

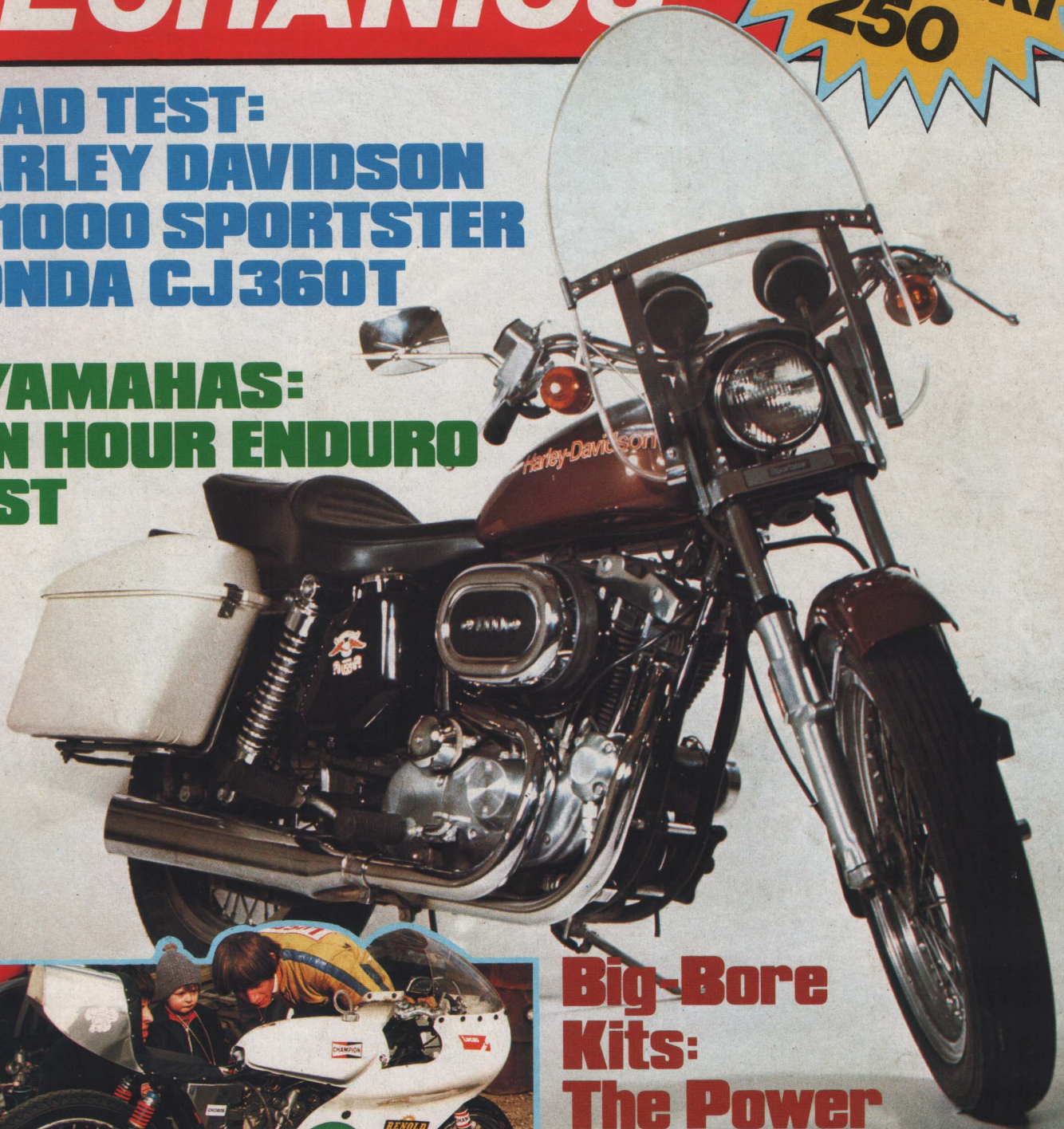
MOTOR CYCLE MECHANICS

JUNE 1977 40p

Win
a Suzuki
250

**ROAD TEST:
HARLEY DAVIDSON
XL1000 SPORTSTER
HONDA CJ360T**

**3 YAMAHAS:
TEN HOUR ENDURO
TEST**



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Kits:
The Power
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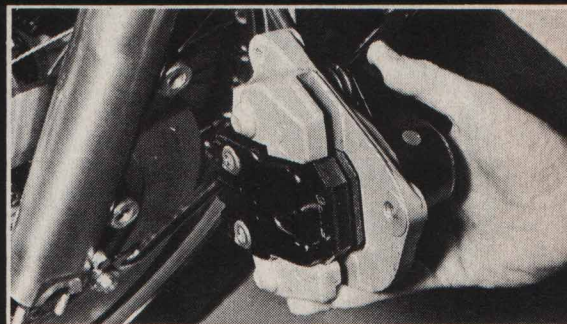
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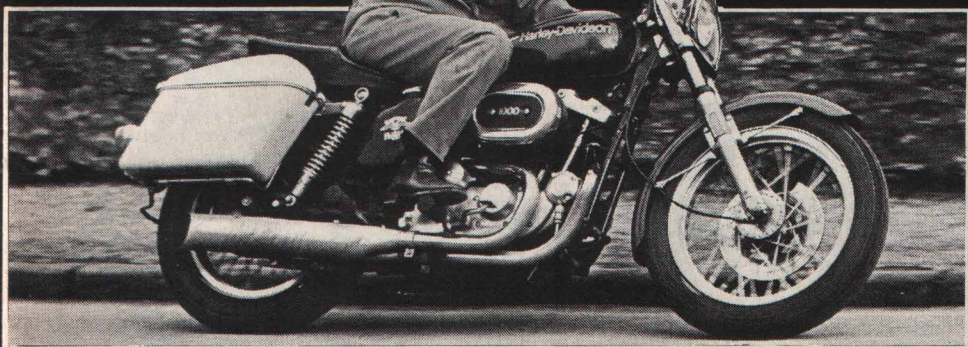


