

T H E  
*Magnit*  
T H E U L T I M A T E B L I N D T



# Efficient

TEST?

BY ALAN COTÉ

"Your mission, should you choose to accept it, is to test seven Mondonico bicycles," the boss told me over the phone. "The bikes appear to be virtually identical. Identical size, identical geometry, identical components—even the spoke tension is the same." I tugged at my shirt collar. The boss cleared his throat. "The only difference between them is the tubing. What we have here are seven bikes and seven kinds of Columbus tubing, but you won't know which is which."

I paused for barely a moment. "Boss, you know this is my kind of assignment," I said.

"Get on a plane to L.A.," he replied. I hung up the phone and tipped back in my chair, thinking for an instant I should light up a cigarette, just for the imagery.

"I'll need these," I said out loud to no one in particular, as I tossed my Sidi Tecnos and a pair of Speedplays into a black attaché.

Photography By  
Fran Kuhn

HELMETS: BELL • JERSEYS: SANTINI • RIDERS: KEVIN BURKE, SHAWN CRONKITE, JIM FRYER, MARK RICH, SUGI SORENSEN, JOHN WIKE, STEVE WRIGHT



**M**AGAZINE EDITORS love to rant and rave in road test articles. We say one bicycle is especially stiff, while another is soft. This bike has twitchy steering, that one is more stable. This one soaks up road vibrations, that one has a buzzy ride. This one is good for sprinting and criterium racing, that one is better for long road races and century rides.

Most of the qualities of how a bike rides, of how it feels on the road, are entirely subjective. Some of a bicycle's attributes, such as steering, can be analyzed—if a bike steers quickly, we can plug some numbers in and calculate trail to confirm our inklings. But other qualities about a bike, such as vibration damping, are entirely subjective.

Editors and other alleged bicycle authorities often attribute these ride qualities to something in particular. We say one bike is stiffer because it uses tubing

that incorporates internal helical reinforcements. Or another bike vibrates on descents due to flexible fork blades or because the wall thickness of the top tube is only .3 millimeters.

The companies that manufacture bicycles and tubing jump right on the bandwagon. They lead us to believe that the more expensive bikes and types of tubing are better on the road. But why is it that we think a very expensive bike rides better than a less expensive model—are the extra dollars subliminally making conclusions for us?

This group of Mondonicos could help clear up some of these issues. Among the seven bikes, there were seven types of Columbus tubing. Tubing decals were omitted from the frames—there was no way to tell which bike used which tubing. Each bike simply had a number, one through seven, on the stem. Only when we cried “uncle” after finishing

the road tests did Mondonico's U.S. distributor, Torelli Imports' Bill Semonian, let us know which frame was which.

Semonian went to great lengths to ensure that the only differences between each bike was the tubing. The seven frames used exactly the same design and geometry, including subtleties such as each fork blade being raked on the same mandrel. Antonio Mondonico brazed all of the lugged joints himself, while Mauro Mondonico, Antonio's son, torched the braze-ons in place. The Mondonico shop then had all of the frames painted the same metallic green color.

Semonian didn't stop there. He had one mechanic build the frames up with Sachs New Success component groups (“All the groups came from the same shipment,” Semonian said, though he wasn't sure why this should matter). The wheels were laced and trued, and a tensiometer was used to ensure uniform

■ Identical lugs were used on all bikes, save the oversize tubes.



■ Columbus' long horizontal dropouts—the pros' choice



When I was a junior racer, a friend of mine decided he had to get a new frame. His mount was a perfectly good Colnago but he wanted a Ciöcc. His reasoning was that the Ciöcc was a stiffer bike and would, therefore, make him go faster. The Ciöcc was stiffer, he said, for two reasons: It used the then-new Columbus SLX tubing and it was made in Italy (there was a widespread rumor at the time that Colnagos were being built in Mexico).

To present a more rational and technically on-the-spot point of view, *Bicycle Guide* conferred with engineering consultant Jim Papadopoulos, one of the technical authorities in the bicycle industry. Papadopoulos, who has his doctorate in mechanical engineering from MIT, has devoted much of his life to the mechanical analysis of the bicycle. "I'm not just tuned in to this sort of thing, I'm obsessed with it," Papadopoulos commented. With that said, consider what *BG* learned from him.

When evaluating steel tubing, there are two primary things to consider: the metal's tensile strength and its modulus of elasticity. Tensile strength is simply a measurement of how much force (in tension) can be applied before a material breaks. Modulus of elasticity represents how stiff a material is—how much it deflects under a given load.

