

MEASUREMENT NEWS



January

1993

Issue #57



FUZZY PHOTO BY EDITOR - VIDEO IS NOT FUZZY.

Tom McBrayer rides a tight line through an s-bend. This scene is from Tom's new measurement video, which is now available. It is 17 minutes in length, and is designed to help people visualize the various aspects of course measurement. To obtain the measurement video, send \$7.50 to:

Tom McBrayer
7733 Moline
Houston, TX 77087

MEASUREMENT NEWS

#57 - January 1993

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TAC HAS A NEW NAME

The Athletics Congress (TAC) is now USA Track & Field. This name change was approved at the recent TAC convention.

The new acronym appears to be "USATF," at least for now.

New certificates will be prepared and sent to all certifiers. They will feature the new logo and text reflecting the ten-year expiration date now in effect.

ROAD COURSE MEASUREMENT VIDEO NOW AVAILABLE

A video showing the key elements of road race course measurement has been produced by Tom and Mary Anne McBrayer of the Road Running Technical Council of USA Track & Field (formerly TAC). 17 minutes in length, it is intended as a companion piece to Course Measurement Procedures, the measurement instruction book.

To obtain the measurement video, send \$7.50 to:

Tom McBrayer
7733 Moline
Houston, TX 77087

To obtain a copy of Course Measurement Procedures, send \$4.00 to;

USA Track & Field - Book Order Dept.
PO Box 120
Indianapolis, In 46206

The above announcement was sent to the running media. Send for a video and show it to your friends. It will help people visualize the measurement process.

A FEW GOOD MEASURERS

Mike Wickiser is seeking extra help for validations. Certifiers, please send him the names of people you know to be good measurers. See his letter elsewhere in this issue.

A NEW KIND OF COURSE

I recently had an application for certification from Carl Hykes, a first-time measurer in Carrollton, Ohio. He wanted to lay out a multi-distance course for his club's use, with every mile and 5 km (and 12 km) certified, up to the half-marathon distance, doubled for the marathon. This was an ambitious task, but after several iterations of measurement and map he got it right. The entire course, with all split points, is shown as this MN's map of the month. Carl and I worked hard to get this one right.

In the past we have listed courses like this at each of their separate distances. On this one, however, I debated calling the course distance "Multiple," since it did not seem a good idea to use up half a page of the course list on a single course. The new abbreviation "Mult" would indicate that the course is certified at several distances.

I like the idea of this, since it saves space in the lists. The biggest drawback is that the specific distances at which the course is certified would not appear in the lists. As long as we don't get too many courses of this type we can handle it, but somehow it seems ridiculous to have so many listings for what is essentially the same course,

Multiple listings also give certifiers and measurers unearned credit for the work done. Should one half-marathon measurement yield credit for 19 courses for both measurer and certifier?

Does anybody have an opinion on this?

NEW FINAL SIGNATORY

Bernie Conway has been measuring Canadian courses for years, and getting them certified through us. Although Canada has had the beginnings of a certification system, and has produced a measurement book, there seems at present no system actually up and running. Since our certification label carries some credibility, Bernie feels that a respected foreign certification is better than none at all.

In any case, Bernie no longer needs to have anyone to look over his shoulder. He knows the trade, and he now is empowered to sign certificates for his own Canadian courses.

TEN YEAR LIFE FOR CERTIFIED COURSES NOW IN EFFECT

Read all about this in the minutes of the TAC convention, elsewhere in this issue.

STATUS OF ALL USATF CERTIFIED COURSES - OCTOBER 30, 1992

A = Active courses	8862
D = Deleted at request of certifier	926
F = Failed validation measurement, deleted	10
M = No map on file	523
p = Passed validation, but deleted	26
P = Passed validation, active	143
X = Expired	20
R = Expired, but renewed on request	0
Total	10510

The above code letters will appear in the "ST" or "status" column of various course lists.

Newsbits

The 1992 Arkansas Sports/RRCA Annual Awards were presented recently: Runners of the Year - **Clint Daniels, Amelia Ingersoll**; Masters Runners of the Year - **Jimmy Pearsall, Carla Branch**; Most Improved - **James Bresette, Cheryl Potter**; Ultra Runners of the Year - **Bill Laster, Irene Johnson**; Walkers - **Paul Johnson, Beverly Robinson**; RRCA Club President - **Don Still**; Race Director - **Don Potter**; Volunteer - **Lynn Warner**; Spirit Award - **Dick McKinnon**; Newsletter of the Year - **Little Rock Roadrunners**.

← Don Potter,
RRCA
- AR CERTIFIER

EXPIRED COURSES

At the TAC convention we discussed giving certified courses a 10 year life, after which they can be renewed upon a request by the race director, and a statement that the course has not changed.

The following courses were dropped from the list on January 1, 1993. It's not much loss this year, since we did not have many 1982 courses on the list. Note that the "status" (ST) column contains "X" for "expired." Most of the expired courses were those with no maps. Some had already been deleted by the certifier ("D"), while four still had "active" ("A") status - at least nobody had said they were inactive.

In 1994 we will drop 500 more courses, in 1995 800, and finally, in 1996 we will drop 1200. Since 1200 courses per year has been the recent historical rate of certification, we expect the course list to stabilize at a size of about 12,000 to 13,000 courses. All courses, expired or not, will be retained in the files.

This process will sort out the deadwood and keep our lists useful.

<u>DIST</u>	<u>COURSE ID</u>	<u>ST</u>	<u>LOCATION</u>	<u>COURSE NAME/RACE</u>	<u>DROP</u>	<u>SEP</u>	<u>MEASURER</u>
08km	AK 82001 TC	XM	Anchorage	Campbell Creek	out/bk		J Trent
10km	AL 82001 TC	XM	Tuscaloosa	Struttin Around T-Town	loop		W Gregg
50mi	AL 82002 TC	XM	Pelham	Birmingham Track Club	loopX10		H Gregg
07mi	CA 82016 CW	XA	Foster City	Sri Chinmoy	loop		R Sellew
10km	CA 82029 RL	XA	Fountain Vllly	United Way	loops		D Ikenberry
10km	CA 82127 RL	XM	Los Angeles	Fairfax Festival	loop		M Albert
10km	CA 82087 RL	XM	Playa del Rey	Learn Not to Burn	out/bk		M Albert
Trck	IA 82020 RL	XA	Eldridge	North Scott HS	440 yd		J Rogers
05mi	MA 82001 TC	XD	Cambridge	33Dnstr St Mothrs Dy Clsc	keyhole		J Booras
10km	MA 82002 TC	XD	Andover	Fast Women Road Race	2 loops		J Booras
05km	NC 82001 ACL	XM	Raleigh	Run for the Roses	keyhole		A Linnerud
10km	NJ 82001 GD	XM	Hammonton	Athletes Korner	loop		G Hoopes
Mar	NJ 82001 TC	XM	Asbury Park	Jersey Shore	2 lpsX2		T Baum
05mi	NY 82004 TC	XM	New York	Midnight Run	loop		B Noel
15km	NY 82002 TC	XA	Schenectady	Stockadathon	keyhole		B Goot
30km	NY 82001 TC	XM	Colonie	National TAC Championships	2 loops		W Cooney
01+mi	OH 82004 PR	XM	Columbus	Antrim Lake	6192 ft		P Riegel
10km	PA 82007 GD	XM	Troy	Troy Classic	loop		J Bernhardt
04mi	VA 82001 TC	XM	Salem	Lewis Gale	keyhole		R Jenkins
10km	WA 82005 TD	XA	Duvall	Duvall Prisoner Run	loop		T Duranti

RRTC MEETING - TAC NATIONAL CONVENTION - LOUISVILLE, KY - DEC. 2, 1992

The meeting was called to order by Chairman Pete Riegel at 8:30 pm.

Attending: Bob Baumel, Marcia Baumel, Andy Beach, Norman Brand, Dan Brannen, Barbara Chambers, Paul Cook, Bill Grass, Norm Green, Frank Greenberg, Philip Greenwald, Finn Hansen, Bob Harrison, Basil Honikman, Justin Kuo, Bob Langenbach, Carole Langenbach, AC Linnerud, Mary Anne McBrayer, Tom McBrayer, Jack Moran, Al Morris, Rick Recker, Joan Riegel, Pete Riegel, Barb Simon, Mike Wickiser

After opening remarks, Pete welcomed Tom McBrayer to his new position as Vice Chairman, West. It was announced that Wayne Nicoll, Vice Chairman, East, was unable to attend this year's meeting due to his daughter's medical emergency. Mike Wickiser, Validations Chairman, rounded out the panel.

Pete called for brief reports.

Course Registrar, Joan Riegel: Nearly one thousand new courses were certified in 1992, bringing the current total of certified courses to slightly over 10,000.

Vice Chairman, West - Tom McBrayer: In a smooth transition from Bob Baumel, Tom reported receiving 80 pounds of reports, which have all been organized and incorporated into his files. Tom is up and running -- please call him with any questions or problems.

Validations Chairman, Mike Wickiser: Of 17 courses investigated in 1992, 5 came up short. The breakdown was almost even: 9 road races and 8 race walks. There are currently 4 courses remaining to be validated.

TACSTATS, Basil Honikman: To facilitate service, TACSTATS is offering "Bulletin Board", a computer list of area certifiers, with instructions in preparing results and sending them in by phone. Their goal is a standardized format for race results. This year, 3800 races sent in reports. State record keepers need to keep after race directors to send in their results.

Finish Lines, Alan Jones: Alan Jones was unable to attend the convention.

Bob Baumel reported on a proposed rule that would allow records only if set on a TAC sanctioned and certified course and only if run by an athlete who is a member of TAC. Track and Field has long had this requirement, but imagine the uproar if a non-TAC runner set a record and the record was denied. Bob did not think the rule would be adopted. Pete said TAC should be a service to athletes, not a hassle.

Jack Moran remarked that we need to keep track and field records, as well as road racing records or someone else will. The record keeper for T&F is currently Track & Field News. Jack noted that this is a totally unrelated subject, but asked that we give it some attention. Basil has the format for results -- see Basil if you have any questions.

Expiration date for certified courses: Pete proposed a 10-year life for certified courses in order to keep the course list from growing unmanageable, and to clear out the deadwood. As the list grows, more and more courses become obsolete, and the current printed book is 188 pages, even with smaller type. The certificate would still be held on file by the registrar.

but 1982 courses would not appear on current lists. If a course were still active, it would appear on current lists, under its original number, and the code "R" (renewed) in the "status" column. All agreed to go ahead with this plan. Norm Green suggested we send announcements of this new procedure to Road Race Management and to all popular running media, emphasizing this is not to de-certify the courses, but merely to keep the list from becoming unwieldy. We will attempt to notify race directors of this plan. To re-instate a race, they need only send in a copy of their certificate, showing a map of the unchanged route. If a record is set on an expired course, TACSTATS will notify them their course is no longer on the list, and races can complete the paperwork. New certificates will have to be designed to reflect the new TAC logo. Bob Baumel agreed to do this on his Macintosh and to add an expiration date of 10 years.

Appropriate SCPF for courses short of nominal distance: Since it is harder to be accurate in smaller courses, it was suggested to add 1/10 of 1% plus 1 meter to all measurements. When using a steel tape, should we add a meter to each loop? Small courses often meet the standards of certification, but do not pass validation. Mike Wickiser noted that 15% of shorter courses are coming up short. AC Linnerud added that he normally measures a shorter course more than twice. Pete wondered whether a measurer could be sued if a course did not pass validation after a record had been set. Is there any coverage under the race sanction?

Changes to steel taping procedures on calibration courses: It was suggested the question, "What are your qualifications?" be left off the measurement form, as this appears to intimidate some new measurers into hiring a surveyor to lay out their calibration course. We should encourage even the novice measurer to have confidence in the steel taping procedure.

Olympic Marathon Measurement: The upcoming Olympic marathon course in 1996 has already been discussed in correspondence between Julia Emmons, Women's LDR chair, and the RRTC chair, offering the services of our committee to design and measure the course. Pete suggested a prime opportunity for measuring would be in conjunction with the 1995 TAC convention, to be held in Atlanta. This would be an opportunity to invite IAAF and AIMS measurers to join in the measurement ride, thus setting an example for cooperation in future Olympics.

Frank Greenberg, outgoing President of TAC and strong supporter of RRTC, was introduced and spoke briefly to the committee. Mr. Greenberg declined to take up measuring courses upon his retirement, but asked to be kept on the mailing list for Measurement News.

