MEASUREMENT NEWS

November 1990 Issue #44

42,195 Meter und keinen weniger

Von Horst Milde

Wenn einer jede Ecke und Kante der Laufstrecke des BERLIN-MARATHON kennt und diese 42,195 Meter ihm vertraut sind wie keinem anderen, dann ist es Helge Ibert (Jg. 1934), Diplom-Ingenieur, Bauingenieur und leidenschaftlicher Marathonläufer, der seit 1968 dem SCC Berlin angehört.

Der Vermessungsspezialist der AIMS/IAAF verbindet sein Hobby Laufen mit seinem beruflichen Können. Die Strekken des BERLIN-MARATHON sind seit 1974 auf seinem Reißbrett entstanden. Zunächst nach Straßenkarten errechnet, wurden sie anschliessend in die Realität des harten Berliner Pflasters umgesetzt. Jedesmal wurde darauf geachtet, daß die Strecke läufergerecht und Berlin-spezifisch konzipiert wurde, so daß sie im Ergebnis eine Art Sight-seeing-Tour darstellte.Helge Ibert hat als offizieller AIMS-Vermesser viele internationale Strecken vor- und nachgemessen: Stockholm, Paris, Frankfurt-Hoechst, Rotterdam (dreimal, davon zweimal nach den Weltrekorden), Hamburg, Wien, 25 km de Berlin u.a.m. In Wien passierte ihm das Mißgeschick, daß er beim Messen schwer stürzte, sich das Becken brach und nach Berlin zurückgeflogen werden mußte.
Marathonläufer sind zäh. Es dauerte nach dieser Verletzung nicht lange, bis er wieder wie ein Stehaufmännchen trainierte. Laufen bringt ihm den entspannenden Ausgleich für das stressige Berufsleben.

Der BERLIN-MARATHON 1990 ist für Helge Ibert ein Jubiläumsmarathon. Es wird der fünfzigste Marathon seiner Laufbahn sein. 1972 begann er in Wolfsburg mit 3:06:01, seine Bestzeit erreichte er in Nürnberg mit 2:37:21, und die langsamste Zeit mußte er in New York mit 3:08:33 verbuchen. Der Durchschnitt der bisherigen 49 Läufe beträgt 2:47:33 bei einer Standardabweichung von 6:38. Und das bei Hitze, Kälte, Sturm oder Regen. Sei es beim Laufen oder beim Vermessen, Helge Ibert liefert Präzisionsarbeit. Abkürzen gibt es nicht; lieber einen Meter mehr, aber eine ehrliche Zeit!

Helge Ibert

Der SCC dankt einem Mitarbeiter, der am Erfolg der vielen Läufe maßgeblichen Anteil hat und wünscht ihm am 30.9.1990 zumindest eine 2:47:32. Helge Ibert wird es wieder "hinzirkeln", ohne zu "schnippeln". Präzise - eben AIMS-vermessen! ■

BERLIN MARATHON

30. September 1990

Helge Ibert has been the measurer of the Berlin Marathon since 1974. His club, Sportclub Charlottenburg (SCC), printed this article about Helge in the race program. A translation will be found inside this issue of MN, as well as some examples of his work which we may learn from.

MEASUREMENT NEWS

#44 - November 1990

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TAC CONVENTION TOPICS

RRTC will meet on Wednesday, November 28, at 8:30 PM and on Thursday, November 29, at 8 PM. The following subjects will be discussed:

1) What adjustments should be made to a course after a validation is made?

2) Shall we make an effort to assist foreign federations in getting their records run on US soil recognized?

3) Discussion of track measurement methods, and of a way to interpret track measurements.

4) Cones and monitors on course maps.

5) Assistance to TACSTATS in keeping world records.

6) Use of computer-timing in official results.

PROOFREAD YOUR COURSE LISTINGS AND DATA!

We recently learned that a state record-keeper was confused about whether a course was a 10k or a 15k, and he wrote to Sally Nicoll about it. She replied that the course was listed incorrectly on the course list. Two letters were thus written on the subject, and time expended that could have been used on better things.

Certifiers, please read the new listings of certified courses that appear in each issue of Measurement News. We do make mistakes. If we do, a postcard is all it takes to fix them. Just check over the courses you have certified to see that we got them right. Otherwise they go onto the course list as you see them, and unnecessary questions then arise.

It is no problem for us to fix the list at any time, but it is better done sooner than later, after time is wasted.

Remember, as a certifier you may obtain a current list of your state's courses for the asking, at any time. Just send Joan a note, and you will get the list by return mail.

Recently Bob Baumel told me I had a certifier's address wrong, so I fixed it. I had had recent correspondence with this certifier, and he had been sent MN, but did not trouble to inform me of his address change. I guess the Postal Service must have been forwarding my letters and his MN to him. If we are to do a good job, people must know where to find us.

GARY IS RACE DIRECTOR OF "STROLLING JIM" 40 MILE RUN AND OTHER ULTRAS.

GARY CANTRELL
233 UNION RIDGE
WARTRACE, TN 37183

PETER RIEGEL
CHAIRMAN
ROAD RUNNING TECHNICAL COMMITTEE, TAC
3354 KIRKHAM ROAD
COLUMBUS, OH

PETE,

I READ THE B.A.A. PROPOSED AMENDMENT TO RULE 185.5, AND I MUST SAY THAT IT WAS ONE OF THE FUNNIEST THINGS I'VE READ IN QUITE SOME TIME. PARTICULARLY HILARIOUS WAS THE 5 POINTS OF "REASONING" BACKING UP THIS RULE.

ALTHOUGH I AM NOT A MEMBER OF THE MEASUREMENT COMMUNITY, I HAVE FOLLOWED THE CONTINUING BOSTON "CONTROVERSY" WITH GROWING IRRITATION. FRANKLY, I HAVE RESERVATIONS ABOUT THE INCLUSION OF ROAD RECORDS TO START WITH. THE TRACK MEASUREMENTS I HAVE BEEN INVOLVED IN HAVE CAUSED ME TO DOUBT THE POSSIBILITY OF TRULY ACCURATE ROAD COURSES. ADDITIONALLY, AS A RUNNER, I AM WELL AWARE THAT COURSE TERRAIN HAS MORE TO DO WITH MY ANTICIPATED RESULT THAN THE DISTANCE INVOLVED. BASED ON MY EXPERIENCE, I QUESTION THE ALLOWANCE OF EVEN .1% NET DECLINE. BOSTON'S APPARENT ATTEMPTS TO EVADE THIS MINIMUM STANDARD THROUGH A MEDIA APPEAL TO THE UNINFORMED HAS SEEMED LIKE SELF-SERVING NONSENSE FROM THE VERY BEGINNING.

AND NOW THERE IS THIS PROPOSED AMENDMENT....

THERE HAVE BEEN FAR TOO MANY MAN HOURS PUT IN BY YOUR DEDICATED GROUP, HOURS THAT HAVE BROUGHT SOME LEGITIMACY TO ROAD RECORDS, FOR THE INTERESTS OF A SINGLE EVENT'S MANAGEMENT TO OVERRULE THIS MINIMUM STANDARD. IF THIS RULE CHANGE IS MADE, THE WHOLE EFFORT WILL HAVE BEEN WASTED. WHAT WAS PLAIN FUNNY AS A PROPOSAL WOULD MAKE A VERY NON-FUNNY JOKE AS A RULE.

I IMAGINE THAT THE EFFORTS OF BOSTON MANAGEMENT HAVE RESULTED IN SOME UNEDUCATED CRITICISM OF YOUR WORK. I HOPE YOU ARE AWARE THAT THE INFORMED PEOPLE ARE TOTALLY BEHIND YOU. THE ABSENCE OF OFFICIAL TAC RECORDS WOULD BE PREFERABLE TO THE ERODING OF STANDARDS NECESSARY FOR THESE RECORDS TO HAVE MEANING. THE ACTIONS OF THE BAA SHOW LITTLE REGARD FOR THE INTEGRITY OF OUR SPORT.

IF I HAD A VOTE, IT WOULD ECHO YOUR SUGGESTION. IF THEY WANT RECORD STATUS, IT IS WITHIN THEIR GRASP. LET THEM RUN THE DAMN THING IN THE OPPOSITE DIRECTION. WE ALL KNOW THAT THEY WON'T BE DOING THAT, THE RESULTING TIMES WOULD BE TOO SLOW.

I HOPE YOU GUYS STICK TO YOUR POSITION ON THIS ONE, BECAUSE YOU ARE RIGHT AND THEY ARE WRONG, AND IT ISN'T VERY OFTEN THAT A "CONTROVERSY" IS THAT CLEAR.

SINCERELY,

The following was telefaxed to John Disley from IAAF's Mark Horley. It concerns rules approved by the IAAF Council for Road Race records:

DRAFT RULES FOR ROAD RACE WORLD RECORDS

Record Distances

Road Records will only be recognised for competitions taking place under IAAF Rules and over the following distances:-

15km, 20km, Half Marathon, 25km, 30km, Marathon, 100km, Road Relay.

Certification of the Course

The course must be certified by an approved IAAF Course Measurer using an IAAF approved method of measurement.

Validation of the Performance

The performance must be witnessed by the Measurer who certified the course or by an approved representative of the Member Federation.

Decrease in Elevation

The decrease in elevation between the start and finish must not exceed one in a thousand, ie 1 metre per kilometre.

1 m/km, 30%

Start and Finish

The start and finish points, measured along a straight line between them, must not be further apart than 30% of the race distance.

Timekeeping

The performance must have been timed in accordance with IAAF Rule 160.

Doping Control

An athlete achieving a world record performance must submit to doping control in accordance with current IAAF Rules and Guidelines.

TRANSLATION OF COVER ARTICLE

Peter S. Riegel
AIMS Technical Committee
3354 Kirkham Road

USA - Columbus, OH 43221

42,195 meters and not less (by Horst Milde)

If there is a man who knows every corner and edge of the Berlin Marathon course and to whom the 42,195 meters are more familiar than to anybody else - this man is Helge Ibert, civil engineer and enthusiastic about marathon running, who has been a member of the SCC Berlin since 1968.

Being an IAAF and AIMS expert of measuring he combines his hobby with his professional abilities. The courses of the Berlin Marathon have been laid out on his drawing board since 1974. First studying the maps he then adapts the course to the reality of the hard pavement of the streets of Berlin. He attaches great importance to the fact that the course will meet the requirements not only of the runners' athletic ambitions but also their interest in the city of Berlin. In fact the result of his endeavours was the course being laid out as a kind of a sight-seeing tour. In his capacity as an AIMS measurer Helge measured many international courses such as Stockholm, Rotterdam (three times, twice after a world best time had been set), Hamburg, Vienna, 25 km de Berlin, and others. It was in Vienna that he broke his hip in a bicycle accident while he was measuring, so that he had to be taken back to Berlin by plane.

Marathon runners, however, are tough guys. Soon after having suffered this injury he got up like a little tumbler and started to exercise again. Running may be considered as a compensation of the strain in his professional life.

For Helge Ibert the 1990 Berlin Marathon will be a kind of jubilee as it is going to be his 50th marathon of his running career which began in 1972 in Wolfsburg (his time there 3:06:01). He achieved his personal best of 2:37:21 in Nuremberg in 1980 while he finished in New York City only at a time of 3:08:33. The average of his 49 races amounts to a time of 2:47:33 with a standard deviation of 6:38 - heedless of what weather conditions would be. Whether while running or measuring Helge will do his work to perfection and precision: Short cuts - never! Better to run one meter too many at a time that will be achieved honestly.

The SCC wants to express its gratitude to Helge Ibert who shared the work and success of so many important running events. We wish him a time of at least 2:47:32 on September 30. Helge will manage once more to set things right - somehow. Everything will be correct according to what AIMS expects him to do.

BERLIN MARATHON MEASUREMENT

The Berlin trip was one of the best we've had. The hospitality of Anna and Helge Ibert was fantastic (we stayed with them), and, for the first time I saw an attraction to living in a large city. Berlin is a civilized place. Maybe I like it because I'm part German, from way back, and maybe because my outlook seems to match the Germanic. In any case, I felt at home there.

The measurement was easy, with Helge leading the way and good protection from East and West German cops. Everybody friendly and no problems. Helge said I got a better measurement because I was a sloppy calibrator, which we both smiled at, because I had no adequate witty reply. In any case, the course as he had it came out less than a meter bigger than it should have, and we did nothing to change it. When Horst Milde, race director, saw the 58 cm discrepancy he jokingly faxed Helge to call John Disley and tell him to come over early to measure it again and get it right this time.

Helge and his training partner Jochen took me for daily runs in the Grunewald, which is less than a kilometer from his home. Huge woods full of mystifying pathways, which they knew thoroughly. There was even a 6 km fun-run that ended at the enormous 1936 Olympic Stadium. 13000 people, restrained by a lead car, came jogging down Olympischestrasse toward the stadium, and finished on the track. Then they all got a plastic-bagged breakfast.

We gave the blue-line painters (and John Disley, who officially observed the race) a course tour, but the blue-liners got it wrong on one corner, which we fixed next night with spray cans. Our 50 meter corrected portion looked like it had been painted by drunks, but it worked. On race day things went correctly up front, but back in the pack the runners cut several corners. Even I cut two, because I was caught in the flow and did not choose to fight my way to the proper path.

