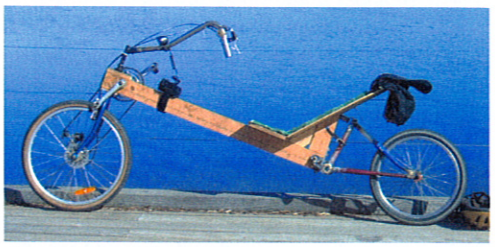


Evolution of a design: from the re-purposed BMX to a wooden prototype, and on to the production-ready model using castings. For economy the same casting is used four times: twice at each end of the main beam.

BIG AT THE FRONT

Stephen Nurse from Victoria, Australia, describes the evolution of a new type of recumbent.

If a recumbent bike has different wheel sizes, the big one will be at the back, right? Well, no. Starting with a twisting-chain-and-pulley bike I made a few years ago, I have been building front wheel drive bikes which have the big wheel (24", 26" or 27") at the front, and 20" at the back.

All have twisting-chain front wheel drive, but the bikes developed over the last year dispense with the intermediate pulley (found on bikes like the Zox) and keep the standard-bike fork rake of about 70 degrees. This is in contrast to other new bikes such as the Minq [see Issue 23 -Ed] which have direct front wheel drive but reverse trail.

The layout ends up something like some American long wheelbase bikes but dispenses with long control cables, long chain and all the chain pulleys. The wheelbase is long and so are the bikes, and the drive mechanism and tiller-style steering have some costs in terms of handling such as a large turning circle. But the rear wheel of the bike is suspended, and it's easy to fold the rear triangle under the bike to make the whole thing more compact.

The first bike was built in late 2006 and started life as a 20", six-speed BMX with suspension. Since then I have built several others like it.

The bike I now ride most has a cro-moly steel main boom and rotary laser cut end pieces which are the same front and back. They support the bottom bracket and steerer (front) and the rear suspension pivot and seat (back). This bike has completed 50-70 km per day, twice weekly commutes, 100 km training rides and the 210 km 'Round the Bay in A Day', all without fuss or serious mechanical problems. The puncture gods have even been kind!

While building this all-steel bike, I started to think about alternative ways of making it. First, a wooden recumbent was made using laser-cut flats to secure parts to the timber.

Later, I put a lot of work into designing a casting which would do the same job as the rotary laser cut end pieces. At work I deal with aluminium castings and am familiar with the rapid prototyping and dies used to make them. After getting a quote for some parts, I approached the diecasting firm Sankey Australia for sponsorship and soon after received funds that let me proceed. Thanks to Andrew Mitchell and Sankey!

And now I have the result of the work with the castings. The newest bike takes some design cues from the wooden bike and has a 24" front and 20" rear wheel, two V-brakes on the front and no brake on the back. The lower part of the rear triangle is horizontal and 'out of the wind'. All the control cables run through the steerer tube. The front and the back of the bike aren't joined by control cables and can be separated for transport.

The bike is designed to have the identical frame castings used four times and to eliminate all other complex arrangements in the frame. Once a die was made the castings would cost maybe $5.00 each or so, and the parts are designed so a die would not be hideously expensive.

If the bike were produced in volume, the result would be an inexpensive and fast recumbent cycle. A moderate price tag would leave some allowance for buying good components.

I am interested in hearing from manufacturers interested in producing these bike designs and have taken provisional patent protection on the intellectual property. Within a few months I plan to publish some details of the designs. Meanwhile I can supply individual requests for plans and parts at a price to be negotiated.

Stephen Nurse

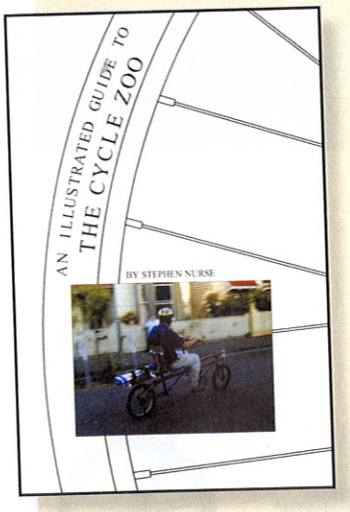
Stephen Nurse also wrote the article in Issue 17 about the 'Modular Bike'. He can be contacted via *www.modularbikes.com.au* or by phone: +61 3 94818290 or fax +61 3 9489 6669.

An Illustrated Guide to the Cycle Zoo

Stephen Nurse

In this modest volume, Stephen Nurse sets out to catalogue the many varieties of human powered transport, and he manages to cover pretty much every species familiar to *Velo Vision* readers, many of which will be new to the average cyclist. 'Normal' bikes, folders, recumbents, tandems, load bikes and family carriers are all explained, the various layouts described in the text and illustrated with nice clear schematic drawings. The descriptions are necessarily short, so the diagrams provide useful 'at-a-glance' elaboration.

The Australian author has been building recumbents and HPVs for over 20 years and has patented a design for a modular bike, which we featured in *Velo Vision* in Issue 17. So there are also chapters on the benefits of modularity, and on the process of design and building of a front wheel drive long wheelbase recumbent. For those thinking of home building there is information on basic geometry, stability and materials, design tools and the principles behind levers and suspension. A bibliography at the back points readers to sources of more detailed information.



The remaining chapters deal with commuting by bike and a short account of a trip to Bribie Island, near Brisbane, to try out a locally made vintage Manx recumbent. I would have juggled the chapter order around a bit to make a more logical progression, but then this isn't a book that needs to be read from cover to cover, so it's easy to dip in to the chapter you need. All in all, it's a handy addition to the interested cyclist's library, especially someone contemplating some home building.