Non-certifier validators: The question of involving non-certifiers for validation rides left us wondering whether there was a requirement that validators be certifiers. Why not send a known expert measurer on a validation ride? Mike Wickiser asked certifiers to send him a list of good measurers in their state, so that the pool of validators might be increased. Dan Brannen suggested that validation assignments should be up to the judgment of the Validations Chair. All agreed.

Track measurements: Pete noted that often when paperwork cannot be found stating the length of a track, RRTC will measure tracks as a service to the sport. Over the course of the years, Pete has accumulated data on tracks, which he presented on bar charts. The charts showed wider variability in track measurements than we normally see in road measurements. Tracks are rarely measured after they're built, and often are found short. Norm Brand

mentioned that many tracks have been re-surfaced, and while they once might have been accurate, often the length will have changed. Bob Langenbach noted that when called upon to help, it is usually for ultra-distance events. We should be able to set our own standards, because we are not conflicting with track people.

Finn Hansen commented that every track measurement is not perfect. Maybe the problem is in conversion from 440 yards to 400 meters. Removable curbs are not always relocated in the exact same place. All roads are not equal; all tracks are not equal. An in-depth discussion followed, with Dan Brannen noting that tracks measured and certified in the 5th lane are certified for road race events and possible track LDR records. Rules 183 and 185 were discussed, reaching the agreement that if a track event is held on a track, it is a track record. If an LDR performance is achieved on a 500 meter track, it might be a track record, if a 500 meter track is officially a track (by the rules it's not).

Certified cross-country courses: Since cross-country maps usually lack fixed landmarks and cannot be followed by another measurer, should RRTC certify courses that use marks that are not able to be pinned down? AC Linnerud assured us it would be easy to re-measure a cross-country course within a month. He suggested the course be put on the "D" list immediately, with validation done as soon as possible whenever necessary.

AC has also done trail runs out/back and through a forest. These are certified as "cross country" courses. Cross country courses are usually not validated, but are measured to certification standards. It's up to the race director whether to have the course certified. There is no good definition of a "road." If "cross-country" is checked off on the certificate, it's not a road certificate. TAC does not recognize records set on cross-country courses. Andy Beach has even measured roller blade courses, since this sport is interested in having accurate courses.

Measurement contest: The contest course was laid out by Pete Riegel yesterday, as there is no certifier who lives nearby. The course is on the riverfront, right outside the hotel. All are encouraged to enter. The winner of this contest will be the median answer.

New final signatory: Bernie Conway, an expert measurer who lives in Canada, has been sending Pete his courses for TAC certificates, as there is no certification process in Canada. By naming Bernie final signatory for his own measurements, he can write his own certificates, thus saving time. A copy of the certificate would still be filed with RRTC.

Measurement video: Tom McBrayer distributed the RRTC course measurement video, which was previewed and critiqued at last year's TAC convention. Running 17 minutes, this video was written by Mary Anne McBrayer and narrated/demonstrated by Tom, with technical help from their local access channel. The committee agreed this will be a valuable teaching tool, especially for local running clubs and other measurers who may be complete novices to the process. The video is designed to complement the the RRTC handbook, Course Measurement Procedures. All state certifiers will be sent one copy to use in teaching. Additional copies can be ordered from RRTC for a nominal fee. TACTimes and Road Race Management will carry news of its availability.

As a final note, the entire committee agreed that ALL aspects of a measurement are required before race day in order for a course to be certified. This includes a MAP.

The final discussion centered on heart monitors, with Bill Grass giving first-hand impressions since he now wears one in training. While the technology is generally appreciated, it was suggested that it would be more fair to limit their use to training runs and eliminate them from races.

The meeting concluded at 10:50 pm.

RRTC MEETING - TAC NATIONAL CONVENTION - LOUISVILLE, KY - DEC. 3, 1992

The meeting was called to order at 8 pm.

Attending: Bob Baumel, Marcia Baumel, Andy Beach, Michael Blanchard, Bill Bradna, Norman Brand, Bob Carlson, Bill Grass, Norm Green, Finn Hansen, Bob Harrison, Basil Honikman, Linda Honikman, Jim Knoedel, Bob Langenbach, Carole Langenbach, AC Linnerud, Palma Linnerud, Mary Anne McBrayer, Tom McBrayer, Joan Riegel, Pete Riegel, Barb Simon, Christine Steele, Allan Steinfeld, Karen Wickiser, Mike Wickiser

Winners of the measurement contest were announced: Finn Hansen, first; Basil Honikman, second; Bob Langenbach, third place. Prizes of local chocolate cremes were awarded and generously shared by the winners. However, once it was uncovered that the results were based upon a TAPED measurement (tape produced and used at the last minute, thus changing the contest rules) a protest was filed by Norm Brand. The entire committee supported Norm's position, and duplicate prizes were awarded according to the median measurement: Christine Steele, first; Andy Beach, second; Mike Wickiser, third. We ate a lot of candy that night!

AC Linnerud demonstrated his computer program for entering measurement data. Time was spent on general discussion, and the meeting adjourned early.


Joan Riegel
Course Registrar

1992 TAC CONVENTION MEASUREMENT CONTEST

RRTC has no certifier living near Louisville. Pete Riegel is the Kentucky certifier, and, appointing himself Contest Director, he decided to scout out a contest course on Tuesday afternoon, just after he and Joan arrived for the convention. Joan suggested a waterfront location. Pete did a hurried reconnaissance, prepared a map and contest form, had them copied, and set them out on the registration tables for convention registrants to pick up.

At the first RRTC meeting several people noted that Pete's stated length of the calibration course was off by quite a bit, and asked how he had measured it. Pete said that he had made a hurried estimate of its length based on rough pacing. Pete had called it 41.67 meters, but it turned out to be only 34.45 meters. Pete had remembered 25 paces, but it was really 21.

Because Pete had thought the course would probably exceed what could be steel-taped, he did not bring one. Since he did not have the extra time to do a full-scale bike measurement, he estimated the length of the calibration course and announced, at the first RRTC meeting, that the median measurement would be considered as the official length. In past years the median had always been very close to the right value (note: not this year!). Contestants were told to use the stated length of the calibration course as official. At the end of the meeting Bob Langenbach said he had a steel tape, and Pete and Bob decided to tape the course the following morning.

During the taping, Pete and Bob were joined by Mike Wickiser. When asked what he was doing on the course so early in the morning, he said that wife Karen had seen a couple of people from the hotel window, taping the course. Mike had come to see who was cheating.

The winners of the boxes of Kentucky Chocolate Cremes were based on the actual taped measurements, with Finn Hansen taking first prize. However, a protest was lodged by Norm Brand, on behalf of Christine Steele (Mrs. Brand), who had obtained the median measurement and, by the announced standard, was entitled to her prize. The protest was considered by the Contest Director, and considered valid. Joan hurriedly obtained duplicate prizes, thus avoiding injustice and the attendant complications, since the Contest Director had neglected to appoint a Jury of Appeals. We thus had two winners this year.

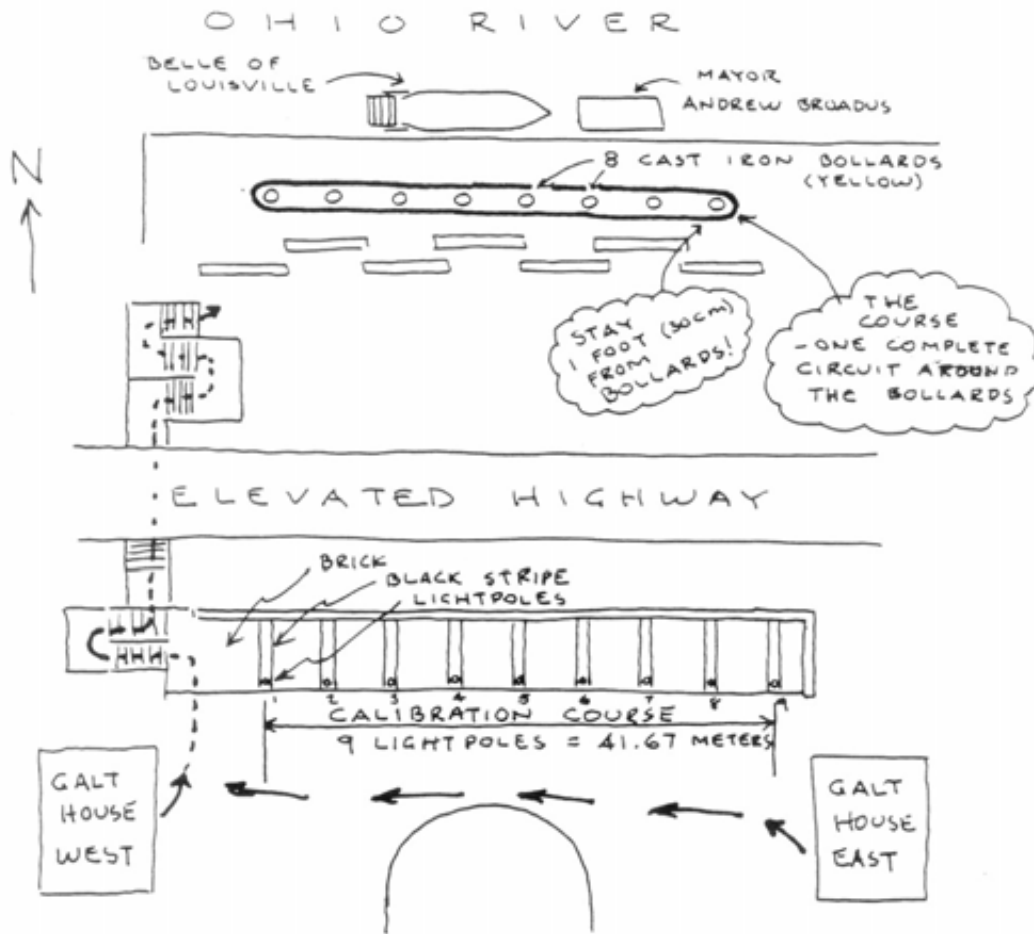
As is usual when sharply-honed athletes approach the starting line, excuses were much in evidence. Winner Finn Hansen noted that "It's cold down by the river." Bob Langenbach, third place winner, mentioned that he had been handicapped because "wind conditions were not the same on calibration course and measurement." One excuse seemed better than these. Bill Grass noted that he almost got run over by a pickup truck on the race course. This must have spoiled his aim at the SPR, since he finished out of the money.

Last-minute chaos was narrowly avoided when Basil Honikman arrived at 8:14, a minute before the deadline for prizes. Since Basil (with Pete's permission) had submitted two estimates, he was asked which of them he wished to have considered as his official entry. He said "whichever one wins," which did not please the Contest Director, who was reportedly miffed because he would have taken third by default if Basil had arrived a minute later.

The Contest Director learned a lot about the conduct of events during this exercise, and now understands better how things can go wrong even when the best intentions exist. Perhaps RRTC needs to write Rules for Competition for future contests of this type.

WIN VALUABLE PRIZES!

ENTER RRTC'S ANNUAL COURSE MEASUREMENT CONTEST!
SEE MAP. USE YOUR HEAD AND FEET TO MEASURE ONE
CIRCUIT AROUND THE BOLLARDS.



Prizes will be awarded at the second meeting of the Road Running Technical Council, as the first item of business. The meeting will be held on Thursday, December 3, at 8 PM. You, or a person with a written note from you, must be present for you to get the award. If you're not there, the award will go to the next best estimator who is present.

Tear off here and place in the box.

