The following interview appears in Grant Petersen's Summer 2002 issue of his *Rivendell Reader*, number 27. The *Reader* is a rare jewel of non-mainstream bike culture. Check it out and maybe even consider a subscription. Grant can be reached at (925) 933-7304 and Rivendell can be visited at **www.rivendellbicycles.com.**

Grant Petersen interview of Charlie Cunningham for the *Rivendell Reader*

Where did you grow up, and what did you do as a kid?
When I was a kid, we relocated every three years or so because Dad was a pilot in the Air Force. When I was about seven we moved to Virginia. We lived there longer than usual and we had more time to bond to the people and land.

You seem outdoorsy and independent. How did that come about?
Well, even as a kid I liked to go on long hikes alone in the woods between our house and the Potomac River. I've always been comfortable alone in nature.

Do you remember your first bike, or one of them?
In Virginia I had a rusty one-speed bike that was too big. I liked how fast I could get the rear wheel spinning when I turned it upside down and revved the cranks. That bike became my best friend. It carried me far into the boonies, enlarging my sense of home. After Virginia we moved to Japan, which was novel and somewhat traumatic.

Your shop here is amazing. How did you get interested in tools and metal?
Maybe it's innate. I guess some of us are just tool using primates. I learned a lot as a kid by abusing my Dad's tools. I remember blowing up Dad's vise by putting a whole roll of caps in it, tightening the jaws and hitting the handle with a hammer. It made a very satisfying boom but it fractured the brittle cast iron. First lesson in metallurgy. I also had my erector set confiscated when I made a big metal propeller and mounted it directly on the high-speed motor shaft, instead of the geared-down jackshaft as per the instructions. My parents freaked when they saw it in action. I also liked turtles, jet airplanes, racecars, motorcycles, go-karts, space travel, and such. My Dad had a cool book with paintings of a hypothetical trip to the moon using the best knowledge of the time that was fascinating.

Did you like school?
Not very much at first, but it got better when I went to college. I studied for an engineering degree at U.C. Cal Berkeley, but throughout college I spent a lot of time studying things that weren't offered in classes that I found interesting. I think most of what I learned in school has been useful.

How did you come to build your first bike? Who taught you, when?
I didn't exactly start by building bikes. I started "improving" them when we moved to Mill Valley in about 1964. Mom had a really nice German one-speed I adopted for exploring Mount Tam. For lower gearing I bolted a big cog onto the small rear cog. It

allowed me to go up steeper hills but it spun out at higher speeds. I didn't mind though, because I could coast down the hills. Later, I got a brazing outfit for my birthday. I made the usual acetylene-oxygen bombs and built a smokeless powder cannon that could blast huge lead slugs that I cast clear through really thick steel plate. I also used the torch to modify my go-kart frame and to modify my Gitane ten-speed. With shortened chainstays and raised BB, it became my official trail bike, replacing Mom's one speed.

I made my first custom chainstay mounted toggle brake for the Gitane. After moving to Fairfax I used this bike to learn all the trails on this side of Tam. That was before the mountain bike thing started to happen. In the mid seventies, a great machine shop teacher named Ray at College of Marin let me make some parts for my first bike fixtures after hours. I was living in Fairfax when the fat tire thing got going. I had my first encounter with a "mountain bike" as I was riding Yolanda Trail on my Gitane.

I came up behind two people riding their fat tire cruiser bikes, with cantilever brakes and ten speed gears. The bikes looked fun but my bike was going faster with less energy. They showed off the bikes and told me about the Repack race the next weekend. I went, and that's when I connected with all these other people who were as crazy about bikes as I was. These folks were living the early mountain bike culture here in Marin.

When did you build your first whole bike?
It was about 1975, and it wasn't a mountain bike. It was a folder made out of thin, big diameter CrMo (steel) tubing, and it had 20" sew-ups. It's a little rocket that rides like a track bike and fits into a canvas bag small enough to take on a bus or put in an airplane overhead compartment.

Okay. What about your first Cunningham mountain bike?
Well, that came a bit after the Repack race. Ukai, a Japanese rim maker, came out with a light aluminum 26"x 1.75" rim and Cycle Pro brought out the first fat skinwall tire, the Snakebelly. That gave me an alternative to the heavy tires and steel rims and made it possible to build a light bike with light wheels.

Your folder was steel. Why did you use aluminum for the mountain bike?
Mainly because of Gary Klein's influence. Sunshine Bikes here in Fairfax got a cool aluminum Klein road frame, and I was impressed by how light it was. I wanted it. There were other aluminum bikes like the Alan, but they were flimsy by comparison. Maybe because I studied mechanical/aeronautical engineering at UC Berkeley, Gary Klein's literature and his analysis of aluminum frames clicked with my own approach to engineering. I nearly bought the Klein, but I wanted a mountain bike more, and I had lots of design improvements in my head, so I used the money to get a TIG welder and build my frame jig instead. I heat-treated some of my first frames by renting the equipment at a heat-treating facility in South San Francisco. Later Bill Abright, a ceramics teacher at College of Marin, built me my own aluminum heat-treating kiln in exchange for a bike.

