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OCTOBER 1981

## LESS IS MORE

Yamaha's Unique 920 V-Twin

### Enduro Test: Yamaha IT465— and How to Make it Even Better



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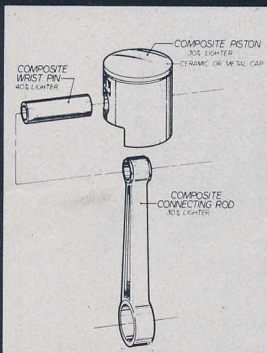
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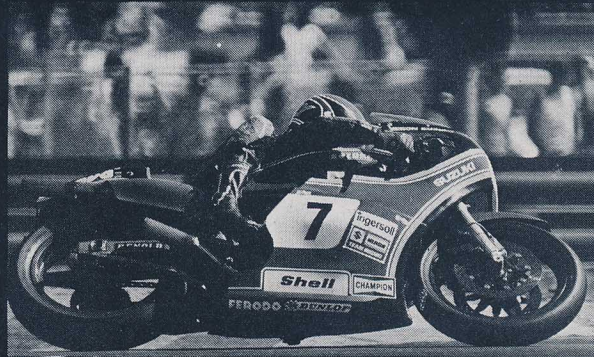
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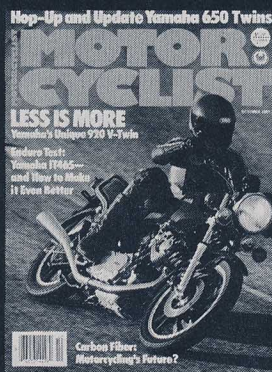
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This month's cover is a test. Sharp eyes will discover something missing in this shot, the 936th published photo taken through the Editor's gritty old Nikkor lens with potatoes growing in it. Actually, there are three things absent if you count the XV920's missing mirrors. Check your powers of observation by reading the XV920 test, which will unravel the mystery.

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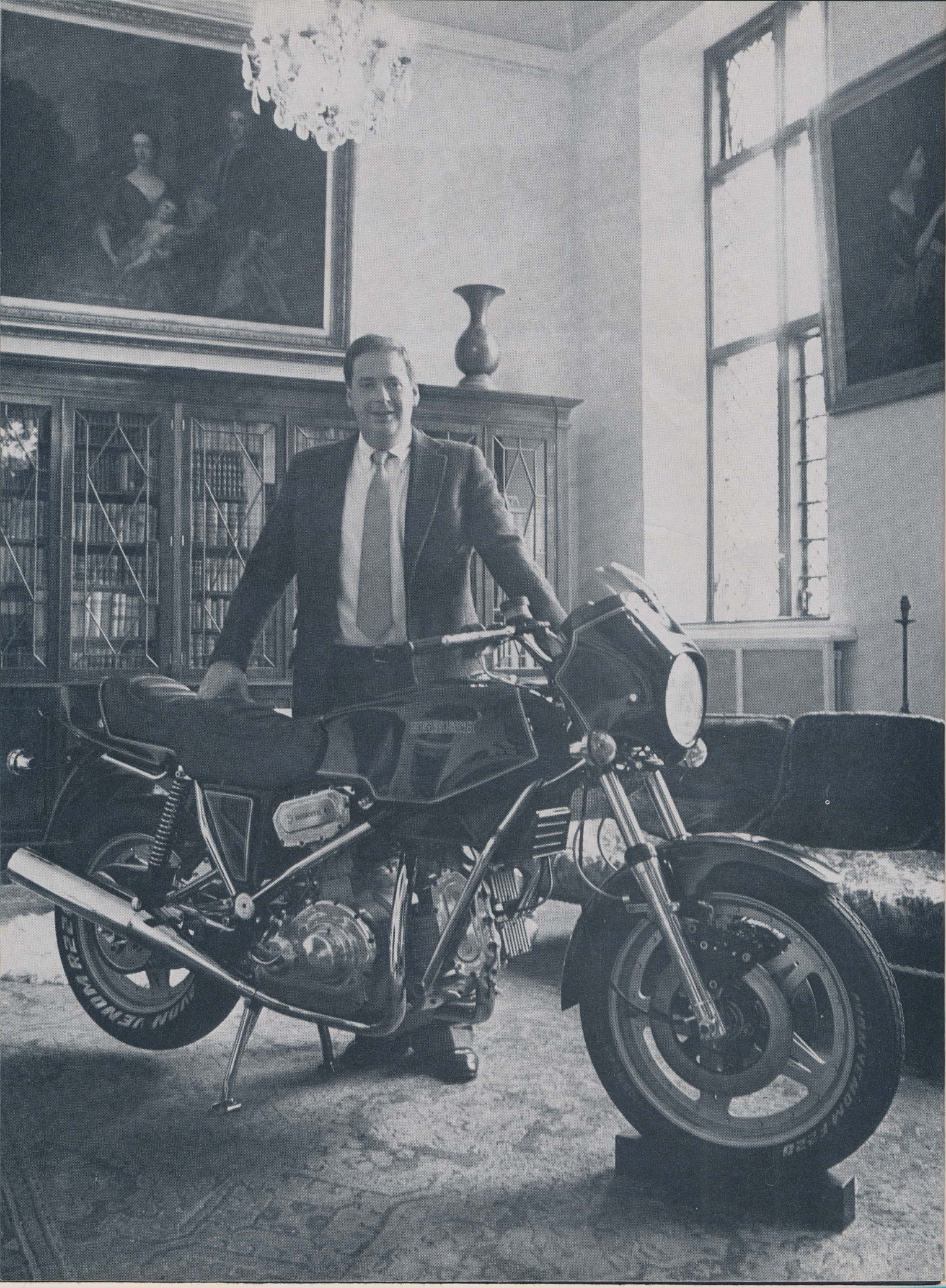
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# THE HESKETH IS A REALITY