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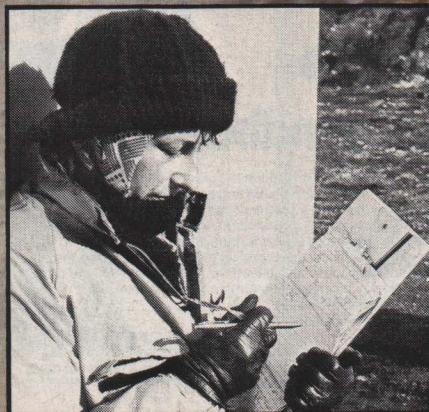
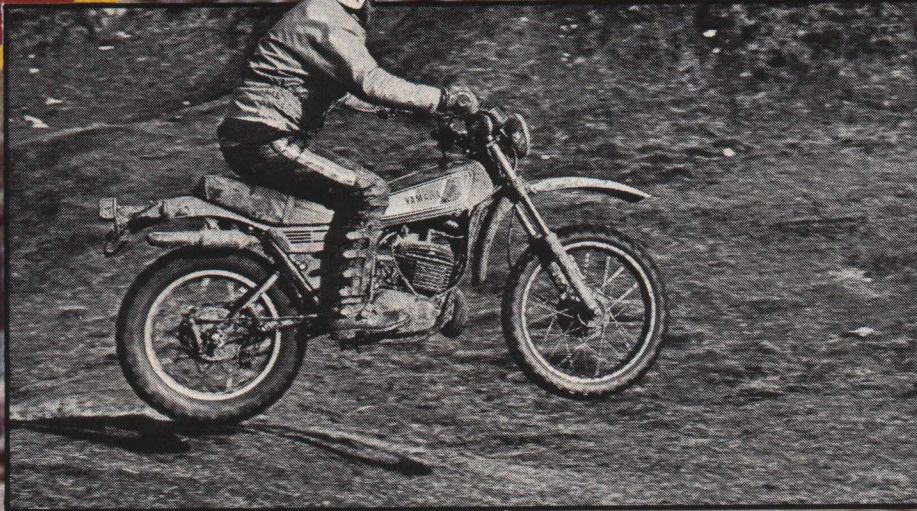


WIN A 250 SUZUKI

DETAILS PAGE 47

ENDURANCE
TEST

SHOWDOWN



A Sunday morning in March: even the sunrise had wiped out in a bank of freezing fog. Four minutes after eight o'clock the 175 Yamaha crackled into life as John Pearson fed in the clutch and slithered away down a muddy slope.