Name: _____

Estimated length of course (meters) _____

Comments/suggestions? _____

1992 TAC CONVENTION MEASUREMENT CONTEST

1992 Official Distance = 284.20 (steel taped by Bob Langenbach and Pete Riegel)

1992 Median Measurement = 289.39

	Estimated Meters	Meters Error	Percent Error	Place based on Official Length	Place based on Median	
Finn Hansen	284.4	-0.2	-0.07	1	10	**
Basil Honikman	284.69	-0.49	-0.17	2	9 @	**
Bob Langenbach	283.25	0.95	0.33	3	12	**
Pete Riegel	285.3	-1.1	-0.39	4	7	
Tom McBrayer	285.42	-1.22	-0.43	5	6	
Bob Baumel	286.26	-2.06	-0.72	6	5	
Mike Wickiser	286.65	-2.45	-0.86	7	3	**
Bob Harrison	281.27	2.93	1.03	8	16	
Michael Blanchard	280.97	3.23	1.14	9	17	
Carole Langenbach	279.2	5	1.76	10	19	
Christine Steele	289.39	-5.19	-1.83	11	1	**
Andy Beach	291.09	-6.89	-2.42	12	2	**
Mary Anne McBrayer	276.97	7.23	2.54	13	22	
Justin Kuo	292.31	-8.11	-2.85	14	4	
Walter High	293.7	-9.5	-3.34	15	8	
Bill Grass	294.8	-10.6	-3.73	16	11	
Bob Boal	296.51	-12.31	-4.33	17	13	
Basil Honikman	296.71	-12.51	-4.40	18	14 @	
George Vernosky	297.51	-13.31	-4.68	19	15	
Karen Wickiser	298.47	-14.27	-5.02	20	18	
Bob Carlson	300.95	-16.75	-5.89	21	20	
R. D. Mochrie	301.56	-17.36	-6.11	22	21	
Dave Gwyn	313.18	-28.98	-10.20	23	23	
Barb Simon	249.62	34.58	12.17	24	24	
Norm Brand	354.2	-70	-24.63	25	25	

@ = dual entries

** winners

Norm Brand, aka "Eye in the Sky" did not perform up to expectations this year, in spite of being able to see the entire course from a hotel window. Perhaps some subtle atmospheric effects were present - we shall never know.

PERCENT ERROR RECORDED AT PAST MEASUREMENT CONTESTS

	1987	1988	1989	1990	1991	1992
Bob Baemel	0.07		-3.03	-0.91	2.63	-0.72
Marcia Baemel	0.02				4.37	
Andy Beach					-5.36	-2.42
Michael Blanchard						1.14
Bob Boal				27.76	-0.19	-5.89
Bob Boal						-4.33
Haig Bohegian				6.72		
Norm Brand	41.61	8.07	0.80	-0.90	9.56	-24.63
Dan Brannen		-0.21				
Margaret Brooke	-6.52					
Nick Brooke	-6.61					
Jim Brown			0.36			
Frances Childs					10.46	
Felix Cichocki	2.14	0.76	6.51	0.99		
Robert DeCelle				187.61		
John Dunaway			4.58			
Miriam Gomez		-3.86				
Bill Grass					-0.83	-3.73
Dave Gwyn	-3.33		4.91	0.65	1.86	-10.20
Ben Hablutzel	-3.05					
Finn Hansen	3.31	4.16	-1.02	4.28		-0.07
Bob Harrison						1.03
Walter High						-3.34
Basil Honikman			5.67	-1.22	-29.89	-0.17
Bard Horton				-0.47		
Jim Jacobs				28.14		
Alan Jones			0.01	1.27		
Clain Jones				0.09		
Bill Keesling					22.29	
Tom Knight	1.50					
Carol Kuo					0.72	
Justin Kuo			17.14	-1.61	0.07	-2.85
Bob Langenbach	-0.66		3.50		-0.93	0.33
Carole Langenbach						1.76
Tom Mayda				-0.21		
Mary Anne McBrayer	-2.91	0.14	4.06	-1.69	0.61	2.54
Tom McBrayer	-3.66	-2.38	-1.48	-0.90	3.07	-0.43
RD Mochrie						-6.11
Wayne Nicoll	-1.11		-10.34	0.54	-2.55	
Ron Pate				-7.62		
Rick Recker	-0.79	-2.22	-0.17	-1.96		
Joan Riegel		1.74	-3.35	-1.40	2.28	
Pete Riegel	-1.00	0.95	0.08	-0.52	-1.25	-0.39
Larry Schloss			2.07			
Barb Simon					-1.11	12.17
Jim Smith	0.86					
Christine Steele						-1.83
Stephen Tabb	0.62					
Bob Thurston		0.84				
Peter Torres Jr				33.21		
David Troy					18.38	
George Vernosky				27.30	-1.49	-4.68
Karen Wickiser				-1.53		-5.02
Mike Wickiser				2.49	0.22	-0.86
median	-0.72	0.76	0.58	-0.06	0.42	-1.83
avg	1.14	0.73	1.68	11.54	1.50	-2.45
std dev	10.16	3.13	5.41	36.84	9.45	6.15



The Athletics Congress of the USA

The Governing Body for Athletics in the United States
including Track and Field, Long Distance
Running and Race Walking for
men and women and boys and girls
at all age levels.

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December 1, 1992

TAC/RRTC VALIDATIONS ANNUAL REPORT

The following listing includes all validation activity from 12/1/91 thru 12/1/92

DATE OF RACE		DATE OF VAL		VALIDATIONS CONDUCTED										
DIST	DATE	NOM METERS	MEASURED METERS	DIFF M/KM	COURSE ID	RACE NAME/COURSE	MEASURER	VALIDATOR						
5k	11-90/91	11/23/91	90/91	5000	4988.7	-2.26	CA 89027 CW	YOLO GEN HOSP TURKEY TROT	SCOTT	KNIGHT				
								*** VALIDATED, BUT NOT RUN AS CERTIFIED. OK AS RUN						
10k	1/4/92	1/4/92	92	10000.0	10021.47	2.15	NC 91088 ACL	CHARLOTTE OBSERVER 10K	LINNERUD	NICOLL				
								*** PRE-RACE VAL						
50k	4/5/86	1/19/92	86	2500.0	2498.268	-0.69	WA 86006 TD	NOAA 2.5 RACEWALK LOOP	GREISZ	BARRETT				
8k	6/15/91	6/13/92	91	8000.0	8007.5	0.94	CA 91014 TK	FUJITSU 8K (1991)	KNIGHT	BAUMEL				
8k	6-92	6/13/92	92	8000.0	8008.32	1.04	CA 92005 TK	FUJITSU 8K (1992)	KNIGHT	BAUMEL				
								* PRE-RACE VALIDATION CHECK						
10k	7/4/90	7/10/92	90	2000.0	2003.47	1.74	NY 91047 AM	ROBERT MOSES PKWY. 2K RACE	MACPHEE	NICOLL				
5k	3-92	8/9/92	92	5000.0	4997.832	-0.43	CA 86068 PR	Carlsbad 5000 Road Run	COLLIAS	NICOLL				
2k	3/29/92	8/21/92	92	2000	2004.253	2.13	DC 88006 RT	Reflecting Pool 2km Loop	THURSTON	WICKISER				
10k	4/12/92	8/21/92	92	10000	10014.62	1.46	DC 85002 RT	Sally Mae 10k	THURSTON	WICKISER				
15k	2/15/92	8/21/92	92	15000	15012.1	0.81	FL 92001 WN	Gasparilla 15km (MEN)	NICOLL	LOEFFLER				
								0.76 FL 92001 WN						
40k	9/86-90	9/12/92	86-90	5000	5005.753	1.15	NJ 86005 GD	Fort Monmouth 5k Loop	JOHNSON	NICOLL				
40k	9/91-92	9/12/92	91-92	2000	2014.4115	7.21	NJ 91020 DB	Fort Monmouth 2k Loop	JOHNSON	NICOLL				
5k	10/04/92	10/03/92	92	5000	5008.164	1.63	NY 92026 AM	Freihoffer's Run For Women	MORSS	NICOLL				
100k	12/15/91	10/17/92	92	100000	100302.42	3.02	LA 92002 ETM	Mardi Gras Ultradistance	GEORGE	RIEGEL				
2.5k	4/30/89	11/31/92	89	2500	2499.41	-0.24	CA 89015 RS	Cal State Long Beach 2.5k	COOTS	SCARDERA				
5k	5/18/91	11/14/92	91	5000	4987.5	-2.50	MO 91025 BG	St. Louis Women's Racewalk	SEBEN	THURSTON				
10k		11/29/92	92	2000	2000.24	0.12	WI 92003 WG	2000 Meter North Course	MOWLES	GRASS				

COURSES REVIEWED BUT NOT VALIDATED

NOMINAL DISTANCE	COURSE ID #	RACE NAME	MEASURED BY	COMMENTS
5 k	CA89027CW	Davis Turkey Trot	KNIGHT	Course "as run" measured during validation
5 k	AZ91003KY	Senior Olympics Festival 5k	YOUNG	Accepted on measurers credentials
8 k	DC90001RT	Nike Women's Race	SISSALA	Previously validated - validator was at race
8 k	TX92001ETM	Baker Hughs Bayou City 8k	MCBRAYER	Accepted on measurer's credentials
10 k	DC85007RT	Northern Telecom Cherry Blossom	NASS	Previously validated - Affidavit of certifier recvd.
10 k	AL86007WN	Azela Trail Run	NICOLL	Previously validated - accepted on course mgr. affidavit
10 M	DC90015RT	Army 10 Miler	THURSTON	Course viewed - accepted on measurers qualifications
15 k	FL86003WN	Jacksonville River Run	NICOLL	Previously validated - accepted on course mgr. affidavit
HMAR	PA86002WN	Philadelphia Distance Run	NICOLL	Previously validated - photos reviewed by validator
MAR	MN90017RR	Twin Cities Marathon	RECKER	Previously validated - Affidavit of certifier recvd.
50 k	LA92001WN	Olympic Trials 50k Race Walk	NICOLL	Accepted on measurer's credentials
100 k	FOREIGN	IAU World Cup	ARNDT	IAAF Measured - B.Brannen supplied info
100 M	NY87002DB	Sri Chinmoy 100 Mile	BRANNEN	Previously validated - photos reviewed by validator
24/48 HR.	TX91057ETM	Dallas Ultrarunners 24/48 hr.	BEACH	5th. Lane of Certified 400 meter track

Currently pending, not completed :

5 K	MT84001TC	Governor's Cup	CASSELS	Additional info needed - awaiting reply of race director
5 M	IL87052WG	Good Times Classic	KRAUSS	Validation pending - to be assigned
HMAR	CA84053CW	Humbolt Redwoods	WILLIAMS	Validation pending - to be assigned
50 K	WI83005TC	Vilas 50 k	HINTZ	Validation pending - to be assigned

Michael A. Hickman
 T.A.C. / R.R.T.C. Validations Chairman

An Extended "Experiment" on "Reverse" Blood Doping

by Bob Baumel

This article is in response to comments of Pete Riegel (Sept '92 *MN*, p. 32) and Alan Jones (Nov '92 *MN*, p. 15) on "reverse" blood doping caused by donating blood. I would like to share my own experience as the involuntary subject of a lengthy "experiment" in reduced hemoglobin levels caused by disease. I suffered for five and a half years with ulcerative colitis which, aside from distressing bowel symptoms, produced anemia due to rectal bleeding. That disease was cured by surgery in Jan 1988, but problems developed, leading to another operation in Feb 1992. Although the disease is gone now, my hemoglobin has not returned to its original level (and may never return). Throughout this period, I have continued to run and enter races. Figures 1 and 2 show how my hemoglobin levels and racing performances have varied during this time.

Before delving into these graphs, however, I must comment on the subject of blood donation because I don't want Pete's comments to scare anybody away from donating. Like Alan, I've been a long-time donor, and my experiences are very similar to his. Although the disease problems have limited my ability to donate during the past ten years, that's all over now, and I am now a regular donor again. My current total is 29 units or about 13 liters. (One unit of blood is 450 mL, which is about 0.95 US pints, or about 0.79 Imperial pints.)

After donating blood, I have certainly noticed weakness if I try running the next day (perhaps similar to running at high altitude when you've only been running at sea level). For this reason, I now *avoid* running the day after a blood donation. But like Alan, I have never detected any subjective effect lasting more than a day or two (although I've heard that the actual hemoglobin level takes several weeks to a month to regain its previous level). I have never noticed any correlation between blood donations and frequency of colds. I find it hard to believe that Pete's running was shot for a whole month due to a blood donation. I see no reason for runners to avoid donating blood, although you probably shouldn't do it within several weeks before an important race. (And if you *never* want to lower your hemoglobin for even these short periods of time, there is the option of platelet pheresis described by Alan.)

Now let's return to Figures 1 and 2, which document my disease-related problems. On both graphs, the time scale covers a 15-year period from 1980 through 1994 (where each tic-mark denotes the *beginning* of the indicated year). Figure 1 shows hemoglobin readings taken as part of "complete blood counts" (CBCs). Also, because the data are so sparse on the left side of this plot, I have added a dotted line showing what I think my blood count was *probably* doing in between some of the data points (based mainly on the course of the disease).