I had hoped for 3:30 but got 3:38:25. I was stuck in the densest runner traffic, and could not achieve the running I wanted, because it was a constant battle to pass people in the crowd. Also, I was running with Art Smith, a longtime friend who came from Cyprus to Berlin just for the race, and we worked to remain in contact, since we had the same 3:30 time goal. I finally got on pace for a 3:30 by 25 km, but all the jockeying had worn me out. I started to hit the wall at 30 and slowed after that, just when a little running room started to become available. Also lost Art there - I think he crashed worse than me, but am not sure, since I never saw him after the race. There was plenty of water, but each stop for it cost me 20 to 30 seconds, because I then had to get past the people who were walking and drinking. Starting near the front, with running room, Helge did 2:54, and declared it his 50th and last marathon. He also said he's getting out of measurement, and wishes to concentrate on his business. I hope he doesn't do this - he is one of the finest anywhere, personally and professionally.

I'll never run another huge race like that with a time goal. It's the kind of event where it's better to just run with the flow. The crowds were enormous and vocal. As the runners passed under bridges there would be a deafening "Hey! - Hey! - Hey! - Hey!" by runners and spectators. Under bridges late in the course the runners were not so vocal. The run was one not to be missed, and I'm glad I didn't. I lost 90 seconds reaching the start and another 30 after passing through the Brandenburg Gate onto Unter den Linden. The crowd pressed us onto one side of the road after the gate, although two sides were legal.

The metric splits were a blessing. All I needed was 5 minute km's, with a little in the bank for the 195 m at the end. Easy to keep track. And kilometers come at you more often than miles do, so you get a more frequent pace check. I think I could have done 3:30 with running room, but wouldn't trade the memory for a somewhat less mediocre time.

My favorite spot on the course was a tiny circular park at Platz am Wilden Eber (the Wild Boar). It has a small bronze statue of a boar, and that's the place where the crowds start roaring "sau rauslassen!" at the runners - go for it! There's only 6 km to go, and those with anything left do. I did not.

Race organization was fantastic - even more so when it is realized that they have no paid race director. Sportclub Charlottenburg (SCC) does it all. They had about 27000 starters and 22000 finishers. Each chute at the finish was a separate finish line. 14 of them. A separate computer at each. When they had enough people through the chute - about 100 - they would close it, take the floppy out of the computer, and send it with the tags to the results people. Then they would put in a new disk and reopen the chute. They also had people manually writing down finish numbers in the chutes. The Iberts' son Martin wrote the scoring program.

Anna and Helge took us touring a bit. We went to Potsdam to see Sans Souci, Frederick the Great's summer place. It was a bit run down, but now that it's in Germany proper I expect they will renovate it more. A night at the Deutsch Oper to see Cosi Fan Tutte, which was enjoyable even though I hadn't a clue what was going on. A boat ride in the "Grosser Kurfurst" on the Havel, to Wannsee, and a pretty bus ride to return home. And a fine dinner at a small restaurant in Spandau on the evening we arrived. Mostly we ate at home. Went food shopping with them - the shops and market stalls are only a few blocks from their place in Neu Westend, a quiet neighborhood near the Olympic Stadium and the Grunewald. Ate lots of garlicky feta cheese salads and olives with pepper, all washed down with good Berlin beer. Great bread. And Anna made good her promise to fill up Helge and me with lots of noodle dishes before the race. Oddly, I seemed not to gain weight in spite of the feasting.

We also went to a couple of VIP dinners, and did they lay on the food! I almost wept to see it all - so much food, so little stomach. I felt the same way when we went downtown to the Kurfurstendamm and visited the Food Hall at KaDeWe, a big department store (Europe's largest). Saw the wall, of course, and places where it used to be. And our course tours took us into East Berlin 4 times, about three more than I needed. The western side is a whole lot nicer. The Zoo was magnificent. Great place to take a walk, right in the center of town.

There's a ruined shell of the Kaiser Wilhelm church in the center of town, that has been left as it was after the bombing. There's a big public plaza around it. One little place inside remains relatively undamaged, probably restored. The ceiling is frescoed with paintings and gold leaf, and the walls contain pictures of devastated Berlin after the war. In the Grunewald, next to a little lake called Teufelsee, is a 120 meter (40 stories high) mountain ("Teufelsberg") made of the WWII rubble of the city, with another similar mountain nearby. Sobering. People hike to the flat tops of them and fly kites.

We missed the reunification celebration by a day, but we were ready to come home. Our flight took off three hours late, so we missed the connection in Kennedy and got home at 11 PM instead of 5 PM. At the time it was a pain, but that has faded, and all that remains are warm memories.

Pete & Joan

Notes on Course Measurement and Documentation

1) Helge's original course layout showed a length of 42242 meters, 5 m more than needed. Because start and finish were located in favorable positions, he left them where they were. Our validation ride came up only 4 m less than his layout, and we changed nothing.

2) On calibration there was a headwind on the first and third rides, and a tailwind on the others. My very first calibration ride was a bit wobbly because I was not yet familiar with the bike.

3) I did a 30 meter bike check of the calibration course. Based on full-length rides, I should have obtained 280.04 counts on a 30 meter ride. I actually got two rides of 280.5 counts each. From this I accepted the accuracy of the EDM-measured calibration course with no full-length check.

3) I cheated the course out of about half a meter at the corner of Karl-Liebnecht-Strasse and Karl-Marx-Allee. I rounded the corner nice and tight, and found myself on the sidewalk! I gradually moved over, off the curb, and back onto the road.

4) With the exception of the first 5 km, which was whole-road, the course was held solely in the right-hand lanes of all roads that had central dividers (curb-to-curb), and whole-road elsewhere. The sole exception to this came near km 12, where Bellevuestrasse turns left onto Entlastungstrasse. At this point there is only a small central divider, and we shortcut this point. The blue-line people did not, and we changed their line to the proper line a few nights before the race.

5) Berlin city maps are large-scale, and contain much detailed information. From them Helge was able to obtain elevation data about every 100m, and to prepare the course profile that appears with the race map. Helge's map is actually larger and more detailed, since he is not bound to put it all on one piece of small paper.

Helge provided the race director with:

1) Large-scale course map

2) Course profile

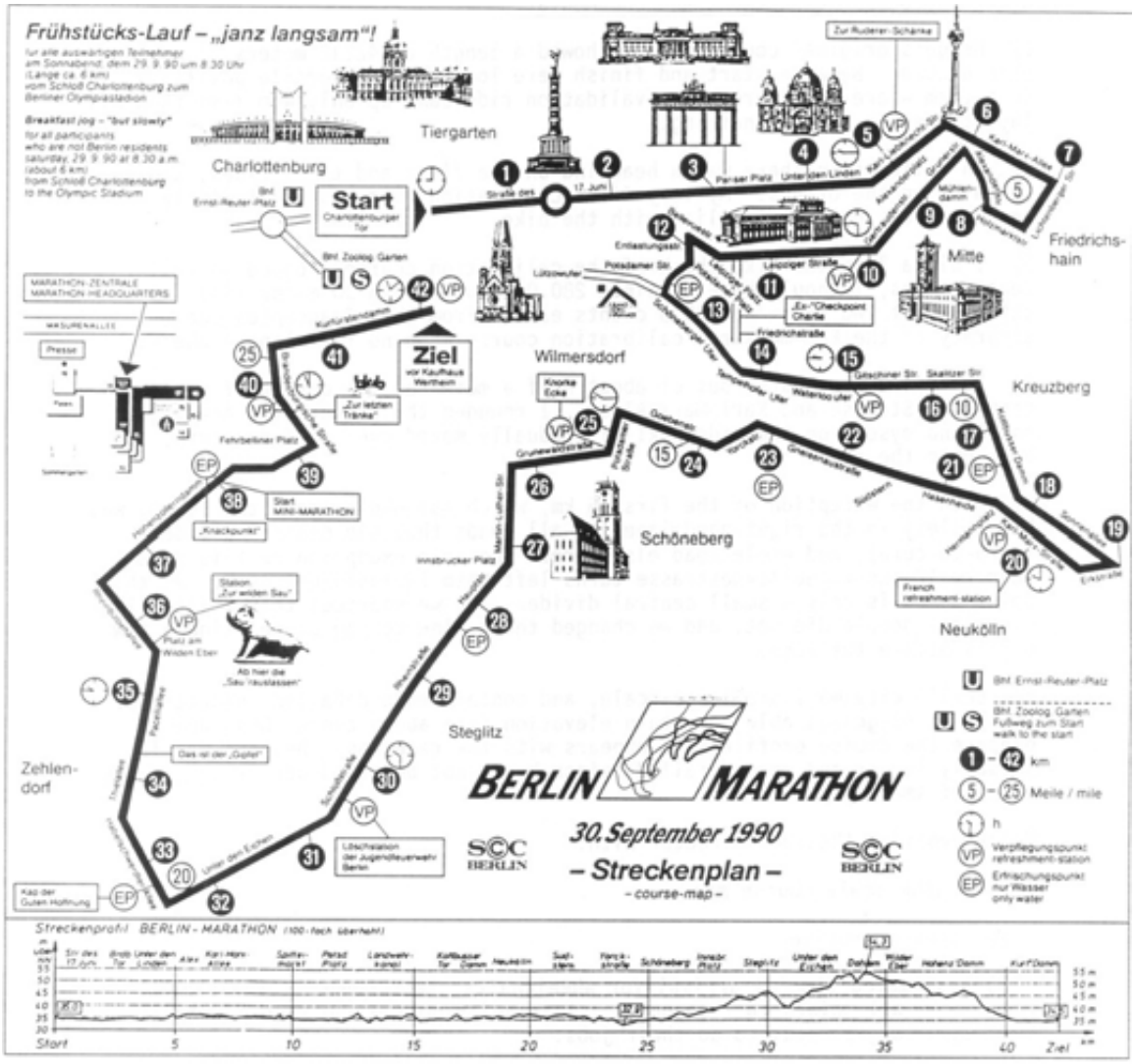
3) Estimated time of arrival for wheelchairs, fast runners, and slow runners at all points in the course. This helps police and race people to know when to get ready to do their jobs.

4) Detailed list of split points, arranged as you see elsewhere. It shows the locations as follows:

a) First, the street on which the split is located.
b) Second, the approximate distance before (vor) or after (nach) the nearest cross-street.
c) Third, the distance before or after a landmark, usually a lightpost (laterne). The lightposts in Berlin are generally numbered.

In his description, "before" and "after" refer to the direction the course is run. In our course ride to locate and repaint the marks, I was navigator, and Helge's method of documenting the splits was easy to use.

I intend to adopt some of these methods.


Frühstücks-Lauf – „janz langsam"!
für alle auswärtigen Teilnehmer am Sonnabend, dem 29. 9. 90 um 8.30 Uhr (Länge ca. 6 km) vom Schloß Charlottenburg zum Berliner Olympiastadion
Breakfast jog – "but slowly"
for all participants who are not Berlin residents saturday, 29. 9. 90 at 8.30 a.m. (about 6 km) from Schloß Charlottenburg to the Olympic Stadium
Tiergarten
Charlottenburg
Start
Charlottenburger Tor
Bhf Ernst-Reuter-Platz
Bhf Zoolog. Garten
Straße des 17. Juni
Pariser Platz
Unter den Linden
Zur Rudolfer Schänke
Mitte
Friedrichshain
Kreuzberg
Wilmersdorf
Schöneberg
Neukölln
Steglitz
Zehlendorf
Ziel
vor Kaufhaus Wertheim
MARATHON-ZENTRALE
MARATHON HEADQUARTERS
Presse
Fehrbelliner Platz
Start MINI-MARATHON
„Knickpunkt"
Station „Zur wilden Sau"
Platz am Wilden Eber
Ab hier die „Alte Heerstrasse"
Das ist der „Gipfel"
Löschstation der Jugendfeuerwehr Berlin
Kap der Guten Hoffnung
Ex-"Checkpoint Charlie"
Knorke Ecke
„Zur letzten Träne"
French refreshment station
BERLIN MARATHON
30. September 1990
– Streckenplan –
- course-map -
SCC BERLIN
Bhf Ernst-Reuter-Platz
Bhf Zoolog. Garten Fußweg zum Start walk to the start
km
Meile / mile
h
Verpflegungspunkt refreshment-station
Erfrischungspunkt nur Wasser only water
Streckenprofil BERLIN-MARATHON (100-fach überhöht)
Start
Ziel

CERTIFICATION OF BERLIN MARATHON 1990

Validation Measurement using the Calibrated Bicycle Method (Jones Counter)

Start: Straße des 17.Juni, Charlottenburger Tor, Mid of Gate
Finish: Kurfürstendamm 231 (Wertheim), 6 m east of streetlamp #8
Type of Course: Loop course (nearly closed), flat, well paved surface.

