DOUBLETALK

BULLETIN OF THE

Vol. 2, No. 5

May-Aug., 1978

TANDEM CLUB OF AMERICA

TANDEM OPTIMIZATION....NOTES ON BRAKES

by Harvey Sachs

In the next couple of issues, we want to comment on several brake topics, including the following:

1) How (best) to set up rear rim brakes, particularly for the mixte-back bike.
2) Who needs a third brake? Rim or hub? Front or back? Who should control the third brake?
3) Is the $130 disc better than the $20 disc? Why?

This issue will deal with the first topic; the second will be covered in a later bulletin and the third will be deferred until we can give you some real test data in addition to opinion.

By way of introduction, all brakes work by converting kinetic energy (motion) to heat. Ultimately, the heat goes into the atmosphere, but in the meantime it affects the contact surfaces (rims, pads, etc.) and adjacent materials (inner tubes, etc.).

Tandem brakes serve two functions: stopping, as at traffic signals or in panic; and speed control on long descents. In our 10,000 mi. or so of tandem riding, we have always found two brakes adequate for stopping. Still, we insist on a third brake for two reasons: First, we want a descent (speed control) brake, since we often ride (with child) in hilly country. To avoid excess rim heating and blowouts, this must be a hub brake (or parachute!). Second, on a single there is sufficient margin that either brake can stop the bike reasonably well by itself. To get the same safety factor on a tandem we want a third brake.

If your bike has a men's/men's frame, the manufacturer has probably taken reasonable care of your rear caliper brake needs. What follows is for the poor bloke who isn't satisfied, particularly if he has a mixte-back ("lady-back") tandem - as we do. In our experience, three principles rule:

1) The fewer and gentler the cable bends, the better the brake works.

2) If the bends are reasonable, the shorter the cable the better.
3) For tandems, cut the nonsense: centerpull brakes have about twice the mechanical advantage of sidepulls, so they can take better advantage of good (Matthauser) pads. We've used good sidepulls and good centerpulls. I'll ride either on a single, anywhere, but on a tandem I strongly prefer centerpulls.

Mechanical advantage is the crucial concept here. For a given brake lever, we are concerned with the ratio of the lengths of the brake arm ends: pivot-to-yoke (or cable attachment) divided by pivot-to-pad (Figure 1). If this ratio is high (standard centerpulls), a given movement of our standard lever results in high contact force but relatively little brake pad movement. Conversely, if the mechanical advantage is low (conventional sidepulls), then our standard lever movement gives more pad movement but less force at the pad. This has a couple of consequences: Sidepulls feel firmer, all other things being equal, because the smaller force reactions mean less deflection of the parts. Second, Sidepulls are more tolerant of wavy rims; for a given amount of lever travel, they will sit further from the rim. Third, for tandems the mechanical advantage of centerpulls means less force required on the lever (but more movement) and lower loads on the cables. The Furst brake (Figure 3) has these advantages in spades. Fourthly, the longer the sidepull arms, the less suitable for tandems.

