

Bikes like this don't grow on trees



Presenting a record breaking baby put together, just for fun, for silly money by Steve Rowley, with help from Mike Cookson Cycles in Manchester.



# BREAKING THE 20lb Barrier

**I**992 has seen the emergence of the truly light mountain bike. From frames to inner tubes, just about everything has got lighter. A top flight MTB now easily matches all but the very lightest of road bikes in terms of weight, and it would be even more competitive were it not for the extra bulk of MTB tyres. Using the very lightest frames and

**Pictures:**  
**Dave Stewart**

components available it is possible to build a mountain bike that tips the scales at a wisp-like 20lb - here it is.

How is it done? Easy. Stuff your back pocket with about three grand and read on for the secrets of MB's superlight project bike.

#### Heart of the Matter

The heart of any light mountain bike is the frame. Recent technological developments have provided manufacturers with a range of materials that provide frames with feathery statistics. Aluminium, carbon

fibre, steel, metal matrix and of course, titanium, are all capable of forming the basis of an ultra-light MTB.

Generally, titanium just edges out the others by a few ounces. There are lighter frames built from the other materials, but they often fall down so badly in terms of strength or stiffness to be of little interest to the serious mountain biker. For example, ultra-light Excell HR (steel) tubing from France has exceptional strength (200,100 psi tensile, 171,000 psi yield) yet is drawn so thin that frames built from it can be extremely whippy. A degree of 'give' can be desirable, but a frame that writhes around like a snake is virtually useless.

Therefore, for the purpose of MB's project bike we have stuck with what has become the benchmark for high performance, lightweight MTB frames: **3/2.5 titanium**.

That is titanium doped with 3% aluminium and 2.5% vanadium. This type of tubing is

used extensively in the aircraft industry for high integrity fuel lines and is available to frame manufacturers in certified or uncertified versions. Both are more than adequate for mountain bike frames, the quality of the welds dictating the final strength of the frame. It is highly unlikely that the *ti* tubing itself will fail.

Back in 1987 there was only one manufacturer of *ti* MTB frames in the game, Merlin, whose first bikes were made for Marin. Now of course there are lots of different titanium frames available for the MTBer. Many of these come from the same source, Sandvik in the USA. Examples of Sandvik sourced frames are Kona, McMahon and Dean. Other 'stand-alone' manufacturers include Merlin, Litespeed, Lavo and Marin who now manufacture their own *ti* frames as well as sourcing from Litespeed.

In short, any of the aforementioned frames would fit the bill admirably for MB's



superlight bike. The **Marin Team Titanium** was chosen because it is readily available, performance proved and cost effective. At around 3.5lb it is also very light. Compare that to an average steel frame which weighs around 5lb or more.

The Marin frame was mated to **Ritchey's Logic fork** which at around 730g is among the lightest.

#### Bolt Ons

To mate frame and fork together, **Onza's Mongo UFO** headset was chosen, chiefly because of its low weight at 99g, but also because of its use of roller instead of ball bearings, providing for a good action and improved durability.

Continuing with components that bolt directly to the frame, at 187g, **USE's** titanium seatpost is an obvious choice for the saddle mount. **Dean's** post is similarly light at 190g for a 360mm length, though is not available in the UK at the time of writing.

**MRC's ti post** is another contender at 212g. A titanium, non-quick release seat post binder bolt by **X-Lite** was chosen to clamp the post in position.

At a trim 195g, the

ubiquitous **Flite** was the obvious choice of saddle. Not everyone's choice in terms of comfort, others swear by it.

and **San Marco's Titanio 200** (220g).

Moving down to the bottom bracket, **Syncros' ti** bracket



*Nuke Proof carbon fibre hubs with titanium Ringle QRs*



*Marin Lite titanium bars/Mongo UFO headset combo*

There is a plethora of titanium railed saddles in the 220-250g region that have more padding than the Flite, these include **Ritchey's 'WCS'** (230g), **Orange's 'The Edge'** (210g)

was fitted weighing a skinny 165g. Even the very best steel b/b's such as **Shimano's XTR** sealed unit (267g) do not come close to *ti* units in terms of weight.

#### Bars and Stem

Moving up now, the stem. Again it had to be *ti* and there are a number of candidates. **MRC**, **ITM** and **Marin** all make light units. Although slightly heavier than the other two, the Marin stem at 230g was fitted because it includes a cable roller, thus needing no separate cable stop.

And now to the component that has perhaps captured the hearts of weight shavers like no other; the handlebar. For some odd reason, manufacturers have fought tooth and nail (sometimes with catastrophic results) to produce the lightest bar. I recently had a close shave with a carbon bar that decided to reproduce in the primitive manner - split into two. And no, I was not abusing the bar. Heavy or aggressive riders should avoid very light bars in preference to beefier models for safety's sake. Although manufacturers should not see this as an excuse for getting away with goods that are dangerous.

Three bars hover around the 130g level; **Ritchey's 'WCS' Prolite** weighs around 125g, the aptly name **'Sub 130'** from **Pace** is similarly svelte and **Marin's 'race**

version\* of its **Marin Lite bar** weighs 133g. The **Marin Lite** was fitted to the *MBI* project bike. It could have been any of these three however.