Local Measurer: Helge Ibert, Westendallee 100d, D-1000 Berlin 19 (Germany)
AIMS Certifier: Peter S.Riegel, 3345 Kirkham Road, Columbus, OH 43221 (USA)

Calibration Course: Straße des 17.Juni Length(m) 1000,00

	Local Measurer			AIMS Certifier		
Ride	Pre-Cal.: 5:30 a.m. 1st Count	2nd Count	8° C Digits	1st Count	23 Sept 1990 2nd Count	Digits
1	20000,0	29335,5	9335,5	76630,0	85969,0	9339,0
2	29335,5	38670,0	9334,5	85969,0	95304,0	9335,0
3	38670,0	48005,0	9335,0	95304,0	104641,5	9337,5
4	48005,0	57341,0	9336,0	104641,5	113978,0	9336,5
Average:			9335,25			9337,00
Ride	Post-Cal.8:30 a.m. 1st Count	2nd Count	10° C Digits	1st Count	23 Sept 1990 2nd Count	Digits
1	89000,0	98334,0	9334,0	47970,0	57302,5	9332,5
2	98334,0	107668,0	9334,0	57302,5	66633,0	9330,5
3	107668,0	117002,0	9334,0	66633,0	75967,5	9334,5
4	117002,0	126337,0	9335,0	75967,5	85300,0	9332,5
Average:			9334,25			9332,50
Constant for the Day:			9334,75 counts/km			9334,75 counts/km

Split Point	Recorded Digits	Elapsed Digits	Distance (m)	Recorded Digits	Elapsed Digits	Distance (m)	Cumulated Distance
Start	72 000			29 354			
Ref.1	590	28 590	3 062,75	57 948	28 594	3 063,18	3063,18
Ref.2	2 670		153,10	61 760		153,10	3216,28
5 km	19 281	16 611	1 779,48	78 372	16 612	1 779,59	4995,86
10 km	66 095	46 814	5 015,02	25 169	46 797	5 013,20	10009,07
15 km	12 797	46 702	5 003,03	71 850	46 681	5 000,78	15009,84
20 km	59 547	46 750	5 008,17	18 580	46 730	5 006,03	20015,87
25 km	6290	46 743	5 007,42	65 300	46 720	5 004,95	25020,83
30 km	53026	46 736	5 006,67	12 020	46 720	5 004,95	30025,78
35 km	99755	46 729	5 005,92	58 733	46 713	5 004,20	35029,98
40 km	46493	46 738	5 006,88	5 436	46 703	5 003,13	40033,12
Finish	67075	20 582	2 204,88	26 016	20 580	2 204,67	42237,78
Total		392 995	42253,32		392 850	42237,78	

Comments:
The total length of course is assumed to be correct within the interval 42195 to 42237 meters. No adjustments were made to the course.
The distance between the reference points Ref.1 and Ref.2 (construction site of Brandenburg Gate) was measured by steeltape on 22 Sept 1990.

The attached course maps and descriptions are part of this certification.

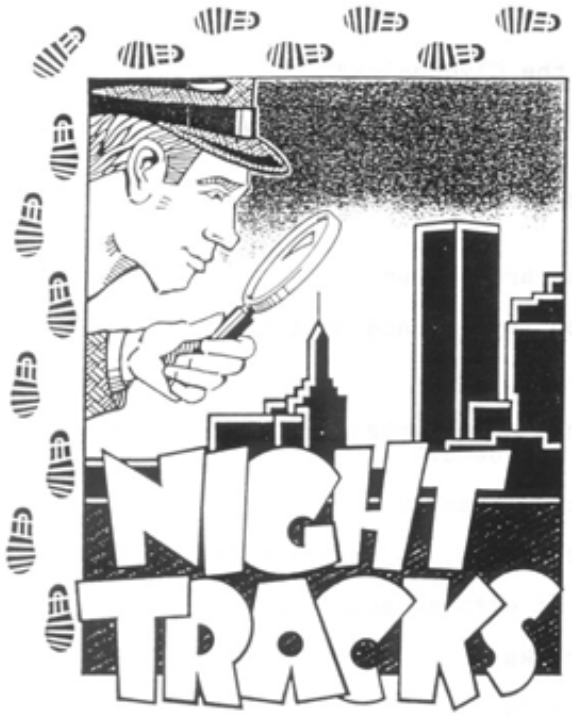
Signed: Helge Ibert Date: 27.09.90

Signed: Peter S. Riegel Date: 27 Sept 1990

BERLIN-MARATHON 1990 Lage der Kilometerpunkte Location of Km-Point Start: 09:00 (08:50

	km	Straße/Platz Street/Place	Querstraße/Platz/Punkt Cross-Road/Place/Point	Bezugspunkt Reference Point	Rollst Wheeler	Spitze Top	Schluß End
S	0,000	Str.des 17.Juni	Charlottenburger Tor	Mitte Tor	08:50	09:00	09:03
	1,000	Str.des 17.Juni	160 m vor Gr.Stern (Ampel)	17 m nach Laterne132	08:52	09:03	09:10
	2,000	Str.des 17.Juni	10 m nach Kl.Stern	2 m vor Laterne 664	08:54	09:06	09:17
	3,000	Str.des 17.Juni	170 m vor Brandenburger Tor	11 m nach Laterne256	08:57	09:09	09:25
	4,000	Unter den Linden	50 m nach Friedrichstraße	6 m nach Lat.16-d-2	08:59	09:12	09:32
*	5,000	Karl-Liebkn.-Str.	90 m vor Spandauer Straße	15 m vor 3.Laterne	09:02	09:15	09:39
	6,000	Karl-Marx-Allee	50 m vor Grunerstraße	Ausfahrt Hotel	09:04	09:18	09:47
	7,000	Lichtenb.Straße	20 m nach Strausberger Pl.	Hausecke vor Krzg.	09:06	09:21	09:54
	8,000	Alexanderstraße	30 m nach Holzmarktstraße	1 m nach 1.Laterne	09:09	09:24	10:02
M	8,047	Alexanderstraße	U-Bahn-Eingang Jannowitzbr.	3 m vor 3.Laterne	09:09	09:24	10:02
	9,000	Gruner-Straße	40 m vor Jüdenstraße	Bus-Halt (Warte-H.)	09:11	09:27	10:09
*	10,000	Spittelmarkt	Beginn Leipziger Straße	2 m vor Lat.5k6/MStr	09:14	09:30	10:16
	11,000	Leipziger Str.	40 m nach Mauerstraße	5 m nach 2.Laterne	09:16	09:33	10:24
	12,000	Bellevuestraße	60 m vor Kemperplatz	6 m vor Laterne 11	09:19	09:36	10:31
	13,000	Schöneberger Ufer	Nach Am Karlsbad Nr.8	23 m nach Laterne 16	09:21	09:39	10:39
	14,000	Tempelhofer Ufer	Nr.21 (U-Bhf.Möckernstraße)	15 m nach Einf.Nr.21	09:23	09:42	10:46
*	15,000	Gitschiner Straße	Ostseite Zossener Brücke	8 m vor Laterne 101	09:26	09:45	10:53
	16,000	Gitschiner Straße	15 m nach Böcklerstraße	2 m vor Laterne 77	09:28	09:48	11:01
H	16,093	Gitschiner Straße	Segitzdamm/Wassertorplatz	7 m nach Laterne 1	09:28	09:49	11:02
	17,000	Kottbusser Damm	Nr.5 (185 m n.Kottb.Brücke)	4 m nach Laterne 7	09:31	09:51	11:08
	18,000	Sonnenallee	Nr.20 (40 m n.Hobrechtstr.)	12 m nach Laterne 10	09:33	09:55	11:16
	19,000	Sonnenallee	10 m vor Kreuzung Erkstraße	10 m vor Laterne 78	09:35	09:58	11:23
*	20,000	Karl-Marx-Straße	Nr.23 (60 m n.Reuterstraße)	7 m nach Laterne 13	09:38	10:01	11:30
	21,000	Hasenheide	Graefestraße (1.Ampel)	3 m vor Laterne 24	09:40	10:04	11:38
H	21,098	Hasenheide	20 m nach Fichtestraße	5 m vor Laterne 27	09:41	10:04	11:39
	22,000	Gneisenaustraße	5 m nach Baerwaldstraße	3 m nach Laterne 51	09:43	10:07	11:45
	23,000	Yorckstraße	Vor Rathaus Kreuzberg	28 m nach Laterne111	09:45	10:10	11:53
	24,000	Yorckstraße	25 m vor S-Bahn-Brücke	5 m nach Laterne 33	09:48	10:13	12:00
M	24,140	Yorckstraße	25 m nach Bautzener Straße	2 m vor Laterne 21	09:48	10:13	12:01
*	25,000	Potsdamer Straße	Einfahrt vor Kleistpark	13 m nach Laterne 15	09:50	10:16	12:07
	26,000	Grunewaldstraße	Eisenacher Straße	Mitte Kreuzung	09:52	10:19	12:15
	27,000	Martin-Luther-Str.	Fritz-Elsas-Straße	Ampel Südseite	09:55	10:22	12:22
	28,000	Hauptstraße	Nr.72 (90 m n.Hähnelstr.)	10 m vor Lat.11/MStr	09:57	10:25	12:30
	29,000	Rheinstraße	Nr.28 (nach Roennebergstr.)	1 m nach Ampel Süd	10:00	10:28	12:37
*	30,000	Schloßstraße	Nr.26 (vor Zimmermannstr.)	5 m vor Lat.20/MStr.	10:02	10:31	12:44
	31,000	Schloßstraße	20 m nach Waetzoldstraße	8 m vor Laterne 63	10:04	10:34	12:52
	32,000	Unter den Eichen	90 m nach Kamillenstraße	10 m vor Laterne 93	10:07	10:37	12:59
M	32,187	Unter den Eichen	45 nach Fabeckstraße	6 m vor Laterne 82	10:07	10:38	13:01
	33,000	Habelschw.Allee	Nr.27 (70 m n.Ehrenbergstr)	13 m vor Laterne 24	10:09	10:40	13:07
	34,000	Thielallee	Nr.6 (20 m vor Kuckucksweg)	11 m nach Laterne 12	10:12	10:43	13:14
*	35,000	Pacelliallee	30 m nach Im Dol	12 m vor Laterne 72	10:14	10:47	13:21
	36,000	Rheinbabenallee	Nr.26 (vor Heydenstraße)	15 m nach Laterne 32	10:17	10:50	13:29
	37,000	Hohenzollerndamm	Nr.119 (90 m n.Berkaer S.)	12 m nach Laterne218	10:19	10:53	13:36
	38,000	Hohenzollerndamm	70 m nach Cunostraße (AEG)	Laterne 152	10:21	10:56	13:43
	39,000	Hohenzollerndamm	10 m nach Mansfelder Straße	3 m vor Laterne 96	10:24	10:59	13:51
*	40,000	Brandenburg.Str.	Zähringer Straße	6 m vor 1.Ampel(Süd)	10:26	11:02	13:58
M	40,234	Brandenburg.Str.	Duisburger Straße	Mitte Kreuzung	10:27	11:03	14:00
	41,000	Kurfürstendamm	30 m nach Wielandstraße	16 m nach Laterne 86	10:29	11:05	14:06
	42,000	Kurfürstendamm	20 m nach Meinekestraße	Vor Eingang Apotheke	10:31	11:08	14:13
Z	42,195	Kurfürstendamm	Nr.231 (Kaufhaus Wertheim)	6 m nach Laterne 8	10:32	11:09	14:15
			1.Lücke Hochbeet (Mitte)	1 m hinter Gully			

(S/Z) Start/Ziel (H) Streckenmitte (M) 5-Meilen-Punkt (*) 5-km-Punkt
Die Bezeichnungen "vor" und "nach" beziehen sich auf die Laufrichtung.
Markierungen rechts und am Mittelstreifen: Km = hellblau, Meilen = rot.



from Joe McDaniel —
Race Director of "Night Tracks"

3rd Annual

5 km Road Race & Fitness Walk
Friday Evening, September 14, 8:30 p.m.

Oklahoma's Largest Nighttime Race
An Uncustomary Event

PLIT TIMES
Times will be called at each km and halfway. This is a totally metric race. You should determine your estimated pace ahead of time.

METRIC SPLITS
Night Tracks Survey

"Metric splits suck, the majority of people don't want it."

"When I read in the brochure about the metric splits, I drove 90 miles just to try it. Its great."

"I train in miles and I like mile splits."

"The first time I tried it I didn't like it, now I think its great."

"Its nothing but a communist plot."

"Why have metric races and call mile splits...makes no sense."

"Why not post the miles and call the kms or vice versa."

"Metric splits are confusing after doing everything else in miles."

"Its very easy when the course is divided into 5 equal parts."

"Why pounds and not kilograms for the Clydedales?"

"Its great. Five evenly spaced splits allows me to ajust my pace more often and run an even pace"

"Why call 3 uneven mile splits and then have a little left over. This is confusing."

"I won't run again if metric splits are called."

"It becomes second nature after you try it once or twice."

"How far is a km?"

"There are all types of bigotry and there certainly is metric bigotry. Those opposed are all over age 40 it seems."

"Why change the splits after all these years?"

"We've had metric road races for 20 years, why not metric splits?"

"I challenge those opposed to try it with an open mind."

"You can't teach an old dog new tricks."

"I'm too old to learn the metric system."

"Runners are the most intelligent group of people around. They can't figure out 5 equally divided splits? Come on."

"Night Tracks was a modern-day, first-class event including metric splits. Keep up the good work."

"Best organized race I've been in all year including the splits. How can you score 1,800 runners in one race and have the winners posted?

"The first time I ran a metric race, I asked the question how far is 5 km. Runners are now asking how far is 1, 2, 3 & 4 km."

"Let's be consistent..metric races & metric splits. I try to run 20 minutes. That very easy..4, 8, 12 & 16 minutes at each split."

"Road racing is an international sport just like the Olympics. The metric system keeps us all together. Nobody is saying lets change everything to metric."

"Its a step forward, its progress, its communication. Keep it going."

"Its easy for me because I study the metric system in school and I think its better. My dad doesn't like it because he doesn't understand it." (12 & under runner)

PROBLEM. At last week's TAC meeting, I was approached separately by the Chief Official and the Record Keeper to ask if my prime timing device was the computer. My yes reply resulted in each saying that all the results I submitted must be purged from the record books. They said this was per TACSTATS. I haven't seen anything on this - perhaps I missed it. I did read an article describing drift and resolution, but that was just informational. What disturbs me immensely is our Chief Official who has NO computer knowledge puts more trust in his $15 stop watch rather than in my $3000 computer.

I run a program to check for any time drift using a computer and incorporate an adjustment factor in the computer if needed. In addition there are computerized Select Times which are supplemented with manual select times to fix any problem if I encounter a miscompare with the computer displaying select times. I have a high level of confidence with the accuracy of my results.

What I find amusing is that at races to which I invite the Chief Official to "bless" the timing, he puts 3 stop watches on the first male and female finishers and asks what time I have for them. Since our times match, he says my results are good and may be submitted for TAC record keeping. I assume he knows about track and field, because he sure doesn't understand what's involved in road race timing.

