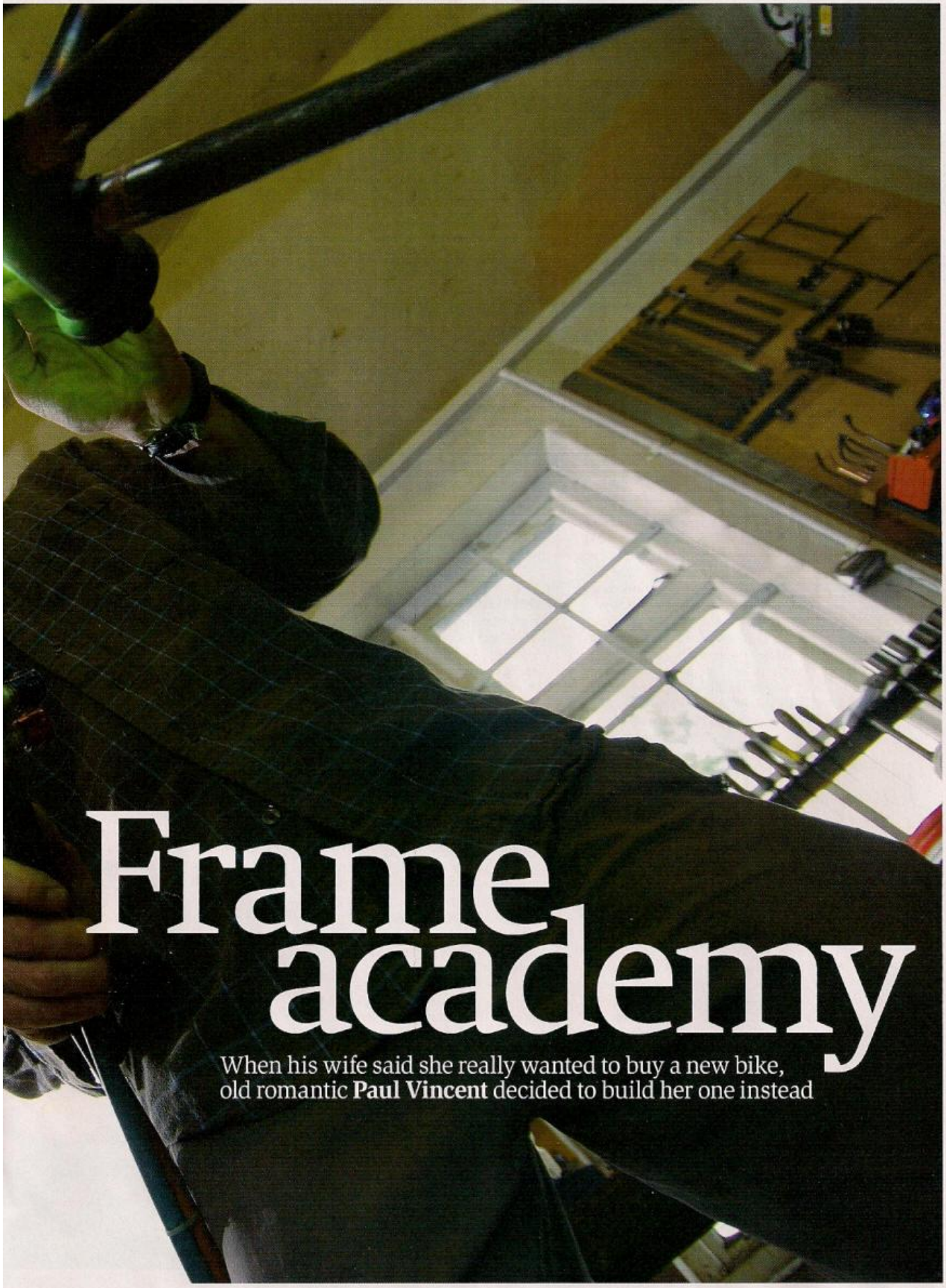
