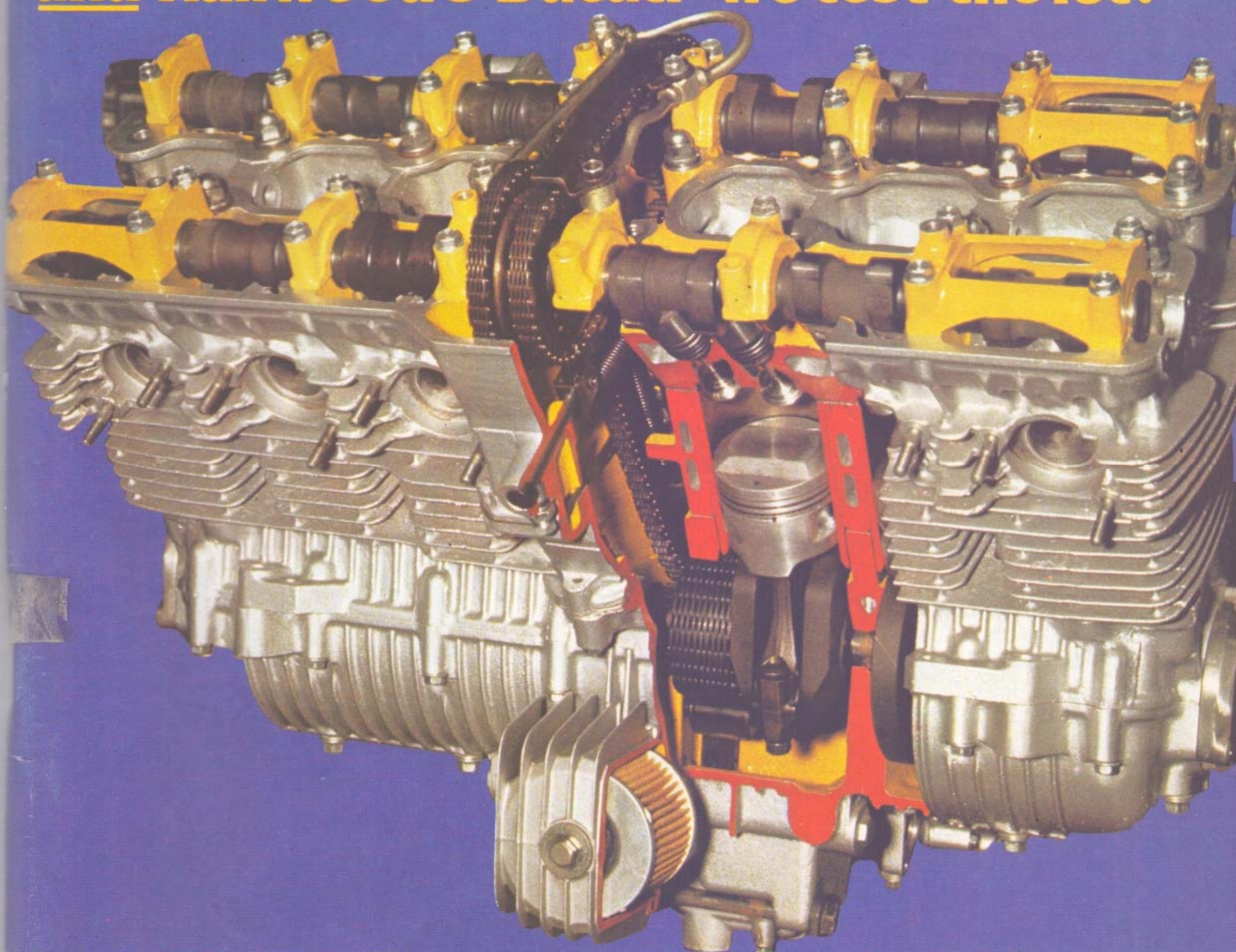


# **MOTOR CYCLE MECHANICS**

OCTOBER 1978 50p

Win  
a Honda  
CB400N  
-details inside

**POWER PLUS ISSUE: Honda CBX,  
Yamaha XS1100, Suzuki GS1000  
and Hailwood's Ducati—we test the lot!**



**EXCLUSIVE! Secrets of Laverda's V6 racer**



# Winning Formula

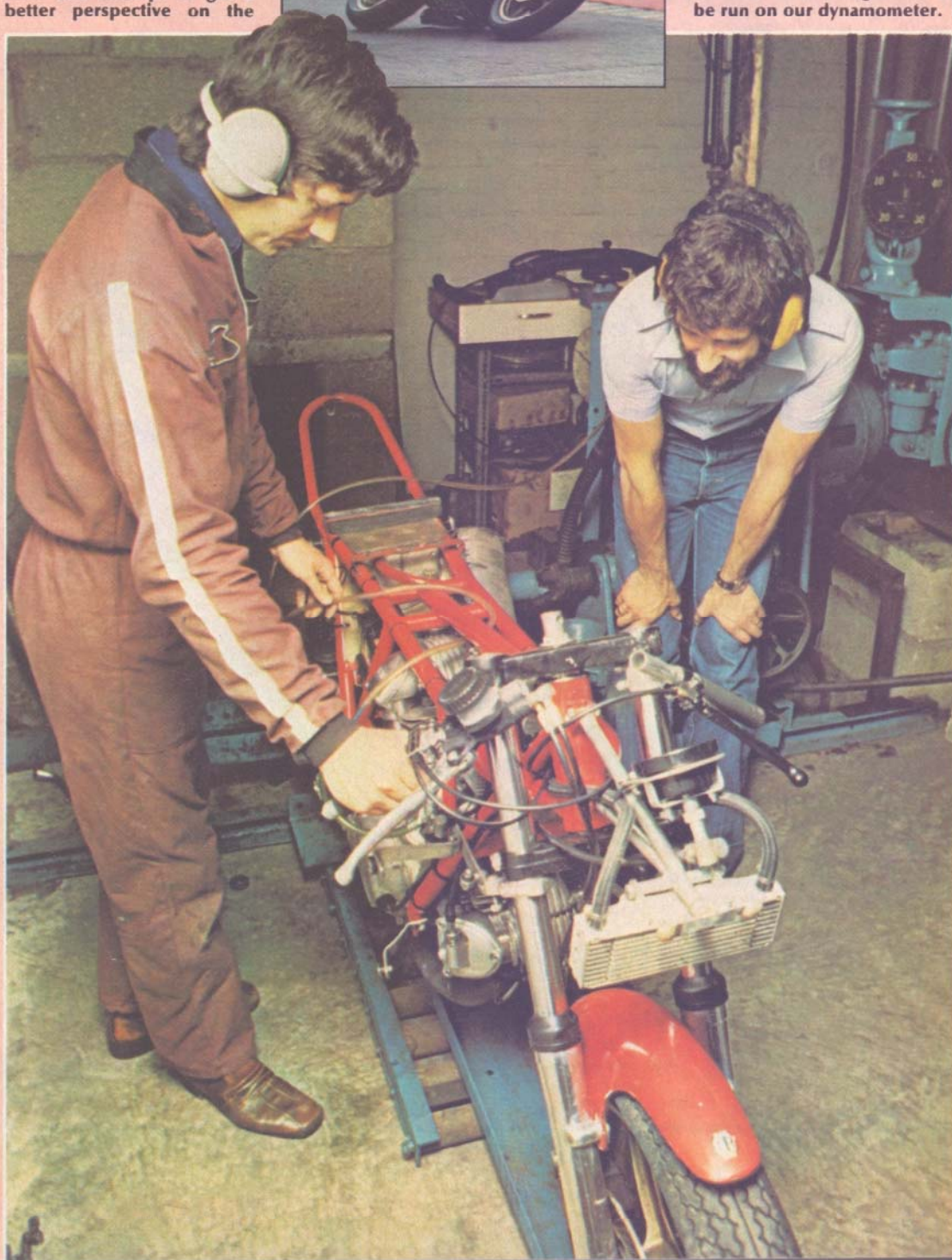
## Hailwood's Ducati on the dynamometer

WE HAVE all read the claims about 120bhp race bikes. Each year the figure goes up for the latest machines from the major factories. And so much emphasis is placed on horsepower that the bhp figure seems to be the main criterion on which a bike is judged.

