FRAMES

There's nothing new under the sun in frame design. Or is there? Do six-day riders use too-steep seat angles; could kilometre riders hold a steadier line with shallower head angles, and go faster on steeper seat angles; and how many women riders have to make do with frames that look cut-down larger versions?

Inviting discussion on these and other themes, frame-builder Dave Moulton airs his views on how frame design can be improved. Also in this feature, news from other frame builders.

Time for a new angle

Cycle racing is a unique sport which really has no parallel with any other sport. Apart from rowing I can think of no other where you have a machine propelled entirely by human power. As in all sports great strides forward have been made in training methods, but is the machine itself being exploited fully? One area, which I believe could be developed further is in the design of the frame.

When engineers are designing and developing a racing car or motor cycle, the engine is developed to achieve maximum power, and the car chassis or motor cycle frame is designed to make full use of this power with good road holding, which means minimum loss of traction, and the ability to go round corners fast with maximum safety.

Exactly the same criteria should apply to the design of the racing cycle. The development of the engine, which in this case is the rider, is the job of the coach. The frame designer's job should be to produce the frame so that all of the rider's development is not spoilt.

I feel that this is not always being done. For a start seat angles could in many cases be steeper. Look through the pages of Cycling and you will often see photographs of riders sitting right on the front of their saddle, sometimes with almost the whole saddle showing behind them. This is because when making maximum effort the rider slides forward to get into a natural position, which is right over the bottom bracket.

The trouble is that if sitting on the front of the saddle where it is narrower, apart from being uncomfortable it has the effect of being too low. Watching the Olympic cycling on television in the kilometre event for example, some of the riders were sitting well out of the saddle for the first half of the race and then sliding right on the point of the saddle for the duration of the race. The saddle was only used for sitting on while waiting for the starting pistol.

Surely there is room for experiments here with steeper seat angles, to get the rider over the pedals, sitting in the saddle so that he is in the correct position for maximum efficiency.

More experimenting

Sitting further forward has other advantages in that the rider can breathe better because his legs do not come up to his chest. If you sit back your body is double more than if you sit forward. I don't mean by this that you are sitting in a more upright position, but that the upper part of the body remains horizontal or whatever position you normally sit. It is just that your whole body is moved forward in relation to the bottom bracket.

The advantage in this position is that with the rider's weight more over the pedals of the bike is improved, providing you don't have too steep a head angle.

This brings me to another point I noticed in the Olympic kilo-

merie. The riders who were fighting to keep control of their

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From p19:

**FRAMES**

The big influence on frame design in recent years, which is quite wrong — although other frame builders may disagree with me — has been the six-day track bike. Six-day racing on road indoors tracks is so specialized, and so different from other forms of cycle racing, as to require a special design of frame. For a start, due to the stop-starts, there are G forces, pulling the rider back on to the bike, so a small dead angle is called for around 33 degrees, and a fairly long tube of 55 cm plus. Another can end making a long body so that his weight is spread out, minimizing these G forces. Also, six-day racing requires an anti-saddle, flat pedalling type of effort over long periods in which this type of position is best suited.

The head angle needs to be steep, around 75-76 degrees for quick steering, necessary for switching in and out between changing riders. So here is a very specialized bike for a very specific type of racing. Some builders have attempted to build frames like this for road racing, where a leg-pumping position, plus 3 tubes, is more suited. Getting back to the slow development of cycle frames, there seem to be so many variations in frame design, often laid out in books such as the well-known cycling manual published by the Bicycle U.K. which makes statements but gives no reason for doing so. For my part, it seems that the head angle can be steeper than the seat angle but never shallower. I can see no logical reason, scientific or otherwise, for making such a statement.

This book also states that the seat angle can vary according to the size of the frame, and then goes on to say that the head tube should normally be parallel with the seat tube, but again gives no reason why.