England's New V-Twin Superbike is in Production.  
We Talk with Hesketh and Look at His Machine.

By C.D. Bohon

**T**he Hesketh V-twin Superbike is a reality—or should be by the time you read this. The first new motorcycle from Great Britain in 12 years, when the BSA/Triumph triples were introduced, the Hesketh was scheduled to go on sale in England in August after some four years of development work. Shown at the recent NEC Motor Cycle Show in the UK, the production models were swarmed over by thousands of enthusiastic visitors and potential purchasers, indicating that the planned production schedule of 2000 machines a year may not be enough to meet demand.

When we visited Lord Hesketh's estate last fall, he told us all he had to do was sell 700 a year to break even, and he was sure he could do that despite the high price tag (around \$8000). "The Vincent was 130 percent of the average yearly wage when it was in production, and it sold quite well," Lord Hesketh explained. "The Ariel Square Four was 85 percent of a year's salary, and it sold. We are at 80 percent and are selling to a different market. The Vincent and Ariel really competed against small motorcars, and that is why, ultimately, they failed. But we are aiming at the mature *motorcyclist* who wants a first-class, distinctive, elegant motorcycle. If anything, we are competing against the sports car, and since a sports car that truly works is a rare and extremely expensive piece of equipment, we feel we shall succeed."

The machine Lord Hesketh places his hopes on is no jury-rigged contraption slapped together from bits and pieces of old designs. Far from it. Hesketh has been interested in producing a motorcycle for some years. He got involved with motor racing some years back, when he sponsored James Hunt's successful run at the world championship. After that he founded Hesketh Racing and began producing

monocoque racing car chassis and rebuilding Cosworth Ford and Brabham racing engines. But the motor racing business has its ups and downs, and was not doing much to help Hesketh pay the rent. Nor was it producing a clear Hesketh product. The idea of manufacturing his own motorcycle increasingly appealed to the lord. He checked into taking over the old Norton factory at Wolverhampton, not far from his estate, and even considered the possibility of taking over Triumph's Meriden works, but after investigating the situation, decided neither was a good idea. He wanted to build his own motorcycle at his own facilities, and simply taking over an antiquated factory and building an obsolete motorcycle with his name on the gas tank was not appealing.

So in December, 1977, Hesketh started the ball rolling on his new machine. The first thing he did was grab some Japanese bikes and strip them completely, "before we put a line on paper," as he phrased it. "As engine developers and rebuilders, we were surprised at some of the things we saw. For example, many of their engines run the cam right on the metal of the cylinderhead. That does not impress us. Now, as to why we decided on a V-twin," Lord Hesketh went on, "we looked at a four, but couldn't see any special production advantages—it's easier to make, of course—and we wanted to build something that was different. A six is too expensive. The next smoothest is a 90-degree V-twin. We decided to make it down the frame rather than across for less drag."

We asked Lord Hesketh if, as had been reported in the British press, the engine was not really a reworked Weslake grass track motor. "Absolutely not." Although Weslake Engineering did help on initial design development, "Not a single component on the engine bears any relationship to the

Weslake engine. Our chief engineer is Geoffrey Johnson, who was head of engine development at Austin, Morris, and BRM—he did their V-12. He's the man behind our engine, not Weslake."