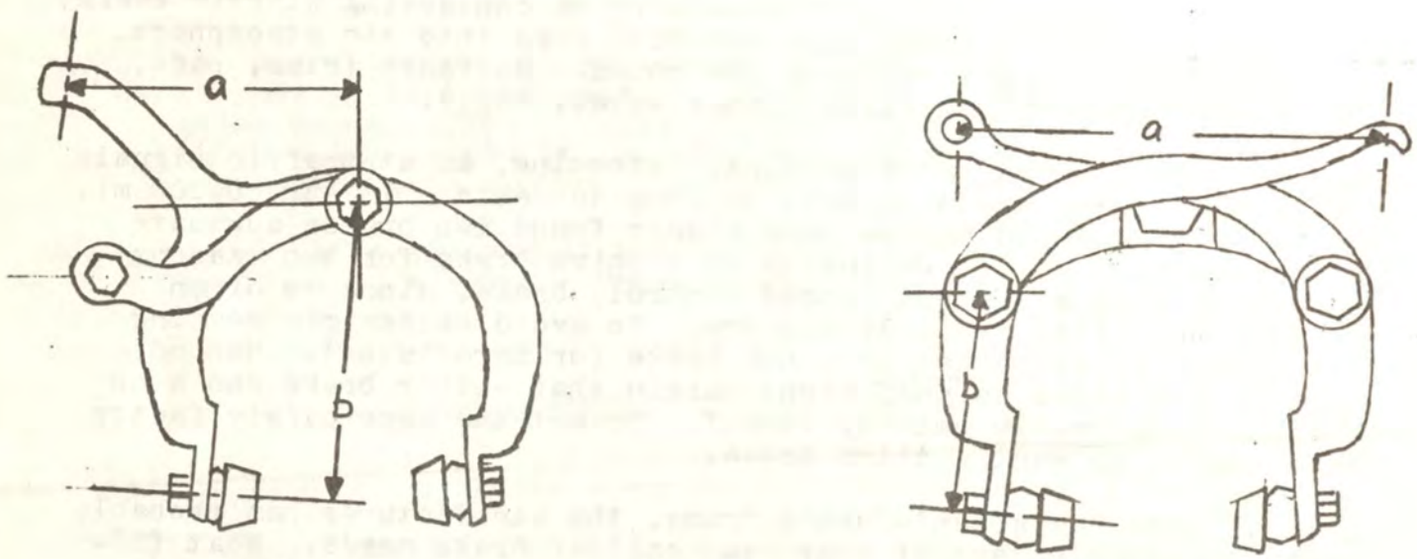


FIGURE 1

Along those lines, the standard Mafac cantilevers are used by cyclo-cross racers because they are light and because they have very little mechanical advantage - they travel a long distance and so forgive mud, dings and other hazards. Other than rigidity and forgiveness, they have nothing to offer tandems. Although I haven't measured, the same seems to be the case for the nice Shimano cantilevers, as noted by Malcolm Boyd. Among centerpulls, we have had good success with the humble Mafac, particularly the Competition, but we prefer the Universal 61, since it is quite rigid and uses the fully adjustable Matthauser pads.

Factory tandem makers (except the Paramount) seem to prefer putting brakes on the seat stays (Figure 2, #1) instead of the intermediate stays (Figure 2, #2). I never have figured out why: A seat stay either requires using a sidepull brake with the attachment inverted, so the cable runs along the intermediate stays and loops around, like on a girl's 3-speed, or a centerpull is used with a pair of abrupt bends of about 130° or one such bend and the world's worst pulley. In our experience, the sidepull is a better solution, but it is hard to find a rigid one which can be rigged for the inverted cable.

If you must use a seat-stay brake, we recommend Ben Furst's solution (Figure 3), detailed in the next article. This requires an extra pivot, but it doubles the leverage (and halves brake arm travel). Keep your rims true....

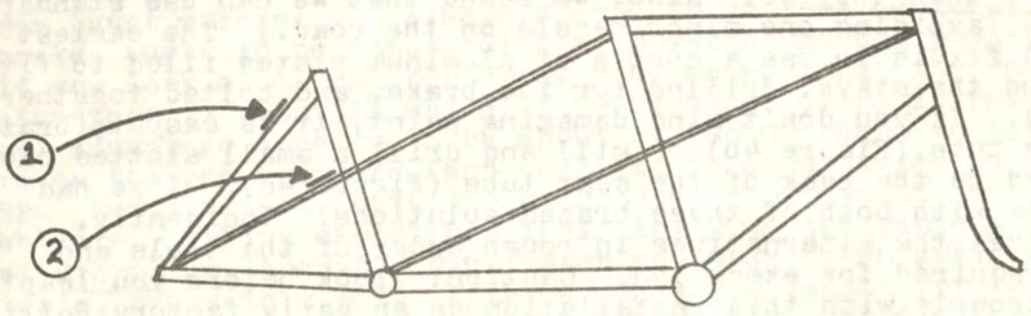
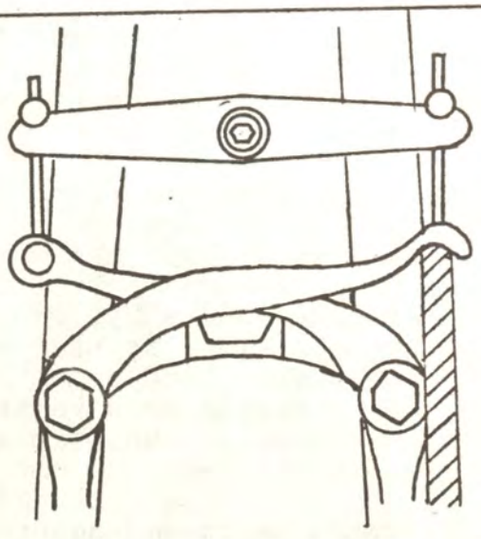


FIGURE 2

FIGURE 3



We - and some of the Baltimore set - feel that the much better solution is to go to a middle-stay brake (Figure 4). However it is mounted, this gives a beautiful cable run and works like a champion. (Since it has one bend fewer than diamond-frame singles, it works better than they do. Also, we found that we can use standard rear cables, avoiding one minor hassle on the road.) The easiest (Baltimore) fix is to use a couple of aluminum plates filed to fit right behind the stays, drilled for the brake, and bolted together (Figure 4a). If you don't mind damaging paint, it is easy to braze in a bridge tube (Figure 4b) or mill and drill a small slotted block to be brazed to the back of the seat tube (Figure 4c). I've had good results with both of these brazed solutions. Incidently, Figure 4 gives the alternatives in rough order of the tools and equipment required for execution. Caution: Look before you leap! We had no trouble with this installation on an early factory Follis, but you should check wheel clearances carefully. If we had not been changing to vertical drop-outs on our Schwinn Town and Country/ Paramount, we would have had trouble getting the wheel out, since the chain stays are only 15½" long. Standard yoke cables are not long enough to loop around the seat tube. For a Mafac installation, I cut a piece of brake cable. For a Universal 61, I got the long yoke cable sold for mixte singles.

