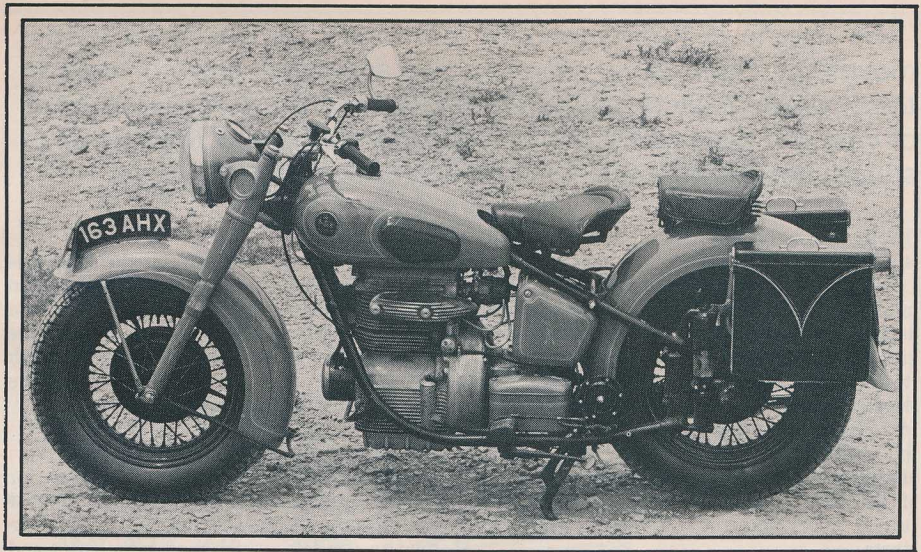
The Sunbeam made a great compromise to rider comfort by the adoption of a pair of fat 450 × 16 balloon tyres fitted to wide, car-type wheel rims, and surmounted them with huge, deeply-valanced mudguards which had no peer for sheer bulk — even the Harley-Davidson fenders shrank by comparison.

The whole machine shrieked of luxury in its long low-slung silhouette and distinctly overweight appearance. Sunbeam's S7 was very much the Gentleman's Touring Machine, with an easy, smooth gait and a measure of comfort which was not always in evidence nearly 30 years ago.

Sunbeams were never very much in evidence in their short lifespan of 1948-1953, and they are even fewer today. But there are some examples of the marque alive and well, and all are in pristine condition.

The subject of this report is an excellent 1953 model, still finished in the original "mist green" which alternated with trad black as the standard color scheme, and it is as close to bog standard as could reasonably be expected after 26 years. The bike has been fitted with a set of small fibreglass saddlebags, with some quite out-of-place yellow pin-striping to relieve the basic green paint job and it now sports even fatter 500 × 16 tyres, but is otherwise spot-on.

It should be, for the speedo shows 13,000



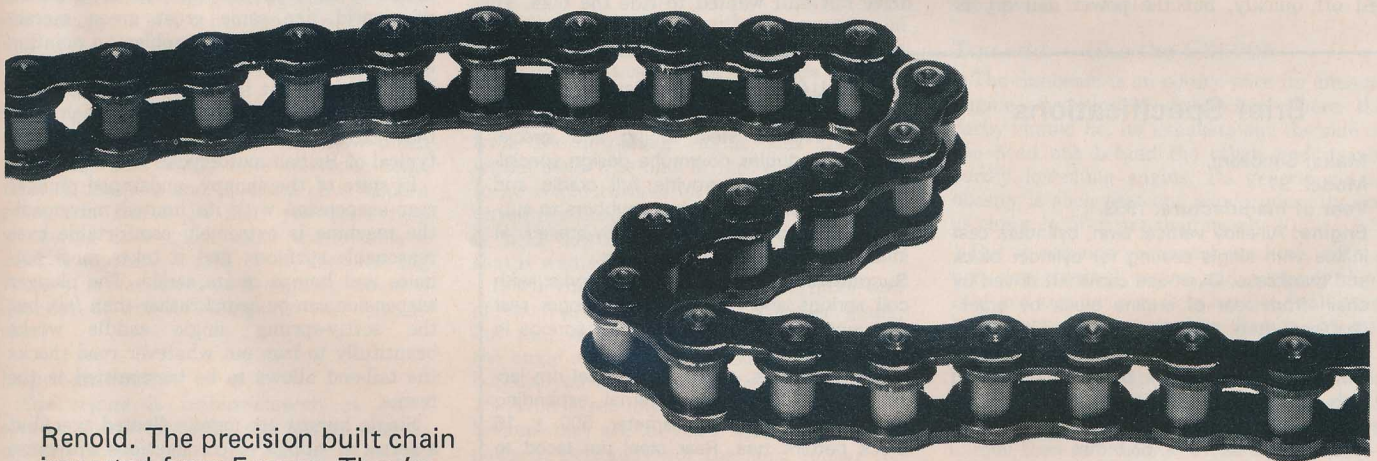
View from the "ugly" side. The saddle is a cantilever spring device, sprung pillion seat is non-standard. Plunger rear suspension had rear axle through pairs of springs and is undamped.