The motor Hesketh came up with is a 90-degree V-twin displacing 992cc. The bore and stroke is 95x70mm. The compression ratio is 9.5:1. Horsepower is 86 at 6400 rpm, and torque 69 foot/pounds at 5000. Claimed dry weight is 502 lbs. Each cylinder has four valves and a flat-topped piston with indents for the valves. The valves are opened and closed by two chain-driven overhead camshafts. "Pushrods would have been fine," explained Lord Hesketh, "but we put four overhead cams on it for publicity. But with DOHC it has specs in reserve, and should be able to be tuned to produce a great deal more power than stock, should anyone choose to race it."

In any event, each cam chain has its own tensioner. The cams operate straight onto the bucket covers on the valve stems, and adjustment is done by slipping shims under the buckets. Using experience gained tuning Formula One cars, Hesketh increased the overall size of these buckets to prevent any chance of them moving sideways during hard running. Double valve springs are used on all valves. The combustion chambers have well-defined squish areas. Primary drive is by helical gears, and the engine runs "backwards." A massive, eight-plate hydraulic clutch transfers power to the final drive chain, which is 5/8-inch-pitch rather than the expected 3/4-inch item, thanks to some careful engineering, more about which in a moment.

The crankshaft is a massive, one-piece casting with six-inch flywheels supported by 40mm bearings, roller on the left, ball on the right. Needle roller bearings are used throughout the transmission and to support the camshafts. Each cylinder is deeply spigoted into the large, boxlike crankcase, which is split vertically. Each crankcase mouth has four inverted bolts around it, held in place by sleeves screwed into the case. The cylinderheads have integral cam boxes closed by separate covers. A short, curved intake sucks mixture from a 36mm Amal Concentric carburetor for each cylinder. Ignition is Lucas Rita electronic. The transmission holds five speeds.

Our Technical Editor, Joe Minton, took a look at the photos of the engine we brought back from Lord Hesketh's development shop and remarked, "It looks like a slice off the end of the finest V-8 in the world today—the Cosworth, the Indy engine, the Formula One engine. If it has a broad powerband and plenty down low, it could be equal to the Suzuki GS1100 motor in performance."

The frame is made from Reynolds 531 tubing, bronze-welded and nickel-plated. The engine forms a pre-stressed part of the triangulated frame, which is built on the straight-line approach: the frame's two main load-bearing points are the steering head and swingarm pivot. The best way to connect them to get maximum torsional stiffness is with a straight line, and a glance at the photos accompanying this article will show they've almost got this. They've certainly come about as close as anybody.

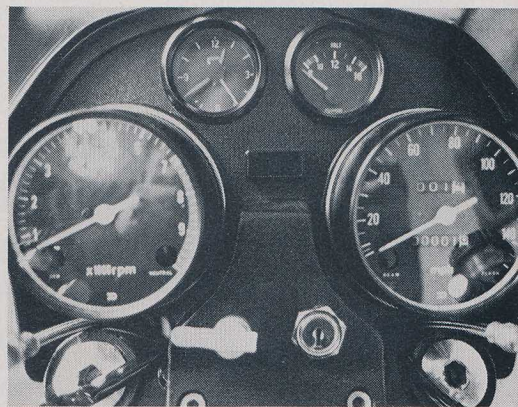
In addition, Hesketh's engineers have ensured that the swingarm pivots exactly on the gearbox sprocket center, thanks to the use of a coaxial-type mounting. This also puts minimum strain on the chain, with none of the constant alteration in chain tension that is the major factor in chain wear (aside from neglected lubrication, of course). That explains the smaller-pitch chain used. A bigger one isn't necessary if you engineer things right. The chain adjuster is a Bimota-style eccentric. The rear wheel is self-centering. "When you take it off, just slam it back on."

The front forks are Marzocchi units, and the rear dampers are Girling's. We could have hoped Hesketh would pick superior units, and he may in the future; we suspect these two bits may prove the most unsatisfactory items on the big V-twin. If our recent experience on a new Triumph is any indication, anyone who buys a Hesketh will soon be tossing the Girling's in favor of something more modern.