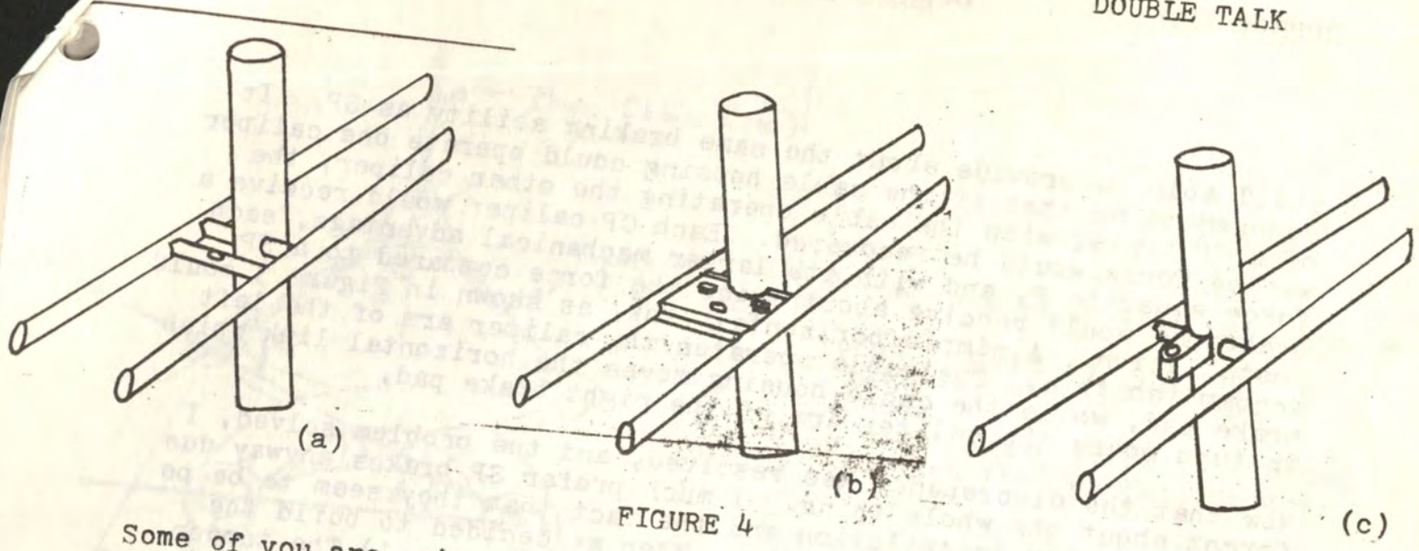


FIGURE 4

Some of you are going to think about using cantilevers or side-pulls on the center stays. I once saw center stays with Mafac bosses (Bob Jackson frame) and still can't figure out if it was usable: Every time I checked the geometry, the arms seemed aimed directly at the stoker's ankles - unless the stoker is very pigeon-toed. Similarly, almost all sidepulls are wider than the stays, so they risk hitting the stoker' ankle. Now, if only there were a brake which fitted nicely under the chainstays and cleared the chainwheels.... It would be out of the way, but very dirty.

Next time: Who wields the power?

Two solutions to different problems were submitted by club members. Ben Furst discusses the extra link that he added to imporve the braking characteristics of a center-pull mounted on a lady-back, and Malcolm Boyd discusses cable yoke lengths for cantilever brakes.

Ben Furst writes: It always seemed to me that centerpull (CP) brakes ought to be about twice as powerful as sidepull (SP) brakes. If you look at SP caliper arms, you can see that the mechanical advantage is about 1, while if you look at CP calipers, the mechanical advantage appears to be about 2. So CP ought to have about twice the pad pressure, and ought to be about twice as powerful as SP. But, in fact, both types are just about equal in brakeing ability. Biking experience indicates this, and Table 1 on page 70 of Bicycling, August, 1976, which accompanies an article on brake tests, bears this out. After a while the reason for this occured to me. In a SP installation the brake cable housing operates the other caliper with just about the same force. In a CP installation the force due to the housing is applied to the frame and is therefore wasted. Only the force applied by the cable is used for braking, and that is divided approximately evenly between the two CP calipers. So each CP caliper receives a force equal to $\frac{1}{2}F$, compared to the force F that each caliper of a SP receives. However, the CP compensates, due to its larger mechanical advantage, and is

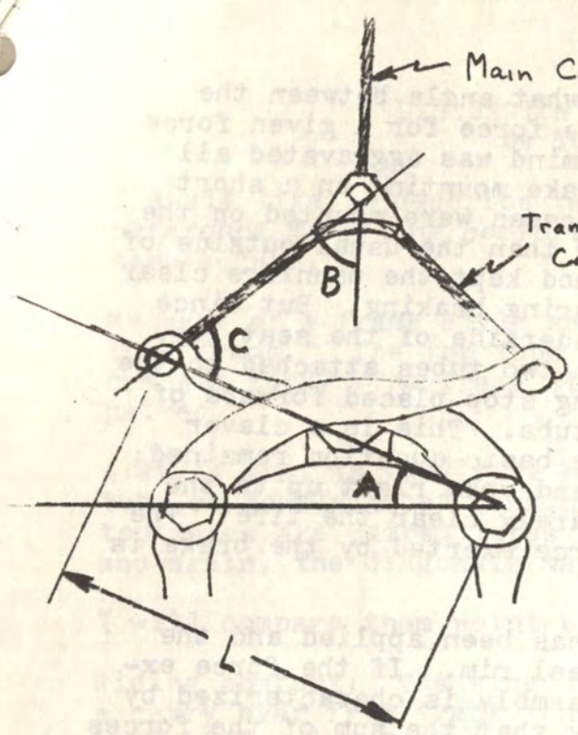
still able to provide about the same braking ability as SP. It occured to me that if the cable housing could operate one caliper of a CP brake, with the cable operating the other caliper, the wasted force would be recovered. Each CP caliper would receive a force equal to F, and with its larger mechanical advantage, each brake pad would receive about twice the force compared to a SP installation. A simple horizontal link, as shown in Figure 3 could accomplish this. The cable operates the caliper arm of the left brake pad, while the cable housing moves the horizontal link which in turn moves the caliper arm of the right brake pad.

