

IF YOU are a trail bike owner who ventures only rarely off-road, but wishes to get deeper into the scene by carrying out a few modifications to your bike; or if you are a proficient enduro competitor but think you may be missing a trick or two, let London dealer Dave Rayner guide you along his off-road preparation path.

Some of the tips will be too competition-orientated for the newcomer to trail bikes, while others will be 'old hat' to the experienced rider. The idea is that you should pick out the tips which will best suit your bike, and your pocket.

Dave rides in enduros and moto cross for business and pleasure. What he learns from racing he passes on to his customers in the shape of advice and competition parts. A specialist dealer for Yamaha competition bikes he is supported by Yamaha importers Mitsui in his racing ventures. In enduros he has been racing one of the latest DT175MX Yamaha trail bikes — in fact, he won a gold medal on it in this year's Welsh Two-Day Trial, the only rider on an under 250 cc machine to achieve the gold standard.

Much of the content of this article is based on the modifications carried out to Dave's DT Yamaha, but engine tuning is not covered because it cannot be adequately described in general terms.

GENERAL TIPS

1. Loosen the handlebar levers. They should be tight enough to stay in place over the roughest going, but loose enough to slide round the bars when the machine is dropped. This modification will reduce the

against particles of mud and grit being run up and down the fork legs. They will also prevent pitting of the stanchions by protecting them from rain, rusting and chipping. Once the forks have become pitted the oil will find its way past them and damping quality will suffer because of oil loss. This modification will eventually pay for itself in terms of saved oil seals, time and oil, particularly if you are using expensive fork oil and have experimented to find the best oil viscosity and quantity to suit your weight and riding requirements.

4. Fit comfortable handlebar grips which stay on the bars. Trying to pull your bike upright after a fall is no fun if the grip comes off in your hand and the bike goes down again! Soft rubber grips will be comfortable for long riding periods and make throttle operation more positive when the grips, and your gloves, are slippery with mud. It goes without saying that comfortable, hard-wearing gloves are also important, but clothing is another subject altogether and will not be dealt with here.

5. If your engine is not held together with Allen screws then fit them. An Allen key fits deep into an Allen screw, and providing both are of good quality will not suffer from burring. With Phillips or crosshead screws a tight screw will require a lot of leverage both downwards and sideways to keep the driver in the slots. As we all know, they can jump out and distort the slots ... particularly on Japanese engines.

The other advantage of the Allen screw system is that the key is very small and takes up little room in the toolbox ... much less room than an

parking lights are hardly ever required on a bike, the battery can go. The hooter can be replaced by a bicycle bulb type.

7. Lighten all possible parts. This complements Section 6, and again depends on the lengths to which you will go. Fitting a lighter hooter has already been mentioned. The rear light section and number plate on trail bikes are often bulky and vulnerable to damage and can be replaced by a lightweight unit with rubber number plate. The headlights are often large and are supported by brackets which hold the instruments. A lighter headlight and mounting bracket such as an alloy plate can save considerable weight around the steering head.

The mudguards can be changed for lighter plastic units such as the Preston Petty types which incorporate a rear light lens and give far better protection than most standard guards. You could go mad and further lighten the bike by drilling holes in the rear sprocket and cutting off all unnecessary lugs. Determine your own boundaries in this direction, but remember that frame strength is of great importance on an off-road bike.

8. Eliminate dead weight from the toolkit. Again this is part and parcel of sections 6 and 7. First of all make sure the tools you are going to carry will actually fit in the toolbox. Carry a spoke key and a tyre lever. You only need one lever because you can use the spoke key to hold the part of the tyre you have just pulled out. Combine tools wherever possible. My tyre lever was cut in half and welded to a box spanner for the wheel nuts so

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likelihood of breaking or badly bending the levers.

2. Loosen the knurled rim nuts on each valve stem of the inner tubes. Even if your bike has security bolts tyre creep can occur, particularly if the tyres are at low pressures for muddy going. Tyre creep will pull the inner tube around the rim, and if there is not some 'give' at the valve stem, the tube can be stretched to the point of tearing; sometimes completely separating the tube from the stem. I use self-tapping screws to hold my tyres in place (as described later) but still loosen the rim nuts as an extra precaution.

3. Fit fork gaiters. They weigh virtually nothing and will preserve the oil seals which cannot hope to last

impact screwdriver and hammer!