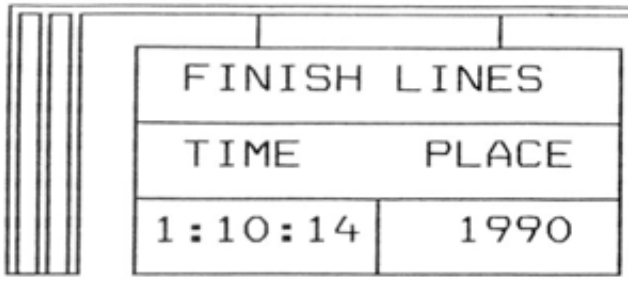
Is this an item for the RRTC agenda at the Convention? What's the universal solution? For me I think its the computer clock check program. For that "comfortable feeling", I frequently compare my stop watch with the computer screen display, understanding that there is only a 1 second granularity. I do not look forward to a cumbersome solution that could be selected because it could apply universally. I no longer have a functioning Chronomix if both must be run in parallel and compared. Would the print of computer race time (with fractions of a second, which is not available in the program today) at the end of the race for comparison with an "official" timepiece be sufficient. If a drift is found, then a technique would be needed to incorporate the drift affect on the existing times in the file. Then of course there is also the question on how to verify this for the results checkers. A signature on a form doesn't necessarily make it so.

Regarding that, I encountered a scary thing recently when observing a race for which I had certified the course and was hanging around willing to assist on race day as needed. I asked the Race Director if he briefed his volunteer Select Timers yet. "Who?" The problem was not semantics. He had been doing races for years and never had select timers. "What do you do when the number of finishers and number of Chronomix times do not match?" "That doesn't happen often and I don't know what to do, and since it only affects the last runner or 2, I just ignore it." Unbelieveable. But I think my Chief Official who hassles me about my "perfect" computer results would probably do the same. I shouldn't have said that - that was nasty and unsubstantiated.

Thanks,

Felix

Felix Cichocki
P O Box 1572
Cave Creek, AZ 85331
(602)488-9614



Alan Jones, Chairman
RRTC Finish Line
Sub-Committee
3717 Wildwood Drive
Endwell, NY 13870
(607) 754-2339
November 1990

THE RETURN OF THE FINISH LINE COLUMN

When someone suggested to Pete a few years ago that the committee chairs write a regular column in Measurement News, Pete protested that he saw no point in writing something just because it was time for another issue. He preferred articles as needed. I agree with Pete but at the time I offered to write a regular column on finish line procedures since there seemed to be a lot of material to cover. However, as you may have noticed, I either ran out of material or ran out of energy since the most recent Finish Line column was in the November 1989 Measurement News. During this past year, no issues arose that I thought worth covering in this column. Now, in recent weeks two people have raised the issue of timing races through using a computer's internal clock. The two people are Jim Gallagher whose article, "Computer Timing for Road Races," appeared in the July/August issue of TacTimes and Felix Cichocki who sent me a letter on the same issue.

COMPUTER TIMING

Jim's article does a good job of describing two attributes of a clock -- the resolution and the drift -- and how they affect the accuracy when timing a race. Jim apparently scores races using a Digital Equipment Corporation (DEC) Micro VAX 2000 computer. Part of his article applies only to VAX computers. Since most scoring of races is done by IBM PCs and compatibles, I thought I should provide similar information for the PC environment.

I covered some of this same ground in the December 1986 issue of Measurement News. I am sure it is appropriate to look at this issue again since computer timing is much more common now than it was at that time.

DEC VAX CLOCKS

Jim says that the VAX computer has a runtime clock which runs off the line's 60 Hz AC and a 'Time of Year' clock which runs off of a quartz crystal. He says that the 60 Hz AC clock has low drift but poor resolution (1/60 of a second). My understanding of the AC power grid in this country is that for periods of 24 hours this is true. However, at times the line cycles can be several seconds off. When this happens, the power grid has to make up the cycles (usually at night) to keep the long term drift to zero. Otherwise our electric (non-battery) clocks would wander.

IBM PC CLOCKS

The IBM PC does not depend on the line frequency for timing. It uses a quartz crystal to generate a frequency of 14.31818 Mhz. This frequency is divided by 3 to get the familiar 4.77 Mhz which is the operational speed of the original IBM PC. This 14.31818 Mhz frequency is also divided by 4 to obtain the 3.58 Mhz which is used by the color burst signal when driving a color TV and divided by 12 to obtain 1.193180 Mhz which drives the

timer which controls the internal clock. Every time the timer counts 65536 pulses, an interrupt is generated and the internal clock is updated. This happens about 18.2 times a second. Therefore, the resolution of the internal clock in an IBM PC architecture is about 0.055 seconds. In addition, it is possible to read the value of the counter at any time and therefore divide this time into 65536 pieces to achieve a resolution of 0.00000084 seconds (0.84 microseconds). However, few programs do this and it would make little sense since it takes the computer many microseconds just to process an interrupt.

While it is relatively easy to determine the resolution of the internal timer, it is not nearly as easy to determine the drift. In the December 1986 article, I reported on how I tested three IBM PCs and found them to be within 0.5 seconds per day. This is the accuracy for most quartz-controlled stop watches -- usually stated as ±15 seconds per month. One reason computers are fairly accurate is that it is important to set the video color burst frequency to a tight tolerance. The circuit board has an adjustable capacitor to allow tuning of the timing circuit. I have attempted to find out the tolerance specification but have been unable to. I have communicated with others and they have found an accuracy similar to what I found except for one (unnamed) brand which has been found to be off as much as 3 percent. This would result in an error of over 5 minutes in a three-hour marathon!

In the same December 1986 article I reported on timing a race with 600 finishers. We timed with two Chronomix 707 printing timers and an IBM PC. Analyzing the times showed there was no discernable drift. There was a consistent difference which seemed to come from the fact that the three timers did not hit the start button at exactly the same time.

In addition to the internal timer which I have just described, most PCs these days have a "clock-calendar". This is a circuit powered by a replaceable battery which continues to run even when the computer is powered off. The time in the clock-calendar is used only when the computer is started so that the user does not have to type in the time and date. Therefore, this clock has no bearing on the accuracy of race timing.

There is one additional situation which can cause problems when using an internal timer. It might be possible that the timer runs extremely accurately during a test but is found to be way off at the end of the race. How can that happen? Remember above I said that the computer is interrupted about 18 times a second to update the internal clock? The interrupt can only happen if the interrupts are enabled. It is extremely easy for software to disable interrupts so it is possible to miss timer "ticks." One place in a program where this could happen is in the reading of data coming in the serial port. A programmer might turn off interrupts in order to make sure that no characters are lost forgetting that these interrupts are important to keep the time-of-day clock running.

WHAT ACCURACY SHOULD WE SEEK?

Since we measure our courses to an accuracy of about 0.05%, it might seem unnecessary to demand accuracy much better than that. However, an accuracy of 0.05% in a three-hour marathon could produce an error of about 5 seconds. Since to set a new record, it is necessary to only break the old one by one second and since we can time much more accurately, it seems that we should. But there is another reason. With today's large fields, it is possible for potential winners of an age-group award to enter different chutes in the "toll booth" method of finish line procedures. If the timers for each lane have different amounts of drift, a runner could be cheated out of an award. On the other hand, since we round all times to the next second, it is not possible to determine who won between two runners with the same time unless we keep track of fractional seconds.

It would seem that we should strive for an accuracy of ±0.5 seconds per 24 hours which is 0.06 seconds in 3 hours.

ACCURACY OF EXTERNAL TIMERS

While discussing the accuracy of internal computer clocks, it would behoove us to take a look at the external timers. Following is the accuracy as stated in the literature of various timers. I must emphasize that I have not tested any of these. After each timer, I state the claimed accuracy in seconds per 24 hours.

TIMER	Error/24 hours
Casio wristwatch with stop watch:	
"±15 seconds per month at normal temperatures"	±0.5 sec
TimeMachine:	
"Accuracy: ±0.0002% (±0.17sec/24hr) at 70 degrees F"	±0.17 sec
"Stability: ±0.003% ±2.6 sec/24hr) from -4 degrees to 158 degrees F"	±2.6 sec
TimeTech PR-1000:	
"Accuracy: ±.001 sec./hr"	±0.024 sec
Chronomix 707:	
"Accuracy: Automatically rounds hundredths of seconds to next higher 1/10 second for printout" Huh?	
Chronomix 731:	
"Time Base & Accuracy: Quartz oscillator ±0.5 second in 24 hrs at 77 deg. F"	
"Guaranteed accuracy range is 23 deg to 104 deg F"	±0.5 sec
Chronomix 727:	
"Time Base & Accuracy: Quartz oscillator; ±.002%)"	±1.7 sec
Chronomix 737:	
"Time Base & Accuracy: Quartz oscillator ±0.002% (1 sec/10 hours)"	±1.7 sec
"Optional: temperature compensated oscillator ±0.0003% (1 sec/100 hours)"	
"(worse case figures)"	±0.26 sec
Chronomix S-111 Memory Stopwatch (Same as Seiko):	
"Time Base & Accuracy: Quartz oscillator, ±0.5 seconds (24 hours/70 deg F)"	±0.5 sec

While the above specifications are hard to compare because of various ways of stating the accuracy, I believe that the actual accuracy of all of them is about the same. After all, they probably all buy the same quality quartz crystals. And, in "normal" conditions, I suspect they all give an accuracy of at least ±0.5 seconds/day. I would appreciate hearing from anyone who has actually measured the accuracy and, particularly, if someone has done it under different temperatures as we are likely to meet in a road race.

CHECK THE ACCURACY OF YOUR COMPUTER

To check the accuracy of your computer's internal clock, you should first check your stop watch. You can do this by tuning into the government's WWV stations on short wave or catching the time-tone at the beginning of national news broadcasts. I have checked and found them to agree with WWV.

I have written a program which allows one to test the accuracy of a given computer's internal clock and, if inaccurate, to adjust the timing (if using my scoring program). Even though a given crystal may be somewhat off, if the amount of error is known, one can adjust and obtain good accuracy since the quartz crystal is very stable with extremely small variations with temperature and other parameters. The specifications for quartz crystals as they are shipped from the manufacturer are usually in the range of 20 to 100 parts per million (PPM). An accuracy of 20 PPM is .002% or 1.7 seconds/day. The reason watches and computers usually do better than this, is that the timing circuit is timed after the crystal is installed.

You can test the internal clock in your computer by setting the time-of-day (TIME command) and starting a stop watch at the same time. Let the computer run at least overnight. Every once in a while, check how it is doing by entering, at the command, line "TIME" at an even second according to the stop watch. Since the DOS clock only displays in hours, minutes, and seconds, you will have to do this several times to get a good reading. (If you find that the date is not correct after midnight, don't worry about it. There is a bug in many BIOS chips which prevents the date from being updated correctly as one goes past midnight.)

SHOULD WE USE COMPUTERS TO TIME RACES?

Even though computer clocks are usually quite accurate, it is possible for one to be off by quite a bit. Therefore, should we use them for timing races? I say we should but we should do it with care. Two precautions should be taken: (1) calibrate the computer's clock and (2) have an independent timing method.

Anyone who submits race results to TACSTATS should be able to prove that the times are accurate. Perhaps there should be a new question on the TACSTATS "Application for the Recognition of Road Race Performances" about the calibration of the computer's clock if computer scoring was used. Another way to prove accuracy is to have an independent printing timer. In fact, as Jim Gallagher mentions in his article, you might want an external timer as security in case you have a power outage. As always in this business, redundancy is the key. Another reason for an independent timing method is that more than one time is required by TACSTATS before a record can be verified.

AN ACTUAL INCIDENT

In his letter to me, Felix Cichocki related the following to me:

> At a recent TAC meeting, I was approached by an official to ask if my prime timing device was a computer. My 'yes' reply resulted in him saying that all the results I submitted must be purged from the record books. He said this was per TACSTATS. I haven't seen anything on this -- perhaps I missed it. I did read an article describing drift and resolution, but that was just informational.

Felix then goes on to say that he always calibrates his internal timer. However, he does not always have an external timer. At some races he invites the Chief Official who puts three watches on the first male and first female. The times match so the official signs the TACSTATS form.

October 24, 1990

Dear Peter Riegel:

Tracks may be outside the purview of the Road Running Technical Committee, but the subject was brought up in the last Measurement News. I think the measurement of tracks is a job for a genuine surveyor, unless we want to certify them as road courses. If tracks were certified as road courses, some very confusing records could be created.

I think a topic for the convention, for some committee, should be curbs for tracks. I don't like them. They're expensive, and dangerous. The idea that runners should be intimidated into running in their lane by a dangerous obstacle (the curb) is barbaric. If a white line is a good enough inside boundary for the runners in the outside lanes in the events restricted to lanes, it should be adequate for all runners. Even if my wife had not tripped on one and broken her collar bone I'd still be against them.

About the course measurement seminar. I think the fact that validation measurements by experienced measurers differed by more than one thousandth is an indication we have to clarify what procedures are to be used for validation measurements. 2300 degrees of turning is what we're told you calculated there were in the test course. That's 6.4 complete circles. If you went around all that turning just 13cm further out than someone else that would mean you would get a measurement 5.2m longer, according to what I can recollect from my eighth-grade geometry. For validations, we have to do something a little more exact than eyeballing 30cm. Maybe, before we measure, we should go around with paint and a ruler and make a few dashes around the curves so that we would have at least an occasional guide. If we really wanted to be as accurate as possible, we might do something with a solid-tired walking wheel at least 26 inches in diameter. At walking pace, we could be more exact about where we were measuring. We could even make some sort of protruding guides so we would know if we were 30cm from the inside edge of curves. I did a cursory test a few years ago and found that our club two-meter-in-circumference walking wheel was less affected by the difference in texture between grass and pavement than was my bicycle. If validations are to mean anything, whatever people's time restrictions, they have to be a bit more carefully done than lay-out measurements are required to be done.