Now that the discrepancy was resolved, and the problem solved, I forgot about the whole thing. I much prefer SP brakes anyway due to their neater installation and the fact that they seem to be po powerful enough for a solo bike. When we decided to build the tandem, the problem returned for several reasons: 1) The tandem was built with a strict budget in mind, using as many parts from my bike parts box as possible. CP brakes were in the box and I felt that I should try to use them. 2) Standard rear CP installations on a ladies frame have never appealed to me, and I wanted to do something more appealing. 3) I had read that tandems can m make use of more powerful rear brakes due to the smaller weight transfer to the front wheel when braking, and that such improved rear braking is very desirable. After thinking about all this for a while I thought of using the horizontal link as shown in Figure 3. This would solve all three of my problems at once. And, in fact, it did. The end result is what I feel is a neat installation, and what I feel is a rather powerful rear brake. Both comments are quite subjective, especially the second, since I've never been on another tandemand honestly have no idea what a powerful brake feels like. But on our tandem the rear brake is as powerful, or more powerful than, the front brake, which is a standard CP installation. The rear pad pressure may be too great, in fact, since the Mafac brake pads rub off and deposit on the rim, as if they've been partially melted. This doesn't change the braking ability but does make the rear brake squeal loudly.

Harvey Sachs supplied the following general analysis of a center-pull installation. See page 7.

The jist of the Sachs analysis is that if the angle A is at all greater than zero, the torque supplied to the brake arm is a function of the cable yoke angle. This is why modern Japanese center-pulls (e.g. Diacompe) use a very short yoke which maximizes the factor k. The unfortunate aspect of the Furst derivation is that it ignores this effect. For the Furst brake, B = 0, and k is at its minimum value of about 0.5. This offsets the doubled F_{mc} to which he alludes.

A similar problem exists for cantilever brakes. One of the little details that often bothered me when I adjusted the Mafac cantilever



$C = 90° - (B - A)$

Force applied to main cable is F_{MC}.

Force applied to <u>each</u> <u>half</u> of transverse cable is F_{TC}.

The main cable force is divided between the two caliper arms so that

$$F_{TC} = \frac{F_{MC}}{2} \cdot \frac{1}{\cos B}$$

The torque applied to a caliper arm is

$$T = F_{TC} L \sin C = F_{TC} L \cos (B - A)$$

$$= \frac{F_{MC} L}{2} \frac{\cos (B-A)}{\cos B} = \frac{F_{MC} L}{2} \frac{(\cos B \cos A + \sin B \sin A)}{\cos B}$$

$$= F_{MC} L \frac{(\cos A + \sin A \tan B)}{2}$$

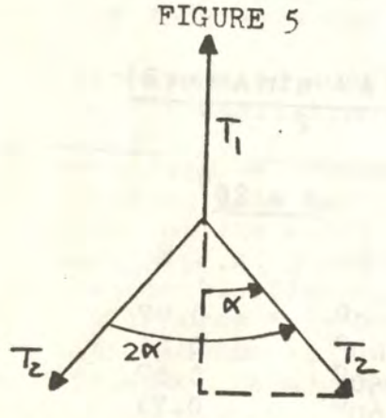
or $T = k F_{MC} L$ where $k = \frac{(\cos A + \sin A \tan B)}{2}$

<u>A = 0°</u>		<u>A = 10°</u>		<u>A = 20°</u>	
B	k	B	k	B	k
$k = \frac{1}{2}$ for all values of B		0°	0.49	0°	0.47
		40°	0.57	40°	0.61
		50°	0.60	50°	0.67
		60°	0.64	60°	0.77
		70°	0.73	70°	0.94
		80°	0.98	80°	1.44
		85°	1.48	85°	2.42

brakes on my tandem was the question of what angle between the straddle cable provided the maximum brake force for a given force exerted by my hand. The question in my mind was aggravated all the more by the treatment of the rear brake mounting on a short (21-22") Bill Boston. Here, the brake bosses were mounted on the inside of the rear frame triangle rather than the usual outside of the same seat stays. This mounting method kept the panniers clear of the brake cable, a typical problem during braking. But since the cable stop can't be placed on the underside of the seat log, the yoke on the Boston is guided through two tubes attached to the sides of the seat log and a cable housing stop placed forward of them on the bottom of the stoker's top tube. This is a clever solution to the pannier problem, but the basic question remained: Is it best to bring the straddle cable and yoke right up to the cable housing stop, or should it just barely clear the tire? The analysis that follows shows that the force exerted by the brake is independent of that angle.