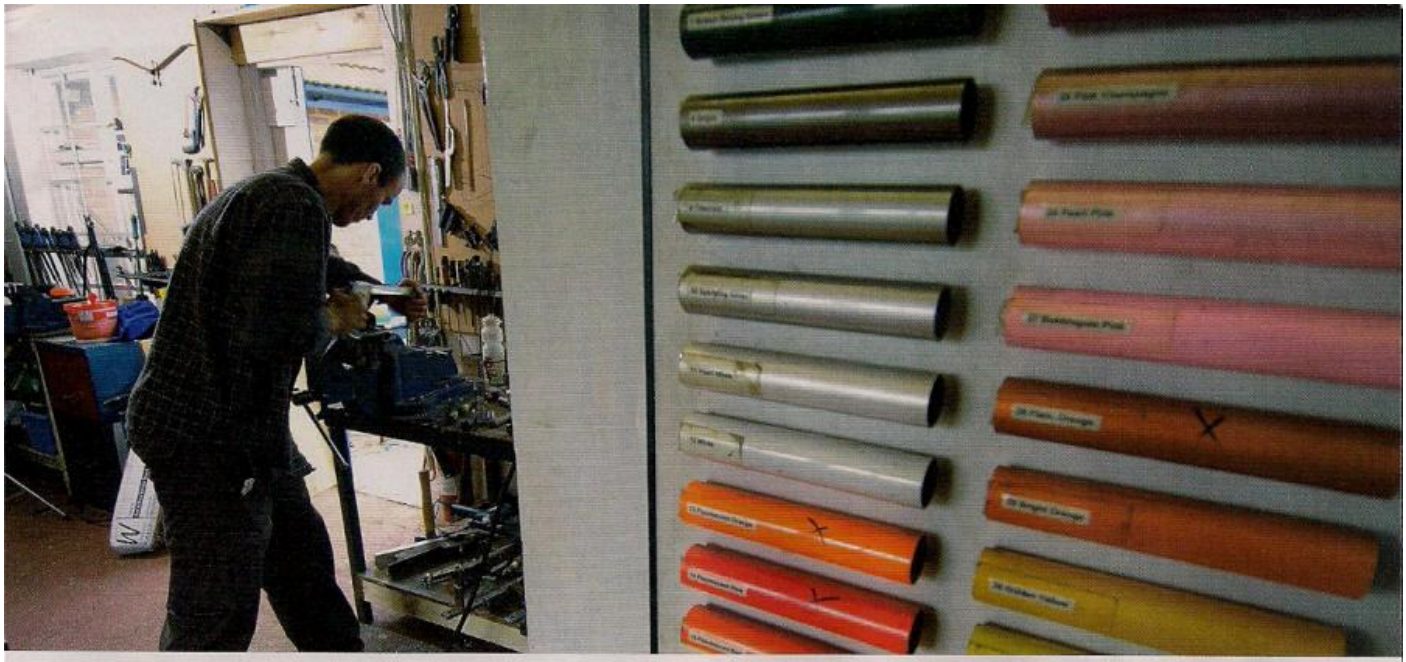
Geoff Waugh