The smallest of the three Yamaha enduros disappeared into the swirling mist and while its straining exhaust note echoed and faded across the moor, Yamaha's Bill Matthews gave the DT250

AT BOOTH'S FARM

Ten gruelling hours of moors, mud, rocks and near-misses push the Yamaha monoshocks beyond normal limits.

Do the new DT400, DT250 and DT175 live up to their enduro label?



its final checks. A few seconds later Bob Goddard headed the new Monoshock bike out in pursuit of the 175.

The pit crew's frozen fingers checked out the third bike; chain tension, fuel and oil levels and all the other details that could be vital, ticking them off as the motor warmed up. In the few minutes that passed before the DT400 was wheeled out, the 175 had dropped down from the moor, through the short

stretch of tarmac hairpins and up to the moto cross circuit at Booth's Farm. When the 400 got into the chase the bikes were spread out and the muffled exhausts were sounding from all around the five-mile circuit. Our ten-hour endurance test was under way. It now remained to be seen whether the bikes would run out of steam before we ran out of riders.

ENDURANCE TEST



Frank Melling had set up the course to simulate concentrated enduro conditions and it had a mixture of fast stretches, steep slopes and deep, slippery mud, all liberally spattered with large rocks and holes that suddenly opened up under the front wheel.

A trial run on Frank's PE Suzuki showed that it would be hard work to average much more than 20mph for any length of time, but how much the course would change with the weather was just one of many unknown factors. How the stock trail bikes would react to it was another.

With the exception of the tyres, the three Yamahas were left completely standard, right down to their flashing indicators. They were barely run in, with no more than 500 miles on any of the clocks and pre-test work had been limited to servicing and a thorough check-over. The trials tyres used as original equipment wouldn't be good for the test conditions and we had some Dunlop enduro tyres fitted.

The object of the test was to run the bikes as hard as they are likely to be used and to see if they could keep it up for hour after hour. We had six riders of varying abilities, not a bad thing because an inexperienced rider can be a lot harder on equipment than an expert. Watch two riders and as the experienced one floats across a rough surface it is obvious that he is going faster but the novice is also finding all the bumps and hitting them harder.

The day before the test we took the bikes to the circuit for a brief wobble round to make sure they were OK and to see where Melling's circuit went. It rained steadily all day long and the first problem emerged. The waterlogged ground around Booth's Farm was getting slipperier by the minute.

On the first lap the 250 and 400 got round the full circuit but 175 just wouldn't get up the steepest hill-climb. The problem wasn't a lack of power but the combination of peaky power and the limited grip of the enduro tyres. Backing off to find traction made the motor bog down, using power gave vicious wheelspin. On the only occasion we got both grip and power, the 175 looped on the steep hillside.

We omitted the worst of the climb, replacing it with a more gentle slope across the face of the hill. Riding this camber was almost as perilous; the bike had to reach a narrow track on the far side, but on the muddy slope it continually slid downhill. The only way was to aim it further uphill than the track and guess the trajectory it would follow to be on course at the far side.

The monoshock machines were very different to the 175. Housed in identical chassis the bigger motors produce very

gentle power with all the torque peaking low on the rev scale. Compared to the lively 175 they gave traction like a four-stroke single.

Across well-drained land the 175 seemed at least the equal of the other two bikes; with its conventional frame it felt quicker, it was smaller and lighter to handle. But when the going got heavier the flexibility of the monoshock models really started to have an effect. They also seemed to have very stable slide characteristics.

When we had to ease the bikes across slippery negative cambers, steering on the throttle was a lot easier than on the 175. Eventually to cope with the mud, we set the tyres at 12psi despite doubts about concussion punctures on the unavoidable rocks.

After only a few, gentle laps, all three machines needed a considerable amount of chain adjustment. This seemed to be the part most likely to fail in the following day's test, although Bill Mathews had fitted new chains and was expecting a lot of stretch in the first few miles before they settled down.