miles, which the machine's owner, Ivan Casson of Emu Plains, claims is original. The bike looks as though it just left the showroom floor, though there are some inevitable pock-marks here and there under the paintwork, and some of the chrome has, of course, seen better days. However, it appears to be better overall than many models which have left the showroom a scant year or so ago, and it has survived those in-

evitable tests of time imposed whether it has been ridden hard or hidden in some dank garage.

Luxury specifications of the Sunbeam S7 do not extend to an electric starter, so the rotund machine must be kicked over like its lesser contemporaries. There is some slight resistance felt because of the unusual layout of the starter (it couldn't be the piddling 6.8:1 compression ratio!) but the engine will

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"The engine is turbine-smooth and totally remote in its rubber mounting. There is no vibration felt anywhere and no trace of transmission snatch. The saddle movement is a continuous series of dips and rises which, while it adds to the general impression of squashiness, is nonetheless extremely comfortable."

fire up in one or two kicks if the right drill is used.

Even though the engine's crankshaft is set in-line with the frame and revolves at 90 degrees to the road wheels' rotation, the kickstarter operates in the normal manner. It does this because of a bronze-and-steel skew-gear assembly which transfers rider effort through 90 degrees to compensate for the shaft layout. There must be a mechanical advantage in there somewhere in view of the ease with which the engine can be turned over, and the ease with which it starts.

Naturally the tiny carburettor must be tickled to raise the fuel level in the floatbowl and it is then better to kick it a couple of times before turning on the coil ignition. Once this is done the engine will fire up in one or two kicks and idle reliably.

The idle speed is set on the low side and the engine thus tends to rock about in the frame a bit, jumping sideways in its soft rubber mounts. The muffler is rigidly mounted at the rear of the plunger suspension, with a short section of flexible exhaust piping just behind the two-into-one exhaust pipes to compensate for the flexible mounting of the engine.

Typically, there is a small fracture in the flexible section, with some loss of exhaust gas and the inevitable mumbling through the muffler when the throttle is backed off; there is also an occasional back-fire on long descents, particularly if the throttle is snapped off quickly, but the power delivery is

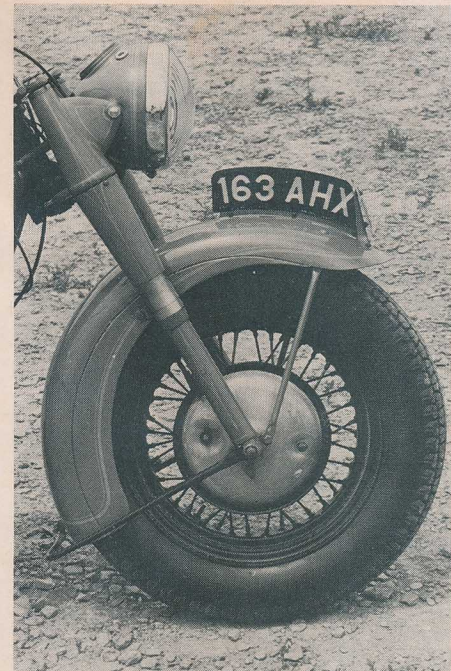
crisp overall.