Frame academy

When his wife said she really wanted to buy a new bike, old romantic **Paul Vincent** decided to build her one instead



One man's vice is another's virtue...

The smell of hot metal drifts over and instantly my mouth goes dry. In my head I'm back at school, sitting ashen-faced in the corner of the metalwork room, head between my knees having almost lost a finger in a rapidly revolving lathe and resolving to swap to woodwork as soon as possible. I've just arrived at Dave Yates' Lincolnshire workshop for the start of an intensive three-day frame-building course. I'd been looking forward to it, but as the memories of clumsily brazing sliding bevels and dodging flying chuck keys come flooding back, I begin to have doubts.

Perhaps Dave notices the blood draining from my face as he quickly moves to calm my rising apprehension with that guaranteed cure-all – a cup of sweet tea. Just as I start to relax, though, I drop a digestive in my cuppa as the relative calm is shattered by the sound of a jet fighter from nearby RAF Coningsby firing up its afterburners. It's the perfect cue to get welding.

Despite decades spent tinkering with bikes – both human powered and motorised – I've no formal engineering qualifications

My first encounter with Dave had come at a bike show in the early 1990s, when *Cycling Plus* was in its infancy. Under the lights of the Birmingham NEC he'd set up a temporary workshop and I, like many others, stood transfixed as armed with an oxy-acetylene torch he turned a collection of rusty tubes into a beautiful bicycle frame. At the end of the show I congratulated Dave on his 'act' and left wondering whether I could ever build a frame myself.

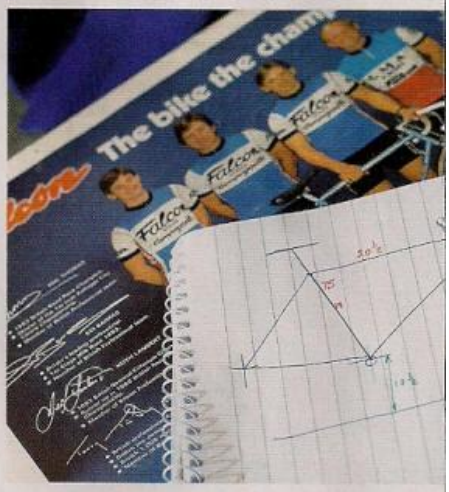
Fast forward to late last year and I'm discussing the vague possibility of taking out a loan to buy my wife Louise a new high-end bike when I get a call from Dave offering me a place on one of his frame-building courses. I jump at the offer and imagine Louise at Christmas, tearing off the wrapping paper to reveal a bike I've built with my own hands.

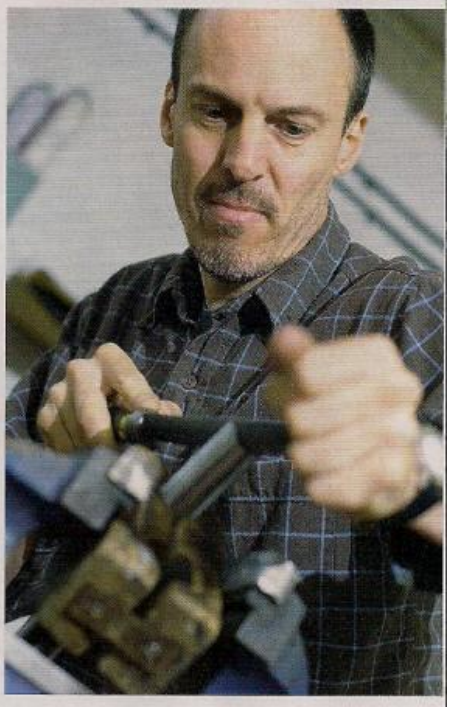
Metal mayhem

Despite decades spent tinkering with bikes – both human powered and motorised – I've no formal engineering qualifications and this, along with those school days 'enjoying' metalwork, fills me with some apprehension as the course begins. It doesn't help that I'm planning to complete my frame in three days, rather than the five Dave's course usually takes. Dave helps put me at ease by telling me he gets students from all of walks of life, many less experienced than me, and shows me some of their impressive frames ready for painting.

While I'm admiring the previous alumni's handywork, a loud whooshing noise tells me that the course is under way – Dave lights up a torch and holds its bright flame near an old piece of tubing. Within seconds a ragged hole appears in the tube – Dave isn't demonstrating best practice here, but rather how heavy-handedness with a welding torch doesn't lead to a beautiful frame. He then shows us how it should be done – 'dialing in' the flame to the correct length and focused to a sharp black point in the middle. Then it's my turn and, to my surprise, Dave's calm advice means that I'm soon feeling confident wielding a torch that I'm sure my metalwork teacher once claimed could cut a man in two!

Once my initial flame-throwing lesson has ended, Dave guides us to the middle of his workshop and to a contraption that resembles a painting easel. This is the 'jig' on which I'll be constructing my frame. The jig holds the steel tubes I'll be brazing into a bike-shaped object. »





By holding the tubes in-situ and pretty much in the shape of the finished frame, Dave says the jig will help us "see what we're going to get". It also means that we can make small adjustments to the design as we go. So at last it's time to get down to business.

Fancy a lug?