To learn how to weld aluminum I read the available literature from the aircraft industry and just started doing it. I learned how to heat-treat aluminum the same way. Read and

do. But as I discovered, heat-treating bike frames introduces special problems. Back then, the available literature told what to do thermally with 6061 to get good properties, but it didn't tell how to do it with a bike frame. Heattreating bike frames introduces special problems but I solved them by experimenting and worked out a sophisticated process that I'm really proud of. I made really strong, light, long-lasting, straight frames that are stiff in the right places for good energy transmission and very good at absorbing shock to the rider for a comfortable ride.

Did you wreck any frames during the heat-treating experiments? It must have made you nervous, trying to heat treat a frame you'd just built, not knowing whether you'd ruin it or not. And what would constitute a "failed process" anyway? I mean, if it didn't work, how could you tell?
A real failed process would be a melted frame! Fortunately I never trashed one during heat-treating but I was constantly wary. The first stage of heat-treating 6061aluminum requires the frames to get near the melting point. I used an experimental method to control the temperature accurately in the kiln with high quality thermocouples and surplus controllers. I was quite nervous during the first use, and was happy to avoid the dreaded molten blob!

My first mountain bike frame in 1978 used big diameter aluminum tubing but it wasn't heat-treated because I wanted to be able to cut and re-weld the frame to experiment with geometry and tubing dimensions. Most of the fat tire bikes of the time were made from heavy old cruiser frames. A few were custom built but they copied the Schwinn Excelsior geometry, with long wheelbases and shallow head angles. They were also quite heavy and were great for Repack but they didn't work well on the twisty singletrack where I did most of my riding. I test rode a lot of borrowed bikes and formed a mental list of improvements I wanted. My bike had to be much lighter, have better climbing traction, better handling, better brakes and a whole slew of other things. When I built the bike, I spent a lot of time building the frame but even more building the other parts. The fork was built with butted 1" Ishiwata (CrMo) top tubes, the stem was machined from magnesium bar, the toggle brakes were carved out of aluminum plate. The brake linkages were meticulously fabricated small steel parts brazed together. The hubs were made from Hi-E parts and parts I made. The titanium chainguide was carefully fitted by forming at red heat, etc. After many test rides and some chopping and rewelding of the frame, the bike was finally finished toward the end of 1979. It was incredibly fun to ride! After using that bike for many years I sold it to Diane Hopkins and later bought it back to restore it for the Mountain Bike Hall of Fame Museum in Crested Butte. It weighs about 23 pounds, has a sloping toptube, the first prototype 1.6 pound Type II fork, handmade toggle brakes mounted on the fork and chainstays, single front chainring with a magnesium and titanium chainguide, custom wide ratio rear freewheel, toe clips, drop bars, etc. Everything about it was untraditional and considered outrageous at the time. I went out to Crested Butte with it in 1980, caravaning with Scot Nicol, Joe Breeze, Charlie Kelly, Denise Caramagno, Wendy Cragg, Gary Fisher and others. I was fairly fit and the bike impressed everyone. The most avid riders from Crested Butte, Don Cook and Steve Cook placed the first orders. Lawrence Malone and George Work were next.

Mountain bike racing was just taking off and the demands of racing were responsible for the most mechanical improvements in those days.

At about this time I met my lifetime honeypie, Jacquie Phelan. She was into road racing and I made her a mountain bike that she named Otto. (Which rhymes with auto.) We had great fun riding Marin's trails together and she won lots of races on Otto, including several nationals. She pestered me into racing in 1984. I was a reluctant old fart even then but managed to beat most of the pros while winning the over 35 class. That, along with Jacquie and other winning Cunningham racers, helped promote the bikes and establish the use of aluminum for mountain bikes. I'm proud of the fact that I never had a mechanical failure or even a flat tire in all my races. I built over 150 bikes before retiring my frame building business in about 1990 to focus my full energies on Wilderness Trail Bikes.

How did you meet Mark Slate and Steve Potts, and how did that alliance lead to WTB?
I think it was 1982 or 1983 when I met Mark and Steve on the Pearl Pass tour from Crested Butte to Aspen. We lived near each other in Marin, but this was the first time we rode together. The friendship that grew out of that Pearl Pass Tour led to our business collaboration.

What was your plan for Wilderness Trail Bikes?
We wanted to manufacture and sell the same mountain bike components that we made for our own personal bikes. Many of the early components were designs I created in my shop originally for use on my Cunningham bikes. Some were adopted for sale through WTB without change and some were refined in my shop with input from Mark and Steve. Examples are the Type I and Type II forks, modified Hi-E hubs with cartridge bearings in standard width and extra wide 118 mm front and zero dish 135mm rear, fixed-angle seatposts, toe flips, the Roller Cam brake, Grease Guard Guard bottom bracket bearings, Grease Guard hub bearings, Grease Guard headsets. I created the first Grease Guard products and coined the Grease Guard name.

What was WTB's first product?
I think it might have been the Roller Cam brake, although hubs followed soon after. The brake was constantly evolving with the improvements derived from our riding experiences. My first improvement to the Roller Cam was replacing a coil spring with the linear spring design. I wish I'd patented the linear spring! It was the first time a linear spring like this had been used on a bicycle brake and it works much better. The linear spring strongly centers the brake arms because of its rapidly rising spring rate and hand lever tension is easily adjusted. Shimano was the first to adopt it for their V-brake. Nowadays, linear springs are standard on V-brakes.