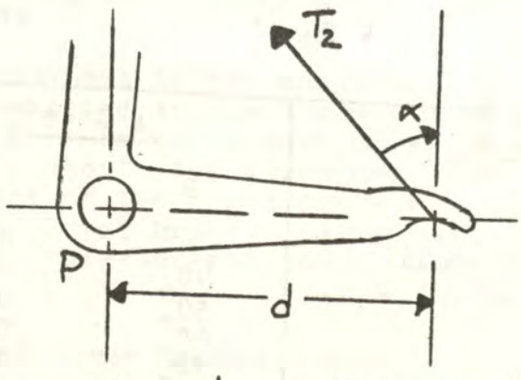
Consider the situation where the brake has been applied and the brake shoes are pressing against the wheel rim. If the force exerted by my hand and the brake lever assembly is characterized by T_1, for tension, the laws of statics say that the sum of the forces around the yoke that connects the brake cable and the straddle cable will be zero. This means that tension T_2 in each arm of the straddle cable will be $T_1 / 2\cos\alpha$, where 2α is the straddle cable angle (see Figure 5). At this point, the long cantilever arms of the brake are nearly horizontal.. The force of the brake shoe on the rim will be directly proportional to the moment Mp caused by the straddle cable around the brazed-on pivot P. This force is e equal to d T_2 cos , where d is the length of the brake arm (see Figure 6). Substituting for T_2, we obtain $Mp = d\,(T_1/2\cos\alpha)\cos\alpha$, or $Mp = T_1\,d/2$. Note that this means that the moment is independent of the angle of the straddle cable. Therefore it makes no difference at what angle the cable is set when adjusting the brakes.

FIGURE 5



$T_2 = T_1/2\cos\alpha$

FIGURE 6



$M_P = d\cos\alpha(T_1/2\cos\alpha)$

A DISCUSSION OF TANDEM BICYCLE FRAMES

by Tullio Maseratti

I would like to describe two very different tandem frames with reference to riding comfort, stability riding ease and ease of manufacture.

My name of a frame style we are all familiar with is the "single tube frame." The top tube is a single tube, as is the bottom bracket tube. The frame stiffening diagonals may be single or paired.

A style that is very rare but worthy of discussion is the "paired tube or double tube" (again my name for it). In this frame the top tubes are paired tubes of the same diameter as the chainstays; and again, the diagonals may be paired or single.

I will compare them point by point.

Riding comfort: The single tube frame rides hard! This design is a carry over from track tandems where stiffness is desirable and hard riding is of no importance on a smooth track. The hard ride is further aggravated by shortening the wheel base and curving the rear seat tube, thus stuffing the rear wheel under the stoker. When this design is converted into a pleasure bike all sorts of tricks are used to make it ride easy, such as curved top and down tubes and/or extended or curved chain stays to absorb the road shock.

The double tube frame could be made stiff and hard riding, but there is no need. With the same effort it is much easier to design an easy riding double tube frame, especially for the stoker. Because the stoker sits more nearly over the center of a wheel than the pilot it is a fussy design problem to make the stoker's ride soft enough so he can put out full power without serious riding shock.

Stability: The single tube frame usually features a very large round or oval tube connecting the bottom brackets. This is a talking feature. The principle strength of the bike goes from the head tube to the down tube through the bottom brackets to the chain stays. This is a circuitous route far from the center of gravity of the loaded bike. Simply put, the two riders wave around in relation to each other while balanced on the pedals. This makes the bike hard to control because the high center of gravity bends the frame excessively.

The principle strength in the double tube frame goes from the head tube back through the seat tubes and down to the rear wheel. The double top tubes hold the seats in line much better than the single top tube, resulting in less motion of the center of gravity in

relation to the wheel line and less correction of the steering track. This makes the handling more predictable and the bike feels more stable.

Ease of manufacture: The single tube tandem presents a fearsome design problem. The top tube which MUST be rigid is cut completely away by the intersection of the front seat tube! The designer is entirely dependent on the seat lug to stiffen the tube. Unless he can make his own cast steel alloy lugs he cannot change angles to his own choice. The lugless bike is always too flexible in the top tube.

The double tube frame neatly solves this problem; in fact this is possibly the whole reason for the configuration! Two tubes neatly passing around the front seat tube gives about eight times the lateral strength. The joints are easily made and there is great flexibility in design. True, this is not as asthetically pleasing; but if the diagonals and bottom bracket tubes are also doubled, the frame will have a nice airy look.

To sum up: The single tube bike is familiar to us and asthetically pleasing or even elegant in appearance. It is a most difficult design to make well and generally is more hard riding and wobbly bike. The couble tube frame is easier to make in the small shop with no foundry. It is much stiffer laterally and because there are no limitations imposed by lug angles there is much more freedom of design.

My very good experience with couble tube frames has led me to write this article. Can the bike be made competitive? The Czech Tandem Team won the World's in '74 in Montreal on a double tube frame!

LETTERS TO THE EDITOR

Harvey Sachs writes: "The 'older single speed Schwinn tandem' Dale Brown recently acquired is undoubtedly a Town and Country, which was built until the early '50s and catalogued with the Paramounts. As far a I know, the bike was made of 4130 tubing and Schwinn may still have replacement frames; they did in 1974. Ours has over 40,000 mi. on the Veeder cyclometer. Because it is a good excuse to talk about cos-effectiveness of conversions, I'll write up an article on it for a coming issue of Double Talk."