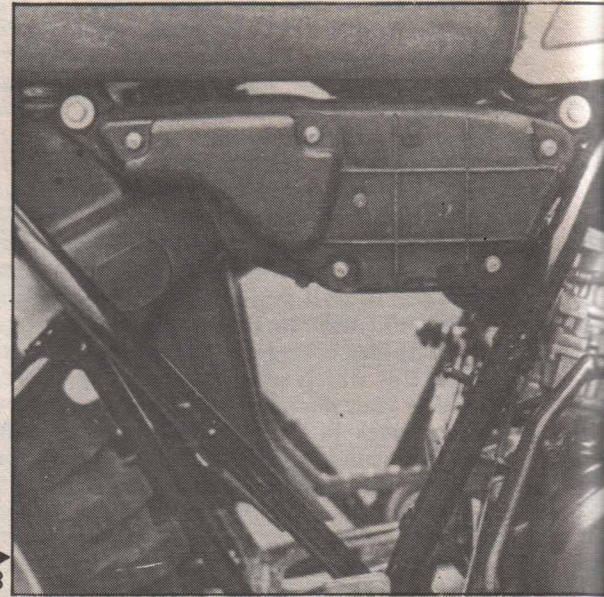
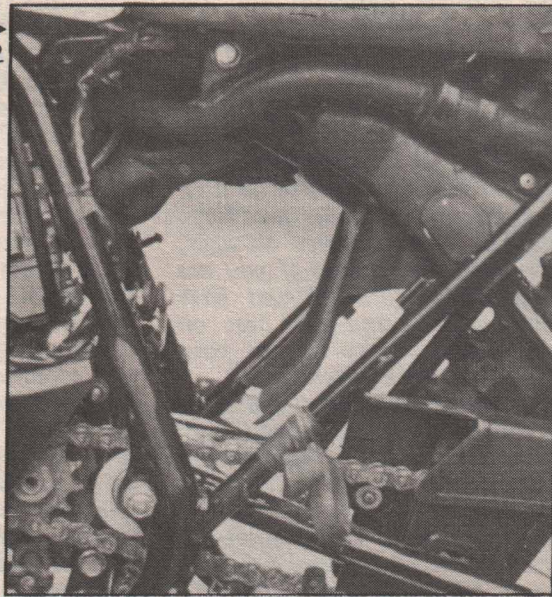
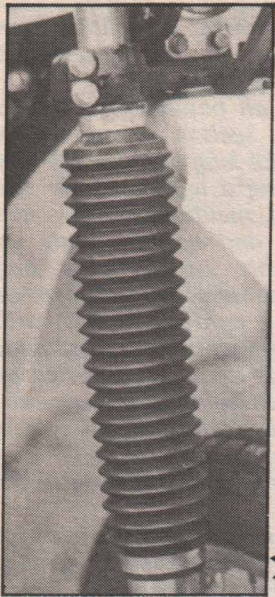
6. Remove unnecessary weight. You can decide for yourself which of the following are unnecessary; rear view mirrors, indicators and their mounting stalks, rev counter, pillion footrests, oil tank (if it's a two-stroke), battery, seat strap, wiring. There may be other dispensable items on your bike.

If you take the rev counter off, the cable comes off with it, and if you remove the indicators their part of the wiring loom can be detached as a bonus. Two-stroke owners can go straight to petroil lubrication and shed the weight of oil tank, oil lines and oil pump. The battery on some trail bikes power only the parking lights, indicators and hooter. Since

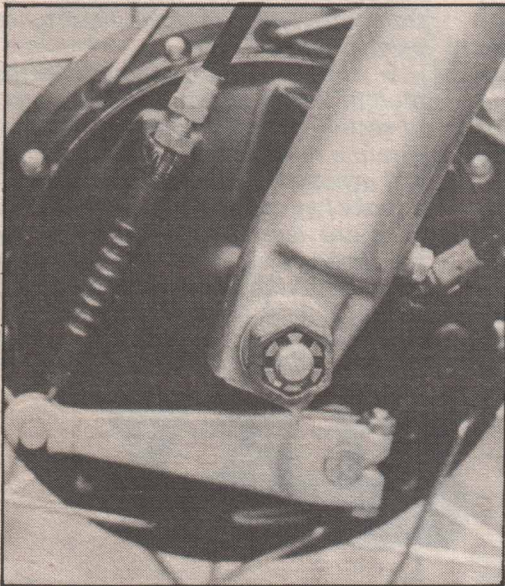
that one tool now does two operations.