The tensile strength of steel can vary enormously according to specific combinations of alloying elements in the metal. Aelle tubing is made from steel that has a tensile strength of 700 N/mm<sup>2</sup>, while the steel in EL has a tensile strength of 1200 N/mm<sup>2</sup>. The Aelle metal has less than 60 percent of the strength of EL.

The metal in more expensive, high-tech tubing is stronger. To produce Aelle and EL tubes of equal strength, less EL material is required, so EL tubing has thinner walls than Aelle and is, therefore, lighter.

Stiffness is another story. While the tensile strength of steel can be manipulated, the modulus is almost unchangeable—it only varies by a few percentage points from one type of steel to another. This means some surprising news: Aelle metal is just as stiff as EL metal. But for tubes of equal strength and diameter, the Aelle has thicker walls than the EL, so the Aelle tube will actually be stiffer than the EL tube.

To compensate for the flexibility that results from strong, thin tubing like EL, the diameter of the tube is increased (hence EL's OS—oversize—suffix). If we disregard butting, the stiffness of a tube is proportional to its weight multiplied by its diameter squared ( $W \times D^2$ ). A 250-gram, 1¼-inch-diameter EL-OS down tube ( $W \times D^2 = 390$ ) is about 12 percent less stiff than a 350-gram, 1½-inch-diameter Aelle down tube ( $W \times D^2 = 443$ ). (For those who are wondering, the butting actually works to make the EL tube a little more flexible than this equation shows.)

So this empirical analysis shows the \$460 Aelle Mondonico weighs ¼ pound more than the \$1275 EL-OS Mondonico, but the cheaper frame should be stiffer. And both were made in Italy.

—Alan Coté

stashed. "Head up to Malibu for riding," he told me. I nodded, put on my trendy, I-wanna-look-like-a-pro Oakley sunglasses and headed into the midcity gridlock.

Road testing a bicycle is usually a straightforward affair. We try to ride a bike under a variety of conditions in order to report its full range of abilities. We compare a given bike to a mysterious standard—a standard that's the culmination of impressions of every bike we've ever ridden.

This road test was a little different. What really mattered was the relative

differences between the bikes. If I had a year just to write this article, I could have spent a month or more on each Mondonico. I'd get so tuned in to how one bike rides that moving to another might feel like a big change—or maybe not. But by the time I would ride the seventh bike, my half-year-old impressions of the first bike would be a distant memory, and you would be reading this article alongside coverage of the Atlanta Olympics.

A short riding blitz of all seven bikes would be the test recipe: Set up a bike with the correct seat height, pump up



■ Identical fork crowns graced our mystery frames.

spoke twang. All other components—rims, saddles, tires, tubes, bar tape, rim tape—were the same across the board.

*It was a brown day when I arrived in the City of Angels. I made my way to the boss' mid-Wilshire office building. As I stood in the elevator, the difficulty of my assignment hit me. Sweat began to bead on my forehead. What if I couldn't feel any difference between the bikes—what would I write about?*

*"You'll need the right vehicle," the boss told me, his hands castling nervously. I started thinking about a Jaguar, or maybe a big, black American sedan. "A minivan should do it," he said. I'd look like a Boy Scout troop leader, but seven bikes could fit inside.*

*A few hours later, I pulled a Pontiac Trans Sport into the underground parking garage where the Mondonicos were*



■ Mondonico used the same set of classic proportions for each tubeset.



BIKE	FRAME WEIGHT	FORK WEIGHT	FRAME PRICE	TUBING	COMMENTS <sup>1</sup>
Aelle (#4)	4 lb 12 oz	1 lb 9 oz	\$460	Carbon manganese	Set for amateur and touring cyclists
Cromor (#1)	4 lb 7 oz	1 lb 8 oz	\$600	Chrome-moly	Set for road bikes, ideal for the more demanding riders who favor versatile, high-performance light frames
Thron (#7)	4 lb 12 oz	1 lb 8 oz	\$620	Chrome-moly	Set of tubes with butted sections and reduced thickness for racing frames of the new generation
Brain (#3)	4 lb 8 oz	1 lb 8 oz	\$700	Chrome-moly and Cyclex (vanadium alloy)	All-purpose, high-performance road set
SLX (#2)	4 lb 8 oz	1 lb 6 oz	\$1000	Cyclex	Road set specially intended for professional cyclists
Neuron (#6)	4 lb 0 oz	1 lb 7 oz	\$1050	Nivacrom (niobium and vanadium alloy) and Cyclex	SDS tubeset (Stress Distribution System) for the manufacturing of high-performance frames, built with or without lugs
EL-OS (#5)	4 lb 0 oz	1 lb 8 oz	\$1275	Nivacrom	Road set specially designed for maximum lightness. Oversize diameters ensure a good measure of rigidity

<sup>1</sup>Comments taken from Columbus literature.