The exhaust is currently on the loud side due to the loss of the packing material in the so-called muffler. Originally an absorption-type muffler with no baffles, the straight-through pipe should be packed with fibreglass between its perforations and the muffler shell, but the material gone.

"A great, green marshmallow"

The front forks need some attention for the oil seals are not too good and most of the damping medium is long gone. The forks tend to oscillate, which makes the front end float along as the front wheel patters in harmony with the uncontrolled springs. It was a fault common to the BSA forks which are fitted to the machine. The same forks were fitted to the entire "heavyweight" BSA range from Ariel to Sunbeam, so there should be little problem in securing a new set of seals: it will transform the entire machine.

The huge tyres are a bit squashy by modern standards, though there seems little doubt of their effectiveness in ironing out many of the small irregularities. They flex perceptibly and certainly absorb the initial road shock before the suspension comes into play. They also move about alarmingly if the bike is pressed hard, a thing one assumes the gentlemanly Sunbeam rider would not stoop to do! There was a sports variant fitted with standard-sized wheels and tyres for the rider who wanted the luxury of shaft drive but still wanted to ride the bike. The



The test machine's front end was well-worn. Note that front hub has enclosed brake arm. Size was a good front brake performance guide in the original tests, which suggest it was a screamer. Definitely not the case on this machine though.

Sports S8 was smaller overall and much lighter though it was still no ball of fire!

Clutch action is light, and the usual Shaft Drive Principle applies when changing gear if the dreaded crunch is to be avoided. Changes are more leisurely than usual, but can be made quickly enough in view of the fact that it is, after all, a "luxury" tourer.

Handling is reasonable over most surfaces, including dirt, but the machine feels for all the world like some great green marshmallow. There is never a problem in pointing the bike where you want it to go and having it go there, but it feels soft and squashy as it does so. You could never say it handled in that taut, secure manner which was so typical of British motorcycles of the period.

In spite of the choppy, undamped plunger rear suspension with its limited movement, the machine is extremely comfortable over reasonable surfaces, and it takes most potholes and bumps in its stride. The plunger suspension can be *heard* rather than *felt*, but the softly-sprung single saddle works beautifully to iron out whatever road shocks the tail-end allows to be transmitted to the frame.

Single bumps are merely floated over, but a series of ripples or corrugations will cause the back of the machine to leap about all over the place. In fact, if the machine is not absolutely square-on to the direction of travel, the whole bike can pivot around the steering head when the rear wheel clears the ground. Very exciting, and good fun sometimes, but very definitely not up to scratch in modern terms and probably dangerous in heavy traffic.

Rear wheel hop on rough surfaces is a problem under heavy braking, even though the brakes are not particularly good, and

Brief Specifications

Make: Sunbeam.

Model: S7.

Year of manufacture: 1953.

Engine: All-alloy vertical twin, cylinders cast in-line with single casting for cylinder block and crankcase. Overhead camshaft driven by chain from rear of engine block by crankshaft-mounted sprocket. Parallel valves in squish combustion chamber. Cast-iron one-piece crankshaft with bolt-on connecting rods. Plain main and big-end bearings. Wet sump, gear pump lubrication.

Bore × stroke: 70 × 63.5 mm.

Comp ratio: 6.8:1.

Power: 26 bhp at 5800 rpm.

Carburetion: Single Amal.

Ignition: Battery, coil and points. Car-type distributor. Pancake-type 6 volt generator.

Transmission: Direct from crankshaft through single-plate dry clutch to four-speed gearbox and shaft final drive. Rear drive worm-and-worm wheel type, with exposed drive shaft.

Gear ratios (overall:1): 1st, 14.5:1; 2nd,

9.0:1; 3rd, 6.5:1; 4th, 5.3:1. Gear pattern one up, three down. Right foot-change.