With Mark and Steve's input, lots of other things on the Roller Cam improved like pivot bearings, pad clamping hardware and the linkage. I improved the cam shape and rollers but I eventually replaced the cam with the "Toggle Cam" linkage and later a linkage called the Lever Link. We sold some Toggle Cam brakes but the Lever Link never made

it into production because disc brakes were replacing rim brakes. The Toggle Cam and the super powerful Lever Link are highly evolved rim brakes. I've never seen a better rim brake in terms of power, controllability, lightweight, ease of adjustment, reliability and low maintenance. For cross-country riding in dry conditions they can't be beat. No other brake even comes close, not even discs.

The Roller Cam brake: As I understood it, and I think I heard this from Steve or you or Mark about a million years ago, it was developed because you didn't feel comfortable welding brake studs onto relatively skinny aluminum seat stays so you went to the chainstay for it. Right?
Not quite. Actually, I wanted a brake that worked better than the cantilever. I've always felt that the mounting system used for cantilever brakes is inadequate. The stud is not stiff or strong enough. Too much flex is introduced by its mounting location on the frame tubing, which is too far from the end of the seattubes or forkblades. The flimsy stud and mounting location produce a grabby "spring" effect in the brake system, reducing power, feel and controllability. Imagine putting a big soft spring on top of the brake pedal in your car. It would mask any feedback you get through the pedal and slow your reaction time for changes to pedal pressure. The springy canti mounting masks feedback and prevents accurate control, causing a grabby feeling as the mounting loads and unloads. Current V brakes that mount on canti studs are fairly powerful but excessive flex in the mounting makes them impossible to control accurately.

So, the short answer: The reason I mounted the Roller Cam stud on the chainstays was to obtain maximum stiffness. The chainstays are much shorter than the seatstays, and on the bikes I build they are much thicker too. The beefy Roller Cam studs mount nearer the end of the chainstays or forkblades giving even more stiffness. Further, I use a brake bridge that, unlike canti bridges, is compact and stiff. It all adds up to a really rigid platform for a really powerful brake.

But they sure collect a lot of mud, though. I remember riding them and stacking about 6-inches of mud right on top of the brake, and it's a mess.
Yes, really bad mud will collect on anything, but at least it doesn't affect braking on the bikes I build because I cover the brakes with an aluminum shield that keeps mud and water off. The brakes are better than other rim brakes in wet conditions but disc brakes can't be beat for really wet riding. But disc brakes need the wheels to be built heavier because the loads go through the spokes and disc brakes still need better feedback and precision controllability at low speeds.

Talk about the WTB-SunTour connection.
Well, back in 1982, SunTour's president Junzo Kawai was doing some market research in Marin, and saw one of my bikes for sale at the Cove Bike Shop in Tiburon. So he came out to visit me at my house and shop with an entourage of Japanese engineers. I showed them my shop and all the goodies I was working on, and we became friends. Back then, SunTour and Shimano were the only manufacturers trying to make mountain bike parts. After patenting the Roller Cam Brake I wanted to license it to a big manufacturer. My first meeting was with Mr. Mangili of Campagnolo but he wasn't interested because

Campagnolo figured mountain bikes were a passing fad. Because of my friendship with Junzo, I was able to license the brake to Suntour. My patent attorney, Robert Wickersham, helped me with the royalty agreement.

At the time, WTB and Cunningham had race teams and I convinced Junzo we could help promote Suntour if they supplied us with parts, jerseys, travel and entry expenses. The SunTour jerseys were scheduled to arrive for the 1984 RockHopper race but didn't quite make it in time. That inspired Jacquie's famous topless win with a jersey painted on her back.

It must have been exciting, making these deals with SunTour.
It was! I believe my brake license with SunTour established a precedent in the mountain bike industry. The SunTour deal opened the door for the other licensing deals that Mark, Steve and I later did through WTB. We developed an excellent relationship with Bevel Hogg of Trek which lead to our designing Trek's first aluminum bicycle, the adhesive bonded Trek 7000. Trek also co-sponsored our WTB race team.

Later, we designed about 26 tires for Specialized. Our first assignment was to create a super mountain bike tire. I remember getting a lot of satisfaction out of identifying the rider's needs and analyzing what makes a mountain bike tire work and then applying theory to rubber to get the desired result. The Ground Control was a quantum leap in tire performance with much more traction and controllability than previous tires. Not many people know that Jacquie named the Ground Control tire. I've heard that more Ground Controls have been sold than any other mountain bike tire, partly because it was in high demand for so many years. These days there are so many tires, and designs change often, so I think that's a record that won't be broken.

What were your plans for WTB originally, and has that changed much/how?
At first Mark, Steve and I just wanted to pool our resources to make the parts we needed more efficiently and cost effectively. Heck, back then we were making each part in our shops with hacksaws and files. It was really exciting to have local CNC machinists make them in bigger quantities so we had some left over to sell to other riders and builders. Later, an opportunity to license Grease Guard to Suntour led to the formation of WTB Licensing and that eventually led to WTB's OE (original equipment) component business.