**Marin Lite grips** completed the steering department.

The wheels on a mountain bike are an important place to keep weight to a minimum, even if you are not too worried about the overall poundage of the bike. Rotating weight is very significant when climbing or accelerating. At 345g **Trek's Mt Titan** cut a fine dash and were mated to **Nuke Proof hubs** weighing 90g for the front and 165g for the rear. Using 32 hole hubs and rims it was impossible to build a mighty light set of wheels using **DT 15/16 gauge spokes**.

One of the problems of specifying exotic hubs is that generally the rear hub will not accept a Hyperglide cassette. Instead a **Sachs Aris freewheel** incorporating Hyperglide-type tooth profiles was used. **Ritchey Force Racing 'WCS' tyres** are pretty much the lightest tyres around, at 465g, and were inflated by **Air-B latex based inner tubes** at 145g.

#### Cranks

Cranksets have been the subject of severe weight reduction techniques recently and a number weigh less than 500g for the cranks and spider. **Cook Bros Racing RSE cranks** come in at 460g but are just beaten by **Grafton's Speedsticks** at 440g. Equipped with a microdrive size spider, the latter was fitted to the bike. **SunTour Microdrive chainrings** in 44/34/20 sizes completed the crankset.

Although many riders now use **Shimano's SPD** pedals, these were not fitted to the bike because of their relatively heavy weight of 508g (Shimano claims 450g). **Shimano's Deore XT**, and **Grafton's Speedtrap** pedals are neck and neck at around 295g, but both are well beaten by **Specialized's DirectDrive** titanium caged pedals weighing 224g.

**Specialized's clips and straps** completed the set-up. The brakes chosen for the project bike were **Ritchey Logic cantis** operated by **Dia Compe's** extremely popular **SS5 brake levers**. At 166g they just edge out the

newer **SS7** model (184g) and **Ritchey's Logic levers** (190g).

#### Mechanisms

**Shimano's XTR rear mech** is the lightest around, weighing only 230g for a medium cage unit. In theory, an XTR mech is not compatible with a seven-speed block (it has greater throw per unit of cable pull), but

**Venhill Lightening bolt kit** and **titanium bolts** from **Action Tec** were used to replace steel ones wherever possible. Such bolts were used for example in the following positions: stem binder and expander, chainrings, cranks and cantilever mounting. The **wheel QR skewers** are **Ringlé's titanium units** weighing only 83g the pair.



The sub 200g titanium railed Flite saddle



Ritchey's 730g Logic fork and 'WCS' tyres



Ritchey Logic cantilevers mated to Dia Compe's popular SS7 levers

we have tried it and it works acceptably well.

Up front, a **Shimano Deore XT front mech** was fitted weighing 116g, the same as **SunTour's XC Pro Microdrive** unit. To actuate the mechs, **SunTour's XC Pro** thumbshifters were chosen because at 149g per pair, they are the lightest seven-speed units. Again they're not strictly compatible with the Shimano units, but they will work providing everything is well set up and maintained. Completing the drivetrain a **Regina SL** chain with hollow pins was fitted. Weighing 280g, 45g was saved over the weight of an XT HG90 chain.

To finish the bike off, a

But where are the bar ends and bottle cage? The answer is simple; they are not fitted. Cheating? Not at all. The idea from the onset was to produce the ultimate superlight MTB, and to that end the bike is perfectly rideable. Check out lightweight project bikes at exhibitions and you will see that they too omit items that are not required for the bike to function normally.

#### The Real Bike

Having specified *MBI's* project bike on paper, it seemed a shame not to build the 'real' bike, and it was the only way of finding the true weight!

Enter Mike Cookson who specializes in building up-

market, lightweight mountain bikes. At his Manchester shop, Mike stocks a range of bikes and components guaranteed to make any mountain biker drool with envy. Mike very kindly agreed to build the bike up for *MBI*, and it could be seen in all its exotic splendour at Mike's shop situated in the Whitefields area of the city in June. If you saw it, and fell in love with it, Mike will build you a replica for the princely sum of £3,000, and this really is a case of paying more to get less, 19lb 13oz to be precise - beat that!

#### Still Lighter

That begs the question, could we have gone even lighter? The answer is Yes. There are a number of components that are lighter than those fitted to the project bike. Unfortunately at the time of writing they were either not widely available or simply ridiculously expensive. Into both of those categories falls the **Viking titanium chain** weighing 150g and costing £300 in the States. The **Flite Carbon** saddle at 120g would have shaved around 80g and **Ritchey's Pro WCS Latex inner tubes** (110g) and further 70g. In the braking department, **Grafton's new Mag Lite cantis** gravitate out at 72g a pair minus pads. **Syncros' hollow Nivacrom Revolution cranks** come in at 410g minus chainrings and are currently the lightest.

**Alloy nipples** would have lightened the wheels by a few grammes, though because of previous reliability problems Mike was reluctant to fit them. In fairness the problems arose from alloy nipples fitted to production bikes which may have been of dubious quality. I have **Swiss DT** alloy nipples fitted to my own bike which have given no problems whatsoever after 12 months hard use. And finally at 76g the pair, **Critical Racing's** new titanium **wheel skewers** would have saved a few grammes over the Ringlés.

Using the above components, it would have been possible to get the weight of the bike down into the 18lb bracket. I reckon the 17lb mountain bike is around the corner - watch this space!

**Mike Cookson Cycles is at 195 Bury Road, Whitefield, Manchester.**

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