Note: Frame prices are approximate. They reflex actual retail prices of bikes using that particular model of tubing. More expensive frames typically use more expensive fittings (such as dropouts, lugs, etc.) and show greater attention to finishing details.

the tires and start pedaling. Repeat seven times. My ride loop, amidst some of Malibu's most posh, ocean-side homes (and the toolshed that *BG* staffer Mark Riedy used to call home), was the same each time. Included was a mixture of short, steep hills, corkscrew descents and blind corners covered in fine beach sand.

The Mondonicos were stacked in the van in no particular order. My first ride was on number six. I couldn't help but notice the oversize top tube as I cruised along. "Which Columbus tubesets use an oversize top tube?" I wondered, before trying to put the thought out of my head. I liked the way number six felt. It was spunky when I stomped on the pedals

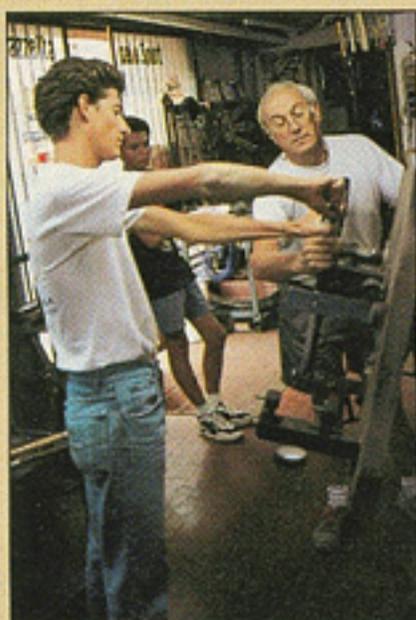
while grinding up steep grades. The bike quickly felt familiar and reassuring—it felt like a fine, handmade bike should.

Next in line was number two. It seemed to ride exactly the same as number six. Then I jammed up the same steep hill, and the bottom bracket seemed to flex a little more.

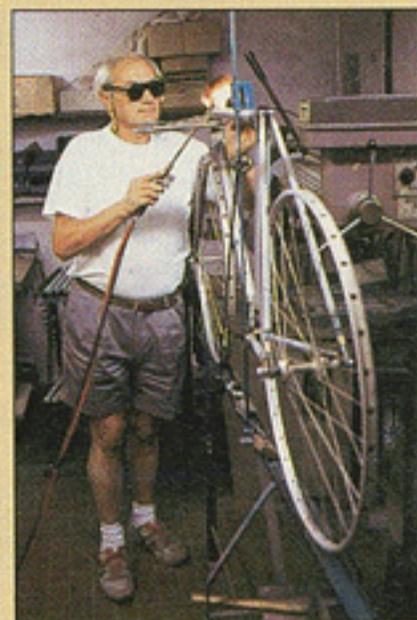
I moved on to number three. Not sur-

The image of the Italian craftsman is a powerful one in our two-wheeled world—deliberate, passionate, reticent, intuitive, immersed in his project, equal parts scientist, alchemist and artist. The Italian custom framebuilder of today is a looking glass through which we can see the method and mentality of a world before the assembly line separated the worker from his work.

A trip to the humble suburban Monza shop of 55-year-old Antonio Mondonico leaves you feeling you've witnessed a true artisan at work. Mondonico and his two sons—Mauro and Giuseppe—hand build some 800 frames per year, using some of the same tools and fixtures that Antonio's father, Giuseppe, used in the frame shop that he started in 1929. Indeed, Antonio grew up working in his father's shop, slowly learning the craft. However, when his father passed on in 1973, Antonio was forced to close the shop and work for larger production builders such as Motta and Colnago. Eventually, Antonio and the legendary Paolo Guerciotti formed a partnership to build frames under the Guerciotti label.



■ Mauro Mondonico takes a tip from pops.