Even in the sloppy conditions we found we could get the bikes round at over 20mph. The problem was that if the rain continued the muddier bits would get worse and a couple of places would get close on impassable. We arranged alternative routes by-passing the trouble spots and decided to let each rider choose his own path according to the conditions the next day.

The organisation of the test hinged on unknowns like this. We didn't know how long the rider could go without tiring, so couldn't pre-arrange pitstops. We didn't know what fuel consumption to expect — we guessed at 30mpg and that the riders would need a rest before the bikes needed fuel. We didn't know what servicing or repairs would be needed — crash damage seemed the most likely and Bill had loaded up boxes with all the spare levers and cables he could find.

The only system was for the riders to keep to their own limits and come in when they got tired.

As each bike stopped it would be topped up with fuel from a quart measure, keeping each tank about three-quarters full, the chain would be sprayed and Bill would make whatever adjustments were necessary. Rather than pairing off the riders, whoever had had the longest rest break would then take the bike back out.

The rest of the pit crew kept a running record of lap times, indicated mileage, fuel taken on and any work done on the bikes. This and maintaining a constant head of hot coffee and bacon butties proved to be a full time job in its own right.

Sunday morning, foggy and cold, was even less attractive than Saturday. Grass-racer John Pearson was sliding the 175 around at an average 18mph, while Bob Goddard took the 250 round at 17mph and I managed 19mph on the 400 — much slower than our practice speeds.

I brought the 400 in after an hour and ten minutes and a couple of minutes later Bob came in with the 250. A crash had broken the front mudflap, rear number plate and tacho and the front brake needed adjusting — how he managed to use the brakes that much will remain one of those imponderables.



John Pearson brings the 175 down from the moor.

Bill went to work and ten minutes later Frank Melling set off on the 250, only to return a lap later with a broken clutch lever. John Pearson made his stint last an hour and thirty-five minutes and his bike was the first to need its chain adjusting.

A relatively calm half hour passed, with a couple of routine rider changes then at 2h 13m, Peter Hughes set off on the 175 and threw it away on the first slope, slithering back to stop a few inches from the coffee pot, as chance would have it. The front brake lever was broken along with the tachometer bracket and Bill found that quite a few spokes needed tightening. It was 28 minutes and many cups of coffee before Peter was on his way again.

A few minutes later when Bob came in to have the 400's gear lever adjusted, it had loosened off a few spokes too. Frank was now hustling the 250 round at 24mph and all it needed at the next stop was fuel.

The conditions had turned to snow and sleet, making riding without goggles very painful but at least everything seemed to be fitting into a rhythm. The stops and rider changes were going off automatically, the bikes were running quite happily and even the chains seemed to be surviving.

They'd been running for nearly three hours when I brought the 250 in to have the handlebars moved further forward. After I'd got used to it and the conditions I found I was going round that bit quicker and was actually braking hard enough to make it uncomfortable with my arms bent. I'd been averaging 21mph and now that everyone had found their own lines around or over the various obstacles, each rider was running consistently close to the 20mph mark. It seemed like we were all trying equally hard consistent with our own abilities — and the bikes were being used as hard irrespective of the experience of the rider.

At 3h 16m the 250 came in and needed its chain adjusting — the need for crash repairs had virtually disappeared now that the riders had found their own levels. We weren't rushing the pitstops but this one was fairly typical and Frank had the 250 on its way in three minutes.

Soon after, the 175 again needed chain adjustment. The bigger bikes, with more suspension movement were actually being kinder on their chains than the 175.

This trusty machine has been around for a fair time now and has earned a reputation for being one of the best trail bikes. And now, competing with the bigger monoshock models it made an interesting comparison.

It felt considerably lighter and smaller



John Robinson on the 400. The bike was sidelined at 8 hours with a puncture.

than the monoshock bikes. The steering is lighter and livelier, helped by the buzzy nature of the motor. Over the less slippery moorland tracks the nimble 175 was the easiest to chase along around surprise rocks and holes, while along the short tarmac stretch, it seemed almost as quick as the 400.