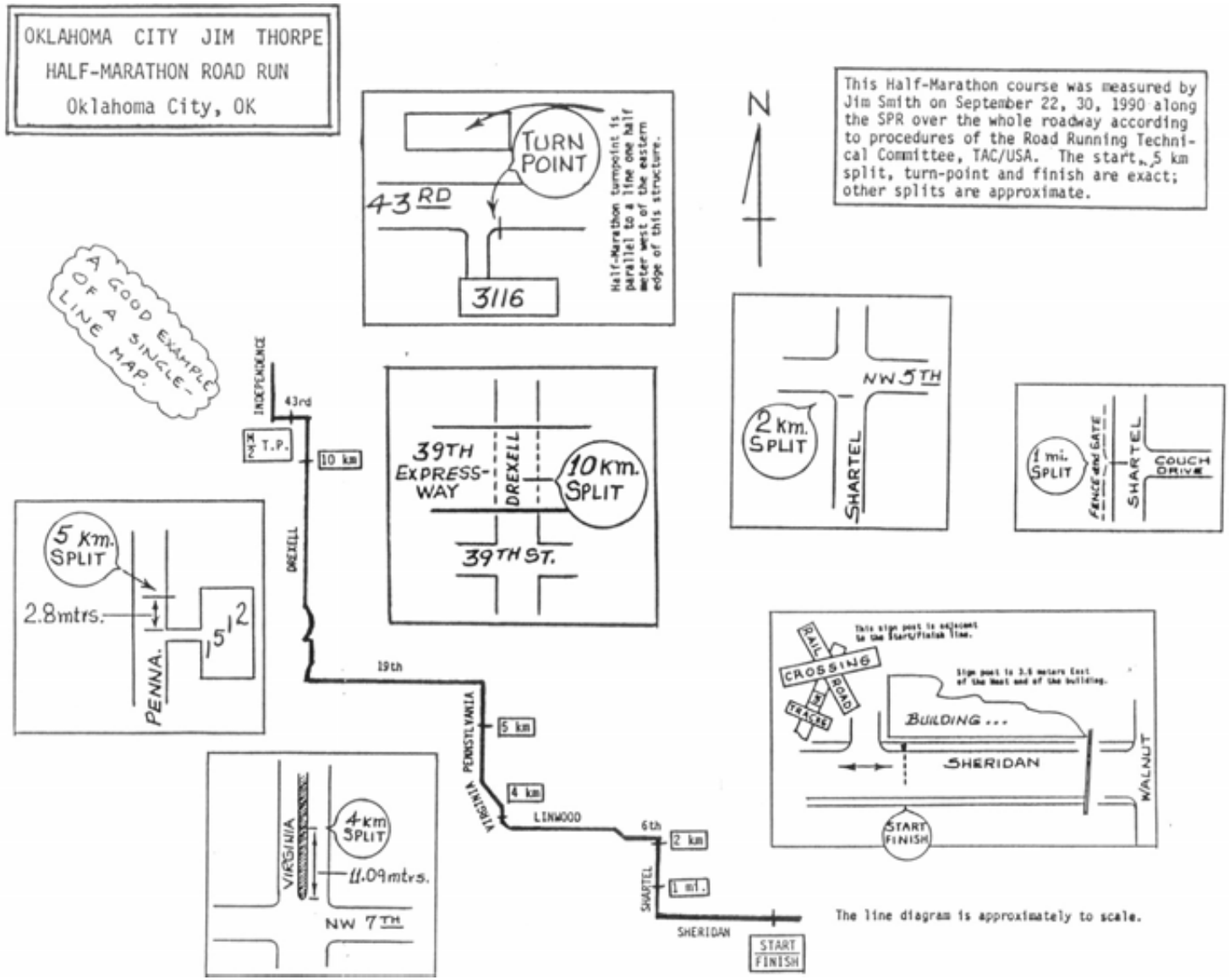
We probably shouldn't use validation measurements as lay-out measurements. A lay-out measurement need only be done so that the measured path is no more than 30cm from the road edge on the inside of curves, but a validation measurement should really be done no more and no less than 30cm from the inside edge of the road on curves. When dealing with crumbling road edges where it is unclear where the edge of the road is, a lay-out measurer should probably judge the edge to be further into the rough than a validation measurer should.

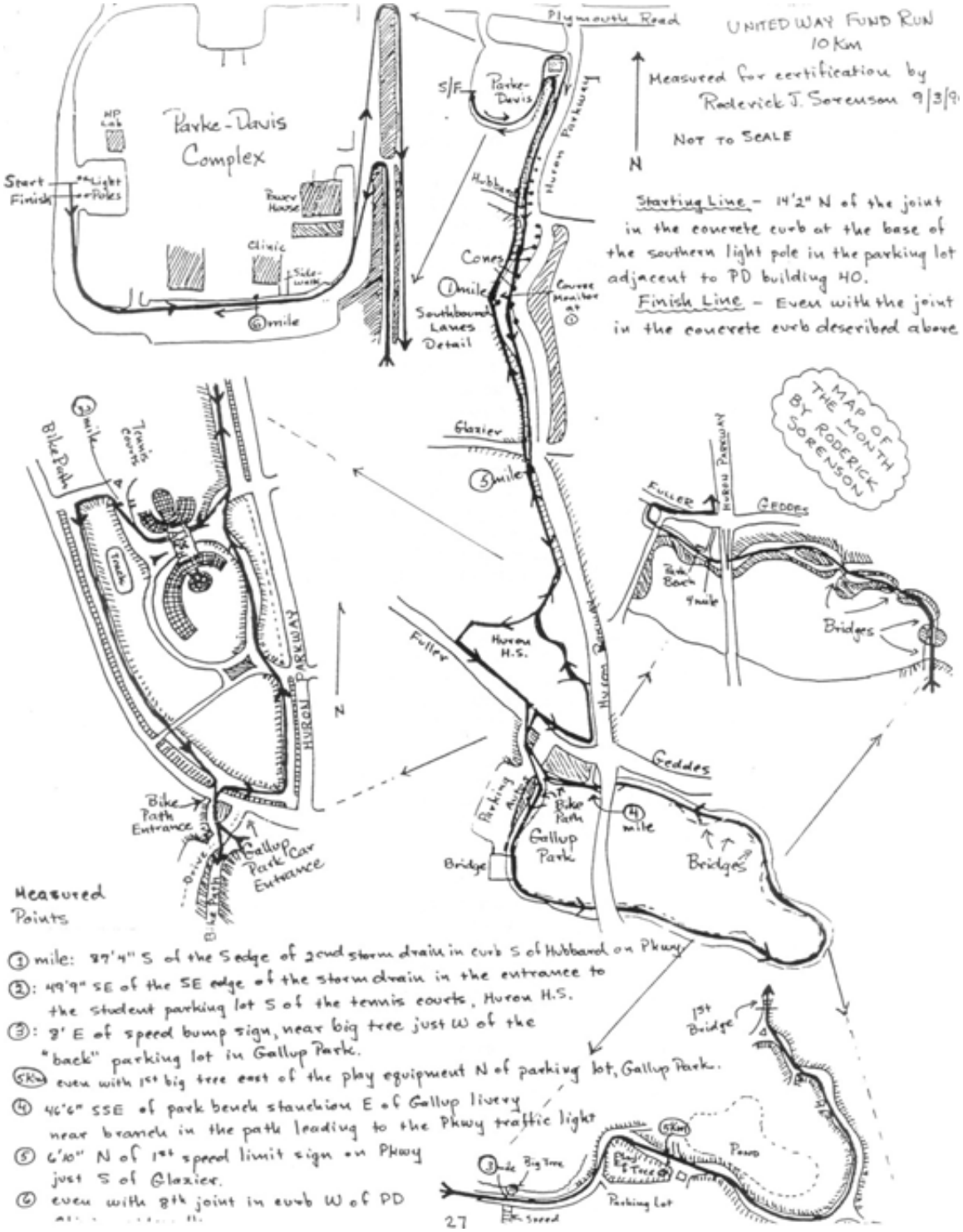
Although I think you're a great RRTC chairman, I object to you unilaterally declaring that maps are acceptable which make no attempt to illustrate where the shortest possible route is within the roadway. That's not what the book we assembled together says. I've been sending back maps that don't show the measured route within the roadway. Our program depends upon a large group of people abiding by the same standards.

David Reik, 930 W. Blvd., Hartford, CT 06105 (203) 236-9160 (8-9 P.M.)

David Reik

SEE MAP ON P.21.
I THINK IT'S PRETTY
GOOD. RACE DIRECTOR
& VALIDATOR SHOULD
HAVE NO TROUBLE. Pete 20


OKLAHOMA CITY JIM THORPE
HALF-MARATHON ROAD RUN
Oklahoma City, OK
This Half-Marathon course was measured by Jim Smith on September 22, 30, 1990 along the SPR over the whole roadway according to procedures of the Road Running Technical Committee, TAC/USA. The start, 5 km split, turn-point and finish are exact; other splits are approximate.
TURN POINT
43RD
3116
Half-Marathon turnpoint is parallel to a line one half meter west of the eastern edge of this structure.
N
A GOOD EXAMPLE OF A SINGLE-LINE MAP.
INDEPENDENCE
43rd
T.P.
10 km
DREXELL
39TH EXPRESS-WAY
DREXELL
10 km. SPLIT
39TH ST.
NW 5TH
2 km. SPLIT
SHARTEL
1 mi. SPLIT
FENCE AND GATE
SHARTEL
COUCH DRIVE
5 km. SPLIT
2.8mtrs.
512
PENNA.
19th
PENNSYLVANIA
5 km
4 km
LINWOOD
6th
2 km
SHARTEL
1 mi.
SHERIDAN
START FINISH
4 km SPLIT
VIRGINIA
11.09mtrs.
NW 7TH
This sign post is adjacent to the Santa Fe line.
RAIL ROAD CROSSING
TRACKS
Sign post is 3.5 meters East of the West end of the building.
BUILDING ...
SHERIDAN
WALNUT
START FINISH
The line diagram is approximately to scale.



Measured Points

(1) mile: 87'4" S of the S edge of 2nd storm drain in curb S of Hubbard on Pkwy

(2): 49'9" SE of the SE edge of the storm drain in the entrance to the student parking lot S of the tennis courts, Huron H.S.

(3): 8' E of speed bump sign, near big tree just W of the "back" parking lot in Gallup Park.

(5Km) even with 1st big tree east of the play equipment N of parking lot, Gallup Park.

(4) 46'6" SSE of park bench stanchion E of Gallup livery near branch in the path leading to the Pkwy traffic light

(5) 6'10" N of 1st speed limit sign on Pkwy just S of Glazier.

(6) even with 8th joint in curb W of PD

When *Validation* is also *Certification*

by Bob Baumel

During this past Summer's IAAF Seminar in Columbus, participants were told that their one measurement of the test course would have to serve as *both* a validation for a previous race *and* a layout ride to adjust the course for a future race. IAAF procedure in such a case is to adjust the course so its measured length matches the figure we normally aim for in *any* pre-race layout measurement, namely, the advertised race distance plus the standard 0.1% Short Course Prevention Factor.

I pointed out in my Seminar report (published in Sept 90 MN) that there are inherent difficulties when the same ride is to serve as both validation and layout. In part this is because some measurers will ride the course more tightly in a layout than a validation, and in part it's because our standard layout procedure includes extra safety factors (most notably the "larger constant") in addition to the 0.1% SCPF.

In spite of these difficulties, it often happens that a TAC validation results in a recommendation to adjust the course for future races. Typically, this arises when the course "passes" the validation, but by such a slim margin that the validator thinks extra distance should be added to provide greater assurance of surviving future validations. (And the situation has become worse since Pete Riegel's Nov 89 declaration of an assumed 0.05% band of uncertainty in validation measurements—which means that a course can "pass" validation even though it measures slightly *less* than the advertised distance.)

Unfortunately, RRTC policy for this situation is virtually non-existent. (Note that although my Seminar report criticized IAAF for failing to think out certain questions involving validation, IAAF has a better-formulated policy than TAC in this particular area of post-validation adjustment.) RRTC currently has no policy as to when or how these adjustments should be performed, or how big they should be.

Usually, the validator simply "recommends" that some distance be added to the course. Sometimes the race organizers follow this suggestion. More often, they don't. If they do adjust the course, then invariably, it's done without writing a new Certificate—which plays havoc with our whole system of course documentation, because the map we have on file with the course certification no longer matches the course actually on the ground.

There is also no standard on how big an adjustment to recommend. For example, one validation this year obtained a measured length of 4998.5 m for a "5 km" course. The course was considered to "pass" (i.e., the pending records were recommended for acceptance) due to the assumed 0.05% uncertainty. But the validator was uncomfortable with the course as measured, and recommended that it be lengthened. Nevertheless, the validator's suggested lengthening was only "two to five meters." Note that even if the race director applies the maximum suggested adjustment of 5 m, the measured length will still fall 1.5 m short of the standard 5005 m target that we aim for in normal layout measurements (which would also be obtained in the standard IAAF adjustment procedure).

How do we create order from this chaos? The first principle we need to enforce is that any adjustment to an already-certified course is a recertification. Therefore, it requires a new Certificate with a suitably modified Map.