■ Antonio teaching by example

PHOTOS: MARK RIEDY

The Mondonico-Guerciotti alliance later wilted, leaving Guerciotti with a name and Mondonico with a frame-production facility that could turn out thousands of frames per year. Since Antonio's true interest lay in crafting high-quality frames (not producing a great quantity), he sold off the facility and moved into a tiny shop connected to his Concorezzo home (about 30 minutes from central Milan) where he now builds a small number of frames with the same methods his father used in the '30s.

Mondonico prides himself on many of the same qualities as other Italian master framesmiths—clean lines, fluid lugwork, near perfect brazing, a solid racing geometry and a devoted eye on tradition. If you're looking for go-fast gimmicks, you'll be saddened by the Mondonicos' absolute devotion to functionality, but that sensibility makes for a frame that will feel fresh long after neon-painted oversize tubes and monocoque construction have gone the way of the eight-track tape, the Naugahyde recliner and leisure suits.

—Mark Riedy

prisingly, it felt the same as the first two bikes. In the hill jam, I decided that it flexed a little more than number six but less than number two.

And so on. The Mondonicos did not, in fact, all ride exactly the same. I thought number six was the most rigid. Stiffness aside, it was also my favorite Mondonico—I just liked the way it felt. Number seven seemed a little smoother on rough pavement than the others. I decided that number two was the most flexible, though the overall feel of the bike was still quite good. Then I started second-guessing myself—did number two feel the most flexible because it was the next bike I rode after my favorite, number six? Four of the bikes—numbers one, three, four and five—seemed almost interchangeable.

As I looked over my notes, I realized how subtle the differences between the bikes were. The ride variations of these seven Mondonicos were nothing like the contrast between, say, a carbon-fiber Trek and a titanium Litespeed, or an aluminum Cannondale and a steel Eddy Merckx, or even between two bikes built by different manufacturers using the same type of material, or even the same brand and model of tubing.



■ Intrepid freelancer Alan Coté gathers information from the gang.

*My work in the field was done. "When you're ready, call this number and ask for Bill," the boss told me. "He's the only one who knows the true identities of the bikes."*

It was time for the Big Question. How did my riding impressions of the bikes relate to different tubing models? The bike I liked best, which I also thought was the stiffest, was bike number six—the Neuron frame. The one I thought was the softest was number

two—the SLX frame. The one that seemed to absorb vibrations best was number seven—the Thron frame. I could perceive no real difference between numbers one—Cromor; three—Brain; four—Aelle; and five—EL-OS.

My affinity for the Neuron frame jives with the tubing's résumé. Neuron uses some very tricky butting—the wall thickness varies such that the outside of the tube is round, but the inside is elliptical. The fancy butting can add

Choosing a bike is more than an empirical judgement, it's an affair of the heart. Intangible qualities like history, romance and soul are often more important than stiffness and weight. Grant Petersen, Bridgestone's former product

manager and the owner of Rivendell Bicycle Works, fusses endlessly over details such as head tube badges and ornate fork crowns, making him the perfect advocate for buying from the heart.

What if you can get just as much performance out of a \$375 frame as a \$1000 or \$2000 one? Does that mean a fine, handmade work of art you can ride is a waste of money?

Actually, a bicycle is less of a "waste," because it is much less inanimate than the kind of art you hang on the wall. It's more like a violin or a fly rod—you work with it, it responds to every move you make, even letting you know when you're doing something klutzy. And like any fine instrument, it inspires great performances and makes even your worst performances (or your most dreary rides) more bearable because it's there beneath you, looking beautiful.

I think it all comes down to what you want your bicycle to be. If your bike is merely a tool and you're after the most performance per dollar, then go for the mass-produced, TIG-welded, chrome-moly entry-level racing frame equipped with Shimano 105 STI, because year after year that's the value leader, no question about it.

But listen: If you've owned a few bikes by now and average just two and a half hours of riding per week during the next 10 years, you'll spend the equivalent of 54 24-hour days

riding your bike. You're a bicycle person, so what's wrong with indulging yourself in something that's as beautiful and well made as possible? What's wrong with supporting the effort of builders who have dedicated their lives to beautifying the bicycle? The art of the frame needs patrons just as much as any other art does, and if not you, then who?

We've all heard people say, "I'd be afraid to ride a bike that expensive—what if it got scratched?" All bicycles that are ridden properly get scratched; that's inevitable. But scratches, worn-off paint, amateurish touch-up jobs, even minor dents where they don't matter are just personalized badges of good, hard use. Fine bicycles age well, grow in sentimental value and maintain respectable resale value; cheap ones just get old and wind up in yard sales.