The light and skittish handling paid off on firm surfaces but on mud the back wheel would break loose too easily and the bike would slew violently sideways. In comparison with the sedate monoshock frames, the 175 was often quite a handful.

Going across the line of a slope the bike would turn itself uphill like a weather vane swinging into the wind. The blend of buzzy power, tyres and handling was all wrong for

slippery surfaces. When the motor's rapid pick-up could be used, the 175 came into its own. The Dunlop tyres were good on tarmac and one stretch, with a tight uphill hairpin, showed the 175 in its best light. The other two bikes would regularly break loose and slide in the tight turn, but as we put power on the 175 bit and gripped, lifting its front wheel as it screamed away from the corner.

It felt quicker along these sections and probably with full knobby tyres it would have made up more time on the slippery mud. But early in the day, when conditions were at their worst the 175 demanded more skill to get it round the circuit.

Dave Walker had hurt his back in a practice crash (who else would practice crashing?) but after nearly four hours helping out in the pits he couldn't resist the temptation any longer and took the 400 out. Anyway it was getting ever so cold in the pits ...

Between the fourth and fifth hour of the test the bikes were running smoothly, the riders calling in for fuel, or to have the odd few spokes tightened up and the 400 had its first chain adjustment. The stints were varying with each rider but were, on the whole, longer than we'd expected. In fact the bikes were a lot less tiring than we'd been counting on and were keeping up a respectable and reliable pace.

At the half-way mark the only failures had been caused by crash damage. The closest the bikes got to mechanical failures were loose spokes and the fact that the fins were clogging with mud, making the motors run hot and causing some piston noise.

The bikes were being ridden as hard as the riders were able — witnessed by the consistency in average speeds — and were taking some punishment. Where it was possible to use power, we were using all of it and the terrain was putting varying strains on engines, transmission and cycle parts.

The first half lap from the pits was easy on the riders, if not on the bikes. The track went up a short, sharp slope, slithered round a slippery mud bank to a longer one-in-one slope which was grippy enough except that the quick way to approach it was at an angle.

Coming over the crest of this slope the track curved away over another jump and along a muddy, off-camber trail, winding into a rutted turn. The low down torque and stability of the monoshock bikes made them easy to slide through the turn, getting on to the next stretch quickly. Here a series of large humps had the bikes bouncing all over the place, threatening to destroy suspension units and twist the forks with each front wheel landing. If they were still on line over the last jump they would land neatly on a sheep track over a stretch of moorland punctuated with small but sharply pointed rocks. The narrow track wound in and out of these and a slide or an over-correction would throw the bike off-course, leaving it at the mercy of the tyre and foot destroying rocks.

Chasing the winding track in second or third gear was really tiring and it was a relief when the trail joined a tarmac lane. The temptation to relax and wind power on too early was a mistake, though; the two paths merged at an oblique angle over a slippery verge and the surface change usually had the back wheel flying off to one side.



ENDURANCE TEST

The hard surface was all too brief. There was just enough room to get the bikes flat in fourth before standing on the brakes for a 90 degree right hander, which had the tails twitching on all the bikes. Then the road went over a rise, leading into a tightening, negative camber left curve, dropping sharply to a hairpin bend. Braking gently in the curve and very hard just before laying the bikes into the hairpin really put a strain on roadholding and tiring arm muscles.

Coming out of the bend, holding acceleration through another hairpin and down a slope with the bikes peaking in third before braking hard into a loose-surfaced S-bend brought us up to the farm. Despite the wet, muddy and broken surface, the bikes could be pushed through pretty hard with only the occasional slide — in fact the Dunlop tyres felt better here than they did on slippery mud.

Past the farm there was a choice of either the track — the only guaranteed path for the 175 — or two faces of the hill, a frontal attack over mud steps or an equally steep, off-camber slope. Over the top of this hill the bikes picked up speed to jump a small hole, across the original track on to another slope. When they arrived here they needed to be on course and upright because the waterlogged mud was very slippery and although the slope was gentle it fell away to the right. All the bikes could get across it but with the risk of an instant doughnut particularly from the 175; the difficult part was arriving at the track on the top. It narrowed here to four or five feet with a dry stone wall on the left and a steep drop on the right. Fighting the bikes along the rutted track brought them out to Booth's Farm motocross circuit. After the exhaustion of the hill and the mental effort of keeping the bike aimed at the narrowing track, it was

deflating to remember that this marked half a lap and there was worse to come.