Sue Archer

Published by Stephen Nurse. ISBN 978-1-921488-08-5. Soft cover, approx 15 x 23 cm, 122 pages, mono. Price: AUS$20, including postage within Australia. For details of shipping to other countries and how to order, go to the author's website: www.modularbikes.com.au/book/

Live to Ride response

After the somewhat critical review of *Live to Ride* in our last issue, the author replied:

May I respond to Sue Archer's critique of my novel, Live to Ride*?*

I have twice toured Great Britain by bicycle, and I keep detailed journals of all my bicycle tours. I chose to write a novel rather than a factual account of a tour for a variety of reasons, one of which is that I have much more latitude with a novel. My journals are not intended for public consumption. I have read several tour accounts, and they are typically very dry indeed. Novels are much more fun! Live to Ride is, to the best of my knowledge, the first ever bicycle-touring novel.

Live to Ride is told from the perspective of two young foreign cyclotourists who, like the author, are bound to misinterpret some of what they see and hear. Not only that, but the characters have never been out of North America before this tour. The 'castle' in Selby, actually an abbey, was mentioned only in passing, as were the mislabelled beefeaters. I probably made a few more mistakes like those, as any foreigner would. This is why novels begin with the disclaimer about real places being used fictitiously.

I described the routes used and towns visited by the protagonists for the benefit of foreign, especially American, readers. My countrymen do not often venture beyond the familiar tourist attractions of central London, and British geography is not taught in our schools! Furthermore, the countryside and small towns are essential parts of the story, almost like another main character. Much of the action happens outdoors. It is my intent that another cyclist can follow the path taken by my characters as a sort of trans-Britain trail, along the lines of the well known TransAmerica Trail.

The subplot about drug gangs may seem over the top, until it is compared to, say, two physicians trying to drive a car-bomb into a major airport. Next to that, my tourist-terrorizing hooligans seem almost ordinary! Eric and Roger are cyclotourists – not Interpol agents or spies – who have a knack for biting off more than they can chew. The outcome of the subplot is a sobering reminder to them throughout the remainder of the story. I wanted to keep the emphasis on bicycle touring and cyclists, rather than on crime, espionage or mystery. At the same time, I wanted to write something more exciting than merely cyclists contending with foul weather, steep climbs, flat tires, unhinged motorists and so on. The story has several more subplots that include local color, racing, romantic misadventures, a custom frame and an attempt to locate an old friend.

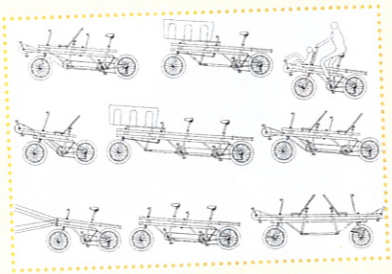
My goal in writing Live to Ride *was to tell a story more interesting, more compelling, and easier to read than so many of the dreary 'classics' I have read. I wanted the characters to grow a bit, and I can say with confidence that they did. I thank Ms. Archer and* Velo Vision *for their comments.*

Best regards, Bo Edwards

Live to Ride is published by Pivo Publishing Corp (www.pivopub.com), ISBN 978 0 98013 4506

MODULAR CYCLING

Reader Stephen Nurse from Australia describes his do-it-all modular bike system.



"Modular: constructed with standardized unit or dimensions allowed flexibility and variety in use."

In 1986 I travelled to Germany and saw a newspaper article about a home built recumbent bike. I resolved to make one myself, and have been making them ever since. As well as recumbents, I have made several tandem HPVs: my son Ewan has pedalled on a string of tandems since the age of 4. He is now 14, and about to overtake me in height! In 1987 I joined OzHPV and started to meet many other HPV builders: I am forever grateful for their camaraderie, friendship and advice.

A few years ago, I built a tandem bike from two Malvern Star folding bikes found on a rubbish pile. The tandem was built with an 'insert' between the two halves. I really liked the bike, but started thinking that something better or different would be possible.

My modular bikes are the result of this thinking. The bikes are designed from the ground up to be assembled as tandems, recumbents and load carrying bikes.

The aim is to make these bikes more affordable by using a cost-effective modular construction.

This construction includes standard frame units with extras such as a suspended rear triangle, steering link, rack, trailer and recumbent seat & boom. The frame has attachment points at the ends for holding another frame or extras, a tube that acts as a static handlebar mount, and tubes that can support pulleys for a front-wheel drive mechanism. The seatpost doubles as a mount for the recumbent seat, as do the bottle mount bosses on the top tubes. I have taken care to ensure that the extra features on the bike don't look scrappy when unused – for example a plastic plate can fit over the front attachment points.

The latest bike design uses NC routing, laser-cutting, steel tubes and flats, plastics and timber seats. These are all processes and materials I'm comfortable with in my job as a mechanical engineer. Mark IV will probably use investment cast lugs and lighter, thinner tubes. Maybe by Mark VII the frame will be moulded from a single piece of carbon-nanotube reinforced plastic!

Quite early on I thought of the commercial potential for the design and applied for a patent which was granted late last year after much CAD drafting, letter and specification writing and fee paying. Hopefully all the hard work will pay off!

I'm interested in hearing from people who'd like to buy a bike or make one using my designs or parts. (I have some more Mk III framesets). If you want more info go to my website: *www.typing2000.com.au/bikes*. My email contact details are also there. Otherwise phone Australia (03) 94818290 or write to me at 10 Abbott Grove, Clifton Hill 3068, Vic, Australia.

See you out there on a modular bike!

Stephen Nurse