

INSIDE THE NEW SUSPENSION BIKE REVOLUTION!

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MANTIS

Finding a step in the right direction

■ Making custom mountain bikes since 1982 has left Richard Cunningham with a pretty good idea of what works and what doesn't. With a variety of wild designs to his credit—the alloy/steel NCR, monocoque Flying V, the Valkyrie X-frame and the Nishiki Alien series—he has a streak of the radical in him. At the same time he is one of the more conservative frame builders. While never afraid to progress to something new, he does so only when he feels the design is warranted. When he called to say that he had a new suspension bike, we anticipated some kind of multiple-shocked bike with aluminum girder frame construction. No, it was just a new version of his popular X-frame with geometry that was designed for front suspension.

There are many changes that suspension brings as a retrofit for non-suspended bikes. Primarily, the frame's geometry is altered

when the suspension is loaded. For every inch of compression, the bike's geometry is affected by approximately one degree. Current aftermarket forks can add as much as two inches to the fork height. The whole bike is then raised with suspension, so stand-over heights are no longer where they were intended.

WHAT GIVES WITH THE NUMBERS?

To account for these problems, Richard started out by raising the head tube on his bike by one inch to make up for the increased height that the Rock Shox provide. By de-

A form of flattery: For many riders front suspension is all that's needed, and of all the front suspension units available, none works as well as the Rock Shox. Cunningham designed a larger-diameter brake loop for increased rigidity and also a newer, cleaner, simpler version of Cannondale's brake system. ▶



MANTIS

A new look: Richard Cunningham designed a new version of his Valkyrie X-frame for his suspension bike. A single, smaller top tube that pierces the bigger one is now used for a cleaner look. If you plan on getting a new Mantis, don't get rid of your old bike so quickly—there's a long waiting list.





In the design: Like the Bontrager, the Mantis' frame was designed around a front fork system. Unlike the Bontrager, the Mantis uses geometry that stretches the rider out more and works the suspension only on big bumps. With a more relaxed head angle, the Mantis is stable at speed.

signing the bike around the suspension in this fashion, it's possible to make sure the rest of the bike sits at the more proper angles and lower heights. Cunningham next slackened his head angle to 70 degrees so that, with the forks totally compressed, the bike would not be steering with anything steeper than a 72-degree angle (remembering the one-degree change for every inch of travel). The Mantis actually uses the opposite theory of the Bontrager. Where Keith Bontrager wants the bike's suspension to work as much as possible, Cunningham only wants it to work at certain times. Both bikes share a 22.5-inch top tube, so while the former (which is a 20-inch frame) keeps the rider's weight over the forks (aided by a 74-degree seat angle), the Mantis' longer top tube (with a 72.5-degree seat angle and 17-inch frame) allows the rider to stay back off the forks more. The slack head angle also ensures that the forks will react less under the rider's pedaling energy and instead closer to the vector force when hitting bumps at speed.

Mantis' X-frame design is also intended to provide a lower standover height. Our prototype test bike measured in with a 29-inch standover height, which is about two to three inches lower than a comparable bike.

INSECT IN THE DIRT

It's a draw. Some riders liked the lengthy top tube and slower steering, while others thought they could read a short novel in the time it took to get the Mantis to make a quick turn. Everyone liked the roomy rider compartment and the rigid feel of the frame. Faster riders still would have preferred a steeper seat angle so they could get a more efficient spin going while sitting over the pedals.

Cunningham himself is still unsure what to expect of the coming suspension revolution. This was his first attempt at dealing with what is the inevitable future of mountain biking. As suspension pieces themselves become more sophisticated, so too will the understanding of how to design frames to accommodate them. It's only just begun. □

Model: Mantis Suspension X-Frame.

Price: \$1400.

Groupset: Frameset only.

Suspension: Front—Rock Shox; rear—none.

Travel: Front—2".

Weight: 27 lb.

Manufacturer: Mantis Bicycles,

350 E. Orangethorpe #27, Placentia,
CA 92670.