I guess word is out by now that Steve Potts and I are no longer involved with WTB. The settlement prevents me from saying much about it though. It has been a really hard time in our lives and for our families. The loss of twenty years of hard work along with our equity in the business and our means for retirement was very painful. Steve and I hope the outcome is good for WTB and we wish the best for the people that still work there. We're a lot wiser now and we're considering new business opportunities.

I didn't know that until two days ago. Well, what are you going to do now?
We might start new businesses ourselves or get involved with existing ones.

That keeps all options open, but who's going to hire you? And, would you move from Fairfax? I can't imagine you leaving this area for anything!
It remains to be seen. I don't want to move. I have lots of knowledge and experience and can apply it best by working here with my shop. Over the years I've made my shop ideally suited to product development, prototyping, quality control, product testing, etc. Working here I developed the specifications for products that are receiving wide use as original equipment these days and I plan to continue developing high quality bicycle parts.

Do you know about Q-factor? If so, do your think that this is important? Do you know your Q-factor? You've never done a crank. Any thoughts on cranks?
Most definitely! My favorite crank of all time is the cold forged Specialized crank of the mid eighties. It's a clean and efficient design, but more importantly, it has the smallest Q factor of any crank I know of, allowing the pedals to be as close as possible to the centerline of the bike. The cold-forged Suntour Micro drive is another favorite with a similar Q but it can accept a 32 tooth middle ring. I don't use the small inner ring on most of my personal bikes. I've always been fanatical about minimizing pedal spacing on bikes I build. I go to great lengths to bias the chainline in favor of the lower gears because this is where the chain loads are highest and where the chain spends most of the time in typical mountain riding. Minimal Q spacing gives the pedals better clearance when cornering, when traversing hillsides, and on narrow singletrack or recessed singletrack (ala horse and cow trails). Biasing the chainline in favor of lower gears improves shifting under load and it significantly improves ergonomic efficiency along with chain life. Unfortunately these days, the chainline standards prescribed by the big manufacturers are far from what I consider to be ideal. Cranks arms tend to be thicker where the pedal screws on, adding even more spacing between pedals. The crank mounting standards have a bigger Q than it used to be. The standards are mostly a result of trying to make drive train parts work on a huge variety of bikes. Such is the price of generalization. The top priorities for most new industry standards are safety and maximizing profits by reducing manufacturing and assembly costs. Trying to design better performing or longer lasting products for the end user is not necessarily at the top of the list these days. Nonetheless, the current products are pretty good considering how broad the application is.

In the early days, I think I remember you were riding 45 x 32, with something like a 38t freewheel. Is that right, and what are your thoughts on gearing these days? What do you ride? In fact, what's your bike set up like? I'll tell you what I THINK it is: Flared drop bars, LD stem, Campy bar-end shifters, Deore XT crank with two rings, SunTour pedals, homemade hubs, I don't know what kind of rims and tires. Now, what's it really like?
Pretty close! Actually I have a bunch of bikes. My first mountain bike, the one in the museum, I recall has a single 44 tooth front chainring with a custom built 11-38 seven speed freewheel. One of my current favorites that I ride a lot was built in 1981. It has a 175mm Suntour Micro Drive Crank with 32, 42 chainrings and an 11-34 eight-speed freewheel. Yes, it has an LD gooseneck stem with modified Specialized RM 3 drop bars with increased flare, Campy bar ends, modified Shimano pedals with customized toe

clips, etc. It doesn't have any modern parts on it, but I don't care because it works so well. I hear some pros are starting to use double chainrings now. I guess they're discovering the benefits like better shifting and lighter weight that Jacquie and I enjoyed back in the eighties.

Since you ride doubles, I'm curious to know what you think, or thought about the Ritchey 2x9 system. I admit I was skeptical when it came out, and I'm still resisting (successfully and happily) 9-cog clusters, but I have it on one bike and I like it. Anyway, what are your thoughts on the 2x9? You can get inners down to about 28t, and outers up to 46t. It seems right up your alley.
I've never used Tom's 2x9 but I'm pretty sure I'd like it. It probably didn't take off because it bucked consumer perception and Shimano's plans for the drivetrain. I think it could have become an established gearing option for performance minded folks but it would have needed more marketing and promotion and that's really expensive.

I started using this kind of set-up on my personal bikes in the early eighties to improve chainline and to avoid the shifting and chainsuck problems that mountain bikes with triples seemed to constantly have. Jacquie's race bikes had double chainrings for the same reasons. The bike I used when we rode Pine Mountain was made in the early eighties, originally with 34/44 chainrings and an 11-34 five speed freewheel. Now it has 32/42 chainrings with an 11-34 eight speed freewheel. I have a different 11-38 freewheel I use for high altitude riding. Anyone who uses a good double chainring set-up on demanding singletrack knows you can always grab just the right gear quickly and easily without fussing around.