A lap of the motocross track bogged the bikes down in deep mud and then, rear wheel spinning viciously to get over a mud bank, launched them along the shoulder of a hill. The slipperiness made the bikes want to drift left down the slope, and the faster they went the more they'd drift. Correcting to stay on line could have the back end step out, down the slope, swinging the bike round on its own axis. Letting it drift made things worse as the slope merely got steeper finally disappearing altogether in a deep valley.

Another narrow track cut into an almost sheer face led off the circuit. It went down steeply enough to make the 400's back wheel lockup purely on engine compression, but even so we had to keep the brakes on hand; at the bottom the gully led out onto more waterlogged mud. This was the easy way out but it was necessarily slow, a longer way round and it led back to the exit track at a tortuous uphill angle. The quickest way was to get out of the gully half way down the slope which meant finding enough grip to steer the front wheel out and praying that the rear wheel would follow it. There was still the problem of riding across the slope but the ground was better drained and we could ease the bikes up into third gear. This was at the same height on the slope as the exit track and the problem was in getting across at any speed without losing height. Some slip was inevitable and we had to aim higher than the track in order to hit it. I found on the two monoshock models that I could feed in power until the back wheel was about to break away, then shift up. As it picked up speed the tail would start to slide away and I could steer the bike on the throttle, balancing the rear wheel's tendency to break loose and point the bike up the hill against gravity's efforts to make the whole machine slither downwards. In places like this the 175 could go completely uncontrollable.

Picking up the track was no mean feat either — getting both wheels into one of the two muddy ruts wasn't easy with the bike travelling even slightly sideways.

This final slippery exit thankfully left Booth Hill behind, if only until the next lap and the remaining stages were faster and easier. The route re-tracked through the two tarmac hairpins and travelling uphill now we could lay the bikes right into the hairpins and steer round on the throttle. This was something the 250 and 400 excelled at, having the right handling to slide through the turns and the low-down power to pull up the hill.

At the top, another sheep-track left the road and flitted about across the top of the moor, carefully winding around boulders, mounds and deep holes that appeared from nowhere. Pushing the bikes along in third it was all too easy to try to take a short cut across the looping curves of the track and equally easy to pick up too much speed to follow the curves. Such an innocent mistake could be very painful as Dave Walker discovered the day before.

Sheep may be stupid creatures but they do not crash into boulders or hurtle into blind holes — and the only safe way across the moor was to follow their trail.

Coming down from the moor on a steep but grippy grass slope there was a choice of taking the straight line and jumping across several holes or weaving around tumuli in a zig-zag descent, using the fluctuating mounds as brakes. Navigation started to get critical here as a stone wall ran right across the bike's path, with only one hole in it just wide enough to get a bike through. Another trail wound away, across the best part of a mile back to the pits. This was quicker than the rest but no less painful as the bumps and holes made the Yamahas jump and buck like demented donkeys.

To hustle the bikes through this in something like ten minutes gave them quite a pounding; to keep it up for ten straight hours, averaging 20mph would be quite a performance.



While Frank Melling (left) leapt from hill to hill others settled to their own pace, and lap times were very similar.



Into the second half of the test the stints were getting shorter as we got tired but everything was still running smoothly. The bikes were humming along reliably, the pit crew had got their routines into a slick rhythm, even the weather was clearing up. As the ground got drier the bikes were going faster and maybe we should have been ready for the next problem . . . punctures.

Just on six hours, John Pearson wobbled in with the 175's front tyre flat. Bill whipped it off, fitted a new tube and hooked our portable airline up to one of the car's engines. The airline adaptor was broken. Eventually we had to take the wheel in to the nearest garage to get the tyre blown up.