From Fred Teeman, Manager, Consumer Relations, Schwinn Bicycle Company (1856 N. Kostner Ave., Chicago, IL 60639): "Referencing the Jan.-Feb., 1978 edition of Double Talk, pages 8 and 9, a person (possibley Dale Brown, Greensboro, NC) asks about an older Paramount Tandem. If you'll ask the person to send us the serial number of the tandem, we should at least be able to tell them when it was made."

Bruce Perry (3505 28th St., Des Moines, Iowa 50310) writes: "In the Jan.-Feb. issue a member asked about an older Schwinn Tandem. I believe he must have a 'Town and Country' tandem made in the mid fifties. Although these weighed up to 90 pounds, I presently have the bike in an under-50-pound configuration. This must have been a top quality bike in its day, comparable to the Paramount tandem now, with excellent workmanship but inferior materials.

"Conversion to a 10-speed requires considerable widening of the rear fork tips. The steel is mild here compared to todays standards but weakening probably results. The radically curved rear seat tube makes fitting a front changer difficult but a cyclone with cage extension is working well. Originally I had a cheap double plateau chainwheel on the bike but this was replaced with a Nervar cottered crank fitted with a Viscount and T.A. cyclotourist chainwheel (they are interchangeable), this will be replaced with a P.W. BB soon. A Campy tandem spoked front wheel and a 42 spoke (6 extra pulling) Hi-E/Lo flange tandem hub are now on the bike. Cantilever brakes are brazed on the mixte tube. A Cinelli stem, drop handlebars, front centerpull with Matthausser, woman's Avocet and alloy post on the rear with a Crane G.S. derailleur are used.

"The original conversion was very inexpensive as many parts were on hand. Considerable money has been invested now in the expectation components may be switched to a custom frame set and this tandem used for a child conversion.

"I do have some questions that experience may answer. How much trouble do people have with pedals unscrewing if cranks are reversed? How do tandemists set up and like front drive tandems?"

SECOND ANNUAL TANDEM SKYLINE DRIVE TOUR

It was billed as an event "planned to enable strong, well-conditioned tandem teams to participate in a challenging, but still sociable weekend." The Second Annual Tandem Skyline Drive Tour proved that there is truth in advertising. The three day, 215 mile tour provided the participants with some challenging climbs and distances; yet there was plenty of opportunity for socializing during and after the riding.

Nine tandem teams set out from Front Royal, VA on Saturday, July 29, and headed south to Waynesboro, 104 miles away through the Shenandoah Valley. The trip was made notable by several steep climbs, strong head winds and 90 degree temperatures. Everyone was glad to reach the motel that night. After a smorgasbord dinner and a good night's sleep, the tandemists were ready to tackle the Skyline Drive.

Cycling on the Drive is a wonderful experience. The traffic was not heavy and the driver were courteous. The road surface was smooth and free of debris. Skyline Drive hills are graded (about 7%), but they are long (some are 5-10 miles). The ups were not difficult; they required more perseverence than brute strength. The downs were pure joy for the braver souls (and veterans of previous Skyline trips) and a little scary, but mostly fun, for the timid novices. It is quite a thrill to descend a thousand feet in 5 miles, reaching speed in excess of 50 mph. This was not a ride for cheap tires!

Sunday breakfast was a 5 mile ride up (straight up!) the road near the entrance to Skyline Drive. The remainder of the day was spent chugging up the hills and drifting down the other side. The trip was marred by rainy weather and patchy fog. Bad weather was not enough to dampen the enthusiasm of these riders; they reached Big Meadows visitors center that afternood in good spirits. That evening the group enjoyed dinner at the lodge and the presentation of the Crescent Wrench Award by Al Schaffer.

The Crescent Wrench Award is held in high esteem by veterans of the Tandem Skyline Drive Tours. It is Al Schaffer's hope that some day it will be ranked among such coveted prizes as the America's Cup and the Tour de France Yellow Jersey. The winner of this award is chosen by "an anonymous committed of one whose decision is not subject to appeal." Al assured the tandemists that it was not easy for "the committee" to pick a winner from among all the eligible tandem teams. He said, however, that the judge had been influenced by the riders who repeatedly called out the name of one couple. In fact, riders all over the country frequently yell this name while riding. A tandem team receiving such praise from their peers must be deserving of the coveted Crescent Wrench Award. And so, Emory and Ann Glass became the 1978 winners of the prize. As you are riding and hear other riders yelling, "Glass!" you will know that they are paying homage to this year's honored tandemists. Among the runners up for the award were: Anton and Selene Sober -- best tandem by an "amateur bike builder" and most broken spokes (5); Glenn and Beth Zeichner -- highest low gear (36") and John and Sandy Granzow -- fewest speeds (3) after they broke their back derailleur.

Monday's ride was very pleasant -- no heat and headwinds like Saturday and no rain and fog like Sunday and a net loss of almost 3000'. The tandem teams enjoyed the final long descent from the Drive -- a 6 mile stretch with speed around 40 or 50 mph. It was a thrilling end to a beautiful trip.

Special recognition is due to Ruth and Al Schaffer for good job they did in organizing the trip and to the sag wagon driver Patty Hudson who carried all the luggage and dispensed cold water and munchies to needy tandemists.