How many bikes do you own? How many do you ride?
I have way too many bikes. It must be an occupational hazard for anybody who likes bikes and can build them. I ride six or seven actively. I have five mountain bikes that get the most use. Three have rigid forks and two have Manitou forks including my full suspension WTB Bon Tempe that I modified to the ends of the Earth to make it ride the way I wanted a full suspension bike to ride. Then there's a 17 pound road bike I built in 1982 to use for pure road riding. And there's my cyclocross bike that I use everywhere, dirt and pavement. It has a single 42 tooth chainring, 11-34 freewheel, 26 x 1/3/8" front tire, 700C x 35 rear and a chainstay mounted mini-cam brake.
\
What do you enjoy most about bikes and about riding?
Bikes are just completely awesome! They're the perfect means for "right living". They're ridiculously efficient and inexpensive to use, both from an environmental and dollar standpoint. They make people healthy and happy and free us from the tyranny of motor vehicles and the guilt of waste. Of course there's a time and place for cars but most of us use them too much.

Beside bikes, what do you like?
Bach. I discovered him 15 years ago when I heard a live performance of his B Minor Mass, and I've been studying and collecting his music ever since. Most of his cantatas were composed as church music for different occasions. The words sometimes reflect the

expectations of his employers and religious dogma of his time, but the music is timeless because it reflects a universal attunement and great spiritual realization. He wrote more than 200 cantatas, and most have at least five movements. Almost everything he touched became a masterpiece. His music communicates from the heart with tremendous technical excellence. I think he was tuned to nature, which gave his music its mathematical quality. Like nature, on a grand scale it's highly ordered and harmonious but on a micro scale it always contains the unpredictable and unexpected. His skill in the use of counterpoint is unparalleled. I think he used counterpoint to express his vision for humanity. He used it to show how the unique gifts of every individual can express themselves in ways that benefit the whole and how the whole benefits by supporting this diversity. I get so high listening to his music. Totally transported!

I'm just in love with Bach's spirit and the creative process in general. I've also gotten interested in the pipe organs of that period too. In Bach's day the organs were built buy master craftsmen with a sonic aesthetic that was mostly lost as the organs were rebuilt over the years, but the old aesthetic is being rediscovered. They originally produced a soft, warm sound with beautiful overtones.

I'm also interested in high quality music reproduction. A great recording is a combination of brilliant composition, inspired and talented musicians that understand the music, superbe instruments and excellent recording techniques. The recording methods have been slow to improve, and sadly, many great performances of the past are stored on funky masters. The digital recording methods used to produce most of today's CDs were sonically flawed but fortunately some new technology is being adopted that could solve the problems.

So that's about it, bikes and Bach?
Well, I study astronomy in my free time and I'm a fanatic follower of GP motorcycle racing, AMA and FIM Superbike, Formula 1 and CART. The machines are fascinating but the human qualities in these sports are even more so. Same with bikes. OLN is televising a lot of awesome downhill and European road bike races these days. I just saw the Paris-Roubaix live. Wow!

Do you think that technology always improves the experience of riding? When does it? When doesn't it?
Boy, that's a great question for our time, isn't it? Obviously technology can do good or bad. To do good, it needs to be applied with insight, wisdom and skill. I like highly evolved, well thought out designs that are proven by the test of time and I'm thrilled by brilliant new approaches that do things better than ever before.

Why do you like riding drop bars off road?
Drops have more hand positions and absorb shock better because they're longer but mainly I like them because their shape is more ergonomically and aerodynamically efficient than flat bars. The more upright position of flat bars limits leg power mainly to the resistance of body weight. On drops, when you stand, your hands are lower and closer to the body so you can resist your leg muscles with your weight and your back muscles to

get more power. This really pays off in climbing. I'm lucky because I have pretty long arms which allow me to ride steep, technical descents with drops by sliding off the back of the saddle to keep my weight low over the rear wheel. People with short arms using drops may have problems in some offroad situations. The bummer is that when I walk my knuckles drag in the dust.

Are ergonomics and "bike fit" important to you?
Definitely! They are to everybody who rides. I made the Fitfinder Stem to help people get the ideal fit. It allows people to experiment with different bar positions while actually riding their bike in different situations. The literature that came with the Fitfinder gives guidelines on proper fit. All bar positions involve compromises, but good bike fit results from choosing the best combination of compromises for your priorities and riding style. Saddle location is also critical. Once I find the ideal saddle and bar location for a bike, I measure and document them so I can reproduce them or use them as reference when I build other bikes.

I've seen you on the road a couple of times, and you wear even more civilian-type clothing than I do. Have you ever dressed like a cyclist?
I guess not. I mean, I don't like that garish stuff. I like comfortable clothes that work well and blend in with nature. I like high performance wicking fabrics for undershirts and even longjohns in cold, wet weather. Gortex is amazing too. Good layering with wicking fabrics and Gortex allows total comfort even in ridiculous weather. I always wear long sleeve shirts and full pants because I prefer to physically cover my skin with sun-blocking fabrics rather than use chemicals. Also, I ride where there is a lot of brush. Tucking pants into my socks avoids scratches and ticks. Long, loose fitting clothes work well in hot weather because they conduct less of the sun's heat to the skin than if it were uncovered. They also act as a radiator to cool the body as sweat evaporates from the cloth.