To discover some of the truth and attempt to get a better perspective on the



balance of power and handling we put Mike Hailwood's formula One TT winning Ducati on the MCM dynamometer. You may remember we did a full feature in our June issue on how the engine was prepared and tuned by Sports Motor Cycles of Manchester. Dave Walker now tells the story of the first road racing bike to be run on our dynamometer.





STEVE WYNNE threw open the doors of his Transit van and said: "I haven't got a ramp, but it's very light." Wedged between a small sink and a gas cooker sat the Hailwood Ducati. The damage from Mike's Donington fall was still very much in evidence. The familiar red, green and white tank and seat had been replaced with a new unit which was still in an unpainted state. Some of the frame was still scuffed but overall the damage did not look as if it had been bad.

The purpose of Steve's visit was to run the Hailwood Ducati on the dynamometer which we use for all our road test machines. Since our feature on the Ducati in the June '78 issue, a lot of people, other magazines and rival race camps, have said that the engine we covered was not the one Mike raced. They claimed that the IOM race motor was a special factory job with re-angled valves and lots of secret goodies.

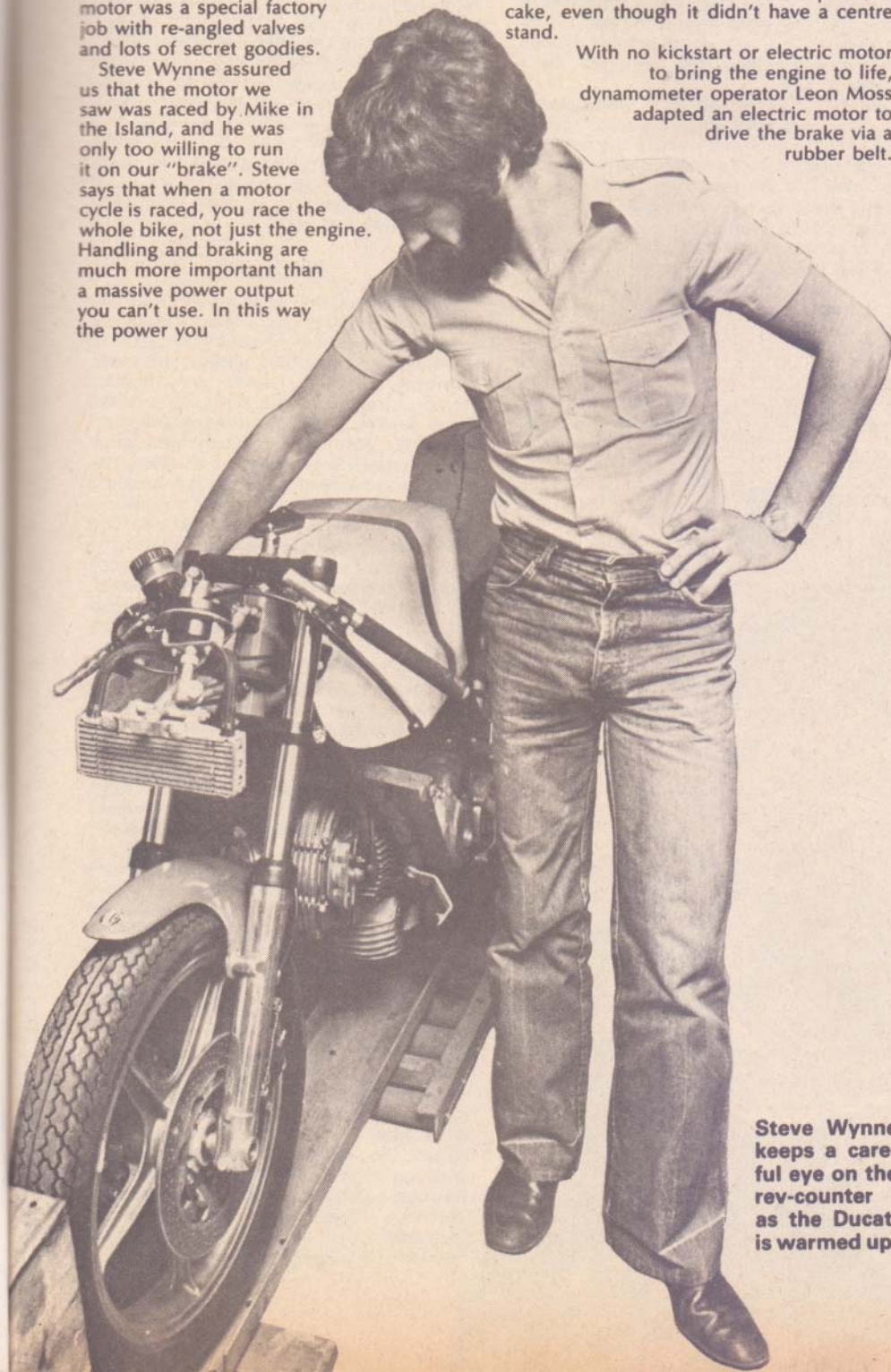
Steve Wynne assured us that the motor we saw was raced by Mike in the Island, and he was only too willing to run it on our "brake". Steve says that when a motor cycle is raced, you race the whole bike, not just the engine. Handling and braking are much more important than a massive power output you can't use. In this way the power you