Yes, we published no Double Talk for May-June, 1978 (Vol.2, No.4). Very few articles or letters were received in time for that issue. The busy schedule of the officers prevented them from editing and typing the little bit of copy available, or writing articles themselves. We will try not to miss another issue in the future, but we need the members' help. We cannot write it all ourselves!

TANDEM '78

LOCATION: Hunt Valley, Baltimore County, Maryland (20 minutes from downtown Baltimore City), in the rolling hills of beautiful Maryland horse country.

DATE: Friday, August 25th, through Sunday, August 27th; Monday, August 28th, activities will be continued for those able to remain.

ACCOMODATIONS: Hunt Valley Inn and Golf Club-- a unique, spacious, and elegant facility which provides an atmosphere reflecting the honored traditions of the Maryland countryside. The Inn has luxurious guest rooms, indoor/outdoor pool, championship golf course nearby, skeet, shooting available, horseback riding nearby, and tennis on the premises. We have reserved 75 first-floor rooms for a very special rate of $25 double occupancy per night plus 8% tax (normal rates are almost double). $5 per additional bed. Bikes may be kept in your room.

We have also rented a rustic lodge (Oregon Ridge) 2 miles from the Inn, for most of our group meals. This lodge is not air-conditioned; therefore, most meals will be indoor/outdoor weather permitting. Bring informal cool clothing.

FOOD: We have contracted for a five-meal package by a local caterer specializing in informal Maryland farm style dining. The package includes country style breakfasts (Saturday and Sunday), outdoor picnic lunches Saturday (cold) and Sunday (hot), and Bull Roast and Seafood Buffet dinner Saturday (Outdoor/indoor.) Vegeterian dishes will be available at all meals, as well as whole grain bread. Price for the meal plan is $28 per person; children 7-12 cost is $13, and children 6 and under the meal plan is free.

REGISTRATION: Cost of Tandem '78 (not including rooms) is $68 per tandem team. This includes registration fee, 2 five-meal packages, and 2 patches. Registration fee with no meal plan is $12 per tandem team. There is no registration fee for children. The cost of the meal plan for children 7-12 is $13, and children 6 and under the meal plan is free.
For other children in the family, the cost of the meal plan is $28 per person. The deposit required per tandem team is $34 minimum. The balance is due upon registration in the Hospitality Room on Friday, August 25th.

If you have any questions or desire more information, please contact Al and Ruth Schaffer, 3212 Midfield Road, Baltimore, Maryland 21208, Tel. (301) 484-0306.

REGISTRATION FORM

Mail along with your deposit to: TANDEM '78, c/o The Schaffers, 3212 Midfield Road, Baltimore, Maryland 21208.

CAPTAIN_____

STOKER_____

ADDRESS_____

_____Zip_____

TELEPHONE_____BIKE CLUB_____

CHILDREN ON MEAL PLAN (NO REGISTRATION REQUIRED)

NAME(S) AND AGE(S) _____

_____

NUMBER OF PERSONS REQUESTING VEGETARIAN DISHES_____
ARRIVAL TIME FRIDAY (APPROX.)_____

DEPARTING TIME SUNDAY (X)_____

DEPARTING MONDAY (X) _____

WE PLAN TO DINNER WITH THE GROUP SUNDAY EVENING_____

DEPOSIT ENCLOSED ($34 PER TEAM MINIMUM)_____

ADDITIONAL PATCHES (AT COST) @$1.00 _____

REGISTRATION ONLY (NO MEAL PLAN) $12 PER TEAM_____

MAKE CHECKS PAYABLE TO BBC TANDEM '78.

TANDEM RIDE CALENDAR

Following are rides of special interest to tandemists. Please send a self-addressed, stamped envelope to the contact address for registration and further information.

AUGUST

25-28 TANDEM 78, Hunt Valley, MD
See detailed description on the previous pages.
For more information contact: Al and Ruth Schaffer, 3212 Midfield Road, Baltimore, MD 21208, Tel. (301) 484-0306.

SEPTMEBER

2-4 MIDWEST TANDEM 78, Louisville, KY
Experience Southern hospitality and beautiful bluegrass scenery. See Churhill Downs, home of the Kentucky Derby, cruise the Ohio on a sternwheel steamboat, visit "My Old Kentucky Home." Mark your calendars now! More details available from: Louisville Wheelmen, c/o Stewart and Deborah Prather, 2873 Regan Ave., Louisville, KY 40206.

OCTOBER BRANDYWINE TANDEM RAMBLE, Chadds Ford, PA
Cosponsored by the Wheelmen and the Brandywine B. C.,
15 the Brandywine TAndem Ramble will include 25, 40 and 62 mile rides with lunch. Concours D'Elegance. Ride with antique tandems. There will be a Saturday tour it there is sufficient interest. Home/hostel lodging will be abailable. Sunday's ride begins at 9:30 AM at eh Wyeth Museum, Chadds Ford, PA (at the intersection of Routes 1 & 100). Bob McNair, 32 Dartmouth Circle, Swarthmore, PA.

22 TANDEM TWOSOME TOOTHSOME TOUR NO. 2, Wakefield, RI
10 AM start at the Wakefield Mall, 75 Tower Hill Rd., Wakefield RI. Take the Main St./Shopping Center exit from U.S. Route 1 south.
A sneak preview, 30 to 35 mile tour of South County, site of the 1980 LAW convention. Come ride with us as we journey to Usquepaug, RI. Feast on jonny-cakes and clam cakes! See a working stone grinding mill! Experience a real, honest to goodness, old time country fair! Savor the taste of fresh pressed apple cider! For additional information and reservations send an SASE to Ted Ellis, Narragansett Bay Wheelmen, P.O. Box 1317, Providence, RI 02901.