Figure 2 displays racing performance during the same period. The races vary in length from 5 km to 20 km. In order to display all these race results on a common scale, I converted all of them to equivalent 10 km times using Pete Riegel's famous formula:

$$T_2/T_1 = (D_2/D_1)^{1.055}$$

(July '90 *MN*, p. 25). Also in Figure 2, I've included a trend line showing how much slow-down I might have expected due to natural aging during this period. (I derived this age slow-down curve from a table based on old data collected by Ken Young at the NRDC, as reported by Hal Higdon in his 1977 book *Fitness After Forty* published by World Publications. Note: I have also checked that I get essentially the same curve by using more recent data reported by Alan Jones in May '90 *MN*, p. 16.)

Figures 1 and 2 both include vertical dashed lines denoting four key time markers. The first marker is in mid-1982 when my first colitis symptoms appeared. The two closely-spaced markers in early 1988 denote a pair of operations, three months apart, which cured the colitis and created

Figure 1: Hemoglobin Readings

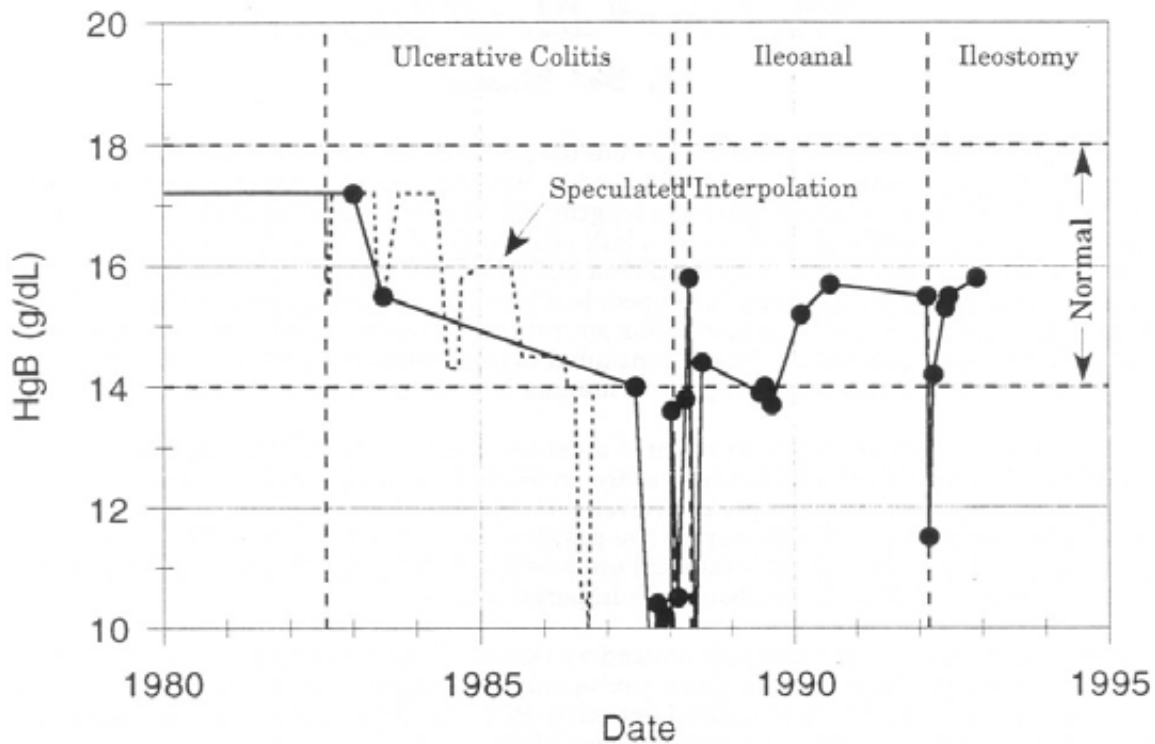
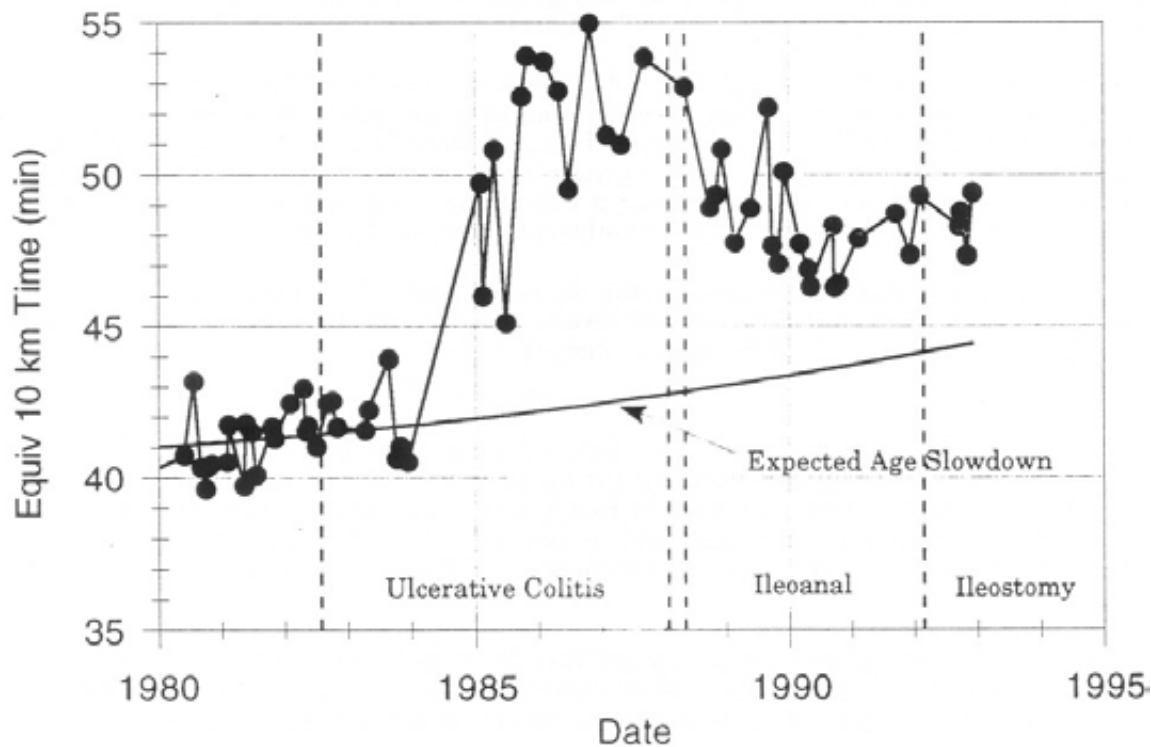


Figure 2: Running Performance



an “ileoanal anastomosis”—a relatively new procedure intended to avoid a permanent ileostomy and allow reasonably “normal” bowel function. The final time marker, in early 1992, denotes my most recent operation, in which I had the ileoanal converted to a standard ileostomy because of problems that developed with the ileoanal.

Technical notes: An “ostomy” is a surgically-created abdominal opening for solid or liquid waste to exit the body. It’s an “ileostomy” if the opening is from the ileum (small intestine); a “colostomy” if the opening is from the colon (large intestine); or a “urostomy” if the opening is from the urinary system. The only known cure for ulcerative colitis is complete removal of the colon, which has traditionally required an ileostomy. The newer “ileoanal anastomosis” procedure avoids the ileostomy by fashioning an internal “reservoir” or “pouch” from the terminal ileum and stitching it to the anus (See Figure 3). This has shown excellent results, and may soon be the “standard” operation for ulcerative colitis. However, I developed persistent “pouchitis” (inflammation of the internal ileal pouch) producing symptoms reminiscent of the original colitis; therefore, I finally chose to have it converted to a standard ileostomy.

Returning to Figure 2, it’s clear that by around 1985, my running had slowed dramatically as the disease became increasingly severe. At this time, I began asking the doctors if they could explain how the disease was slowing my running. I didn’t get any satisfying explanation until mid-1987. That’s when the third data point in Figure 1 was recorded. I then noticed that from Jan ’83 to June ’87, my hemoglobin had dropped from a high-normal of 17.2 g/dL to a borderline-low-normal (for men) of 14 g/dL. Interestingly, my hemoglobin had dropped in almost exactly the same ratio as my racing speed during this period—which all made perfect sense: reduced hemoglobin (obviously due to rectal bleeding) meant reduced oxygen carrying capacity of the blood, resulting in reduced distance running performance.

In addition to the borderline-low-normal hemoglobin of 14 g/dL recorded in June ’87, there were occasions documented in Figure 1 when my blood count dipped *way below* normal. (In fact, in late 1987 and early 1988, I became so anemic that I was *given* six units of blood.) On such occasions, if I could run at all, the anemia was *very* evident in the running. Typically, even a very slow jog would get me so out of breath that I would have to walk after a short distance.

Note that in Figure 1, my “Speculated Interpolation” dotted line includes a sharp dip (well below normal) in mid-1986. That dip represents the first time I experienced such extreme fatigue while running, and it was quite scary. At first, I thought it was a heart condition. Eventually, I decided it was probably reduced hemoglobin. However, no blood count was performed at that time to confirm this self-diagnosis. In Fall 1987, I again experienced the extreme fatigue while running. This time, when I told my doctor, he directed me to get a blood count. When he saw the result (8.4 g/dL), he immediately ordered me to check into the hospital and receive a transfusion.

There is absolutely no doubt that reduced hemoglobin impairs running performance, as illustrated dramatically by my rather extreme case. In the other direction, it is almost certainly true that increasing hemoglobin level by blood doping does improve performance. There was some controversy about this in the mid-70’s, but it’s my understanding that this was due mainly to problems in storing the blood between its removal and subsequent reinfusion. Once the technique of blood freezing was perfected (by around the late 70’s or early 80’s), I believe it became clear to most medical experts that blood doping works.

Returning to my own situation, you can see in Figures 1 and 2 that even though the disease is gone now, my hemoglobin is still lower than its pre-disease level, and my race times are still significantly slower than the age-adjusted equivalents of my pre-disease times.

It is interesting to note that in Figure 1, a local peak in hemoglobin level occurred within the three-month period between the two 1988 operations (or to be more precise, just before the end of that three-month period). At that time, my hemoglobin seems to have been rising very rapidly (It increased from 13.8 g/dL to 15.8 g/dL in just three weeks). Then came the second of my two 1988

operations, which seemed to have halted this rise.

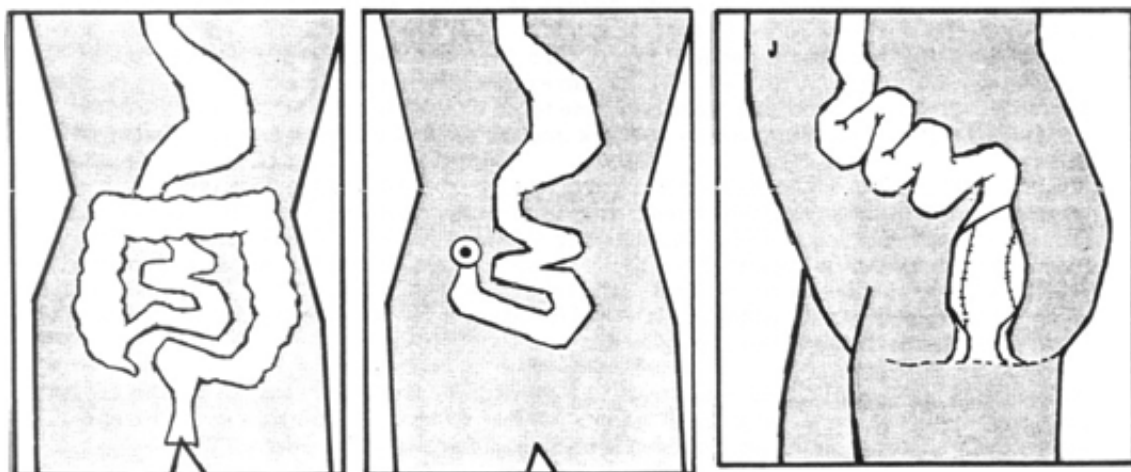
I should explain that during the three months between those two 1988 operations, I had a temporary ileostomy, and the ileal pouch (although already constructed) was not yet "in the circuit." Given the hemoglobin data in Figure 1, my inclination was to assume that if the second 1988 operation **hadn't** been performed, my rapidly-rising hemoglobin would soon have returned to its pre-disease level, perhaps in just a month or two. However, once the ileal pouch **was** hooked up (according to this reasoning), the chronic inflammation that developed in this pouch reduced my hemoglobin level.