Judge a frame partly by the commitment that went into it, rather than by how much faster it'll make you go. You'll know when it's time to buy your dream bike, and when that time comes, get a bike built with more than just performance and value in mind.

—Grant Petersen

stiffness and resulted in a frame that weighed 4 pounds—tied with the EL-OS frame as the lightest in the test by almost ½ pound.

For the SLX frame to be the softest

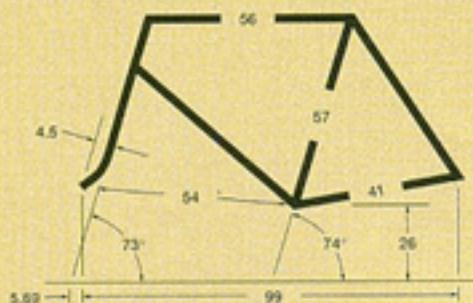
seemed technically possible. While the rifling inside the down tube and seat tube was billed as the road to rigidity 10 years ago, an oversize tubeset with similarly thick tubing—like Thron—

should be stiffer.

But I picked Thron as the most shock absorbing. And I lumped Aelle, Cromor, Brain and EL-OS together. To be honest, I couldn't feel a difference be-

COMPANY	TOP TUBE	DOWN TUBE	SEAT TUBE	CHAINSTAY	SEATSTAY	TENSILE STRENGTH (N/MM <sup>2</sup> )
<b>AELLE</b>						
Diameter (mm)	25.4	28.6	28.6	22.2	14.0	700
Thickness (mm)	.8	.8	.8	.9	.9	
Weight (g)	290	350	350	170	160	
<b>CROMOR</b>						
Diameter (mm)	25.4	28.6	28.6	22.2	14.0	800
Thickness (mm)	.9/.7/.9	1/.7/1	.9/.6	.8	.8	
Weight (g)	285	362	300	160	145	
<b>THRON (optional oversize used)</b>						
Diameter (mm)	28.6	31.7	28.6	29.5x18 (oval)	16.0	800
Thickness (mm)	.9/.6/.9	.8/.5/.8	.9/.6	.8	.8	
Weight (g)	300	310	300	180	165	
<b>BRAIN</b>						
Diameter (mm)	28.6	31.7	28.6	22.2	14.0	900
Thickness (mm)	.8/.6/.8	.8/.5/.8	.9/.6	.7	.6	
Weight (g)	275	310	300	130	105	
<b>SLX</b>						
Diameter (mm)	25.4	28.6	28.6	22.2	14.0	900
Thickness (mm)	.9/.6/.9	.9/.6/.9	.9/.6	.7	.6	
Weight (g)	260	340	310	130	105	
<b>NEURON (optional oversize used)</b>						
Diameter (mm)	28.6	31.7	28.6	29.9x16 (oval)	16.0	1200
Thickness (mm)	.7/.5/.7	.6-.8/.5/.6-.8	.8-1.0/.6	.8	.7	
Weight (g)	235	280	290	180	140	
<b>EL-OS</b>						
Diameter (mm)	28.6	31.7	28.6	29.9x16 (oval)	16.0	1200
Thickness (mm)	.7/.4/.7	.7/.4/.7	.8/.6	.6/.8	.7	
Weight (g)	220	250	290	170	140	