TANDEM SWAP

SWAP - Have a 22" front - 20" rear mixte Gitane. Will swap for larger frame, any make, with or without components or will buy outright. Al Krebs, 869 N.W.Mensh Terr., Port Charlotte, FL 33952.

TANDEMS FOR SALE

Schwinn Paramount Tandem, 22" diamond - 19" mixte frame, "clean green," just overhauled, Campy Hubs, pedals and derailleurs, TA cranksets, good bike for short man, horizontal bar 31" above ground. Owen Moore, 411 N. 4th St., Lemoyne, PA 17043, Tel. 717-761-4822.

23½" - 21½" double men's Gitane, 531 tubing, 20-speed, TA cotterless, 3 brakes, Phil Wood BB's, Superchampion rims, 71 spoke rear wheel, new yellow paint. $800. Cliff Coffey, 2404 E. Notwood #G27, Fullerton, CA 92631, Tel. 714-525-1264.

Bob Jackson short base tandem, 22"/20½" Reynolds 531, orange, 33 lbs. on tubulars, immaculate condition. $1000. Send SASE for complete specifications. Sorry, will not ship. Bill Carson, 30 King St., E., Apt. 407, Dundas, Ontario, Canada L9H 5G6, Tel. 416-627-3396.

WANTED

Tandem crankset, with or without spindles and cups; straight through or crossover cotterless 170mm (standard), prefer English thread. Cups if available Italian thread, spindles for 70mm BB, Edward Gross, 289 Highland Ave., West Newton, MA 02165, Tel. 617-969-0477.

TCA ELECTION

The results of the election are as follows:

Vice-President: Fred Koch
Secretary: Kyle Greenlee
Treasurer: Glenn Zeichner
Editor: Malcolm Boyd

All amendments were passed.

Since there was no majority of write-in votes for President, the club will have none, as such, this year. According to the TCA Constitution, the Vice-President will assume the duties of President.

TANDEM CLUB OF AMERICA CLUB JERSEY ORDER FORM

Order from: Jones Cycle Wear
24 Brown Ave.
Lunenburg, MA 01462
617-342-7439

Ship to: _____
_____
_____
Tel. _____

Measurements:
Shoulder: _____
Chest: _____
Waist: _____
Hips: _____
Length: _____
Sleeve: _____
Height: _____

Fabric:
Cotton-Polyester ___
Acrylic ___
Washable 100% Wool ___

Short Sleeves ___
Long Sleeves ___

	Cotton-Poly or Acrylic	Washable 100% Wool
Short Sleeves	$21.50	$28.50
Long Sleeves	$24.00	$31.50

Postage & handling: $1.50 (No charge on orders of 6 or more jerseys.)
Embroidered name: _____ @ 30¢/letter: $_____
Total amount enclosed: $_____
Enclose check or money order payable to Jones Cycle Wear.

Vice-President: Fred Koch, 905 6th St., Hermosa Beach, CA 95959.
Secretary: Kyle Greenlee, 22 Anna Ave., Maple Shade, NJ 08052.
Treasurer: Glenn Zeichner, 4 Arlington St., Newark, DE 19711.
Editor: Malcolm Boyd, 179 S. Sierra Madre Blvd., Pasadena, CA 91107.

Area Representatives:

Massachusets: Bill & Clairbourne Dawes, 55 Hosmer Rd., Concord, MA 01742.
Pennsylvania: Elliot Weinstein, 6273 Large St., Phila., PA 19147.
Kentucky: Deborah & Stewart Prather, 2873 Regan Ave., Louisville, KY 40206.
Ohio: Gary Stewart, 1954 Indianola Ave., Columbus, OH 43201.
Illinois: John & Marie Kamnikar, 9 S. William Dr., Hinsdale, IL 60521.
Western MT: Rich & Lezlie Smith, 710 S. 9th, Bozeman, MT 59715.
Idaho: Bill & Jenny Stallings, 3719 16th St., Lewiston, ID 83501.
Washington: Bob Freeman & "B" Garland, 8405 Duncan Ave. S., Seattle, WA 98118.
NorCal: Ted Vedera, 2208 McGee Ave., #4, Berkley, CA 94703.
Los Angeles: Cliff Coffey, 2404 E. Nutwood, #G27, Fullerton, CA 92631.
San Diego: John & Donna Goodloe, 8084 Donzee Ct., San Diego, CA 92123.

Dues: $5.00 for individual or tandem team membership from date of receipt to August, 1979, prorated once a year ($3.00 after March, 1979). Double Talk is published bimonthly and a subscription is included with membership in the TCA. All memberships expire as of August, 1979.

TCA patches: 4" x 4½", $2.25 each; TCA T-shirts: XS,S,M,L,XL, $5.50; both available tax and post paid from the treasurer.

TCA MEMBERSHIP APPLICATION

NAME(S) _____

ADDRESS _____

CITY & STATE _____ ZIP _____

Checks may be made payable to TCA and should be sent to the treasurer.