In my Feb '92 operation, the ileal pouch was removed, and was replaced by a standard ileostomy. There were many good medical reasons for doing this. (For example, the pouch had actually shrunk, resulting in reduced capacity and considerable difficulty emptying it.) However, I was also motivated by the hope that once the pouch was removed, my hemoglobin would finally return to its pre-disease level, and I would be able to run faster.

This apparently hasn't happened. My latest hemoglobin reading, nine months after the Feb '92 surgery, is 15.8 g/dL—exactly where it was at the end of the three-month period between the two 1988 operations. In an effort to raise my hemoglobin, I have tried iron supplements, but with no success. I am currently experimenting with Vitamin B-12, but I doubt that this has much chance either. In all likelihood, after all the years of disease, my body simply adjusted to a lower hemoglobin level than it had before the disease.

If true, this can be interpreted in a positive way: I can say that, so far as running is concerned, I'm a different person now than I was before the disease. So I can start fresh and simply ignore all those (now unreachable) PRs from before the disease.

There is, however, one complicating factor: I am now at least three or four kilograms heavier than I was at the left-hand edge of Figures 1 and 2. If I could shed that extra mass, I could surely eliminate some substantial fraction of the gap between my current performances and the "Expected Age Slowdown" curve in Figure 2.



**Anatomy Before
Colon Removal**

Figure 3

**Anatomy After
Colon Removal**
(Proctocolectomy with
Standard Ileostomy)

*This is what I have
Now (since Feb '92)*

Ileoanal Reservoir

*This is what I had after the
1988 surgery, until it was
undone in Feb '92 surgery.*

20

Michael Franke
3824-51st Street
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December 20, 1992

Pete Riegel
3354 Kirkham Road
Columbus, OH 43221

Dear Pete,

Bob Baumel and I certified 2 courses, a 5 km and 10 km, in Ames, Iowa in 1989 (IA89010-MF & IA 89011-MF). I learned, after this year's race, that the courses had been changed; I was told that they had been lengthened perhaps 20 to 40 meters.

I wrote to the club putting on the race, telling them that the TAC certification on the courses was no longer valid, and that they should be remeasured.

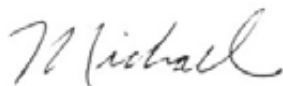
I received a protest from the individual who measured the courses. He argued that because the courses were *lengthened*, not shortened, they were still *at least* the stated distance, and thus the certification should not be removed.

Using this logic, a course of, say, 10.8 km could be measured and certified, and then advertised as TAC certified 10 km. If this were the case, uniformity and consistency would be lost, records would be pointless, and the words "TAC certified" would be virtually meaningless.

Our measuring philosophy centers on avoiding short courses not long ones because, historically, this is where the problems were. My opinion in this case is that while the course may still be at least the stated distance, it is no longer "accurate".

I told the measurer that I would write to you for a ruling. I look forward to hearing from you on this.

Best regards,



USA TRACK & FIELD

3354 Kirkham Road
Columbus, OH 43221

Road Running Technical Council
Peter S. Riegel, Chairman

614-451-5617 (home)
614-424-4009 (work)
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December 24, 1992

Michael Franke - 3824-51st Street - Des Moines, IA 50310

Dear Michael,

Your question is thought-provoking. Because I want to put your letter in the January Measurement News, for reader comment, my answer will be a quick one, with little time for reflection. The deadline is upon me.

Unless the courses have been physically altered, there seems little reason to decertify them. The fact that the race organization chose to lengthen the course as run does not alter what has been certified. So, I'd say don't decertify the courses.

As long as the race begins at or behind the starting line, and finishes at or beyond the finish line, the certified distance is run. If either of these conditions does not exist, then the certified course has not been run.

Adding 20 meters to a 10 km course does not alter the course to the point where a severe problem exists. Of course, as you pointed out, if 800 meters were added, it would be ridiculous to call the course accurate. As far as records go, however, they would still count. As I recall, a substantial number of 8 km records have been set on courses certified at 5 miles, which is about 50 meters longer than 8 km. In 1985 I certified the Elby's 20 km course in Wheeling, WV, even though the measurements showed it was about 100 meters oversize. The race director had a strong need to have the start and finish in specific locations, and leaving the course a bit oversize was the most attractive of the available options. Bill Rodgers set a US record on the hilly course, and Mike Wickiser's validation measurement showed that it was indeed about 100 meters oversize.

At the Records Committee meeting at the recent TAC convention, a 50 km record was removed and replaced with a time set at a 50 mile run, since the 50 mile time was less than the 50 km time! An extreme example, but true.

So, as far as records go, no problem exists on the two courses you describe.

I can understand the problem, however. If I ran a supposedly certified 10 km course, and the organizers had added a minute or two in extra distance, I would feel cheated if I ever found out. On the other hand, I have run plenty of marathons in which I had an extra 100 meters or so to "run" before I reached the start line.

The classy thing for the organizers to do would be to say up front that they added the extra distance, and that the run is still certified, and let the runners figure out how much difference it makes to them.

Now let's see what the readers have to say.

Best regards,



CERTIFIED TRACKS - HOW THE MEASUREMENTS CAME OUT

400 METER TRACKS				440 YARD TRACKS			
MEASURE- OBTAINED	INTENDED LENGTH	AMOUNT OVERSIZE	AMOUNT OVERSIZE	MEASURE- OBTAINED	INTENDED LENGTH	AMOUNT OVERSIZE	AMOUNT OVERSIZE
METERS	METERS	METERS	M/KM	METERS	METERS	METERS	M/KM
399.44	400	-0.56	-1.40	402.00	402.336	-0.34	-0.84
399.52	400	-0.48	-1.20	402.12	402.336	-0.22	-0.54
399.82	400	-0.18	-0.45	402.21	402.336	-0.12	-0.30
399.94	400	-0.06	-0.15	402.24	402.336	-0.10	-0.25
400.00	400	-0.00	-0.01	402.34	402.336	0.00	0.01
400.01	400	0.01	0.03	402.35	402.336	0.01	0.03
400.01	400	0.01	0.03	402.37	402.336	0.03	0.08
400.01	400	0.01	0.03	402.37	402.336	0.03	0.08
400.02	400	0.02	0.05	402.45	402.336	0.12	0.29
400.03	400	0.03	0.07	402.48	402.336	0.14	0.36
400.04	400	0.04	0.10	402.49	402.336	0.15	0.37
400.26	400	0.26	0.65	402.59	402.336	0.25	0.63
400.32	400	0.32	0.80	402.60	402.336	0.26	0.66
400.76	400	0.76	1.90	402.61	402.336	0.28	0.69
401.21	400	1.21	3.04	402.65	402.336	0.31	0.78
				402.67	402.336	0.34	0.83
				402.70	402.336	0.37	0.91
				402.73	402.336	0.40	0.98
				404.18	402.336	1.85	4.59
				404.90	402.336	2.56	6.37
				406.87	402.336	4.53	11.27
AVERAGE			0.231	AVERAGE			1.286
STD DEV			1.056	STD DEV			2.758

The table above was generated by examination of the certificates for all the 400 meter and 440 yard tracks we have ever certified. There are a few inconsistencies and imperfections in the above:

1) Measurements that were made before completion of construction of the track were not included. We have several certificates based on the data from a surveyor who generally attests that the track "...is exactly 400 meters (440 yards) in length." These were not included. The table includes only measurements that were made afterward, generally by a person less skilled than a surveyor.

2) It was not always possible to be sure whether a track was intended to be considered as a 400 meter or a 440 yard track. I arbitrarily divided the measurements into groups as you see above.

It is interesting to note, for validations performed on road courses certified in 1985 and later, that the mean oversize was 0.92 m/km and the standard deviation was 1.84 m/km.

What can we learn from this?

1) The newer 400 m tracks seem better-measured than the older 440 yard tracks. Perhaps the track layout people are getting better at it. About half of each group has a reasonably accurate length. The rest are too long or too short (to my way of thinking, lacking another standard).

2) Measurement variability (as measured by standard deviation) of tracks is not markedly different than it is on roads. "All tracks are the same, all road courses are different" is true only philosophically.

3) If we applied USATF validation standards to the tracks that have been measured, we would see 2/15 (13 percent) of the 400 m tracks fail for shortness, and 2/21 (10 percent) of the 440 yard tracks fail. Of the post-1984 road courses, 10 percent have failed validation. Since we do not apply our road standards here, this is noted only for general interest.

Why do track measurements vary so much, if they are laid out by a method that is more accurate than bicycle measurement? Let's look at a typical track construction project:

The owner tells the architect that the track must fit outside a playing field and inside a stadium. The architect, after consultation with an engineer or surveyor, prepares construction drawings. The construction drawings include the locations of the centers of two circles, which define the circular ends of the track. If no mistakes have been made, and the dimensions are followed exactly, the track will have the proper length.

During the layout, the surveyor will establish stakes at the two radius centers. He can do very accurate work from these points. Later, the points disappear when the playing field is turfed. Anybody wanting to measure the track after it is built must do so by another method.

The trick to building it right is to follow the dimensions exactly. Sometimes easier said than done. How closely can concrete formers or aluminum fabricators come to the layout lines, in reality? Does the striping contractor always put the stripes down exactly correctly? Dimensions may be specified to a hair's breadth, but the limitations of the construction process define what the customer gets.

Some tracks have a removable curb, usually made of pieces of metal, numbered to keep them in proper order. The curb is erected by plugging these pieces into sockets set in the track surface. Each time the curb is assembled, there is a small difference in length from the last time it was used.

Because of the "30 cm from curb, 20 cm from line" definition of the measure line (the official runners' path), a track without its curb in place is, by definition, short of its intended length. Yet many tracks have their curbs erected for only a few days each year, for track meets.

All of the above leads to the inevitable conclusion that tracks, like roads, have their individual characteristics. Some are a bit long, some are a bit short, but most are about right.

Where they differ from roads is that it's virtually unheard of for a track to be checked after a record is set. This is considered unnecessary, since the surveyor's document is usually presented as proof of accuracy.

When we in RRTC are called upon to certify a track, it is usually because the original surveyor's document cannot be found. If it is presented it is our practice to accept it at face value, and not require a remeasurement. If it cannot be found, we check the length. We can be pretty sure that every track we check originally had a surveyor's document, and that it said the track was "exactly" some length. From the above, it would seem that many of these claims are not exactly true.