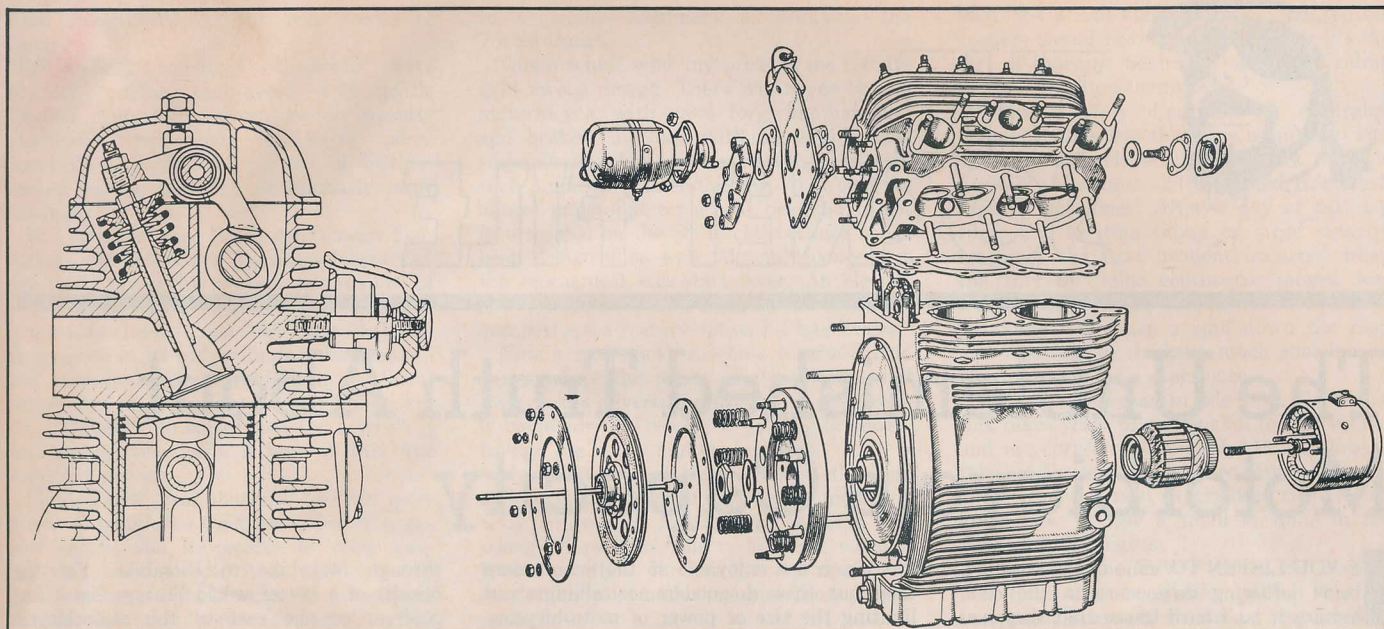
Frame: Welded steel tubing and special forgings in duplex downtube design specially constructed to provide full cradle and mounting points for rubber snubbers to support entire power unit. Heavily-braced at steering head and engine mounts.

Suspension: Front, telescopic forks with coil springs and oil damping. Plunger rear with undamped recoil and shock springs in plunger housing.

Wheels, brakes, tyres: Front steel rim laced to hub containing internal expanding drum brake, 190 mm diameter. 500 × 16 block pattern tyre. Rear steel rim laced to hub containing final drive mechanism and internal expanding drum brake. 500 × 16 block pattern tyre.

Dimensions: Wheelbase, 1425 mm; Ground clearance, 112 mm; Seat height, 750 mm; Weight, 195 kg; Tank capacity, 16.8 litres.

Performance (original road test S8 model, September, 1950): Top speed, 135 km/h; Standing quarter, 18.2 sec; Stopping distance from 48 km/h: 7.7 m; Fuel consumption, 22 km/litre at 80 km/h.



there's inevitable loud screeching from a rear tyre in torment. With reasonable care this does not occur, but emergency braking over rough road surfaces certainly renders the horn superfluous as an early warning device — a fat tyre in torment lets the whole world know about it!