With my steel tubes in place on the jig I get a rush of excitement as I see – roughly – the bike I'm building for Louise. She's asked for a bike with a distinctive top-tube slope that will give her enough clearance to dismount safely with both feet on the ground. And I've decided that the frame will be lugged. Essentially lugs are sockets into which each tube slots while they are bonded together using molten brass, and were common on steel bikes. In fact, many bike builders and riders regarded 'fancy lugs' as works of art.

Dave points to one of his own frames in progress and admits that he prefers fillet brazing – where the tubes are bonded by melting a brass rod around the joins – but I figure that lugs look better; to me they reflect the golden age of cycling when professional riders shod in breeches and cotton caps stopped at the village pump for a mid-ride ciggy and a bottle of beer.

As I've only got three days, I won't be building forks too and instead hand Dave a set of carbon forks I had – ahem – prepared earlier. Using these forks, Dave works out the required frame geometry on the jig, after which I'm ready to start. Before I get to wield the torch on my tubes, though, another metalwork memory returns. We apply some pink, chalky stuff called flux around the joint, which helps the molten flux flow into the joint and prevents the metal oxidising as you heat it. Dave then hands me the torch and I nervously feed in the gas and light it. I'm a little disappointed by the small flame, which flickers with the sound of a little flag flapping in the wind. Dave smiles and takes over, feeding in oxygen to bring the torch to life with a roar eerily similar to the jet fighter earlier.

I place the torch near the lug and move it up and down, the metal turning from cherry red to bright, white-orange. "It's getting too hot, Paul," warns Dave. "Move the flame back and turn it down a little." With the metal now glowing bright orange he prompts me to start feeding the brazing rod into the heated area of the lug. The braze magically disappears behind the lugs and Dave tells me to move the torch downward until the braze runs out the other side of the lug. This process of teasing just the right amount of brazing rod into the gap and then drawing the now molten metal bubbling through to the other side of the lug is vital to the strength of the joint and is surprisingly easy to master. I'm beginning to enjoy myself.

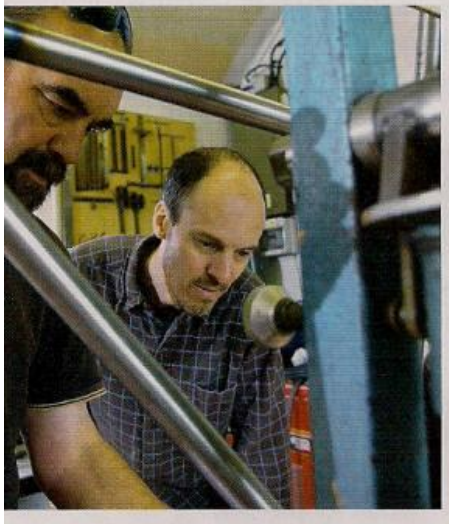
Maybe I'm having too much fun because at one point I run too much heat into the job, resulting in a little globule of braze the size of a cotton bud dribbling from the lowest point of the lug. Dave spots this and demonstrates the delicate art of turning the jig a little and using the flame and gravity to chase the molten metal back behind the lug.

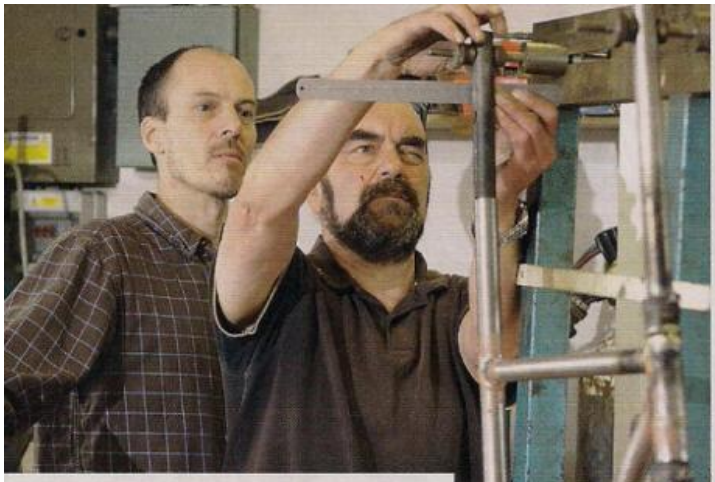
Maybe I'm having too much fun because at one point I run too much heat into the job