# Winning Formula

do have can be put to better use. Keeping the weight down, and having a small frontal area were essential requirements for a successful racing motor cycle.

Lifting the machine from the back of the Transit certainly proved Steve's point. The bike was very light. We sometimes have problems hooking up larger machines on to the brake but the Ducati was a piece of cake, even though it didn't have a centre stand.

With no kickstart or electric motor to bring the engine to life, dynamometer operator Leon Moss adapted an electric motor to drive the brake via a rubber belt.



Steve Wynne keeps a careful eye on the rev-counter as the Ducati is warmed up.

Steve took one look at the oversized elastic band and laughed: "Do you think that thing is going to start my Ducati?" ... it did.

When the unsilenced motor burst into life for the first time it sounded just like a Manx Norton — and so it should have: only one of the cylinders was firing! Steve explained that when the bike had left the road at Donington it went off into the catch pit. With the motor going full song at 9000rpm it had gulped in an awful lot of sand. The cylinder bores and pistons had been ruined, and a lot of grit had found its way into the carbs, blocking the jets and drillings. Since Steve had no more 11 to 1 compression ratio pistons the engine now runs on a 9.5 to 1 compression ratio.

Incidentally, for graph studiers, the power output is for the motor with 9.5 to 1 pistons. We did some quick calculations and estimate that with an 11 to 1 compression ratio the maximum output would rise to around 86 bhp.

A quick check on the exhaust pipes revealed no heat from the front pot, so its carb was pulled off. A blocked idle jet was discovered and cleared. This time the engine fired up and the noise was beautiful. In the confined area of the test house you could feel the motor breathing in and out as the throttle was blipped. Steve explained that the fabulous oooh-aaah sound was not known as "noise". It was something called "music".

As the engine neared its working temperature the familiar smell of Castrol "R" became apparent. Here was a machine which appealed to all the senses. It even felt good to open and close the twistgrip — you could almost feel the power.

When I passed comment on the lovely aroma it was patiently explained to me that these were not oil fumes, but "perfumes" which filled the air.

It would have been all too easy to get carried away with the nostalgic talk of Manx Nortons, Castrol R and the good old days, but we were there to record the power output of the fastest four-stroke machine that had ever lapped the Isle of Man. Yes, Hailwood went even faster on the Ducati than he did on the famous 500 Honda four.

With ear defenders in place — you really can have too much of a good thing — we tried the motor at full throttle with the brake holding the revs at 4,000. We managed a steady reading and then let the motor sing up to 6,000 where a healthy 66 plus bhp reading was recorded. Things seemed to be going well until we reached 7,000. The motor was pulling like a traction engine when suddenly the power evaporated. I closed down and pulled in the clutch — the engine died. I thought we had blown it, and Steve Wynne was looking more than just a little worried.

The only man not disturbed by the apparent disaster was the dynamometer king, Leon Moss. His philosophy is: "They shouldn't make them if they won't hold together". Clearly he had blown up bigger and better engines than this one.