The 400, relatively uncrashed so far, had its speedo cable come adrift but otherwise was running perfectly. At 7h 56m, having lost nearly two hours, the 175 was mended and away. Four minutes later, the 400 limped in, its front tyre as flat as the faces in the pits. I'd got it going a little too quickly across the moor, hit a rock and actually heard the puncture. I backed off and took it down to the tarmac stretch where it seemed to handle OK, I checked it with a wiggle of the handlebars, the Yamaha responded normally and I put the idea of a puncture down to imagination and set off down the road — almost literally. Braking hard into the first corner the bike gave a tell-tale twitch and as I straightened it up the last remnant of air sighed out of the tyre and the 400 went into the throes of what promised to be a terminal weave. By the time I'd got it to a standstill all that was keeping the tyre on the rim and the bike on the road was the security bolts. At this stage it wasn't worth stripping it out and driving off to the garage but while we were thinking about it John Pearson came in to have the 175's forks straightened out, closely followed by Frank with a puncture in the 250's rear tyre. That

settled it — Bill took the good wheel off the back of the 400 and fitted it to the 250.

Both of these singles are, apart from engine size, virtually identical, even in weight. The bigger bike weighs just 4kg more than the 250. They feel totally different though and it can only be due to power characteristics.

Both of the motors produce low-revving torque in great contrast to the peaky nature of the 175. But at the sort of speed range where you're looking for wheel-grip the 400 has twice as much torque as the 250.

You can wind the throttle on from zero speed and the 400 will pick up and thrust forward. It will pull without faltering up steep slopes and in deep mud it finds grip almost like a four-stroke single. The torque falls away rapidly in the top half of the rev band; as the load of a hill drags the motor down the revs drop, the torque comes in and pushes the 400 along with renewed vigour.

The other difference that the monoshock bikes offer is obviously in their chassis. They feel heavier and spongier than the lively 175; in fact with a longer wheelbase, softer suspension and greater weight they are heavier to steer and less keen to lift their front wheels.

If they are less nimble around and over obstacles, they are more stable and more manageable in general. At speed the 400 floats across bumps and ruts. In a turn it handles reliably and is very stable in a slide. On slippery going it was enough to nudge the bike in the required direction, ease on power to get the back wheel going and steer on the throttle. This way the bike was controllable in conditions where the 175 would simply slew round in a tight circle.

In a straight line, across bumps and ridges, the Yamaha would buck about, feeling like it was jumping well clear of the ground. But the wheels still followed the surface and put down power more of the time than most trail bikes could manage. The shiny fork stanchions showed more than seven inches of movement and it felt

like the rear suspension was easily keeping up with this. Maybe it's an indication of either the course, or the riders, that we were making both front and rear units bottom out in several places.

I felt that the riding position could be improved, mainly by making the Yamaha a bit slimmer amidships and moving the rider further back to compensate for the heavy steering. Yet taken over ten full hours, the ride comfort was surprisingly good.

Right from the first few laps of practice, everyone agreed that the 250 was the best of the three for the conditions we had to ride in.

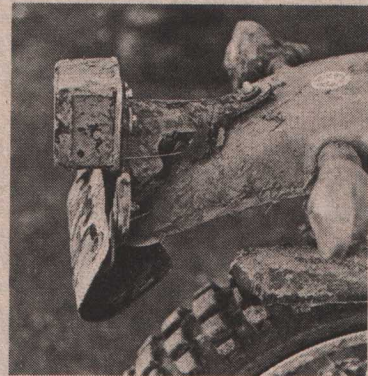
As far as handling and comfort went it was the same as the 400. The motor's power characteristics are the same too, except that there's less of it. In difficult places this meant that the power and pick-up were more gentle and therefore much easier to use. Coming away from a slippery obstacle the 250 would be revving that much harder than the 400, giving the same torque but picking up faster. Overall it was quicker and each of us found it to be the easiest bike to ride over a full lap.

By the end of the day the 250 had finished more laps than the others — not a fair comparison as they were stopped longer for punctures — but it did them at consistently higher speeds.

This wasn't merely because the 250 was being ridden harder or by more skilful riders. Each rider had found his own level and had been able to lap consistently on all three bikes and the fuel consumption reflected this. The 400, as expected, gobbled up most at 29mpg while the 250 ran 35mpg and the 175 managed 39mpg.