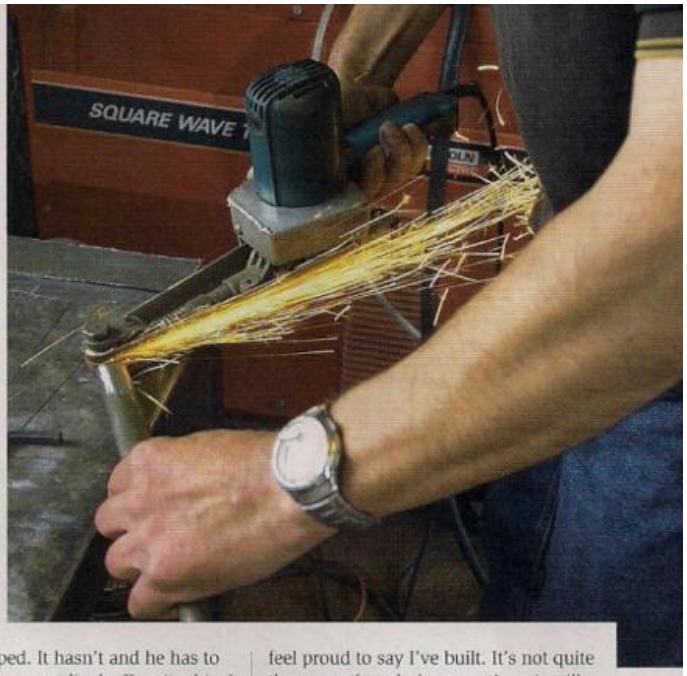
The raw materials...

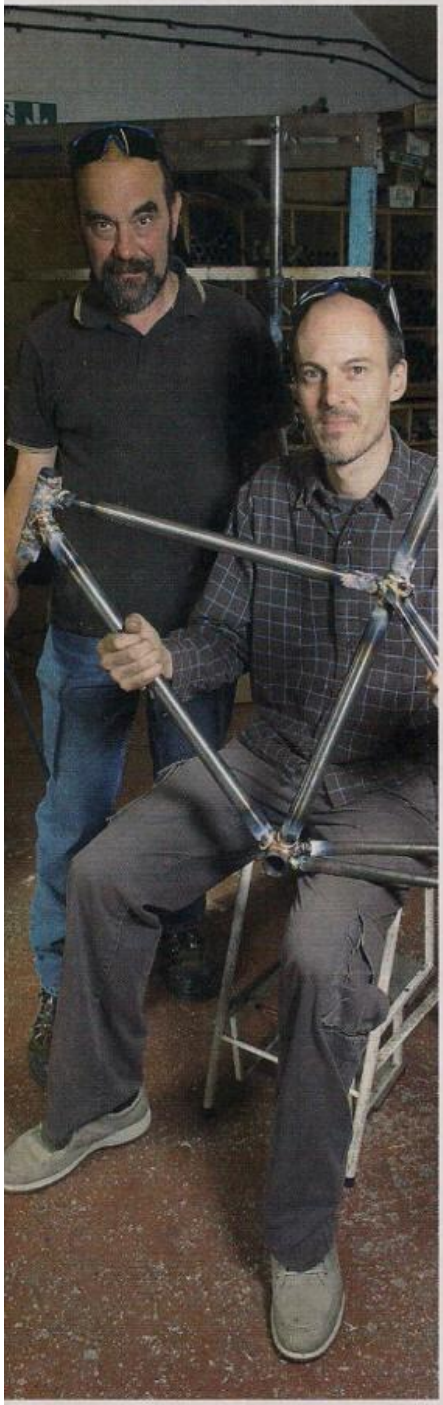
Before we put the tubes on the jig, we had cut and filed an angle in the end of them so they would join neatly together inside the lugs to form mitres. My fondness for woodwork after that teenage lathe incident really starts to pay dividends and I set about the tubes with gusto. My use of the metalworking file sets Dave's teeth on edge, although he does offer me praise of sorts, proclaiming that my mitreing skills are "near enough" – result!