Perhaps the only serious criticism which could be levelled at the cantilever-sprung Sunbeam saddle is the fact that it has no control over the soft spring which provides this most comfortable ride. If the bike leaves the ground over a particularly savage one the saddle spring takes up all the shock, but the bike returns to earth with a thump and pops the saddle back to the start of its travel and lifts the rider out of the seat. Over a series of slight corrugations the saddle movement is a continuous series of dips and rises, dips and rises, which adds to the general impression of "squashiness" in overall handling.

But it is nonetheless extremely comfortable, and leads you to wonder how much better the bike would have felt with some form of damping and mounted on a modern swing-arm frame. In fact, you can't help wondering how much more comfortable a modern machine would be if, like the big Harleys, it was fitted with a spring-mounted dualseat as well as swing-arm rear suspension?

Super-smooth

The engine is turbine-smooth at every speed above a fast idle, and has no peer in modern motorcycles — thanks, of course, to the rubber-mounted engine. Norton tried it and couldn't get it to work effectively, but it is perfect on the Sunbeam and needs no attention.

There is no vibration to be felt anywhere from footrest to handlebar, or through the spring saddle, but a heel placed against the engine as the bike is being ridden shows that there is generous movement. The engine jumps about vigorously within its rubber restraints when the power is applied from rest and it moves about again when the

throttle is backed off. But none of this is felt by the rider.

There is no trace of transmission snatch at any speed either, with no slack to be taken up and no loud clanks or grinds from engine or transmission even if the throttle is backed off and suddenly opened up again.

The combination of smooth engine and very soft, comfortable springing makes for totally effortless long-distance touring, the job for which the bike was originally designed. Cruising speed seems best at around 100 km/h and it will run without effort to the occasional 115, but I bowed to its advanced age and let it lope along completely fuss-free for most of the time on open roads. Acceleration is better than expected; brisk in fact.

It copes very well with the suspension limitations I've already outlined and is amongst the most stable machines ever on smooth highways. Perhaps it was the doughnut tyres, or the very low centre of gravity from the low-slung engine, but the bike tracks dead true and in fact does not want to go round corners on its own. It must be physically dropped into a corner and actually held down, for it gives the impression that it wants to stand up again.

It will corner well on smooth surfaces, and at least predictably on the rougher going, but prop stands and other essentials limit the angle of lean very seriously. That's fine, because you wouldn't want to test the 500 × 16 Avon tyres any more than you need to because they are the older square-section SM pattern. Definitely *not* the ideal rubber for serious ear-'oling!

One tiny feature which deserves comment is the old-fashioned twistgrip. It incorporates that priceless asset not known to modern machines known as a friction adjuster. Its job was to allow the throttle to remain in position if the right hand is relaxed and it takes all the strain off the wrist and trapezoid muscle. I haven't ridden a machine with this fitting for years, and had nearly forgotten what a great boon it was to the comfort of a long ride.

Basic car layout is clear in the 'Beam's engine design. Head detail clearly shows the cam located low in the casting with the angled valves and squish band combustion chamber.

Instrumentation is simple and confined to a speedo in the headlamp shell, with a red generator warning light and a green oil pressure light, with the main light switch and ammeter carried out of sight on the battery cover.

Owners of older model Hondas might be interested to note that the battery cover is on the right hand side just ahead of the rear wheel, which is probably even more odd-sited than having the ignition switch under the nose of the fuel tank.

Too odd — like the CX500?

The Sunbeam is an oddity with its unusual engine sprouting a distributor where the carby should be, its exhausts out the side of the head one behind the other, and its absurdly low-slung engine. Its general air of obesity is such that one would guess its age as closer to 50 years than nearly 30.

But it remains an honest machine, with a very low-stressed engine and a standard of ease and comfort which is hard to fault even by the standards of modern frames and suspension systems.

It did not enjoy the questionable luxury of electric starting, or the undoubted safety of blinkers and rear-view mirrors, but it was as unique then as the CX500 Honda is today — and in many ways similar.

The Sunbeam engine was a design which *would* have been "Modern 10 Years Hence" had it survived, and it would perhaps have been modern even today. Thankfully, there are still odd machines of this type in existence to show many modern enthusiasts that not all progress is for the better, or to reinforce the thought that those that went on before laid many a foundation stone for those machines which were to inevitably follow.