For the next ten minutes worried heads were put together. It was definitely the front cylinder. The spark proved okay and there was still plenty of compression. Once more the front carb was stripped and once more a grain of sand was extracted from one of the jets.

The healthy bark of the Ducati again filled the test house — I doubt if the neighbours



called it music — and we continued the power runs. The motor was very smooth from 7,000 up to 8,500rpm where it gave peak power. Of course we didn't know that this was the peak until we ran it at 9,000. At these revs vibration was quite severe and I had some trouble keeping the thing on full bore because the fine dimples on the twistgrip rubber slipped through my fingers. Since the motor had now "gone over the top" we decided not to push the engine any further. There would be nothing to gain and everything to lose. As you can see from the power curve, the maximum output of 80.5 bhp is not dramatic, but there is a really good spread of power.

When we covered the engine in the June issue Steve Wynne was good enough to pass on some of his tips from tuning his production racers. One of these was cutting the bellmouths down, to shorten the overall inlet tract lengths. Steve didn't think that this helped the top end but said it had a real bearing on the point where the power came in.

While we had the bike on the brake, we decided to check this out by loading the motor on full noise, at 4,000rpm, and then letting off the brake and checking where the power came in, and how much of it there was. As the brake load was eased off, the tachometer crept up the scale. When it reached 5,000 rpm, it shot up to 7,000.

After cutting the engine we removed the bellmouths from the carbs and tried the same test again. This time the engine reached 5,000 rpm and stayed there. The power eventually came in at 5,500, but the jump was only as far as 6,800 rpm.

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Obviously the inlet length with the little plastic trumpets in place was about right for mid-range power. A quick calculation with the slide-rule showed an improvement of around 3 bhp — just from fitting the bellmouths.

Since the motor pulled quite cleanly at peak power it was generally thought that the mixture was about right. Just to make sure we decided to try some larger main jets. If there was any extra urge to be had, Steve wanted it. The carbs were removed once more and the main jets swapped for a couple of 170s.

We didn't bother with a full power curve, but simply ran the engine straight up to 8,500. The power was exactly the same as before but the mixture was well over rich. The fumes in the test house were now so strong our eyes were watering.

The mixture wasn't over rich to the point where power was wasted, but a lot of the fuel was being chucked out of the exhaust pipes without contributing to the useful work load.

**At last! Dave Walker gets on the Hailwood Duke for an all-too-brief test ride.**

Looking at the power curve you can see that the power really came in around 6,000rpm and did not drop off after peak revs. It would have been interesting to run the motor up to 9,500 but we felt it would be pushing our luck too far.

The power was spread thickly over the rev range, which should make it a very easy bike to ride. I know that top-class riders of two-stroke machines have to cope with very narrow power bands, but they must have problems with certain tracks in getting the gearing spot on for every corner — and there are quite a few corners in the Isle of Man.

Ultimately, power output from the crankshaft is related to performance only in terms of power-to-weight ratio. Lots of power pushing along lots of weight means poor performance. And you have to stop the bike once you have attained that performance.

What did the Ducati weigh? Steve didn't know but various people had made various estimates. We decided to put the bike on our scales and find out exactly. The bike topped the scales at 360lbs ready to race — but without petrol. A five gallon load in the tank would add a further 40lbs to the all-up weight. It's not surprising that lap records tend to be broken towards the end of a race rather than at the start!

## Riding

If races were won on a power-to-weight ratio scale, we could just compare machines on the start line and not actually bother with the business of rushing around the track. However, when it comes to scratching round a circuit, handling is the name of the game. Unfortunately this is something you just can't measure. What fills the bill for one rider can be very wrong for another. The only way to evaluate handling is to ride the machine in question and see if you like it.

Getting a ride on the Hailwood Duke is a little like arranging an audience with the Queen. Quite a few road racers have ridden the bike, and passed on their comments, but as far as I know I am the only scribe who was allowed to plant his backside in Mike's saddle.