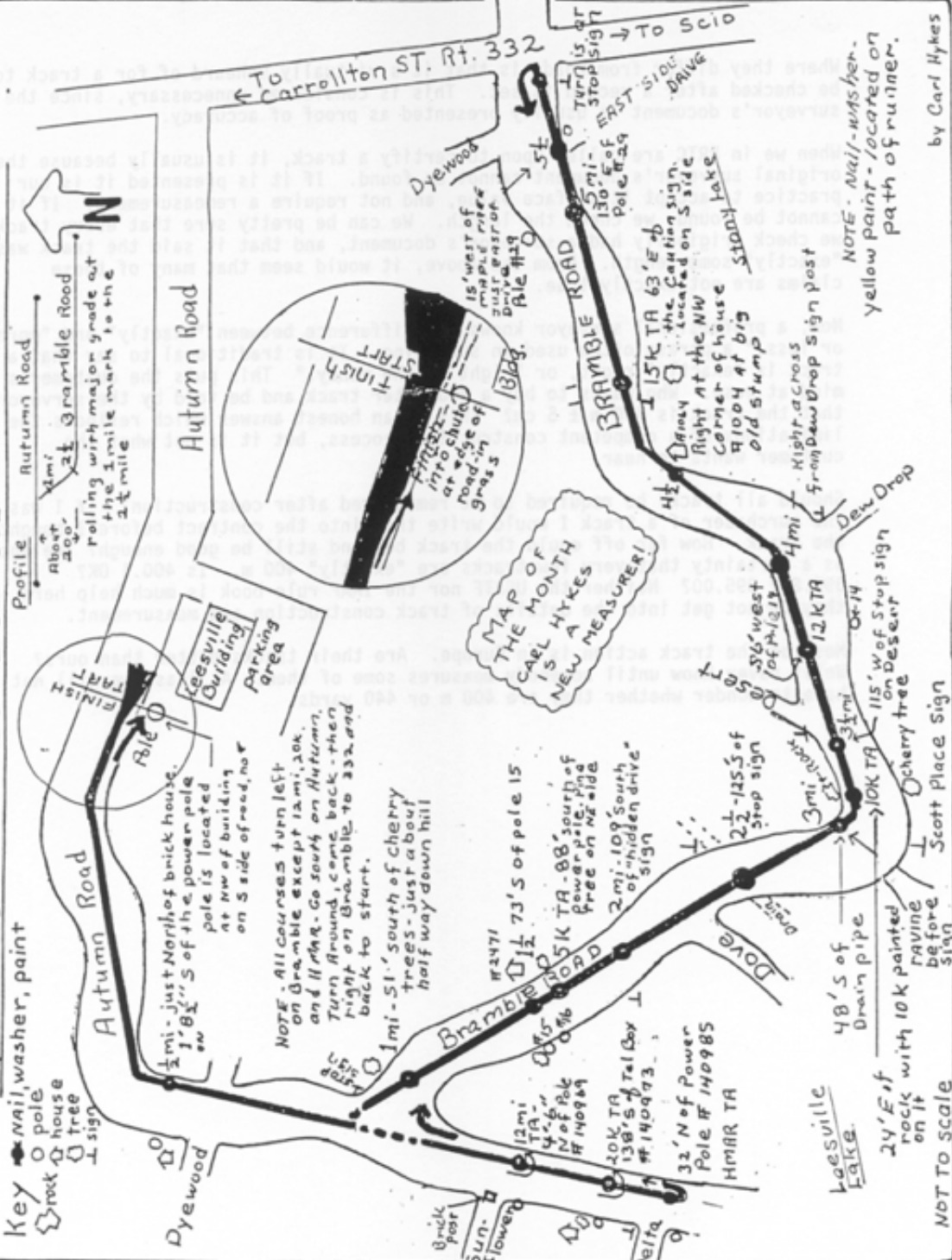
Now, a professional surveyor knows the difference between "exactly" and "more or less," a phrase often used in surveying. It is traditional to say that a track is "exactly" right, or "right on the money." This puts the customer's mind at ease. Who wants to buy a 400 meter track and be told by the surveyor that the track is $400\text{ m} \pm 5\text{ cm}$? This is an honest answer which reflects the limitations of a competent construction process, but it is not what the customer wants to hear.

Should all tracks be required to be remeasured after construction? If I was the purchaser of a track I would write this into the contract before I bought the track. How far off could the track be, and still be good enough? We know as a certainty that very few tracks are "exactly" 400 m. Is 400.1 OK? 399.87? 395.00? Neither the USATF nor the IAAF rule book is much help here - they do not get into the details of track construction and measurement.

Most of the track action is in Europe. Are their tracks better than ours? We'll never know until somebody measures some of them. At least we will not have to wonder whether they are 400 m or 440 yards.

Autumn-Bramble MULTI courses

Nov. '92



Leesville Lake

24' East of rock with 10K painted on it

NOT TO SCALE

48' S of Drain pipe

10K TA 138' S of Tel. Box # 140973

32' N of Power Pole # 140985 HMAR TA

12 mi. TA - 42.6' N of Pole # 140989

10K TA 138' S of Tel. Box # 140973

1 mi. - 51' south of cherry trees - just about half way down hill

NOTE - All courses turn left on Bramble except 12 mi., 20K, and 110K. Go south on Autumn, Turn Around, come back, then right on Bramble to 332 and back to start.

1 mi. - just North of brick house. 3' - 8" S of the power pole is located at NW of building on S side of road, near parking area

Leesville Building

Autumn Road

Autumn Road

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USA TRACK & FIELD

2939 Vincent Rd.
Silver Lake, OH 44224

Road Running Technical Council
Michael A. Wickiser
Validations Chairman

216-929-1605 (home)
216-929-1605 (work)
FAX 216-384-4791

19 December, 1992

Pete Riegel - 3354 Kirkham Rd. - Columbus, OH 43221

Dear Pete,

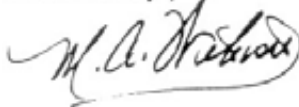
As discussed at the TAC Convention I would like to expand the pool of measurers available to conduct validation course re-measurements.

For this reason I am asking those certifiers who know of measurers that they know and trust to be considered as "expert" to kindly pass along their names to me for consideration. Certifiers are already considered to be expert. There is no way to tell when or if any individual might be called upon! But in the effort to build a large pool of known expert measurers and to accomplish the number of validation re-measurements requested some increase in the available ranks is warranted.

Most of us as reviewers know of some excellent measurers. These are the guys and gals whose names are being requested. Please send me your recommendations. If any questions arise feel free to contact me.

I will race to my mail box daily waiting replies.

Sincerely,

A handwritten signature in black ink, appearing to read "M.A. Wickiser", enclosed in a simple oval scribble.

DISTRIBUTION OF ACTIVE COURSES AS OF OCTOBER 30, 1992

	05km	05mi	08km	10km	10mi	15km	2.5km	20km	Cal	HMar	Mar	Total
AK	7	0	1	13	0	0	0	0	4	3	2	30
AL	50	7	15	31	3	3	0	1	12	4	3	129
AR	23	0	3	10	0	1	0	1	11	1	1	51
AZ	10	0	17	53	2	3	0	3	2	5	16	111
CA	256	24	57	363	18	15	7	15	16	52	53	876
CO	54	10	2	35	1	2	0	1	16	9	6	136
CT	35	24	4	25	2	1	0	2	23	8	4	128
DC	17	1	15	23	9	4	1	3	0	0	7	80
DE	86	30	0	23	3	6	0	0	2	1	1	152
FL	186	25	30	106	3	10	4	1	42	17	18	442
GA	99	4	17	82	1	5	3	2	13	6	5	237
HI	5	3	2	13	2	2	0	1	1	3	3	35
IA	14	1	4	15	1	0	0	1	5	2	1	44
ID	1	0	1	1	0	0	0	0	1	0	4	8
IL	139	13	15	127	8	6	0	6	10	13	14	351
IN	24	7	20	46	3	6	0	2	3	6	6	123
KS	38	1	21	45	4	3	0	2	6	3	5	128
KY	15	0	18	20	0	3	0	0	8	3	2	69
LA	20	2	1	6	0	0	3	0	8	2	5	47
MA	33	41	20	52	7	4	1	3	19	6	11	197
MD	22	4	12	42	5	4	0	2	3	2	5	101
ME	23	19	4	36	3	5	0	6	5	6	6	113
MI	55	8	36	68	4	9	0	0	2	6	11	199
MN	33	4	11	34	0	4	1	1	0	7	3	98
MO	12	1	6	25	0	1	0	1	8	3	12	69
MS	11	3	3	7	0	1	0	0	2	1	5	33
MT	7	2	0	10	0	0	0	1	2	2	1	25
NC	197	20	30	135	11	10	2	5	5	12	10	437
ND	2	0	1	3	0	1	0	0	1	0	1	9
NE	10	13	4	34	1	2	0	2	1	3	7	77
NH	21	11	13	26	2	2	0	1	9	4	2	91
NJ	86	63	4	65	8	4	2	2	3	10	8	255
NM	18	0	1	16	0	0	1	2	1	3	5	47
NV	1	0	2	5	0	2	0	0	2	4	4	20
NY	90	33	22	88	10	9	6	12	12	13	27	322
OH	138	57	15	96	4	9	1	3	17	8	12	360
OK	185	2	11	112	0	12	1	3	8	8	13	355
OR	15	5	35	38	2	5	2	2	5	2	9	120
PA	112	30	9	93	9	6	0	4	3	8	17	291
RI	6	6	0	6	3	0	0	0	0	0	4	25
SC	96	12	40	73	9	6	1	4	0	5	5	251
SD	5	0	3	4	0	1	0	1	1	1	3	19
TN	41	12	15	27	2	4	0	0	7	3	8	119
TX	208	27	23	150	5	18	4	3	14	14	20	486
UT	30	2	1	11	1	2	0	1	0	3	3	54
VA	23	13	14	64	7	6	0	0	0	8	7	142
VT	5	0	2	8	1	0	0	0	4	5	3	28
WA	28	9	23	70	1	5	4	2	0	13	18	173
WI	22	3	22	17	1	2	1	1	0	2	4	75
WV	7	0	4	12	1	0	0	1	1	1	0	27
WY	0	0	0	1	0	0	0	0	1	0	1	3
Total	2621	552	629	2465	157	204	45	104	319	301	401	7798

The above courses represent 87 percent of the total of all certified courses.

67 Southwood Cres.,
London, Ontario,
N6J 1S8
Dec. 12/92

Peter Riegel,
3354 Kirkham Road,
Columbus, Ohio,
43221

Dear Pete,

I was very surprised by your last letter. I am very honoured that you think my work is of a good enough quality that I can fill out my own TAC certificates for measurement of Canadian courses. My middle name is Douglas so I shall use the initials **BDC** when giving a course number. I shall of course send you a copy of any certificates I issue.

I have enclosed a copy of the form I have prepared to go on the back of the map. I hope it is acceptable. I prepared this form using Word Perfect on my IBM clone computer. In order to get the TAC and the RRCA logos I used a scanner. If you have access to a better copy of each (or even better a disk with these logos which is of better quality than I have been able to produce) I would be glad to send you a disk on which to copy it.

yours truly,

A handwritten signature in cursive script, appearing to read "Bernie", with a long horizontal flourish extending to the right.

USA TRACK & FIELD

3354 Kirkham Road
Columbus, OH 43221

Road Running Technical Council
Peter S. Riegel, Chairman

614-451-5617 (home)
614-424-4009 (work)
FAX 614-424-5263

December 21, 1992

Bernard Conway - 67 Southwood Cres - London, ONT CANADA N6J 1S8

Dear Bernie,

You will see your first course listed in next MN, also a notice to all of your new status. I already let people know at the TAC convention.

If you wish to use your new-found powers to found a Canadian certification system, why have a go at it. You could replace the RRCA logo on the certificate by "recognized by CTFA" and take it from there. The Canadian T&F authorities may look with more favor on the system being operated by a countryman, rather than being supervised by a foreigner. Whether this happens is up to you and the others in Canada who may think it is a good idea.

This off-branching may develop some bugs in the future, but it seems like a good idea, so let's go with it if and when you are so inclined.

Although you are now a final signatory for your own work, I want to supervise your reviews of any Canadian applications you may get until I am convinced that you can handle it. Understanding and correcting the work of others is not the same as doing your own. Any Canadian TAC certifications will have to use either our own methods as a basis or those of IAAF.

I have no certificates on disk. Bob Baumel does, though, but he uses a Macintosh, which probably won't work with yours. I found myself wondering why you bothered to design a certificate of your own when we already have a national certificate form which we all use. I thought I sent you a couple. No harm done if you prefer your own.

As you can see above, TAC is no more. We changed our name, and are now USATF, which the American public may understand better, since they believe athletics is football and baseball. A new logo has been produced, and Bob Baumel will be producing a new form which I will mail out to all certifiers when it is ready. It will have the new logo on it.