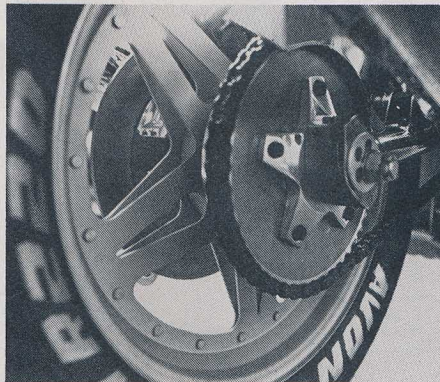
Otherwise we are quite impressed with the Hesketh concept. The rear disc brake is mounted via a parallelogram arrangement, which makes it floating, to eliminate rear wheel hop. "With a normal triangular brake setup," Hesketh said, "when you put on the brake hard, the suspension locks up. With the parallelogram arrangement, brisk braking, as a sporting bike can be expected to engage in, won't lock the suspension. You can brake without fear anywhere in a corner; the bike will do nothing disconcerting."

Our UK correspondent, D.J.K. Wilkinson, reported he had a chance to ride the bike last summer, and that handling was outstanding. We weren't able to wheedle a ride on the beast, but Lord Hesketh did tell us his people had put their machine up against a Ducati and it simply walked away from the Italian V-twin.

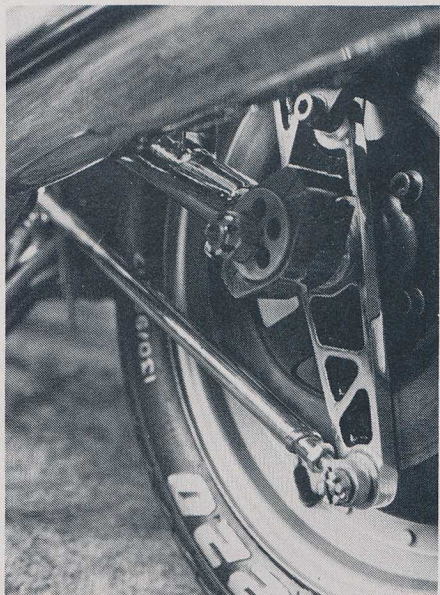
If the motorcycle has good power and handling, it may be worth Hesketh's asking price of around \$8000 if—and it's a big if—it is reliable and won't nickel-and-dime its owner to death. Lord Hesketh is very aware of this, and is certain his engineers have got the design right (it is as modern as anything coming from Japan, accord-



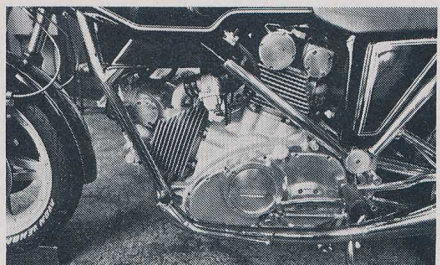
Instrument panel looks a bit home built, but includes, choke, clock and voltmeter.



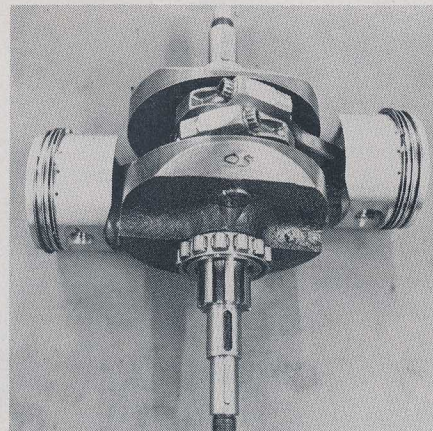
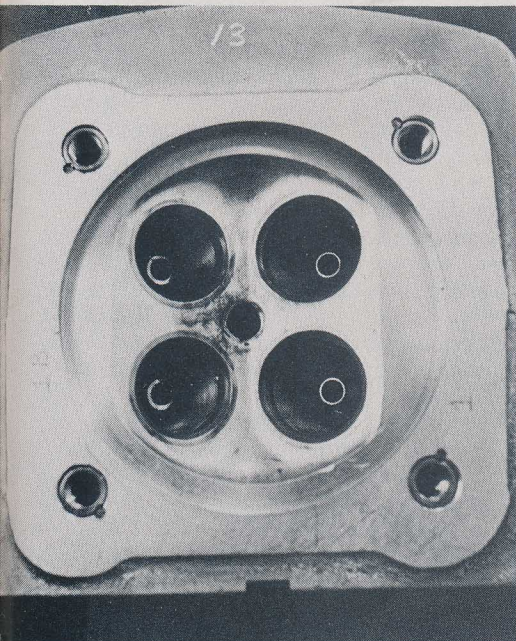
The wheels, made of the light alloy Astro-lite, are very ComStar-like, but cruder.