I agree with making the seat tube steeper, for a smaller frame, and in fact build my frames this way, after all the smaller rider has shorter chips and therefore needs a steeper head tube. But to vary the head tube just to keep it parallel affects the steering and handling characteristics. Also, in making a frame parallel you limit the length of the top tube, if for example, you have a parallel frame with a 22-inch top tube, then it would be too lengthy. The measurement between the bottom bracket centre and front wheel centre will be 22-inch plus the fork rake, say 14-inch which equals approximately 36-inch (1 yard approximately) because you line between brackets and front wheel is not quite parallel with the top tube).

Some women have been criticized for their poor riding positions on frames that are often cut-down models of larger frames. In the photograph and diagram is Dave Moulton's answer, a 72-degree top tube, and corresponding changes in seat stay and top tube lengths.

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FRAMES

Is it worth £82.50?

Bernard Thompson looks in on Mercian Cycles

Speaking as an ancient bike-rider who can remember quite a few half-a-dozen old-fashioned green beasts, one of the six late Fredlyi Scott of Ealing, and taking possession of my very first hand-built racing frame, it is perhaps understandable that I walk the glittering array of equipment at this Harvard show in a bit of a stunned state, unable to accept the price tags that adorn them, more with revulsion than business acumen.

So you want to lodge in a posh hotel with handmade frame, best quality and precision, what will you pay for your £500? It's a Mancroft, or the price of Mercian Cycle "top-of-the line" pretty Professional Road, Vinicor Road, Superlight Road and the Grand Special, and as Mercian’s workshop at Derby was dead in on my route to the national hill climb championships at Llangollen it was a good chance to find out where the customer’s money went to.

Mercian Cycles' owner Bill Betten employs 12 people, of whom four are actual frame builders, and they turn out 2,200 frames per year. Of these 300-400 frames are sent to such countries as the U.S.A., West Indies and South Africa.

There are also two apprentices in the workshop, a sister that Betten once held 20 years ago, learning the trade and the manufacturing side of the way to produce a thing of beauty that will carry a racing man at speeds of 40 mph plus.

The four men in the process of flinging upright seat designs, braiding tubes to tubes — a crucial operation this — and sticking away at the workshop degrees at a later stage like surgeons with insects, are highly skilled. A set of tubes could take up to two hours of flaying, setting tubes and producing by readiness for assembly precision.

Betten himself took on 18 months in his apprenticeship to fully master the art of cutting out those intricate legs. He handed me a couple of legs in the midst, just as they are handed to the frame builder, and I worked over to a finished frame hanging like a pear on专线 in a jeweller’s shop window. Holding the leg alongside the same frame comprises it was beginning to dawn on me where they meant, when: I was going.

Creek Land was sending a partly built Vinicor Road frame, and a frame head in the process of building. The legs were secured to the machine with welding pin and the frame’s alignment is

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they are easy, but only if you have practiced a thousand times.

The key to success is in blocking such scenes as green-baize, cable eyes and green-eyeball from your mind. The key to success is in blocking such scenes as green-baize, cable eyes and green-eyeball from your mind.

A LOT OF DAMAGE IT GETS INTO THE WRONG HANDS: A MECHANIC COMES UNDER THE TORCH

THERE'S MORE CONTINENTAL ATMOSPHERE TO EMPEROR SPUR THAN THE WHITE STATION-WAGON WITH ROGER DE VENNEBROOK SUPPORTERS' CLUB STICKERS AND FLEMISH PLATES THAT USUALLY STANDS OUTSIDE. INSIDE the tiny shop run by one of the south's best-known ducats are books, posters and photographs bringing home of the road to a sunny public — that's if you can cover among the web of equipment, bicycles, frames and wheels to the cramped quarters.

The influence extends to the service provided by Tony Mills and Mick Coward, who, after a pair of careers of over 25 years as answer, independent and professional riders, set up the business about three years ago.