Other essential items for the tool kit are; spare spark plug and spanner, Allen key for the engine screws, a joining link for the chain, and a spare inner tube for the largest rim. More on that one later. You may also want to carry spare cables. These can be routed alongside and taped to the originals. A means of inner tube inflation will also be needed. You can choose from items such as Finilec and soda syphon air cachets to a small bicycle pump fitted to the bike, or one of the new tiny syringe pumps for blowing up air suspension.

9. Do the jobs you may envisage having to do on the trail at home just so that you can discover all the snags.



Addition of fork gaiters (1) is a cheap, lightweight way of protecting seals and stanchions. Running on petrol mixture allows removal of the separate oil tank (2) while opposite flank (3) shows battery and tool box removed. On the Yamaha, a piece of box spanner was forced over the spindle rest (4) to make it the same size as the rear spindle-saves unnecessary spanners being carried. Replacing the split spacer with a piece of appropriate sized tubing (5) means that the spindle can be removed without slackening off the clamp nuts. For a QD rear brake, cut away the rear of the operating arm (6) so that the brass nipple can be lifted out without removing the wing nut. A bent washer in front of the nipple makes compressing the spring easier during this operation.



Perhaps the most likely problem to occur while off-road riding will be a puncture. You can carry an aerosol of puncture sealant, but if the hole is too big it will not work. The wheel will have to come out for a new inner tube. You should therefore practice taking the wheels out to become familiar with the procedure, and you should practice tyre removal.

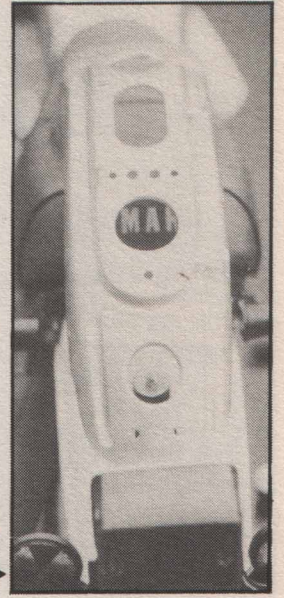
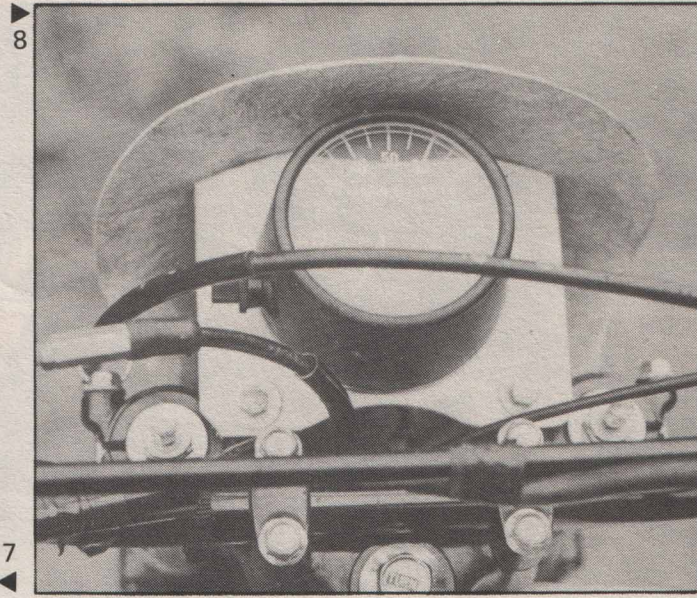
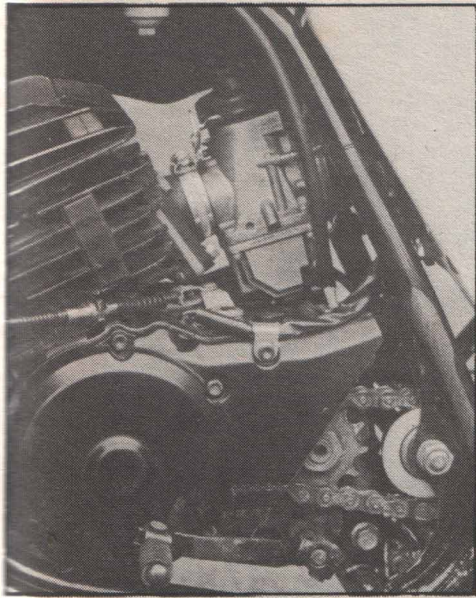
Cut down on the time needed for jobs. Let's take wheel removal as an example. First of all throw away the split pins altogether. You don't need them (or R-pins) if the wheel spindle nuts are done up tight enough in the first place. Use wheel spindle nuts common to both wheels so that you need only one spanner. To achieve

this system on my Yamaha I forced the end of a box spanner over the front wheel spindle nut to make it the same size as the rear.