A second principle is that when our standards indicate a need for lengthening the course, the adjustment should be ***required***; it shouldn't be a mere "recommendation." To enforce this, the previous certification should be considered to immediately expire. Then, if race organizers keep on using the old course, they will be using an uncertified course.

Of course, we don't really want to leave the race organizers high and dry without a certified course (especially if the course "passed" the validation!). But there's no need to leave them without a certified course, because the validator knows how big an adjustment is needed. Thus, the validator should find out where the race director wants the adjustment (Start, Finish, Turn, etc.), and should promptly prepare a new Certificate showing the appropriate changes on its Map.

(Note that normally we require two measurements for a certification...And, in this case, the validator has done only one measurement. It seems entirely reasonable to me, however, that if the validation shows a need to *lengthen* the course, the validator should have the authority to write a new certificate based on this one measurement, because it's clearly better than what we're doing now—which is nothing at all!)

To fully specify the policy, we must know when an adjustment is required, and how big it should be. For this purpose, I think we can find everything we need by combining Pete's concept of the 0.05% uncertainty band with existing TAC rules.

In recent years, we have made a great deal of TAC Rule 185.3, which states in part:

> (From 185.3): Performances made after January 1, 1985 will not be accepted if the remeasurement shows that the actual course distance was shorter than the stated distance.

However, we have paid much less attention to Rule 133.2, which states in part:

> (From 133.2): Courses meet certification standards if the measurements demonstrate that the course is at least the stated distance.

The difference here is that Rule 185 deals with *Validation*, which is the process of judging acceptability of marks achieved in a race that has already taken place. In this case, we don't reject the marks unless the remeasurement demonstrates shortness. Rule 133, on the other hand, deals with *Certification*, which is the process of setting up the course for future races. In this case, the emphasis is on making sure the course is *at least* the correct distance.

If measurements have an uncertainty of 0.05%, then a measurement doesn't demonstrate shortness unless it falls below the stated race distance by at least 0.05%. And similarly, it doesn't demonstrate that the course is *at least* the correct length unless it comes out at least 0.05% *above* the stated race distance.

This should provide our criterion for post-validation recertification. In particular, if the measurement fails to come out 0.05% or more above the stated race distance, we can say that the previous certification has expired because the course is now in violation of Rule 133.2; i.e., the measurements no longer demonstrate that the course is at least the stated distance.

(Note that with this interpretation courses falling within the band of uncertainty, where the measurement differs by less than 0.05% from the stated race distance, would pass the validation but would require recertification.)

How much should the course be lengthened in this situation? The answer is to follow IAAF procedure: Extend the course to the stated distance plus the full 0.1% SCPF. I think it would be crazy to use less than the full 0.1% considering the scary result of the IAAF Seminar, in which 14 measurements of a 5 km course spanned a range of 8 meters (which is 1.6 times as great as the SCPF). In figuring the appropriate adjustment, the validator may, at his discretion, choose to recompute his measurement by larger constant, even though the official validation result was computed by average constant.

It should be understood that in some situations, the validator may decide that he cannot, in good conscience, issue a recertification for the course he has validated. For example, the route used for the previous race—and checked by the validator—may have required elaborate coning which had not been adequately documented on the existing Map, and, in the judgment of the validator, cannot be reliably reproduced in future years. In such a case, even though the race has passed validation, the existing certification may be considered to expire, and it will be the the responsibility of the race organizers to obtain a new certified course for next year's race.

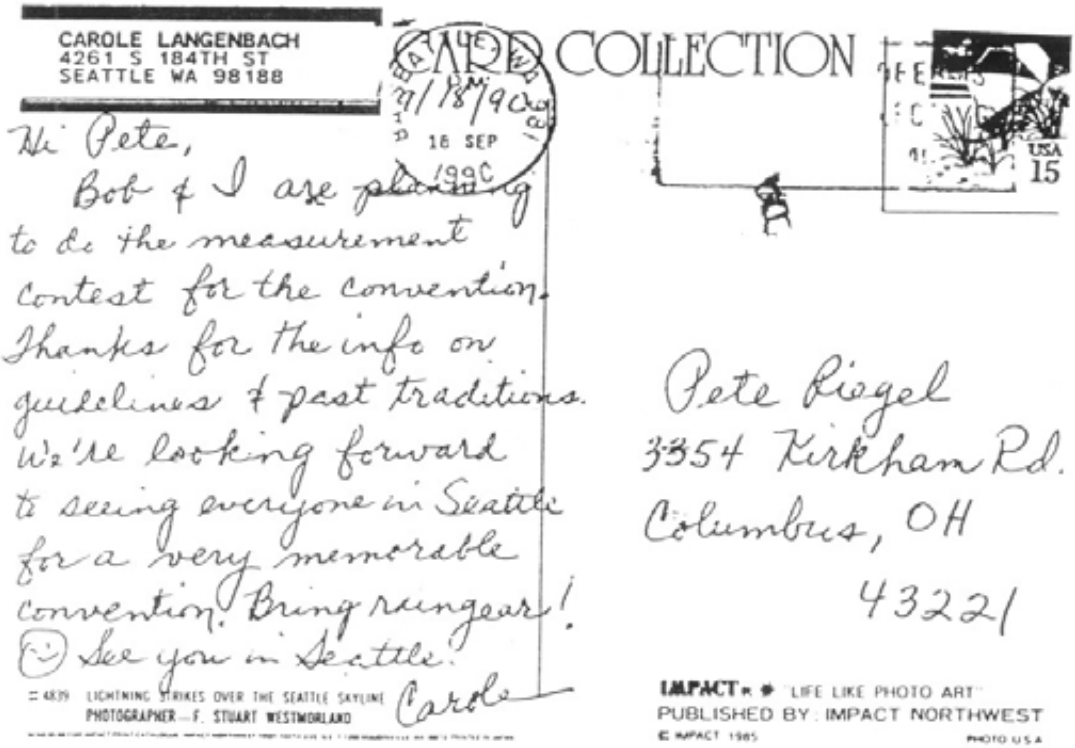
A final question to discuss is what to do when the validation says the course is *excessively long*. Note that this was actually the situation in this Summer's IAAF Seminar: The course measured about 5020 m, so each participant tried to determine how much it should be shortened to obtain the standard 5005 m.

Considering that the entire emphasis in modern course certification has been to make sure courses are at least the correct distance, we should never be casual about shortening an already-certified course. (Indeed, for this reason, the entire exercise in the IAAF Seminar made me somewhat uneasy.) Specifically, I think we can consider it acceptable to *lengthen* a course based on a single validation measurement. But I would never want to *shorten* the course on the basis of only one measurement.

If a race director wishes to shorten a course after it has been validated, it would have to be a standard recertification, which requires *two measurements*. The validation should certainly be considered one of these two measurements (to insure that the course doesn't get shortened any *more* than suggested by the validation result). Preferably, the validation result should be recomputed by larger constant for this purpose. The second measurement may be performed by the validator (but would not be considered part of the validation, and would therefore require separate arrangements between the race director and validator), or it can be done by some other measurer.

I will conclude by summarizing the proposal. For the sake of concreteness, consider a validation of a 10 km course.

- If the measurement comes out less than 9995 m, then the race fails validation (i.e., pending marks are rejected) and the previous course certification expires. This is unchanged from existing policy.
- If the measurement comes out between 9995 m and 10005 m, then the race *passes* validation (i.e., pending marks are accepted) but the previous course certification expires. For recertification, the course must be extended so its measured distance is 10010 m. If possible, the validator should implement this immediately by writing a new Certificate with corrected Map.
- If the measured distance is greater than 10005 m, then the race passes validation and the previous course certification remains in effect.
- If the measured length is so great that race organizers think the course should be shortened, this should only be done by a normal recertification—which requires at least one more measurement in addition to the validation.



August 20, 1990

Dear Jay:

I am taking your advice. I am laying out a calibration course at the race site. Here's how I'm doing it. Want to know if it meets with your approval.

I bought a reel of 3/32 dia. steel cable and put a small loop at one end. Then using a 100 ft. tape I laid out a 500 ft. distance on the street in front of my house. Drove a nail into the pavement at one end of the 500 ft. course. I hooked the loop end of the cable over the nail and stretched it out to the other mark 500 ft. away. Put a loop in that end of the cable so that now I have a 500 ft. cable with loops at each end.

To lay out a 1000 ft. calibration course at the race site I drive a nail into the pavement and stretch the cable out and put down a piece of duct tape at the end of the cable. then I stretch the cable out in the opposite direction and place another piece of duct tape. I now have a 1000 ft. calibration course. I put loops on both ends so I can easily stretch the cable out to its full length and so that I can rewind it from either end.

The 1st course I tried it out on is the River Forest Community Center Classic, 10K. Before I went to the course site I calibrated my bicycle on the 1/2 mile Chicago Lakeshore Drive course and got 14986 counts per mile. The on-site calibration using my cable method resulted in 14985 counts per mile, or a difference of 4.22 inches, which I think is pretty close.

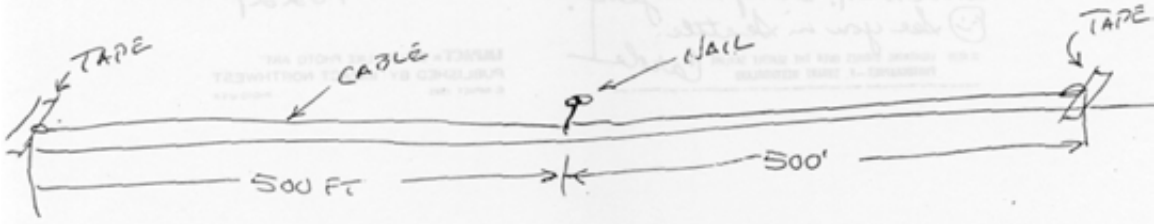
I'd like to know what you think of my cable method. I believe it is more accurate than trying to lay out ten 100 ft. segments. Also it is a way I can lay out the calibration course by myself.

Chuck

Chuck Hinde

P.S. Thanks for the certified course list, and thanks for sending me copies of the certificates for the courses I measure. I have a list of what I think are all the current certified courses. If you want a copy, let me know.

P.P.S - OVER



THE ATHLETICS CONGRESS
OF THE USA

3354 Kirkham Road
Columbus, OH 43221

Road Running Technical Committee
Peter S. Riegel, Chairman

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

October 18, 1990

Wayne Nicoll - Ragged Mountain Club - PO Box 62 - Potter Place, NH 03265
Jay Wight - 4419 Thornbark Court - Hoffman Estates, IL 60195

Dear Wayne and Jay,

I am looking at a copy of Chuck Hinde's letter of August 20 to Jay. My initial reaction was one of admiration for Hinde's inventiveness. It's a valuable thing to be able to lay an on-site cal course solo, and I can see why he is enthusiastic about it.

Before we shoot it down because it's a bit non-standard, let's look at the possible drawbacks:

1) Did Chuck do a full-dress temperature check of his original 500 footer, on which the steel wire length was based? If he made the wire at the same time as he laid the test course, temperature correction is unnecessary, since the tape and wire would be at the same temperature.

2) Are his loops fully secure? One can use either mechanically-compressed clamps or screw clamps on steel wire. Either will do the job, but the mechanically-compressed ones are neater. I'd assume the loops are secure.

3) Does he use the same tension each time? How sensitive to tension is the wire? 3/32 wire is pretty strong, and I'd bet it's quite insensitive to tension once the thing is pulled snug.

4) Does he use temperature correction? Is the thing more sensitive to temperature than a tape, possibly because of the twisted configuration? I'd guess the same temperature coefficient would apply.

5) Over time I would guess the thing will stretch a little bit. It certainly will not get shorter.

If Hinde uses a temperature correction on his winter layouts I would not worry about it. This technique could be valuable to others, and Hinde's resourcefulness should be encouraged. It's through people trying new things that we improve our methods.

I would be inclined to give Hinde a provisional go-ahead on this, but to ask him to lay out, using standard, careful taping technique, a 500 foot test course in front of his home. Then, every so often for the next few months, do some checks of his wire under various conditions, and report the results. I suspect they will show that the wire technique is valid. Although his comparative calibrations are nice and close, some direct measurements against a permanent 500 foot length are better. I look forward to further information.

Best regards,

Pete

xc: Baumel

Jean François Delasalle

B.P. 25
80800 CORBIE

FRANCE

Corbie, October 1990

Dear Peter,

I read with great interest the accounts of the Colombus seminar about the TAC/IAAF measurements and especially Mr Nicoll's letter from which we can draw many lessons.

Mr Nicoll is quite right when he says that in this kind of training session, the measurement judges are "imbued with the competitive notion that the best rider is the one with the shortest measurement". And it is indeed the feeling you get when you organize that kind of seminar. In fact, this is quite wrong and Mr Nicoll is probably an excellent measurer even if he found a slightly longer measure than the others for your 5 K course. The notion of competition should be banned in that kind of training session because it alters the facts of the problem: supposing a judge doesn't do a good calibration because of startup wobble on his 300 m calibration course (which would increase his working constant) and he takes extra care to ride the shortest line possible when measuring the course, then his result would be shorter than in normal conditions.

The opposite is also true: an "excellent" calibration with very little startup wobble along with a loose measuring of the course (without respecting trajectories or guessing what the shortest way possible for a runner is, would give too long a distance for the course (this is the most common mistake).

I think it is on the area of a real race event that a group of measurers can compare their results and not in a park on a "geometrical" course.

All the people taking part in the Colombus seminar were obviously excellent measurers (despite the little mistakes of calculation in placing intermediate Kms, for some of them).

The French Federation of Athletism (FFA) appointed me to the post of directorship of its committee for the technic of measuring in the national commission of road races (IAAF/FFA/CNCR/CTM). We gathered 20 trainees form 20 different leagues of France (one for each region) during the weekend of September 8/9th, in Montry near Paris.
We measured 2 calibration courses of 600 metres each, then we measured a 2 K course (2 measures for each) that I had marked out in a housing estate.