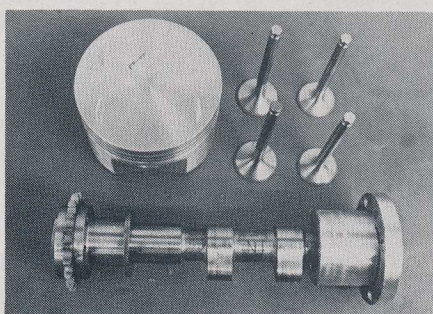
The rear disc is fully floating to help avoid wheel hop during extreme braking.



Mixture must make a U-turn to get through the intake. Yamaha's 920 is better done.



Inside, the motor is quite up-to-date and sturdy, with very narrow valve angles, flat-topped pistons, strong camshafts and massive rod journals. The big-end bearings are plain, pressure-fed. The small-end bearings are plain, with a fully floating wrist pin. A Hobourn Eaton rotor pump keeps the oil speeding along.



ing to our Technical Editor), and that his machine will be stone reliable. "We want our bike to run and run forever," Hesketh told us. "The frame will rust away before the engine becomes a problem. We've over-engineered the bike just for that. We expect it to have a high resale value; we've designed it so it will. Do you know of any manufacturer who design their motorcycle with its resale value in mind?" We suspect most motorcycle makers would prefer

**Hesketh's engine was largely developed in this workshop on his family estate.**

not to even think about the used motorcycle market, so Hesketh may be onto something.

"This motorcycle is aimed at the serious biker, not the teenybopper enjoying the motorcycle for a bit of entertainment come the weekend," Hesketh went on. "When you take the tank off our machine you will still find quality manufacture. Our gamble is that there is a buyer for the Rolls—no, the Vincent, better the Brough—concept of a motorcycle. In fact, that was another consideration for making the engine a V, a format that has a long and favorable history in English motorcycling. You can call our motorcycle 'Out of Brough by Shadow.' That's the kind of motorcycle we'll be building."

To ensure that this is so, the Hesketh organization put its prototype machines through a grueling series of running tests. Last fall when we visited Hesketh, he had three machines running "flat out" 900 miles a day. A team of four riders ran two machines 30,000 miles at the MIRA test track, eight hours a day at average speeds of over 100 miles an hour. The bikes were run hard through the Welsh mountains and then ridden down to London to fight rush hour traffic. Engines were harnessed to dynos and run continuously hour after hour. Nothing broke,

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although the testing brought a few changes, as it was designed to do. The swingarm has been lengthened, the triple Brembo disc brakes have been drilled, tires were switched from Avon Venoms to Dunlops.

Hesketh is definitely serious about the project. He had sunk about five-and-a-half million dollars into his motorcycle when we visited and has issued stock. In order to float the stock his company had to publish a detailed prospectus, which stated manufacture would begin in May, with deliveries to dealers beginning in August. That schedule has been met.

Lord Hesketh is quite optimistic about the future of his firm. "We looked at building everything from sports cars to campers before we settled on the motorcycle as the safest place to put our money. There is nothing the equal of our motorcycle in quality of design and manufacture, and in exclusiveness. We are going to produce a true English thoroughbred. To make sure all goes well, we will limit production at first. For the first year or so we won't sell outside the U.K., not till we get all the bugs out, and we're sensible enough to know that there will be a few, in spite of all the testing we've done. We want to be able to pull a bike back to the factory if it has a problem, see what it is, fix it on that particular machine and then fix all the others. After that stage is over we'll expand to Germany, where we see a major market, and the Benelux countries. We are looking to capture five to seven percent of the 850cc and up market, which was 11,500 units last year."

"How about exporting the machine to the United States?" we asked. "The noise problem seems like it will prevent that. But we have no trouble meeting the European '83 standard, which is 86db at 15 meters. If the American government relaxes standards, we could see a very nice market over there."

But not for now. If you want a Hesketh and can figure a way to sneak it past customs, you can get it set up just about any way you want. "We'll even gold plate the frame if you like," Hesketh said, although planned colors are red and black only.

A new factory has been put up at Daventry to assemble the machine. Its 22-man work force has been culled mainly from the ranks of former workers at vanished English motorcycle makers, so they should understand and care about making a fine British motorcycle. Sophisticated engine and rolling road-test equipment has been installed and every step of manufacture will be subject to rigorous quality control.

"We aim to build the best," said Lord Hesketh.

Perhaps they will.

M