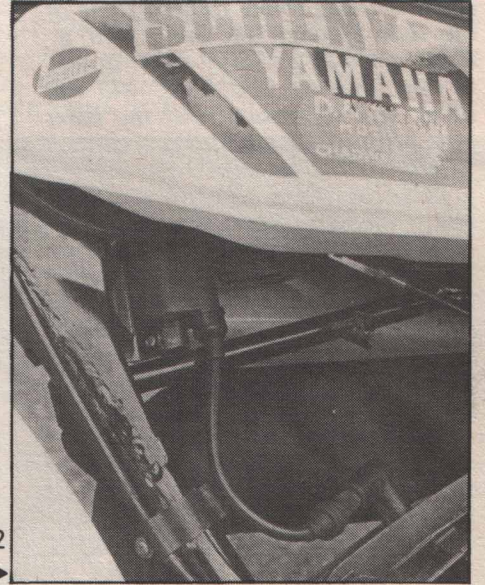
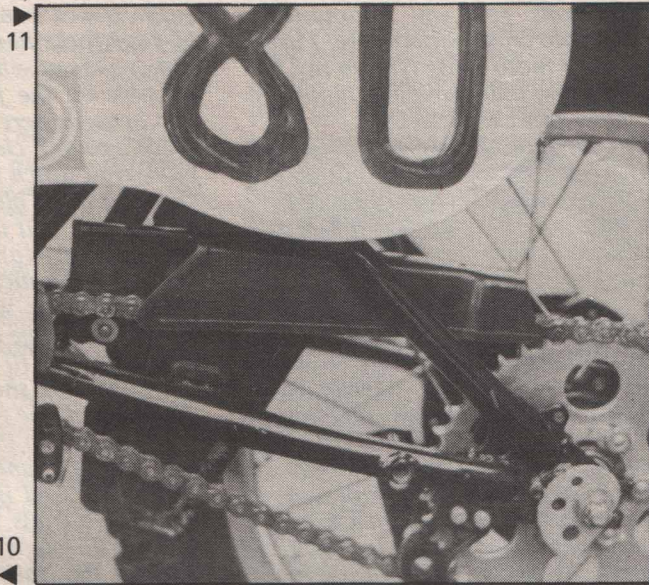
10. The snag on most Japanese trail bikes is that the front forks have some kind of clamping system for the wheel spindle. Ideally, removing the front wheel should involve removing the spindle only: it should not be necessary to loosen and tighten clamps. The problem on my Yamaha is caused by a split spacer which tightens round the spindle as the clamp is tightened. By using a piece of handlebar tube instead of the split spacer, the wheel spindle can be inserted and withdrawn without the need to touch the clamp nuts.

Obviously the new spacer is a snug fit so that the spindle is held rigidly. If the spindle was a tight fit in the first place, emery it down and grease it.

11. Having practised taking your wheels out as in Section 8, you will know whether or not the brake plate comes out with your rear wheel or if it stays in place. If it comes out with the wheel a method of quickly detaching the rear brake is called for. The rear wheel of the DT175MX comes out complete, and if your bike has the same set-up the simple answer is to cut a section out of the actuating arm to enable the nipple (which is free to slide along the brake rod) to be removed and replaced without the need to undo the wing nut adjuster



Cover on the left side has been cut away slightly (7) to give better access to the drive sprocket, helps with the removal of mud, etc. Rev counter has been removed (8) and speedo mounted on an alloy plate. Note forks have air-caps. This metal plate (9) is found beneath the standard Yamaha mudguard which it reinforces — remove it. This is how the forks are clamped when you buy the bike. (10) Re-clamping the forks flush with the top yoke gives more ground clearance and more trail. The cut-away chain guard and heavier than standard chain are evident in (11). Side number plates are essential for competition work. The coil points straight down (12) but ideally it should have its wires facing rearward. If water ingress gives trouble, use silicon rubber as a seal around all connections.



and then have to slide the brake rod out of the nipple centre hole. You can clearly see this modification in the accompanying pictures, which also show a washer with its ends bent to go round the actuating arm. This makes squeezing the spring on the rod easier to detach it from the arm.