Best regards,



NUMBER OF COURSES CERTIFIED BY RRTC PEOPLE AS OF OCTOBER 30, 1992

THE MILLENIUM CLUB - 1038 COURSES
"KILOCERTIFIERS"

1038 WN WAYNE NICOLL

THE CENTURY CLUB- 9330 COURSES
"HECTOCERTIFIERS"

923 PR PETE RIEGEL
638 BB BOB BAUMEL
558 ACL A. C. LINNERUD
506 RS RON SCARDERA
443 ETM TOM MCBRAYER
376 CW CARL WISSER
375 RT BOB THURSTON
306 TC TED CORBITT
286 JW JAY WIGHT
285 DB DAN BRANNEN
239 BH BASIL HONIKMAN
237 BS BRIAN SMITH
232 BG BILL GLAUZ
230 TK TOM KNIGHT
217 RE BOB EDWARDS
204 DL DOUG LOEFFLER
200 KL KEVIN LUCAS
198 RR RICK RECKER
179 SH SCOTT HUBBARD
176 GD GEORGE DELANEY
165 DR DAVID REIK
163 WG BILL GRASS
156 RL BOB LETSON
146 TD TOM DURANTI
140 JL JIM LEWIS
138 AM AMY MORSS
126 DP DAVE POPPERS
126 PC PAUL CHRISTENSEN
114 JD JOHN DEHAYE
111 MR MIKE RENNER
100 BT BOB TESCHEK

THE DECADE CLUB - 1136 COURSES
"DEKACERTIFIERS"

93 GN GREG NELSON
92 JMC JOHN MCGRATH
86 FC FELIX CICHOCKI
86 AP AL PHILLIPS
76 MW MIKE WICKISER
72 FH FINN HANSEN
63 TB TOM BENJAMIN
57 AS ALLAN STEINFELD
52 LB LEE BARRETT
43 JS JOHN SISSALA
39 EL ELIZABETH LONGTON
37 CJ CARL JEANSONNE
35 BN BILL NOEL
35 MF MICHAEL FRANKE
32 DLP DON POTTER
30 KU KARL UNGUREAN
29 FW FREDERIC WILSON
26 RH BOB HARRISON
25 DK DAVID KATZ
22 TF TOM FERGUSON
19 KY KEN YOUNG
19 GLD GORDON DUGAN
17 DM DALE MATTY
16 SV STEVE VAITONES
13 LE LEN EVENS
12 WH BILL HUGHES
10 GAN GENE NEWMAN

THE SINGLES CLUB - 42 COURSES
"CERTIFIERS"

8 CEG CHARLES GEORGE
8 GT GEORGE TUTHILL
7 BC BILL CALLANAN
5 WS WADE STOCKMAN
4 WC WOODY CORNWELL
3 HWC HAL CANFIELD
2 BU BEN BUCKNER
2 RN RAY NELSON
2 PT PATRICIA THORNTON
1 BH BEN HABLUTZEL

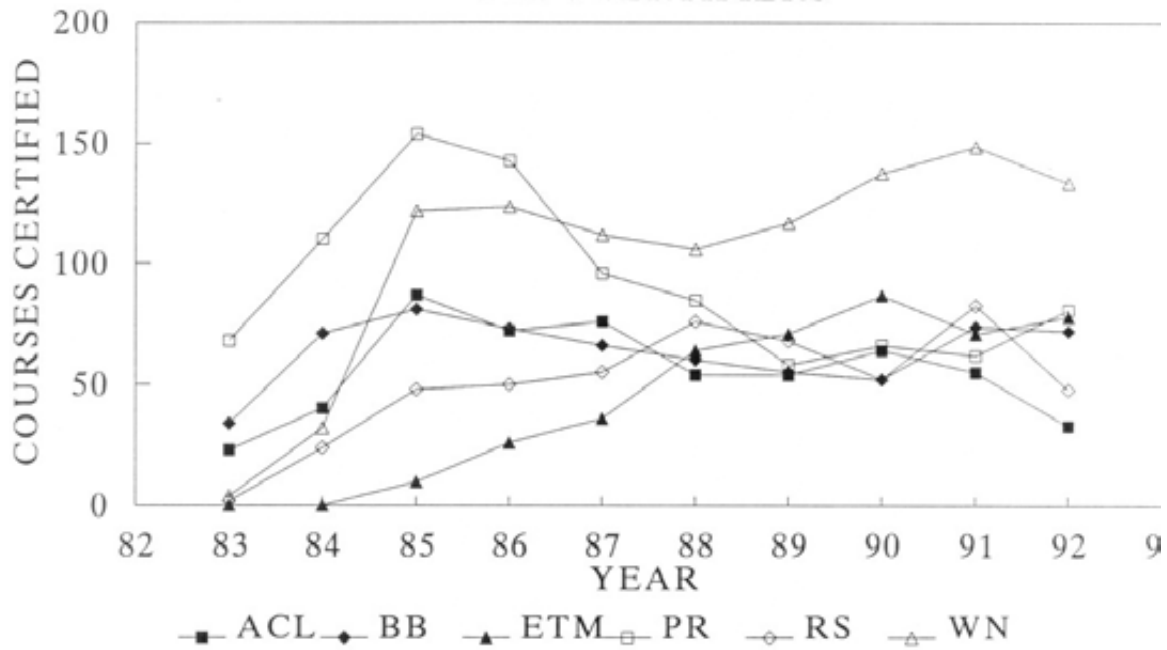
10509 TOTAL COURSES

The Grandmaster

From 1963 through 1982 Ted Corbitt certified 1867 courses. None of these courses appear on the current listings, since they did not include the 1.001 short course prevention factor, which was instituted in late 1982.

PERFORMANCE BY YEAR

TOP 6 CERTIFIERS



	ACL	BB	ETM	PR	RS	WN
83	23	34	0	68	2	4
84	40	71	0	110	24	32
85	87	81	10	154	48	122
86	72	73	26	143	50	124
87	76	66	36	96	55	112
88	54	60	64	85	76	106
89	54	55	71	58	68	117
90	64	52	87	66	52	138
91	55	74	71	62	83	149
92	33	72	78	81	48	134



TADEUSZ DZIEKOŃSKI
ul. Chrobrego 4 m. 8
(skrytka pocztowa 14)
15-057 Białystok
POLAND

Dear Pete,

Thank you very much for the copy of "MNews" issue 56.

As for your "Save your life with angular offsets" article /page 8/ I have a one doubt: the first correction should be at 2 to 5 portion, because a proper measured line is 2 to 4 /not 3 to 4 instead of 2 to 5/. The proper equation for correction in this instance is: $2 \text{ to } 5^2 + 4 \text{ to } 5^2 = 2 \text{ to } 4$. Are you agree with me ?

After my two the latest measurements, the tire and the rim mark did not change its positions.

During the last measurement I had a wet weather and the difference of pre- and post-cal data was 8,2583, although I was warming up the tire for around 20 minutes. I think that the tire is absorbable of water during a period of more than 2-3 hours.

The new Jones/Oerth Counter/6 digits/ I did receive last days. Mr Gee sent me. You are right that an extra wire needs to keep all units together.

I see in my the first Jones Counter that the plastic cog-wheel is a little wasted.

I have finished my 1992 season with a 35.54 at 10K road race.'

With the best wishes

Białystok/Pol, Nov 19, 1992

THE ATHLETICS CONGRESS
OF THE USA

Road Running Technical Council
Peter S. Riegel, Chairman

3354 Kirkham Road
Columbus, OH 43221
614-451-5617 (home)
614-424-4009 (office)
FAX 614-424-5263

November 28, 1992

Tadeusz Dziekonski - ul. Chrobrego 4 m. 8 - 15-057 Bialystok - POLAND

Dear Tadeusz,

You are correct about "Save your life with angular offsets (November MN)," but the difference is very small.

Suppose the road is 20 metres wide, and the distance (2 to 5) is 500 metres. The difference between the theoretically correct method and the offset method is only 0.4 metres. The error becomes greater if the road is short between bends. The error becomes less if the road is long between bends.

The same thing happens when an ordinary, 90 degree, offset maneuver is done. Sometimes it is dangerous to ride a diagonal path along a road. One can lock the wheel and carry across, and ride along one side. This avoids the diagonal, but introduces an error that Pythagoras describes very well. There are two reasons why this error may usually be ignored:

- 1) It is usually a small error, and
- 2) The error usually adds a bit of distance to the course, and is unlikely to cause a short course.

If one is checking a course very carefully (perhaps if a record was set) it is important to be aware, and to use the most exact means of calculation. In most cases, however, the added safety is worth the small error.

8 counts per kilometre change is higher than I usually get with my solid tire, but I have had changes that large. Not very often. As for the tire moving on the rim, after 600 km of riding, my tire has made one complete revolution on the rim. Lately the rate has decreased greatly. I think dirt, and perhaps some rust, have gotten between the tire and rim and give it more friction.

Paul Oerth has corrected the problem with the J0 counter.

I finished my season with a 4:55 marathon. I ran with a friend who weighs 91 kg on a height like mine (173 cm). I weigh 72 kg. Normally I would expect to finish in about 3:50, but because it was his first marathon, and he is so fat, we treated it as an ultramarathon. Each time we reached a mile mark, we would take a 2 minute walk. Otherwise he would never have finished. With ultra-pacing, however, he finished just fine. At 14 miles I saw he was getting tired, so we walked 3 minutes at each mile after that point.

My left knee was in pain for four months before the marathon, so I have taken up race walking for a while. I am enjoying learning a new sport, and my knee no longer has pain.



THE ATHLETICS CONGRESS
OF THE USA

3354 Kirkham Road
Columbus, OH 43221

Road Running Technical Council
Peter S. Riegel, Chairman

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FAX 614-424-5263

September 2, 1992

Ted Paulin - Olympic Park - Swan Street, Melbourne
Victoria 3002 - AUSTRALIA

Dear Ted,

This is my report of the course measurement and race observation of the 1992 Maraton Internacional de la Ciudad de Mexico.

After establishing contact with Leonardo Fonseca Paz y Puente (Race Director), I made arrangements to go to Mexico City. At Leonardo's request, I came a day early, arriving Thursday noon, to speak at the International Colloquium of Marathon Organizers. This proved fortunate. We needed the extra time.

Course Measurement

Two days before the race the Mexican authorities closed the Zócalo to traffic, because of political demonstrations. The race route from 30 to 35 km had to be rerouted at the last minute. Late Thursday night I had an intense map session with Rodolfo Martinez Figueroa ("Jefe de Ruta"), and we decided to measure the altered course the next morning.

We arrived at the Rodriguez Autodrome, site of the start and finish, at 4:30 AM, and laid out an approximate 500 meters on the straightaway, using the jeep's odometer as a guide. I pounded a nail at each end and painted them, and calibrated the bike with the aid of a flashlight for writing notes. Since it was dark, I decided to save the steel-taping of the calibration course for later, when we finished the measurement and had both time and light.

The police did not arrive at 5 AM, the scheduled time, and at 5:15 I decided that to wait longer would be unwise, because of the traffic. With Rodolfo riding as guide, I measured the entire route of the course, without police protection. Enroute I stopped at all places where the course turned a corner, made a reference mark, and took a count, in case I should fall enroute. The traffic was not too bad at first, but became worse as the time passed.

At several places enroute, we were unable to safely measure a rigorous line, and I made no attempt to do so. In these places, however, the degree of curvature was small, and I judged that a meter or two, at most, was lost on each occasion. This was allowed for later, in the final corrections. All significant turns were rigorously measured.

Upon the conclusion of the measurement Rodolfo and I steel-taped the calibration course, obtaining a measured length of 484.41 meters.

From the measurement data I calculated a length of 42.625 km for the race course. Since the new course was far too long, we decided, after consultation with Leonardo, to use a shorter approach road to the finish, with a supplemental turn-around point (to add the final length adjustment) just before the finish. This was the only option available, since the start/finish grandstands had already been erected, and the surface of the roadway painted.

I calculated the needed addition and, with Rodolfo's agreement, added 10 meters extra to the turnaround (5 each way) to allow for our previous small deviations from the shortest route. The turnaround was painted on the roadway.

Rodolfo had provided an excellent 1:20,000 map of the route, showing all streets. In the afternoon and evening I checked my calculations, and laid out splits from 30 km onward, using the map scale in conjunction with distances established for each intersection. I gave the map to Rodolfo, who then went out to put the splits on the course itself. Because no adjustments were made before 30 km, that portion of the course needed no split work. I gave Rodolfo a signed copy of the AIMS Measurers Certificate which I had photocopied from the AIMS Measurement Book, with the serial number (0993) omitted.

With the course documentation properly set up, I took a day off.

I observed the event from the clock truck of the women's race (the women started 30 minutes before the men), and it was run as I measured it. At the conclusion of the race, I gave Rodolfo a signed copy of the AIMS Race Observation Certificate.

Upon my return home I once again checked the calculations, and you will see the results included with this report. No mistakes were made on site.

Personal Observations

I was very favorably impressed with the organization of the race, and also with the care that Rodolfo had taken in the measurement of the course. He measured it with a bicycle, and also by conventional surveying, getting a 5 meter difference between the measurements of the entire course. We both regretted that the Zócalo detour prevented me from checking his route, and getting a comparative measurement. He spent 20 days on the layout, provided a superb map, and then had his work destroyed by the last-minute course change.

The route was well-marked, with large "Ruta" signs, with arrows, at each turn. Each kilometer was marked with a visible sign.