What did you do at WTB, and what do you see in your future? How would you like your life to change, if at all?
At WTB I helped guide the company and designed components and systems for doing business more efficiently. I was the main designer of WTB saddles and rims and was quite involved in designing bearing components, brakes, spokes and tires. I identified a lot of the principles that make the tread patterns work so well. I made machines to test WTB components and the competition and did lots of R&D. For example, I made a machine to test spokes and wheels and learned which spokes are best and how to make spokes that perform as well or better. I created product instructions and specifications, did lots of quality control and interacted with manufacturers to maintain quality standards and timely delivery. Even though I'm not involved with WTB anymore, I find it satisfying to see products I designed being enjoyed by people out on the trail. I always get a kick when I see tracks in the dirt left by tires I helped design.

Right now, I'm taking time to recover from the ugly WTB events of the last couple years. I'm looking at the big picture and want to be extra careful choosing the people I get involved with. WTB was like a child to me. I gave the business my all for twenty years. It

meant so much, but life is full of changes. I'm as passionate as ever about bikes and I'm considering new bike related ventures. Along with the pain of the loss, I feel deep thankfulness for a healthy life, a wonderful family, great friends and new possibilities.

What do you see as the future for Charlie-less WTB?
Hard to say. You'll need to ask the new owners. I'm hoping for the best. I'm learning a lot about myself as I try to transition from caring intensely about what happens in the business to complete detachment about its fate.

Do you stock up on bike parts that you don't think you'll be able to get later? I've heard you do.
Most definitely! When I find something I like, I get enough to last Jacquie and me a lifetime. We have all the Suntour freewheel bodies and cogs we'll ever need. We've sequestered away our favorite derailers, chains, pumps, bars, shifters, saddles, etc. I do the same thing for my modern bikes. Shimano changes drive-train standards so often that you have to snag the good stuff while it's available. I've developed methods to make my bike parts last ridiculously long times. For instance I've found techniques to get absurd life out of drive-train parts. As much as I ride, my parts rarely need replacing.

What do you do to make parts last so long?
We'll, I'm fanatic about getting a new bike set up perfectly. I go to huge lengths to take care of everything, down to the smallest detail. If it's done right, you can get lots of use from a bike that's perfect with minimal time spent on maintenance.

Can you be more specific, maybe part by part?
Starting with the drive train, I build the bike with a good chainline, which gives the chain and cogs longer life. I lube the chain with ProLink chain lube immediately after wet rides or any ride over 3 hours. ProLink is amazing. I'm having a hard time wearing out chains since I started using it.

First I clamp the bike in a stable position so it can be back-pedaled. While back pedaling with one hand, I use the other hand to wipe the chain off with a clean absorbent rag. Then I do the same with a wire brush, rubbing the bristles first against the top of the chain and then against the bottom. When backpedaling, the wire brush can also be used to clean the cogs and chainrings. Then, again back-pedaling, I apply ProLink to the lower run of chain as it passes by. There are four zones in the chain that should be lubed as it passes by: between link plates on both sides and at both ends of the rollers. Then grab the lower run of chain inside the rag as you backpedal, thoroughly wiping it dry. This process leaves the lube where it's needed (between moving parts) and keeps the chain clean to the touch. I check chain wear with a pitch gauge and replace the chain when wear reaches 1mm over a 300mm length. Instead of a pitch gauge to measure wear, one can use an accurate 12" ruler. First tension the upper run of chain by making the right crankarm horizontal and pressing on the pedal and then placing the left end of the ruler next to the side of a chain pin. The chain pin at the other end of the ruler should be no more than 1/32" or 1mm from the end of the ruler. This is about equal to 1mm wear over 300mm. If the chain is never allowed to get beyond this wear limit, the cogs and chainrings last

almost forever. I also flush the freehub or freewheel bearings with ProLink after wet rides by placing the bike on its side and dripping it through the bearings while spinning the wheel. This displaces water and leaves a rust preventative film. I also keep the freehub or freewheel bearings adjusted. Most people don't even know that freehub bearings can be adjusted, but they can and it greatly extends their life. After the first adjustment, they rarely need more attention. These things make the whole drive train last an incredibly long time.

As for hubs, headset, pedals and bottom bracket, I just Grease Guard the bearings immediately after wet rides. It doesn't take long and it sure beats rebuilding or replacing them. When bearings or chains get wet, you can't let them sit overnight without lube or they start getting trashed. The bearings on my cross bike are over 12 years old and I use that bike a lot in all weather.

Also occasionally lube all moving points on the bike like deraillers, brakes, quick releases, cables, etc. with the ProGold Luber. It's a clear plastic tube with a hollow needle that allows just the right amount of lube to be applied exactly where it's needed. Not much is needed on these parts though because ProLink wicks between surfaces well.

When I'm not riding my bikes, I keep them out of the sun because UV eventually ruins plastic and rubber parts. I try to ride smoothly and efficiently with lots of mechanical sympathy. I rarely get pinch flats or dent rims. I don't like to bash equipment. After many years of riding you can sense how to ride just below the damage threshhold.

How did you and Jacquie meet? (Jacquie is Jacquie Phelan, perennial National champion mountain bike racer famous for a healthy amount of battiness and eccentricities herself.)
In the early eighties I saw Jacquie riding her road bike several times and thought, wow, she's awesome! I was attracted big-time, pheromones and all. One day she brought me her road frame, which was causing knee problems. I looked it over, and found it wasn't straight. I fixed it and we got to know each other better. Later, we shared a chair at a slide show at Joe Breeze's house because there weren't enough chairs to go around. We were starting to really like each other. A few days later I went to Jacquie's Full Moon party at the top of Mt. Tam. We rode down the mountain together and it was magic. We really enjoyed each other's company and after a few bike dates we were solidly connected. We got married on 8-8-88.