12. To cut down the time needed to take off a tyre, use self-tapping screws rather than security bolts as the means to prevent tyre creep. If you use security bolts you will need two in the rear wheel. One may not be enough, particularly on more powerful bikes. Once you have the security bolts fitted you have to loosen them to get the tyre off and make sure the tyre is correctly

positioned between them and the rim when it goes back on.

With self-tapping screws, this time you merely kick the tyre off them. When replacing the tyre the screws will penetrate as the tyre is pressed on to them during inflation. There is one hazard to be avoided; that of ripping the inner tube on the screws when removing it.

Fit four screws in either side of the rear wheel and three in either side of the front, ie fourteen in all. Space them evenly in a staggered pattern for either side of the rim and use screws which protrude "inside" the wheel rim by 1/8" to 3/16". File the points of the screws down slightly to reduce the chances of catching the inner tube

on them. Or to save all this work you could buy an enduro rim which features this method of holding the tyre.

13. While on the subject of tubes, fit Schraeder caps which allow you to remove the valve cores as well as keeping the muck out. If you are going to carry a spare tube — an imperative measure for enduro riding — carry a tube which will fit the largest wheel. You can fold a 21in tube to fit an 18in wheel, but you cannot stretch an 18in tube over a 21in rim!

14. If the rim rubber has split, or looks likely to, take it off and go round the rim-well twice with plastic backed adhesive electrical tape. Then



The two bikes may look pretty similar, on first inspection, but Rayner's modified machine on the right is considerably lighter, and quicker! Note, too, his choice of a centre-stand — much easier for rear wheel removal out in the trails.

cut out a hole for the valve stem and make sure the stem slips in and out easily without trying to drag some of the tape through the hole with it. Electrical tape properly stuck down, is not stretched too tight, will not break and so ensures that the inner tube will not come into direct contact with the spoke heads.

15. Alter the gearing to suit your requirements. Often manufacturers supply an alternative drive sprocket with one more or one less tooth than standard. So, for little outlay you can at least create the opportunity to experiment. If you know you want to alter overall gearing more drastically then you can have a rear sprocket made up for you by a specialist manufacturer. If you bought alternative drive and rear sprockets you would then have a choice of four overall ratios for experimentation.

Obviously for off-road work to make better use of the power available you would gear down. I suggest you start either by using a drive sprocket with one less tooth, or a rear sprocket with three extra teeth.

16. When choosing tyres do not think on the lines of "the wider the section the better the grip". This may be true, but you can have too much grip for a required application. If you are riding a standard 125cc mount, and you fit a 5.00 x 18 moto cross rear tyre — not that it would fit between the swinging arm forks — you would find it hard to spin the back wheel to extricate yourself from a muddy situation. The wheel would grip and stall the engine.

I would say that for most Japanese trail bikes the widest section for a rear

tyre need be a maximum of 4.00. If you are going to use the bike in competitions you will undoubtedly need a moto cross pattern tyre: I use a 3.75 x 18 moto cross tyre on my 175 Yamaha and that provides ample grip for the engine characteristics.

17. If your footrests are spring loaded and retained by a cotter pin which is locked in place by a split pin, get rid of the cotter/split pin arrangement and replace them by a nut and bolt.

If you clouted a rock with a footrest it could easily bend the cotter. This would pull the split pin hard against the footrest and make it almost impossible to pull the split pin out. At least with a nut and bolt you would be able to get a spanner on the nut. Then you can think about tackling the job of knocking the bolt out. If you have ever ridden with a footrest jammed in the upright position you will realise the value of this modification.

18. Experiment with quantities of fork oil in 20cc steps to get the required damping. Anything less than this amount and you will find it difficult to feel the difference. You may also wish to experiment with oil of a different viscosity to that quoted in your handbook. In general 'light' oil is used in forks such as SAE 10 or 20. If you are using your bike for some really hard off-road riding you can stiffen up the damping by either using more oil, or oil of heavier viscosity.

For the rear end there are many accessory shock absorbers on the market which would make a vast improvement on some of the

standard shockers to be found on trail bikes.

19. If you can adjust the position of your forks in the yokes, clamp the top yoke at the highest position possible on the fork legs. There are two benefits here. First you will have more ground clearance and second more trail which makes the bike more stable at speed along the straights and on corners. But unless you are riding in competition you may not consciously notice the second benefit. Check in your workshop manual or handbook to see if the location of the rear shockers (if there is more than one location) should be changed to complement the fork positioning.