Sports Motorcycles had arranged for a tyre testing session with Dunlop so that Mike could try out a slick tyre on the front wheel. Special wide wheels were ordered from Italy and arrangements were made for Mike, Dunlop, and the new wheels, to arrive at Silverstone at the same time. Unfortunately the wheels didn't arrive because of the strike by French air traffic controllers.

When Mike had finished his initial testing the bike was made ready for a test ride. I made my way to the pits and arrived just in time to see a certain road racer climbing aboard the Ducati. Since he was bigger than me I decided to keep quiet and wait my turn. What I didn't know at the time was that he was going to hog the bike for most of the track session and only leave me time for a very brief spin at the end.

Up to that point I had only been thinking about riding the bike. Now I had time to sit back and contemplate the prospect of rushing around a circuit that I had never seen before, on a bike that was quicker than anything I had ridden before, and in some very fast company. By the time Mr Greedy came in I was one very psyched-out journalist.

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I began to think of lots of reasons why I really shouldn't be riding the bike. What if I dropped it, for example? Before I had time to voice these objections, Steve Wynne had shoved me on to the bike and was pushing me up the pit road. I cruised down the pits in first gear with just a couple of thousand rpm on the tach.

As I gingerly opened the throttle the bike gently eased its way up the slip road. Getting braver I found second gear and opened the taps half way.

The carburation was really clean: the engine would pull from nothing on part throttle and the high gearing made it quite docile. This two wheeled tiger was nothing more than a great big pussy-cat. The big power jump we had recorded on the brake just wasn't apparent when riding. Obviously it was damn fast but not at all frightening. The close ratio gears gave acceleration the feeling of one continuous rush, rather than that kick-in-the-pants feeling which you get from a really big road bike.

A road racer probably wouldn't even notice these things but for me the experience was totally new. Even the "music" from the exhaust was exciting. I am just about the same height and build as Mike Hailwood and the riding position fitted me like a well-worn glove. It was this very "balanced" riding position that made the bike so deceptive. The hump in the seat and the forward lean cancelled out the feeling of being left behind as the bike surged forward, but the footrest positioned the legs so that they could take the weight under braking.

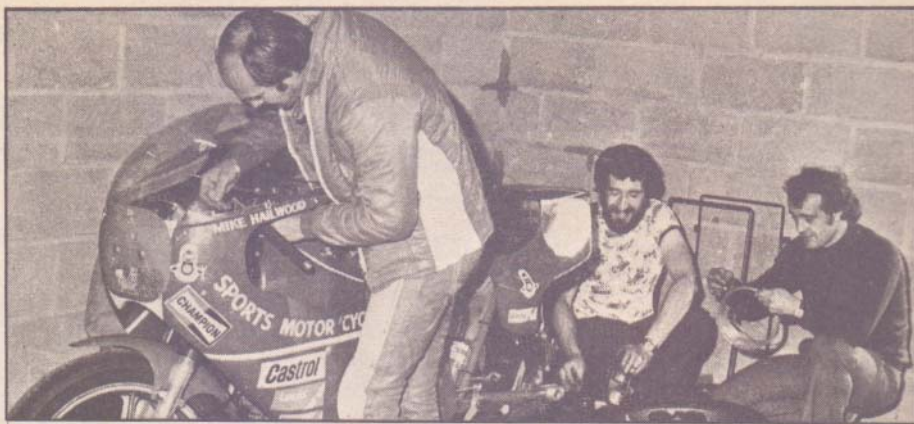
This meant you didn't feel as if you were going very quick until you arrived at the bend, when your pulse rate doubled. Squeezing the brakes didn't appear to slow the bike very rapidly, but you could end up almost at a standstill at the approach to the turn.

For me, the curves in the road are what motor cycles are all about. If a bike didn't lean over through a corner, but stayed upright like a car, I wouldn't ride one. The Hailwood Ducati was the best handling bike I have ever ridden — why can't road bikes handle like that? It was rock solid. Having said that, the suspension did feel a little on the hard side, but I am used to a soft dual seat under my backside, not a thin slice of foam rubber.