And, do you live in a tree house, really? And watch TV via mirrors? What's the story there?
I guess I'm a bit eccentric but I don't live in the tree house. We do sleep in it all year round though. We like the fresh air, the sounds of the animals at night, the birds in the morning, the rain on the roof, the lunar cycles and the seasons. It's a retreat away from the busybody world of phones and faxes and we get the most refreshing sleep imaginable.

For a while I watched TV with a mirror. I'd recommend it as a bizarre left/right brain exercise. It reverses the traditional flow of motion and makes faces and writing

backwards which really tweaks the mind. It's fun and educational. You'll learn how to read backwards. Useful, huh?

Also from the eccentric department is the time I used a scuba tank and mask for air whenever I drove on the freeway or in the city. I got some pretty concerned looks: Is he nuts? Is something wrong with the air around here?

On our ride you mentioned climbing trees, and I heard from a mutual friend that you once climbed something like the world's tallest tree. I don't remember if it WAS the world's tallest or not (isn't that a tree named General Sherman? A giant sequoia down south of here near the coast?) But what's that all about, anyway?
In my college days, two friends and me were doing a lot of rock climbing, caveing and mine exploring on desert trips. To keep things interesting here in Marin, we started climbing trees. After climbing some big oaks and firs we got the idea to climb the tallest tree in the world. I researched it at the library and found it's on Redwood Creek near the town of Orick, in northern California. As I recall, it's almost 20 feet in diameter and 368 feet tall! General Sherman is one of the biggest trees by volume, not the tallest. The lowest branches of the tallest tree don't even start until a couple hundred feet up, so to climb it, we had to find a way to reach the lowest branches, and we didn't want to hurt to the tree while doing it. We tried the usual stuff like a bow and arrow with a cord, but it didn't work, so after fiddling around, we ended up with a propane-oxygen cannon made from a scuba tank with a removable aluminum barrel and tripod, and a spark plug in the end with a piezo electric trigger. It could accurately lob a 4-pound slug 400 feet up with a cord attached. We perfected our climbing technique on some tall local redwoods to prepare for the monster up in Orick. We got good at using the cannon to place the cord over a branch of choice and then pulling the climbing rope into place with the cord.

We planned to make what we figured would be the first ascent of the tallest tree over Easter vacation. Just days before leaving we learned that a local professional tree surgeon had discovered our plans. In a competitive spirit he attempted the climb first but failed because his standard climbing harness didn't work on such a huge tree. On Easter Day we arrived at the Redwood Creek trailhead and began our march up the trail with a great heap of ropes and gear. It was a long walk and we underestimated the time needed. We got to the tree late in the day and our feet were sore, and we didn't have overnight gear.

The tree was huge, and the only place we could get a clear shot was from a sandy bank on the far side of Redwood Creek, about 60 feet from the base of the tree. It was a difficult situation and by late in the day we had used up our propane and had a marginal cord placement over the first branch 200 feet up. We ended up pulling the climbing rope over the branch but it was too far from the trunk for comfort. We were out of time and had to make it work. We drew straws to decide who would use jumar ascenders to climb the scary rope placement to re-secure it. Scott lost, so up he went. Fortunately he's a feather-weight and nothing bad happened. He relocated the rope nearer the trunk and we jumared up to join him. That was the easy part. We discovered the huge lowest branches are far apart making climbing difficult, hairy and slow. We reached a point about halfway up where the tree split into two trunks. Because of the layout of branches, we couldn't

continue without changing over to the other trunk. We had to pass through the gap between them, which was just big enough for a person, and the gap was opening and closing with the wind. A timing miscalculation would squish whoever was in there. Several hair-raising maneuvers later, the three of us were through and continuing on up. As we got higher an awesome panorama unfolded below. The tops of the surrounding trees were moving like a green sea and Redwood Creek was a tiny sparkling silver ribbon. As we approached the top, the branches got smaller and pointed downward, requiring extra care. Finally, when we reached the lightning damaged top, we were so thoroughly gripped and awestruck that we didn't drink the Heiniken we brought to celebrate. We did manage to wire the beer and a copper tag bearing our names to a branch. We only spent about two minutes basking in the setting sun because we wanted to get down before dark! The descent took a long time partly because part of it was in the dark. When we got down, after all the swaying, the ground felt like it was moving. There was no way we were going to get back to the car in the dark, so we burrowed into the duff at the base of the tree and slept the night.

It's hard to describe what took place that night. I experienced something so special in my dreams, a gift from this ancient, noble being, a communion I'll never forget. These big redwoods are kingdoms of Life and home to all kinds of plants and animals. Bathed in the four elements they link Heaven and Earth with their trunks and hold a living wisdom spanning far beyond our own lifetimes. Julia Butterfly knows all about this. I love what she's done and hope to meet her someday.