They are permanently on the look-out for new, bigger machines that could include space for the crowd of "vulgars" to live off their earning hours. Until they find them, Tony carries on wheel and bike-building either side of the counters and Mick is business in the tiny yard, where all day, some weeks every day, he builds frames.

Coward started his career in 1969 with the Improved, in 1970 joined NC Vaux and two years later became an independent with Fred Dean, Spils with Stan Saunders, Ron Whyte-Russ and Ernie Wombell followed. Then on to Geoffrey Bullivant-Curry and Pig. Later to become Geoffrey Bullivant, with Tony Mills as manager.

"We used to go to race in Belgium quite often," said Mick. "This weekend with the pros in Britain involved a 15-mile event in Wrexham, where the winner was the first man over the speed limit. So often there was too much travelling involved if we went to Belgium."

A couple weeks for the Continental scene when he decided to have one last season. "I live like a real pro for a year!" he moved into Belgium and the Rubens team for a season of tournaments. The next year was "to no transport; just to Britain."

He had been trained as a surgeon; instrument maker and had often asked to try his hand at being a professional framework builder while awaiting hours after hours fine-fishing on in Geoffrey Butler's. "You can't start if you like," they told him.

He took two weeks off from work as a frame-builder. There was no one else to show him the ropes, no ready-made jig, no tools, so he began a small shop to get going.

The result was what he calls a "green massivity" — still in use and so far to start when you like.

He worked as a full-time builder for "DEB" and on the progress to the European weekend it was the same. Paul Miller handles the retail and over-the-counter business, while Mick does all the frame-building in the large shed at the back of the shop, a setup that allows his apparent deficiencies and primitive tools, works quite efficiently.

"It's even worse when you're building in a shop," says Mick. "You're not having to serve customers as well," a sentiment surely echoed by hundreds of builders up and down the country fascinated by their work in hilly countryside.

Working on his own, interrupted, Mick builds three frames a week, keeping "semi-normal" hours. If there's a rush on, then days off and Sundays go by the board, and when the hot spell arrives he doesn't work at all in order to catch some cool hours.

"It's easy if I design the jig and most of the tools myself. Most of the tools are those I design, and we always seem to arrive at the same thing. "When the business started off, it was in the

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FRAMES

individual skill and experience which the bicycles bring. And, with Coward that's over 20 years of hand-made racing experience, much of it at professional level, which makes him highly sceptical.

"Testing bikes with the track coaching are for straightforward cycling, we'll build them if they want them, but they don't look after them like the cross Merick or Maritime are riding.

"Six-day bikes with road ends for club training. They have a use if they are purely racing events. Then often they are commissioned by riders using the successful, we'll then train on them and wonder why the bikes start.

"Road racing frame should be at least 75 degree parallel bigger frame can be a bit steeper, up to 80. We don't do a stock frame. We like riders to bring in their old bike and into shop photographs of themselves racing then we can talk it over.

"You can't have a set angle you want angle determined where your times end, so a rider with long thighs will need a different frame.

"Although our workshop looks like a glorified garage, and you have to be careful where you put your feet, it's not just a glorified garage. We have our own dyno testing facility, and the bikes are tested for the appropriate strength for the job and another and the subsequent rework before they leave.

"I built these frames, a week at the end-end busy bee, experience, butches of steel frames, all the

same size, then you can do the shaping a whole. But with "special" every action is different. The frame is never identical and checked after each one."
FRAMES

New business for the New Year

WALLACE SPORT is Wallace McNeil's new frame-building business opening in the New Year in Ballymoney, on Antrim, Northern Ireland. Already he has designed the prototypes upon which he will base his frames. It will be something of a comeback for Wallace, for in 1961, when he formed the Club Sport Wholesalers, later to become Team Route, he built a few prototypes in the local technical college workshop. He has now named Wallace Sport.

This didn't permit him to build both frames and run a shop, so the frames building stopped. He's kept Wallace out of the shop for a while, but recently a meeting with an old friend re-ignited the interest in frames, especially as there was a offer of help.