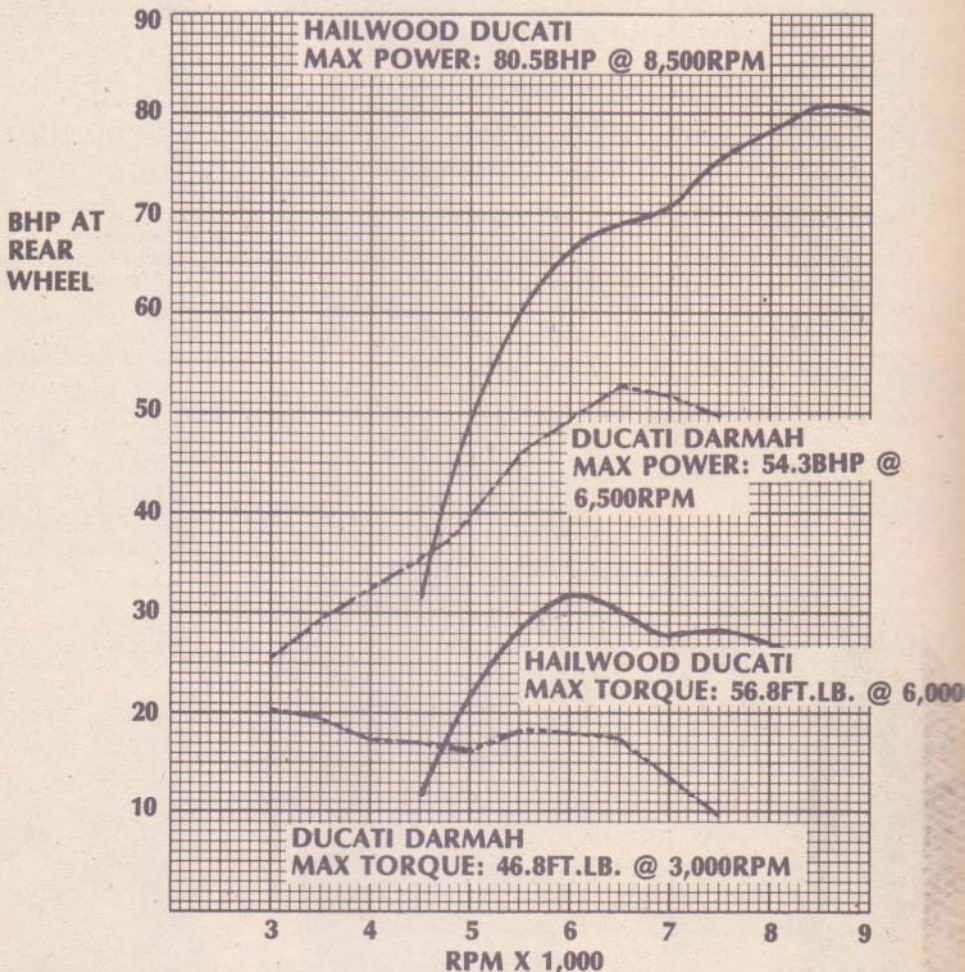
The corners at Silverstone are near constant radius curves. Several times I went into the bend much too slowly — those deceptive brakes — and opened the taps, bringing the speed up to the point where I scared myself. Closing the throttle slightly produced no change in line, or other antics. Not having a clue where the road went I tended to take the curves all wrong, but the Ducati is such an easy bike to ride you could pick it up and lay it down again without any conscious effort.

To sum up the whole machine I think you could describe it in one word: effortless. I would have been quite happy to stick a number plate on it and take to the road, and that's saying something about a machine which has won so much in such a short time.

I really shouldn't have been so surprised because the bike is, after all, only a modified road machine. One of the most interesting points to come to light about the whole test concerned the man who put the bike together: Steve Wynne. He has proved



Mike Hailwood joins in the preparation at Silverstone



that you do not have to own a dynamometer to develop a race winner. Steve's development was done on a "suck it and see" basis. He made his modifications one at a time and track tested each until he was happy with the result. He had no way of knowing if they worked other than that they felt right. The tuning of the inlet tract lengths was spot on, as was the mixture.

It just goes to prove that if you know what you are doing you can "tune by ear".

**Right: Carburetter checks found sand in the works after Mike Hailwood's Donington crash.**