Mindful of my past failure to get the flame to the right size, Dave keeps a watchful eye to see if the penny has »









Dave checks the alignment of Paul's frame (above) and (right) demonstrates how to tidy up a tube with the belt sander

finally dropped. It hasn't and he has to adjust the gas accordingly. Despite this, I eventually have chainstays and seatstays brazed to the front triangle, resulting in the basic outline of a complete frame. No doubt thinking of donning ear defenders, Dave advises me to be careful with the file as I make a curve in the rear brake bridge and, after heeding his advice, I get a hugely satisfying feeling as I get it right first time.

With cable stops fitted I step back and begin to admire a frame that I can feel proud to say I've built. It's not quite there yet, though, because there is still quite a lot of black, glassy flux around the joints. Dave points out that these could be hiding imperfections in the joins, so he moves the frame into a sand-blasting cabinet. With two huge rubber gloves attached, the cabinet looks like something you'd find in a nuclear power plant. And after a noisy blast it certainly provokes a reaction – within the time it takes to down a cup of tea my frame is transformed from a flux-encrusted mess to something resembling what I'd seen hanging up in the local bike shop.

My frame is transformed from a flux-encrusted mess to something resembling what you see hanging up in the local bike shop

Finishing touches

Closer inspection does reveal that some of the molten brass has spilled out of the lugs and onto the tubing. I clean the job up with a file – I'm becoming quite proficient – and give better definition to the edges of the lugs. Dave also notices that some of the gaps in the seatstays haven't been filled properly so it's back to the jig and torch to make just a few minor corrections.

With this done I can hardly believe that I'm looking at my first hand-built frame. I can also hardly believe that I've avoided the inevitable cuts and burns that Dave warned me about at the start of the course. I'm already thinking about building my next masterpiece with a mixture of astonishment, excitement and pride.

The icing on the cake is watching Louise take her first ride on the bike I built under Dave's tutelage. She tells me it's the nicest bike she's ever ridden and the best Christmas present she's ever had. The moment brings back fond memories of my grandfather, who used to talk of his immense pride seeing Spitfires in flight that he had helped build during the war. Maybe the sense of achievement and pride I'm feeling now, as I watch a bicycle I've built with my own hands being enjoyed, is something close to what he must have felt. I hope so: it's a good feeling. »

THE TEACHER

IT SAYS A lot about his personality that this lighthearted Tynesider broke into the high-end mountain bike market in 1995 with a frame called the 'DONKISNOB' in answer to the 'DOGSBOLX' produced by London-based framebuilder Chas Roberts.

Dave Yates will let you tackle virtually any kind of frame that he thinks can be completed within the five-day course. While he has worked with other metals, Dave's courses are based exclusively on building steel tubed frames.

Dave usually teaches two or three students per course. There are currently no places left this year but he is taking bookings for 2010. Dave also builds wheels and complete bikes and carries out painting and frame repairs.

Further details are available on his website *www.daveyatescycles.co.uk* or by calling him on 01526 343322.

The finished product...

Under Dave's guidance Paul has hand-built a fine frame that would happily grace the wall of any good bike shop

ALL IN THE DETAILS...

PAUL'S FRAME IS based on 'new old stock' Columbus SL tubing bought at a cycle jumble in the 1990s. Ceeway has stocks of modern tubing – call 01322 442990 or see *www.framebuilding.com*. Midlands based Autostrada ☎ 01543 483155 did the lovely paint job, the depth and quality of which is down to the application of a silver basecoat followed by a translucent red top layer.

Up front, Paul has chosen an Alpina 1in carbon/aluminium fork. The Shimano Deore DX thumbshifter is a personal preference, and having a SRAM undershifter to control the rear mech leaves space for a bell. The shortened USE carbon handlebars and an adjustable Easton DH stem provide the perfect riding position for Louise. The 1998 Shimano Ultegra groupset and Ritchey Logic seatpost were taken from Louise's old bike, and the Xero Maravilloso wheels were selected for their colour co-ordinating red anodised finish. The Continental Sport Contact Reflex 700-37 tyres work at 70psi for a super-comfy ride, and fit (just) under the standard reach Shimano Ultegra brakes. Completing the look are Acor quick release mudguards. CP