The range should include three frames, a road model with 72-74-degree angles, new Cam- pagnolo Super Record dropouts, rear brake bridge with Allen key fixing, Italian style cage bosses, and an Allen key seatbolt, and internal models using the new Zeus 2000 track ends and fork crowns.

The third model will be constructed from the new Bays- ills 5513 special lightweight tubing, and all frames will be transferred designed by a local firm.

Exclusive

EXCLUSIVE to the W. F. Holdsworth branch at Putney, London, and the new Welling, Kent, shop are a 465-410 range of frames designed by and bearing the name of Roy Thref, the Holdsworth Campagnolo team manager.

The all-round competition is a standard 75-degree parallel road or racing frame, or 75-degree track frame at the bottom of the range at £84 (road) or £83.50 (track). Campagnolo or Shimano front and rear ends, Italian fork and crown, wrap-over top eyes and lugs with small windows cut out.
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There are features of this bike that are new to the frame design. At the other end of the scale, the Roy Thame Champion Elite Superlite, the purists' or time trial frame built in Reynolds 531 Superlite to custom specifications.

Ordinary road or time trial. Campagnolo frames are E3, the Superlite is E11S. Correctly, all the Progents high handlebar and seat by top short-distance man Bob Donsingto into Ace of Clubs design.

The recording frame used the Campagnolo Super Record short drop handlebar and seat stays. Instead, this fell under the category with the Theme Continental design. The theme is the same as the theme of the Continental racing frame, with vertically drop-down, which is flatter and planted, and has the same long fork and seat stays. The 1969 seat is backed away from the Allen seat bolt housing. Long drop handlebar and seat stays. Special design for the track. These means long narrow seat and chainstays, smaller rake fork and short horizontal brake stays. In between the two extremes are the Roy Thame Elite frames, which are carried in stock. The standard model is 73 degrees parallel, the standard pattern cut-out and side lug shape. Variety of top eye designs, including drilling.

Silver Superlite

If you make a mistake the tube will rip off, the frame is cut, and that's one reason why ordinary bearing won't do when working with Reynolds Superlite tubing. Harry Gorton uses this in making the nib frame that adds up to a bike costing £300. Paper Time Trial 70s, which contains the Nervogate frame. New edition.

Although its name is in the company's 75th anniversary, the model will be available to order when the year's up, but you will wait 18 weeks, each of the 100 needed to perfect each of the 1000 models.

Harry Gorton on the cutting and bending of tubes by Billy Whitman, and because these tubes compare in thickness to the Superlite tubing, the frame is assembled with the tube. The frame is an absolute necessity. Silver Superlite is not silver, but a low melting point, very soft, and the stays is used in each frame. Silver welding is very thin, and the low temperature melts the tube. The fork is oval section, the rear ends vertical dropouts, and contributing to its lightness the fork column is dotted. If there's still doubt as to the frame's purpose, the welding equipment proves it by being time-tested only.

Campagnolo brakes have started, cornered hollowed-out, the brake fingers and not a flaw to be detected. The film shows how Harry Queen's name engraved searching and Campagnolo Super Record equipment, including seat post, handlebar and chainset, speak for itself. Every bolt is O.S.A. The wheels are radial-spoked, 36 front and 24 rear, but back to the future. The finish is in a new Italian firm, which needs no lacquer. The white takes weight under 1 lb.

Bird at the back

"I'm not cut out to be a drop-in, I'm a mechanician and a tube builder," said Roy Gorton, who, for those very reasons, has kept his shop at Welling. He insists on concentrating on the solo job of building frames.

But Roy's not gone far, for the drop-in is very much a presence in the workshop itself is taken by W.F. Holdsworth.

"I'd like to be the type of a concentrate on building the super-special job," said Alan, who's himself confessed the season on building an average are a season trailing bike for one of Britain's short-distance stars.

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