Yes, well my tree thing is ropeswings. I'm good at them, and until just now I thought I was pretty groovy for putting up so many good ones. Sheesh. Where you live and ride now has to be the best place in the world for cycling. How much have you ridden elsewhere, and do you have any desire to ride elsewhere?
I love riding everywhere. This planet has so much variety and I love it all. But I'm not a big fan of using cars and airplanes more than necessary because of the consequences for the planet and living things. So, the result is that I ride a lot were I live, and Marin is hard to beat. I do enjoy exploring though, and the less an area is known, the better. Jacquie and I like to jeep out into the boonies, far from everything, and camp and explore by bike. We'll probable continue to explore the Western states this way, especially the deserts.

Which parts on a bike do you think need the most redesigning?
Almost all of them could be designed to last longer and be more serviceable. Bicycle suspension still has a long way to go. Ten years from now it will be far more advanced. Sophisticated suspension won't be cheap but it will provide more ergonomic efficiency, traction and comfort than it does now. Also, I think we'll see better disc brakes and tubeless tires.

Is there a bike part that doesn't need any help?
Probably not. There will always be ways to make bicycles even more efficient, comfortable and easy to use. I'm attracted to the vision of a highly refined human powered machine with advanced technology and awesome capabilities, but I'm also a big

fan of simple, well-designed, unsuspended bikes. They're efficient and need little maintenance, which is very appealing from a practical, minimalist standpoint.

Are you interested in fundamental changes or refinements? Do you think there are any fundamental, huge improvements that can be made still, after all these years?
I've been thinking about something that will revolutionize the bicycle, but I don't want to talk about it. The technology I have in mind will be applied to bikes some day. It won't be cheap though, because it needs high-tech to do it well. I'd like to develop it by working with a good company.

Comment on indexing as fundamental or a refinement, and what place it has in your riding.
I used to grumble about it. But these days it works well and lasts reasonably well. I have bikes with and without and I like both. I enjoy manual shifting, though. Once you develop the skill, it has the advantage of being lighter and simpler with less to go wrong. But for people that haven't developed the skills, index shifting is better. It probably is better for most racing too because it requires less attention from a befuddled oxygen-starved brain.

Do you ever get a hankering to ride a non-Charlie Cunningham-style bike? Just to see what it's like?
I like to ride other bikes and I try to ride the latest gear whenever possible. To improve anything one has to be informed about it. I borrow bikes that catch my interest and I learn a lot by careful observation of others riding the latest equipment.

A few years ago, pre-XTR, there was a flurry of American component makers: Paul, Joe's Derailleur, lots of CNC stuff. Then Shimano responded with XTR, and they all sort of…well, Paul's still around (and a Rivendell member), but it seems like there's nobody trying to compete with Shimano. I can understand that…why pick on the Genius Goliath and all; but for you, as a component designer, where does that leave you? What can ANYBODY do better than Shimano? What do you see as the holes in Shimano's armor? Or would you like to design parts for Shimano? And do you think they'd ever hire an American to do that? Would your former relationship with SunTour make it unlikely? Is there a chance you could design for the new SunTour, or Dia-Tech, or some other smaller player/semi-casualty of the mid-to-late '90s? Are you connected anymore?
Significant improvements will be fewer and farther between but great contributions, as usual, will come out of the blue and be completely unexpected. That's the nature of real innovation. Smaller companies and individuals will still make significant improvements, and to the degree that big companies with lots of resources can work with creative people, more will be possible. I think most real improvements will continue to come from designers that ride a lot and companies that are closely associated with them.

A lot of things in recent years were considered out of bounds when they first arrived. I got plenty of flack for making aluminum mountain bikes in the beginning. Suspension and disc brakes were pooh-poohed. Lately, the non-traditional Egg Beater pedal appears

to be doing well. I think my Grease Guard designs, SST type saddles and the rims I designed with the central beam are worthwhile improvements. They were accomplished without great resources. I think the biggest improvements can be made by creative people working with companies with plenty of resources.

What is the prospect of your selling Charlie Cunningham frames? I can imagine a small local following, but many small framebuilders have a hard time reaching out beyond their county.
Custom frame building feels pretty limited. I'm more attracted to applying the business experience I've acquired and continue to design products and do prototyping and testing. I'd like to oversee limited production of high quality bike frames, components or complete bicycles. Whatever I choose to do, I want to stay connected to my love for the bike and maintain communication with the people that use the equipment as much as possible.

What's the best possible week of riding that you can imagine? Where, when, with whom, on what bike or bikes, and what kind of meals during and at the end of the day?
The riding around here comes pretty close. The mountains in Nevada, Arizona and New Mexico also seem like bike heaven to me. It's great around Downieville in the California foothills too, but it's getting a bit zoo-like. I'd probably choose my Cunningham hardtail or my 1981 rigid bike depending on the expected terrain. I'd use my camping bike if I planned to ride with food and sleeping bag.

My favorite meal is a mixture of rice, wild rice, beans, lentils and goat feta mixed with lots of chopped vegetables and some nuts and a little olive oil. Makes great fuel and tastes super good. I like fresh fruits and raisins too. I love fishing. Can't beat fresh bass and trout. I'm not very into processed food and I only buy organically grown. I've built a pretty high tech water purification system for our house. I guess my religion is clean food, clean air, clean water and clean living!