The course was very much complicated with many curbs, implying direct trajectories and also many pavements that were very low and where the runners were allowed to run - many judges did not use them when measuring!!

The course was measured with the use of a Jones Counter by myself 1978,3), Mr Peltier (1980,7) and Mr Caron (1981,5) who are both experienced measurers.

I had asked Mr Cadet, an experienced measurer, to do a double measurement trying to use the shortest trajectories possible, hedge-hopping as much as was possible the walls, curbs and parapets: he found 1973,4 metres!

I had also asked Mr Caron, an experienced judge, to do another measure, knowingly staying on the road, on a direct line, but not using any curbs or pavements - he found 2000,0 m for this different way of measuring (which proves how complicated my course was).

As for me, I amused myself at checking that a surveyor wheel didn't give any correct result since one lap of the same course with the same trajectories gave me 2013,3 metres! (direct reading) and corrected after calibration of the wheel: 1987,4 metres (i.e a mistake of 0,45 % compared to my own measurement with a calibrate bicycle (1978,3 metres) which confirms the differences usually noticed between the 2 methods (0,4 to 0,6 %)

Let's point out that the surface of the road was rather rough.

Each of the 20 trainee-judges did 2 measures of the course and their results were very much different for, unfortunately, some of them didn't take the most direct trajectories in spite of my instructions : the average result was 1992 m! with extremes of 1980,7 and 2004 metres.
The trainees also had 5 little theory problems to resolve in a 1 hour time and some of them had a hard work doing them!

At the end of the training session, I placed the 20 trainees in 3 groups according to a quotation list as follows:

1) Theory questions : marked on a total of 20 points.

2) Measure of course: marked on a total of 30 points:

- 10 points for the calibration and the calculation of the constant for the day.
- 5 points for the reliability coefficient of their 2 measures.
- 5 points for the calculation of the measure of the course.
- 5 points for the calculation of the distance of a race on the course including 4 rings, plus a part with rings.
- 5 points to find the departure line of a 10 K race on the course, knowing where the arrival line was.

3) And finally, autonomy mark or reliability of the judge (on 50 points) for his result compared to the one expected (between 1978 and 1980 m).

This allowed me to suggest 4 judges to the Federation to be in charge of a region in France (Mr Cadet-Caron-Peltier-Tranchont), the others being appointed as trainees for one year and having to train using this method and measuring on a real course.

All of them have been given the task, in their respective region, to explain and teach the method of measuring with a Jones Counter to other judges and my hope is that in one year from now there will be one person responsible in each French inter-region (there are 8) and one person responsible for 1 league (that is to say 24 in France), this same person, having to work with one person responsible for each "department" (that is to say 90 in France).

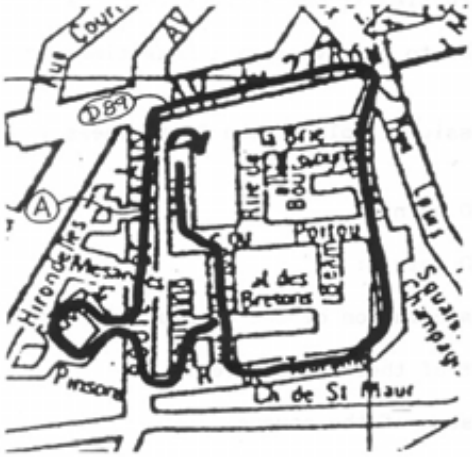
As you can see, I still have a huge work to do here, but things have moved since the seminar in London, after which I advised the method to our Federation who asked me to check from this year on (with the help of my team) all the road course championships (25 K, marathon and 100 K) as well as several main French races.

Since the beginning of the year, I have personnally measured the international marathons of PARIS, LILLE, the course for the marathon French Championship (NICE) and 100 K courses (Martigné-Ferchaud) as well as 30 official courses.

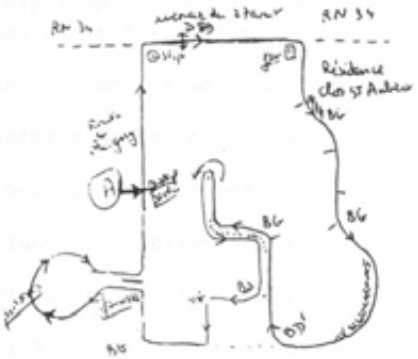
.../...

I was also asked to expertise a 25 K course on which the France record had been broken by 5 runners of the race = unfortunately, but we expected that issue, I found 24,498 K !! which shows that too often, some organizers do not do their work properly.

I hope you are well and wish you all the best.



Jean François Delasalle



RESULTATS DES RELEVES DES STAGIAIRES sur la boucle de MONTRY

	LOOP Une boucle complète (mesure difficile)	Distance A/D89 (mesure facile)
CADET	1973.3 *	137.82
DELASALLE	1978.3	137.81
PELTIER	1980.7	137.2
CARON	1981.5	137.89
TRANCHANT	1985.6	138.0
INGUENEAU	1987.1	non fait
SEGURA	1989.1	138.0
VOIRIOT	1989.4	138.1
MOURNETAS	1989.7	138.0
COLLANGE R.	1990.1	137.7
MAILLE	1991.0	non fait
LEBOULICAUT	1991.1	138.5
BOURREE	1992.5	138.0
VERNEREY	1995.2	138.3
VANNIER	1996.5	137.1
GOUSSET	1999.6 *	non fait
CALLAIS	2001.5	136.7
SERVAIS	2002.5	138.1
COLLANGE JP	2003.4	143.0 ?
MARLIER	2004.0	137.3
HAFFNER	------	115.0 ?

Wiborn Road
Shortsville, NY 14548
August 31, 1990

Dear Pete

I've been wanting to get a note off to you for weeks but since late June until this week almost of my spare time has been taken up by the press of arranging all of the details for my Phelps Sauerkraut 20K race which I singlehandedly take care of. 422 racers and 117 volunteers-a huge undertaking for me.

In what seemed like just a few days after my return from your superb seminar I received your Report of Proceedings. A major project as you were so thorough in documenting the findings as one studies pages 1 - 19. You are absolutely phenomenal. Your fine efforts overwhelm me. Many many thanks for all of your efforts.

ED. NOTE: GEORGE WAS DISCOVERED THE KEY TO GETTING MATERIAL PUBLISHED IN MN

I must comment on one aspect of your course layout as the timing was so apropos. About two months I agreed to measure the new Rochester-now Hilton-Marathon course for certification. In early July I drove over the new layout, almost all on country roads, to check out the length with my car's odometer and to lay out a 1000 foot calibration course near the start/finish (same area). Then a week ago Marsha and I drove around the course to check all of the turns, tangents, road surface conditions, etc. What a shock when we came upon a closed road adjacent to the school and starting/finish area. A walk to the closed section, a gaping "gash" across the road, 15 feet deep with vertical walls and as it turned out-85 feet wide. And full of water being a river. Some crude walkways and footbridges for the construction workers had been built around through some trees beyond along one side of the cut-but not really suitable for carrying ones bicycle around as the "ditch" lay between the start/finish and my calibration course. Also the race course passes along the route. Whew, a significant problem. A call to the race director and then a call last Wednesday from the town's highway supt. I was informed that the ditch will be closed within a two weeks after some large (9 feet high) sections of concrete culvert are installed. The town is really supporting the race and the supt asked me my problem. He said that he would improve conditions for us.

Two days ago two of arrived at the scene to measure the course. A coffer dam, about 10 high had been built to one side for us to carry our bicycles across, a very crude pathway with one foot large bolders, but passable. We measured across the gap and laid out a 100' span that would be used such as we did on your race course. So over the course of the day we carried our bikes around that gap a

number of times. Yesterday we were back out measuring and marking all of the mile points and constructions crews were present with two large cranes and a fleet of trucks, each truck carrying one section of the concrete duct. It's unbelievable what the supt did for us to assist us in getting our measuring done.

Enough of this. I can imagine the situations measurers encounter.

Best Regards

(GEORGE TILLSON)

GEORGE ALSO SENT THIS:

The Best of Times

Issue No 71

... news of, and from, running friends ...

Published by John Graham, 27 Edgemont Avenue, Nepean, Ontario, K2J 3S9, CANADA Free 7/27/90

YOU PROCEED EAST OR WEST

Remember the Sauerkraut 20-km to be held in August in Shortsville, NY. I asked in Issue No 66 : *"Where is Shortsville, NY?"* Well - George Tillson, the race director, has written to give us instructions.

"The race will be held in nearby Phelps, down the road apiece from Shortsville, which is located at 42°5' North latitude and 77°10' West longitude. Berlin is 52°15' North latitude and 13° 30' East longitude. Lake Wobegon is 46° 30' North latitude and 77°10' West longitude. Thus, the race is between these two major compass points. Assuming 45 miles per degree of longtitude we are 4,050 miles (we work in miles in our town) west of Berlin and 855 miles east of Lake Wobegon. (Whew! are you challenging me ... I've not made a correction for the differences in latitude.)"

And how do I get there? *"You proceed either east or west, depending on whether you are in Berlin or Lake Wobegon."*

George goes on ... *"I recently attended an IAAF seminar on Road Race measurement in Columbus, Ohio, as the guest of Pete Riegel and the TAC (I measure race courses for TAC certification) and we discussed miles and kilometers and how best to describe routes. Noting the above, I have just failed part 26 of the measure's test."*

Well ... thanks George.

The Rundown Jul 90
By Wayne B. Nicoll

Several incidents involving infractions of TAC/USA and IAAF rules have dominated the running press recently. In January at the East Valley Marathon in Phoenix the first three women went off course and finished, having run less than a full marathon. The fourth, fifth, and sixth women filed protests. In March an Estonian woman marathoner was disqualified for testing positive in both urine samples for a substance banned by the IAAF and the IOC. The violation cost Sirje Eichelmann her second place prize money in the City of Los Angeles Marathon and a two year suspension from the sport. In May a Soviet woman runner won the Cleveland Revco Marathon and was later disqualified when a TV news broadcast clearly showed her receiving sponges, splits, and an inhaler from a male teammate who had withdrawn from the race.

It is interesting to note the length of time it took to render decisions regarding the disposition of awards, prize money, and disqualifications. The East Valley incident, which occurred in January, was referred to The Athletics Congress national staff for resolution and was only recently settled. The Los Angeles incident involving unauthorized substance use, took from March 4 to May 15 to be settled (that may be a typical time lapse for drug use cases involving foreign athletes). The Cleveland Revco issue, which is strikingly similar to the Charlotte Marathon incident of several years ago, was settled <u>immediately</u>. Do you recall the months of waiting for a decision from Alvin Chriss regarding the protest filed at the Charlotte Marathon?

Cleveland Revco had some savvy people on their race staff who obviously were prepared to handle an incident that might involve a protest. A jury was composed of Jack Staph, Revco Chief Counsel; Chris Tatreau, a highly experienced mega race director; and Jos Hermens, a world record holder and a skilled international race manager. The trio reviewed the videotape and soon issued a verdict that the actions by the Soviet woman marathoner, although possibly unintentional, clearly constituted a violation of TAC/USA and IAAF rules regarding assistance one may receive in a running event. The speed and competence with which the matter was settled negated the need for the second place woman to file a protest.

As many of you know, I have long been a solitary voice calling for trained and accredited officials to interpret and enforce the rules of road racing. Most of the problems described above would have been less likely to happen, and if they did, would have been resolved more quickly and competently, if there were trained and accredited officials present. Directors of races with significant amounts of prize money, berths on international teams, prestigious national titles, and the high probability of national records and world best marks being set, cannot afford to ignore the international rules of the sport. They

must have trained competent people available to handle protests and to insure that the technical tasks of road racing are accomplished properly. I am surprised that no elite athlete has yet filed a protest or initiated a lawsuit against a race for failure to prepare for a national or world best performance that went unrecognized.

I have come up with a list of suggested TAC/USA road official positions. The philosophy in the employment of road officials could be similar to that of track and field - to train as many people within one's own race staff, or within the region, to be qualified to carry the title and perform the required official's duties. Here is the minimum number and types of officials I would like to see created by The Athletics Congress:

Road Referee - interpret and enforce the rules and decide all questions relating to conduct of the race.
Road Jury Of Appeal - Three persons, preferably accredited officials in some aspect of road racing, who consider appeals of decisions made by the Referee. The decision of the Jury is final.
Road Finish Line Judge(s) - In the event of a close finish, determines the place of the competitors in question.
Road Course Inspector - Inspects the race day set up of the course to see that it meets the requirements on the TAC/USA certificate of accurate measurement. Insures that videotapes or still photos of start, finish, turnarounds, and restricted paths are taken when course is set up. Observes the race in progress to insure the correct measured path is followed.
Road Timing Inspector - Insures that all road record timing requirements are met - three stopped times on the first male and first female competitor, watches started at start line, select time teams briefed and have performed properly, stopped times are recorded on the TACSTATS records application form.
Road Scoring Inspector - Checks scoring operation to see that finish data, including select times, is utilized in the reconciliation to insure correct matching of time to finisher. Requires thorough understanding of multiple chute systems and computer based scoring systems.
Road Records Clerk - Responsible for providing the TACSTATS Records Application Form at race and insures all necessary times and signatures are entered on form. Gathers other documentation that accompanies form and submits to TACSTATS.

The above officials are, in my opinion, absolutely necessary in big time road racing. There should rarely be a need to refer protests to the TAC/USA national staff. The technical titles and tasks are based upon experience both Sally Nicoll and I have gathered while performing the above duties in pursuit of national records at several major road race championships. We have been singularly successful at capturing state, national and "world best" records. We would like to pass on our expertise with the formalization of the positions noted above. Hopefully, the road running leadership in TAC/USA can be convinced the time has come for the accreditation of road race officials.