## Mondonico



**Sizes available:** 50 to 64cm, in 2cm increments

**Size tested:** 56cm (center to center)

**Rims:** 32-hole Torelli Master T3

**Spokes:** 14-gauge Wheelsmith

**Hubs:** 32-hole Sachs New Success

**Tires:** Hutchinson Success 700x23c clinchers

**Crank:** 172.5mm Sachs New Success

**Shifters:** Sachs Ergopower

**Derailleurs:** Sachs New Success

**Freehub:** Sachs New Success

**Chain:** Sachs

**Gearing:** 39/53 chainrings, 12-24 8-speed cassette

**Brakes:** Sachs New Success sidepull calipers

**Saddle:** Selle Italia Turbo

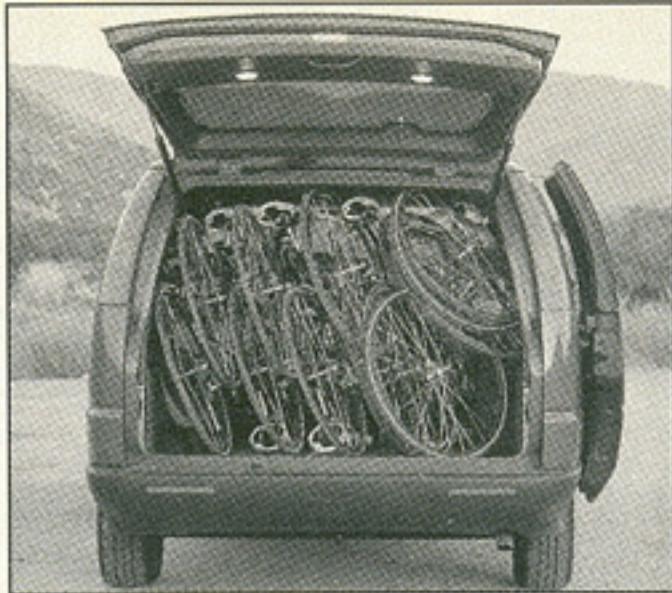
**Seat post:** 27.2x230mm ITM

**Pedals:** NA

**Handlebar:** 42cm Modolo 6[Q]Even with anatomic bend

**Stem:** 120mm Modolo [Q]Even

**Headset:** 1-in. Tange



the least consequential choice." What do these seven Mondonicos say about bike performance and testing? Perhaps more than anything, they illustrate that the personality of a bike is determined much more by fit, frame geometry and components than by what kind of tubing lies under the paint.

Mondonico frames are available from Torelli Imports, 1181 Calle Suerte, Camarillo, CA 93012; (805)484-8705.

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G2BN-K136-(size,color)  
~~\$29.90~~ **\$30.00**

**NASHBAR MEN'S HEAVY-WEIGHT 8-PANEL SHORT**  
Specify Size: S, M, L, XL, or XXL; Color: Black, Royal, Forest, or Purple.  
G2BN-K137-(size,color)  
~~\$24.90~~ **\$20.00**

**CATEYE KOSMOS COMPUTER G2CE-K** Black ~~\$19.95~~ **\$27.60**

**CATEYE KOSMOS COMPUTER G2YY-K**-(color) ~~\$19.95~~

**NASHBAR COMBINATION LOCK AND CABLE G2NA-CCL** ~~\$4.95~~ **\$0.00**

**BELL TEAM JERSEY**  
Specify Size: 3, 4, 5, 6, or 7.  
G2BH-TJ-(size) ~~\$39.90~~

**BELL TEAM HELMET G2BH-HT**-(size) ~~\$34.95~~

**RUSSIAN TEAM T-SHIRT G2RU-RT95**-(size) ~~\$9.95~~

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**TIME EQUIPE PRO HELMET G2TM-EPH**-(size,color) ~~\$53.00~~ **\$440.00**

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**VETTA HANDLEBAR TAPE G2VA-T101**-(color) ~~\$2.49~~

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**VETTA GEL SADDLE G2YY-231** MEN'S. Black Astral cover. ~~\$7.90~~

**VETTA ATB GEL SADDLE G2YY-232** MEN'S. Black Astral cover. ~~\$7.90~~

**CONTINENTAL SUPER SPORT 100 CLINCHER TIRE G2CO-S100**-(size) ~~\$10.90~~

**NASHBAR BLACK STORM GLOVE G2MC-BG**-(size) ~~\$18.95~~ **\$24.00**

**CAMPY ATHENA HEADSET G2CA-HDA** ~~\$22.50~~ **\$27.05**

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**CAMPY ATHENA FRONT HUB G2CA-HBA**-(hole) ~~\$21.00~~ **\$25.05**

**CAMPY RECORD FRONT DERAILLEUR G2CA-FDR**-(model) ~~\$50.95~~ **\$62.05**

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tween an Aelle frame—with straight-gauge tubing and weighing in at 4 pounds 12 ounces—and an EL-OS frame—with double-butt,ed, oversize thin-wall Nivacrom tubing and only 4 pounds of heft. A conclusion which, if marketing literature is to be believed, doesn't make a whole lot of sense.

If the numbers on the bikes were switched around and I were to test each bike again, my guess is that I'd come up with different tubing preferences. I think my ride impressions were essentially random.

Does this mean you should pass on the expensive steel frame and buy a cheap one? I don't know. The Aelle frame does weigh 1/2 pound more than the EL-OS frame, but the EL-OS frame costs \$815 more—close to three times as much as the Aelle frame.

I'm reminded of something Richard Sachs—one of the finest custom framebuilders in the country—told me. Sachs said, "When someone is buying a bike from me, they're buying my design choices and my construction skills. I actually think material is