If you are on the short side perhaps you won't want the extra ground clearance. And if you like slow pace trials type trails then push the forks legs up through the top yoke. This reduces the trail and makes the bike easier to turn. Unfortunately you can't have it both ways.

20. Route the carburettor breather pipe to the highest convenient point possible on the bike. You may need to fit a longer pipe to accomplish this precaution against water getting into the float chamber.

21. A quick action throttle is not strictly necessary unless the one on your bike needs two handfuls to get it on the main jet. In this case a quick action type will be a great improvement, and some of them route the throttle cable neatly along the handlebars to avoid catching it on tree branches and the like. If your cable hangs from the throttle in a wide loop ready to snag everything in sight, turn the throttle round on the

bars so that the cable runs along the top of the bars.

22. Stick to the spark plug type specified in your handbook unless you are going in for competition or very hard-riding, in which case go up a grade to a "harder" plug which will better dissipate the extra heat. Best of all, use a platinum plug which has a wide heat range and will fire dependably from tickover to flat out without fouling. And always carry a spare plug.

23. Adjust the brakes to give the leverage you feel happiest with. But bear in mind that having the front brake adjusted up too much will probably result in a fall if you panic-brake and lock the front wheel. Many top scramblers have the front brake loosened off so much that they can pull the lever right into the bars without locking the wheel. They still have all four fingers round the lever and grip so that they have a firm hold on the bars and they can blip the throttle with their thumb.

24. Fit a pair of braced handlebars. Bars without the centre brace are not strong enough to withstand constant abuse, and some will fold up the first time you drop the bike. Once the bars are bent it is very difficult to straighten them back to their original shape.

25. Fit a heavier chain. Of all the abuse handed out during off-road riding, the chain takes most of the punishment and quickly wears if not lubricated regularly. You can fit a wider chain either on your existing sprockets, or buy a set of wider sprockets — first making sure that there is enough clearance for the extra width.

The advantage of the first method is that the wider chain allows dirt to expel itself as it is squeezed between the chain roller and sprocket tooth. The second method reduces chain and sprocket wear because the transmission load is spread over a wider area. It is interesting to note that German Jwis chain can be bought in this country with sideplates spaced away from the inner plates to allow easy lubricant penetration to the rollers.

26. Keep your brakes clean. You will be surprised how much muck can get inside a drum brake especially after a muddy ride. If you have access to an air line it will make the job easier, and the reward will be in more efficient braking and less wear of the brake shoes.

Most of the modifications you have just read can and have been directly applied to my bike which in essence is an over-the-counter trail bike, though a much better one than the previous DT models.

All items mentioned in Section 6 have been removed. All items mentioned in Section 7 have been made lighter. For racing purposes the lightweight headlight incorporates a racing plate and the original plastic sidepanels have been replaced by glass fibre units to carry side number plates. They are heavier because they are bigger. Unfortunately, on this particular bike it is the only practical solution to the problem of location of the plates.

To make the bike still lighter, the chain guard has been cut down. It also makes pulling the back wheel out easier. By using petroil lubrication at a ratio of 25:1 it is possible to remove the oil pump as well as the oil tank and replace the original right engine cover by a cover from Yamaha's YZ125 moto cross model. This not only makes the bike lighter, it makes it narrower, too. The left engine cover has been cut away near the drive sprocket to make clearing debris from the sprocket easier.

The tool kit casing has been removed and replaced by an enduro tool kit which is rivetted, not glued to the tank. The rivets do give rise to a

slight amount of fuel leakage, but this method of mounting is much more positive than glueing.

The coil is mounted in its original position and I have had no trouble with it. But if it pointed forwards I would have turned it round so that the HT lead and electrical wires pointed backwards to prevent them getting mud and water "full in the face".

I have modified the forks and monoshock rear suspension to give more travel and fitted valves to the forks caps for air assisted front suspension. The engine has been slightly tuned and is now fed by a 34mm Amal carburetter instead of the standard 26mm Mikuni. A mainstand has been fitted to make wheel removal easier. The rear wheel is driven by a heavier than standard chain and the gearing has been altered to suit the power. The original chain tensioner is in use.

I considered the seat comfortable enough not to require modification, and the fuel tank has sufficient range. Because of this the bike does not look too far from standard . . . at first glance.

Dave Rayner with a standard Yamaha DT 175 MX and an array of the parts that have proved dispensible — amazing for a bike which is already noted for its light weight. Although the modifications in this feature refer to Dave's Yamaha, most are equally applicable to other trail (or enduro) bikes.