The course was impressive. Mexico City is the largest in the world, and it has broad and beautiful avenues with abundant and attractive monuments and trees. On race day the runners and spectators get to see the city with no traffic present - a rare pleasure. The Autodromo Hermanos Rodriguez was an excellent venue for the start and finish, since it has a large grandstand, a wide and straight kilometer for the start, and a vast area for the 17,000 runners to gather, as well as the thousands of spectators.

Security was overwhelming. Several hundreds of police, soldiers, and sailors lined both sides of the start and finish, providing excellent crowd control. Credentials were issued to people depending on their jobs, which preserved order in the scoring and timing areas.

A score of police motorcycles led the race, along with several press buses, photographer motorcycles, and radio cars. When the lead man caught the lead woman, at 38 km, the vehicles passed without incident. At one point, oncoming traffic entered the course, but was diverted without affecting the runners, thanks to Rodolfo, who roved on a motorcycle, and the police.

Thank you for the opportunity to measure this course. I would not have missed it for the world. The Mexican hospitality was superb.

Best regards, 

40

xc: Leonardo y Rodolfo

MARATON INTERNACIONAL DE LA CIUDAD DE MEXICO

Course Measurement - 28 August 1992 - by Pete Riegel & Rodolfo Martinez Figueroa

In the dark, we laid out two nails approximately 500 m apart. We later steel-taped the distance once, with a careful check of the number of full tape lengths, and a double-check of the final 4.41 meter reading by Pete and Rodolfo.

Raw measurement of the calibration course:

16 lengths @ 30 m per length, plus additional 4.410 m = 484.41 m.

Temperature during taping was approximately 25C.

Corrected length = 484.44 meters

Calibrations (by Pete Riegel):

Precal - 5:00 AM, dry

Postcal - 9:00 AM, dry

10600				12560			
16291	5691	5690.75	avg	18249	5689	5689.5	avg
21981	5690	11.74763	cts/m	22939	4690	11.7435	cts/m
27672	5691	11.75938	w/1.001	29629	6690	11.75525	w/1.001
33363	5691			35318	5689		

PROBABLY
23939

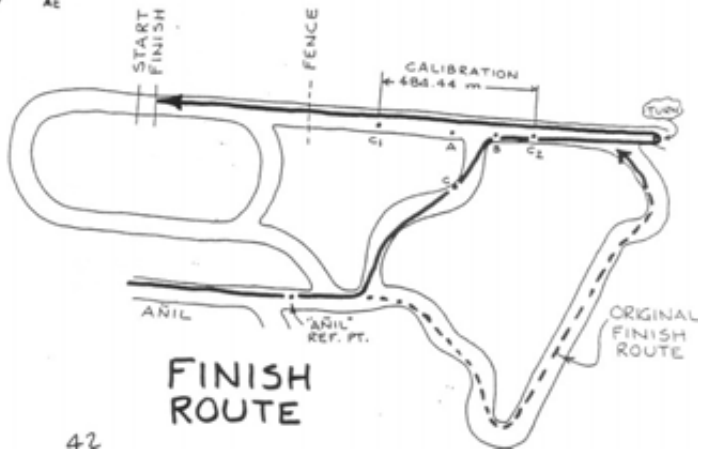
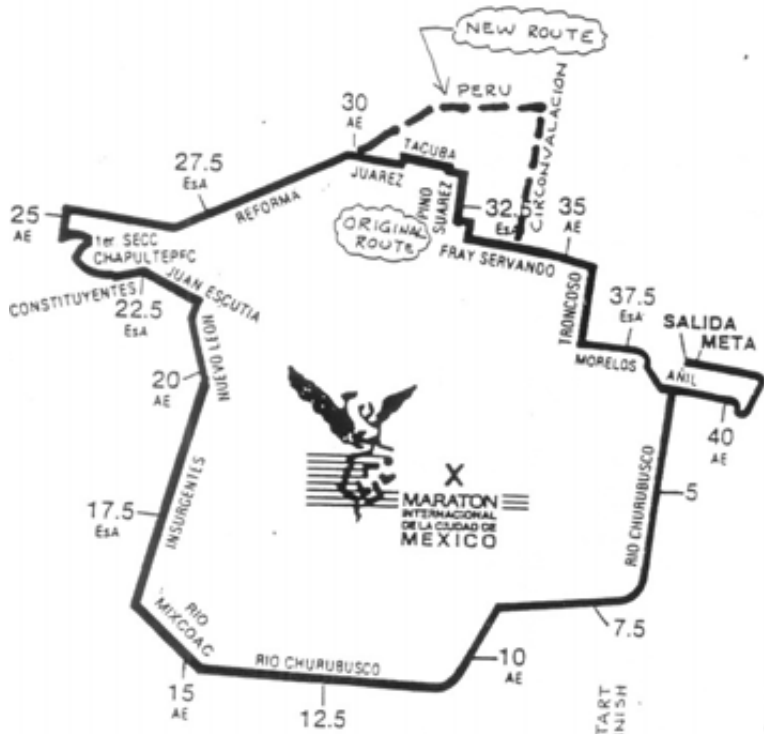
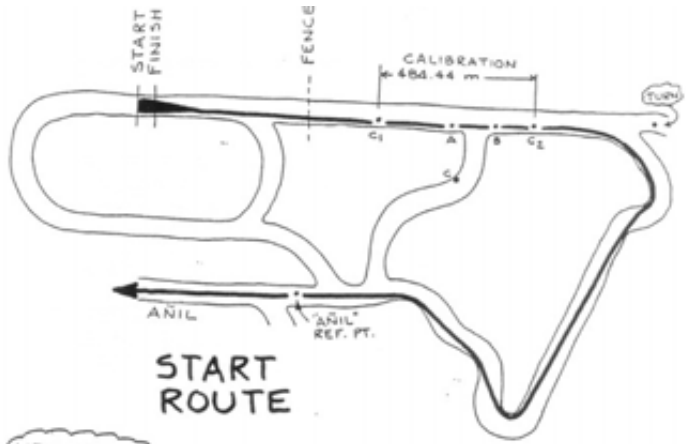
Average constant used for measurement:

11.75731 counts/meter
including 1.001

Measurement of intervals (Pete Riegel, measurer):

Point	Observed Count	Interval Count	Interval Meters			
E end Cal course (C2)	33400					
Begin Añil	53411	20011	1702.00			
Rio Churrubusco	61784	8373	712.15			
Construction gate	94110	32326	2749.44			
Aculco	102084	7974	678.22			
Resume right-hand	141772	39688	3375.60			
Insurgentes	212219	70447	5991.76			
Nuevo Leon	256411	44192	3758.68			
Juan Escutia	274071	17660	1502.04			
Enter Chapultepec	295670	21599	1837.07			
Exit Chapultepec	310293	14623	1243.74			
Begin Reforma	316352	6059	515.34			
End Reforma	382069	65717	5589.46			
End Peru	406952	24883	2116.39			
Fray Cervando	429702	22750	1934.97			
Troncoso	446933	17231	1465.56			
Morelos	461953	15020	1277.50			
End Añil	492567	30614	2603.83			
E end cal course (C2)	512560	19993	1700.47	1702.00	1698.69	

Note: The last interval was measured three times. The shortest value is used hereafter.



The following measurements were done after postcalibration:

Point	Observed Count	Interval Count	Interval Meters
Salida (start)	65100		
Meta (finish)	65478	378	32.15
Fence	69736	4258	362.16
Fence	91990		
W end cal course (C1)	92876	886	75.36

Calculation of original route:

Start	
Fence	394.31
C1	75.36
C2	484.44
Anil	1698.69
Anil	37351.73
C1	2183.126
Fence	75.36
Finish	362.16

Due to the Zócalo detour, the course was too long. More measurements were made to find a shorter route into the Autodromo Hermanos Rodriguez, and to use it with a supplemental turnaround to obtain a course of the correct distance.

Total 42625.17
Desired = 42195

Excess = 430.17 meters

C2	39372		
Añil (via long way)	19400	19972	1698.69
C1	45390		
Añil (via short way)	58574	13184	1121.34
C1	71754	13180	1121.00

Supplemental measurements

Turnaround adjust:

A	76224		
C	77076	852	72.47
B	77978	902	76.72
A	78208	230	19.56

B	86611		
Turn	90266	3655	310.87
B	93921	3655	310.87

2:00 PM
End measurements

Interval Añil-C1 by new route:

As measured (C1-A-C-Añil)	1121.00
Less A-C	-72.47
Plus C-B	76.72
Plus 2x(B-Turn)	621.74
Plus A-B	19.56

Calculations for Turnaround

Corrected interval (Añil-C-B-C2-Turn-B-A-C1) 1766.56

Point	Interval Meters
Start	
Fence	394.31
C1	75.36
C2	484.44
Añil	1698.69
Añil	37351.73
C1	1766.56
Fence	75.36
Finish	362.16
Total	42208.60

Calculation
of new route

Desired Distance = 42195. The extra 13.6 meters may be accounted for from two sources:

1) 10 meters was arbitrarily added to compensate for inability to follow the strictly shortest route while riding on portions of Churubusco, Rio Mixcoac and Insurgentes. On several bends of small curvature we rode to the right to cheat death, losing a few meters each time. I judged that 10 meters was a proper addition to account for this.

2) I made no temperature correction to the calibration course value during the actual measurement. This accounts for the remaining distance.

Note that the best value for the length of the course is 42198.6 meters.

Final Cumulative Positions of Measured Points:

Point	Interval Meters	Cumulative Meters
Start		0.0
Fence	394.3	394.3
C1	75.4	469.7
E end Cal course (C2)	484.4	954.1
Begin Añil	1698.7	2652.8
Rio Churubusco	712.2	3364.9
Construction gate	2749.4	6114.4
Aculco	678.2	6792.6
Resume right-hand	3375.6	10168.2
Insurgentes	5991.8	16160.0
Nuevo Leon	3758.7	19918.6
Juan Escutia	1502.0	21420.7
Enter Chapultepec	1837.1	23257.8
Exit Chapultepec	1243.7	24501.5
Begin Reforma	515.3	25016.8
End Reforma	5589.5	30606.3
End Peru	2116.4	32722.7
Fray Cervando	1935.0	34657.6
Troncoso	1465.6	36123.2
Morelos	1277.5	37400.7
End Añil	2603.8	40004.5
C1	1766.6	41771.1
Fence	75.4	41846.4
Finish	362.2	42208.6

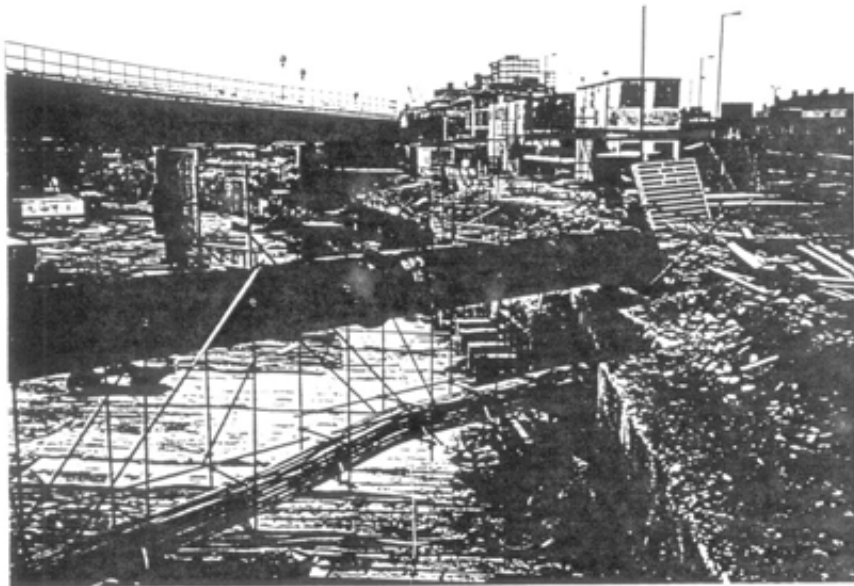
MEMO: To: RACE DIRECTOR
FROM: COURSE MEASURER

- CHRIS BRASHER
- JOHN DISLEY

APRIL 6 1992

MESSAGE:

Please ensure that all international runners can traverse a 4ft pipe - and have a head for heights.



Between Mile 14 and Mile 15
(this was Ming Street)

THIS DESCRIBES A PORTION
OF THE 1992 LONDON
MARATHON COURSE 1
A FEW WEEKS PRE-RACE
-STOLEN FROM THE L.M.
BULLETIN BOARD