The 175 scored on the firmer ground over the moors, the 400's instant power made it easy to correct mistakes on steep slopes, on tarmac there was little to choose between all three. But over the range of obstacles and surface conditions of a full lap, the 250 consistently came out on top.

By 8h 46m Bill had cleared away enough mud to find the rear wheels, switched them



The DT400's rear number plate got furled like a roller blind by the rear tyre.

ENDURANCE TEST

over and had the 250 on its way. For a peaceful threequarters of an hour we had nothing but routine fuel stops but the pace had gone up. Not being able to increase tyre pressures, we should have backed off on the moorland stretches. Instead, with only half an hour to go, I punctured the 250's front tyre and I'm convinced it was on the same rock as the 400.

As the 175 buzzed steadily round to

complete its time, Bob found that the 250 could be ridden gently with a flat tyre and circulated a much modified lap.

At the ten hour deadline the bikes were still running healthily and the 400 had only been sidelined by our lack of foresight and bad luck. Mechanically all three bikes were running surprisingly well; none of them had needed as much as a fresh spark plug. Which was just as well as after the first half-hour it was no longer possible to see the spark plugs!

The only hint of a problem was slight piston noise when the motors started to overheat, caused by the engines being clogged with mud.

Once the new chains had taken up their initial stretch — which happened with frightening speed on the Saturday — they needed minimal adjustment, despite running in the worst possible conditions. They were sprayed every time the bikes stopped at the pits, using up two tins of chain lube in the course of the day.

The only other problems were caused by

crash damage. In the first few hours there were several broken clutch and brake levers, the 250 shattered its "unbreakable" front mudflap, and rear number plates seemed to suffer quite frequently. After the test the rugged frames seemed quite healthy, merely having the forks slightly twisted in the yokes. All the bikes finished with their electrics — and indicators — intact and working.

The only real performance criticism is that the Yamahas seemed to lack top end speed; under our conditions where we rarely hit more than 50mph this didn't really affect things. There are some obvious mods which would improve them for competition work; the monoshock bikes need to be slimmer, for example. But for strength and reliability there doesn't seem to be much that the Yamahas need — possibly more use of injection-moulded plastics for items such as control levers and those rear number plates. A French firm is using this material for footrest kits so maybe there are quite a few other applications on the cycle parts.

	DT 175	DT250MX	DT400MX
OVERALL RUNNING TIME	10h 00	9h 50	8h 01
RUNNING TIME LESS STOPS	6h 47	7h 50	6h 55
MILEAGE COVERED	127 mi	163 mi	122 mi
FUEL CONSUMPTION	39 mpg	35 mpg	29 mpg
OIL CONSUMPTION	240 mpp	163 mpp	185 mpp
AVERAGE SPEED LESS STOPS	19 mph	21 mph	18 mph
OVERALL AVERAGE SPEED	13 mph	17 mph	15 mph
WORK NEEDED	bent brake pedal brake lever broken tacho bracket broken spokes loosened bent chain rail front puncture twisted forks chain adjusted twice	tacho broken front mudflap broken number plate bent clutch lever broken front spokes loosened rear puncture dent in front rim front puncture chain adjusted once and re-set when rear wheel from 400 was fitted	spokes loosened speedo cable adrift number plate bent front puncture chain adjusted once
SPECIFICATION	171 ccm, 66 x 50 mm reed valve single. 6.2:1 comp ratio, claimed output 16 hp at 6500. VM24SS carb, ignition by magneto and cb. Wheelbase 53 inch, dry weight 225 lb front tyre 2.75 x 21 rear tyre 3.50 x 18	246 ccm, 70 x 64 mm reed valve single, 6.7:1 comp ratio, claimed output 23 bhp at 6000 rpm. VM28SS carburettor, ignition by magneto and cb. wheelbase 56 inch dry weight 261 lb front tyre 3.00 x 21 rear tyre 4.00 x 18	397 ccm, 85 x 70 mm reed valve single, 6.4:1 comp ratio, claimed output 29 hp at 5500 rpm. VM34SS carburettor, ignition by magneto and cb. wheelbase 56 inch dry weight 270 lb front tyre 3.00 x 21 rear tyre 4.00 x 18
LIST PRICE INC VAT	£449	£630	£670