MULTIPLE LOOP EXAMPLES

01M	MD 87001 RT	Kensington	Beach Dr Bike Path,Mile 1	-4	52	J Sissala
01M	MD 87002 RT	Kensington	Beach Dr Bike Path,Mile 2	-2	96	J Sissala
01M	MD 87003 RT	Kensington	Beach Dr Bike Path,Mile 3	-3	52	J Sissala
01M	MD 87004 RT	Kensington	Beach Dr Bike Path,Mile 4	1	76	J Sissala
01M	MD 87005 RT	Kensington	Beach Dr Bike Path,Mile 5	-2	95	J Sissala
01M	MD 87006 RT	Kensington	Beach Dr Bike Path,Mile 6	0	68	J Sissala
01M	MD 87007 RT	Kensington	Beach Dr Bike Path,Mile 7	-2	96	J Sissala
01M	MD 87008 RT	Kensington	Beach Dr Bike Path,Mile 8	-6	75	J Sissala
01M	MD 87009 RT	Kensington	Beach Dr Bike Path,Mile 9	0	95	J Sissala
01M	MD 87010 RT	Kensington	Beach Dr Bike Path,Mile10	1	97	J Sissala
01M	MD 87011 RT	Kensington	Beach Dr Bike Path,Mile11	-4	98	J Sissala
01M	MD 87012 RT	Kensington	Beach Dr Bike Path,Mile12	-1	99	J Sissala

01M	OH 83038 PR	Columbus	Wolfpack Bikepath		out/bk	P Riegel
02M	OH 83038 PR	Columbus	Wolfpack Bikepath		out/bk	P Riegel
03M	OH 83038 PR	Columbus	Wolfpack Bikepath		out/bk	P Riegel
04M	OH 83038 PR	Columbus	Wolfpack Bikepath		out/bk	P Riegel
05k	OH 83038 PR	Columbus	Wolfpack Bikepath		out/bk	P Riegel
05M	OH 83038 PR	Columbus	Wolfpack Bikepath		out/bk	P Riegel
100k	OH 83038 PR	Columbus	Wolfpack Bikepath		loopX14	P Riegel
20k	OH 83038 PR	Columbus	Wolfpack Bikepath		loopX3	P Riegel
25k	OH 83038 PR	Columbus	Wolfpack Bikepath		loopX3	P Riegel
50k	OH 83038 PR	Columbus	Wolfpack Bikepath		loopX7	P Riegel

02k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		cl loop	N Dudziak
05k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX2+	N Dudziak
08k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX4	N Dudziak
100k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX50	N Dudziak
10k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX5	N Dudziak
12k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX6	N Dudziak
15k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX7+	N Dudziak
20k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX10	N Dudziak
25k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX12	N Dudziak
30k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX15	N Dudziak
40k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX20	N Dudziak
50k	NY 86072 PR	Niagara Falls	Robert Moses State Parkway		loopX25	N Dudziak

Amy Morss called with a problem. She noticed a course that was advertised as certified, but it was not on the list. She made further inquiries, and found that the course was indeed certified, but it was one of the multiple-distance types you see above. It had inadvertently been added to the list under its principal distance only. This has since been fixed.

Multiple listings eat space in the course lists. Is there a reason why every single distance need be put in the list as a separate course? It's good for our egos, since it raises the measurer's body count, but it may lead to undue bulkiness in an already fat list.

Opinions as to what, if anything, might be done are solicited.

One solution might be to create a new distance, called "Mult", which would cover multipurpose courses with numerous splits. What do you think of this? Please let us know.

The Athletics Congress of the USA
Minnesota Association

August 30, 1990

Pete,

Thanks for thinking of me when the project in Mexico City came up. The short notice they were giving us was no problem for me. I had one small timing job on Sunday, the 26th, but I found a replacement quickly and was ready to go.

As you directed, I contacted Leonardo Fonseca (a vice-president of the marathon) to make arrangements for the travel. With other demands for his time and some missed telephone calls, reservations weren't confirmed until 4:30 AM Saturday. By 7:30 AM Saturday I had my Jones counter and steel tape and was headed for Dallas. Made the plane connection in Dallas at 11:15 AM and cleared customs in Mexico City at 1:00 PM.

Rodolfo Figueroa met me at the airport. He identified himself as the course director. How he picked me out of the crowd I don't know. It turned out that the only person I spoke with over the weekend that was fluent in English was Leonardo Fonseca.

As we made our way from the airport to race headquarters, Rodolfo related to me that he had been to Japan and London to observe marathons. He had a Jones counter and a copy of Course Measurement Procedures English version. I began to wonder why they needed me to measure or validate this course.

When we arrived at race headquarters, I met Leonardo Fonseca and Tadeusz Kepka (the national coach) and a number of other marathon dignitaries. When I mentioned how I wanted to proceed with the measurement, Fonseca responded that a measurement wasn't necessary. They produced a copy of the "AIMS Road Race Certification Document" that Doug Loeffler had issued the previous year. I asked them for a map of the course and they produced one. They assured me that the course hadn't changed since the previous year's competition. There must have been some mis-communication between race officials in Mexico City and Ted Paulin in Melbourne. They wanted an "AIMS Approved Observer." I will need copies of the documents to issue an "AIMS Race Observation Certificate!"

After the meeting, Rodolfo Figueroa and I toured the course as best we could. Some sections were closed to vehicular traffic, and other sections were viewed opposite the way competition would go the next day, because of one-way traffic restrictions. I agree that there is no way to measure the course without traffic control, and to document it without the help of the organizers would be very difficult.

The accommodations provided were first-rate (meals and hotel). At 5:00 AM Sunday I had breakfast with the elite USA participants and took the bus to the starting area at 6:00 AM. The women's start would be at 8:00 AM and the men's at 8:30 AM. There were 17500 participants in the event, of which 1000 were women.

The crowd control was very well done, and the participants seemed to get to the starting line without any problems. Both the men's and women's start were conducted to the standard of our rules. They were both off on time.

I observed the race from a vehicle assigned to cover the elite men's competition. It was a fantastic race with many lead changes. The course followed mostly tree lined boulevards and took in some beautiful sights of the city. The participants were able to follow the shortest possible route which was marked by a painted blue line. There were no problems with auto traffic or bicycles or spectators. The start and finish occur in an auto racing stadium and the first and last three kilometers of the race take place on race track roads. The water stops were frequent enough and the split marks seemed accurate (every kilometer was marked). There were no severe hills and just two sharp turns. It was interesting to see that the water was dispensed in plastic bags that were easy to grab, and had a plug in one corner that they pulled out with their teeth, then drank from or splashed on themselves.

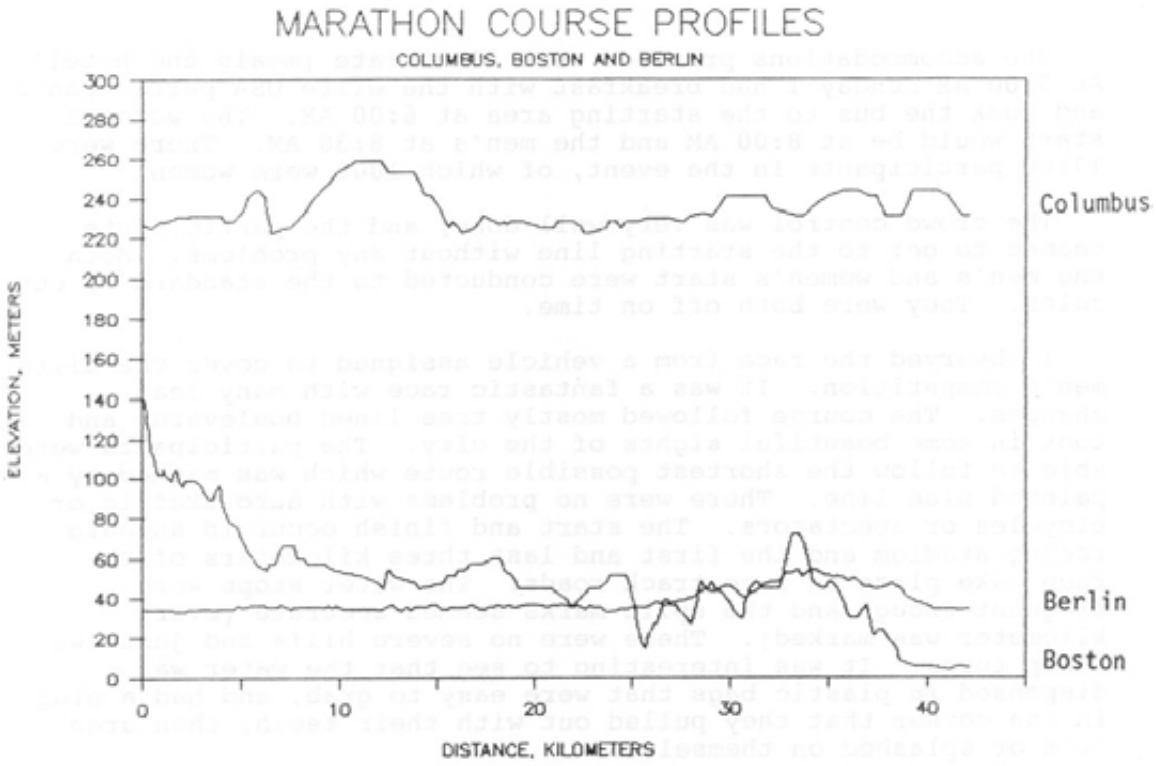
Back at the stadium the finish line operated smoothly for a race this size. The competitors got their goody bag and exited the stadium without any crowding. There were no lines forming before the finish line. The primary timing system was accurate through the elite finishers, and the first release of times and places - for both men and women - corresponded with the times I recorded with my watch. I noticed that the times assigned to the participants arriving at the finish line an hour later were off by about two minutes. This was prior to the massaging of the results with select times. There were two backup timing systems in place.

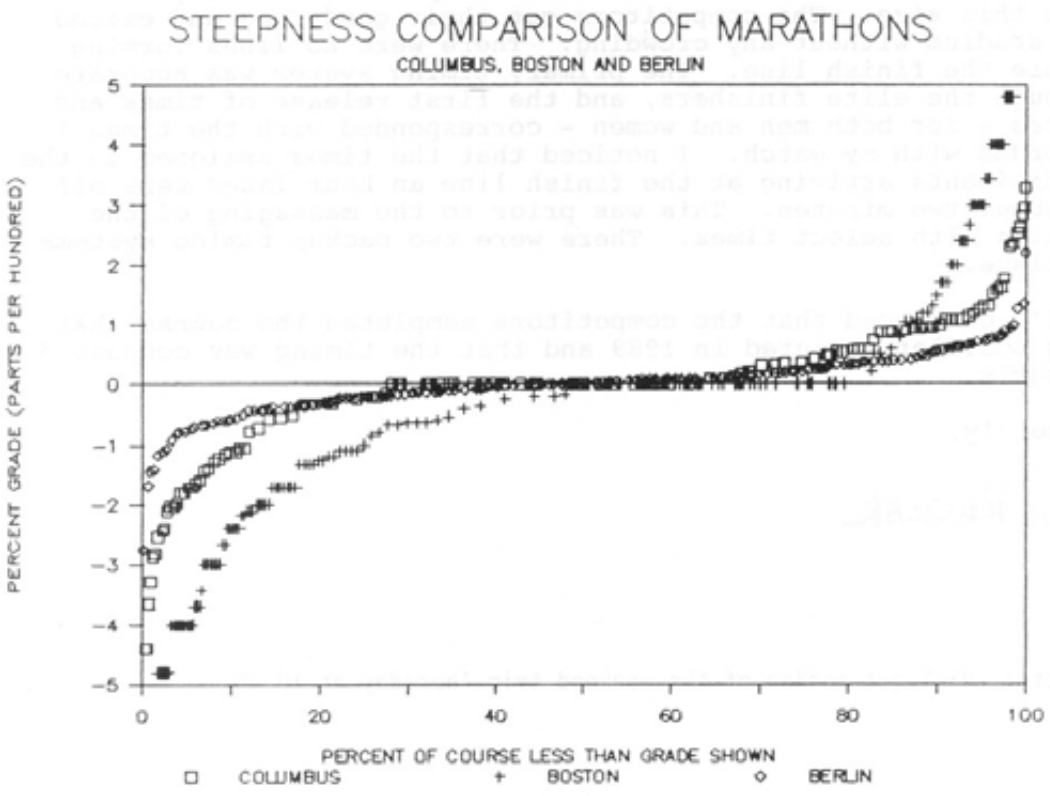
I'm convinced that the competitors completed the course that Doug Loeffler measured in 1989 and that the timing was conducted properly.

Sincerely,

Rick Recker

Ed note: Rick got notice of the weekend trip Thursday at 10 PM.


MARATHON COURSE PROFILES
COLUMBUS, BOSTON AND BERLIN
ELEVATION, METERS
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
0
10
20
30
40
DISTANCE, KILOMETERS
Columbus
Berlin
Boston


STEEPNESS COMPARISON OF MARATHONS
COLUMBUS, BOSTON AND BERLIN
PERCENT GRADE (PARTS PER HUNDRED)
5
4
3
2
1
0
-1
-2
-3
-4
-5
0
20
40
60
80
100
PERCENT OF COURSE LESS THAN GRADE SHOWN
□ COLUMBUS
+ BOSTON
◇ BERLIN

THE SEARCH FOR THE MAGIC NUMBER

Recent investigations of drop and separation, and the heated debates arising therefrom, have led to some in-depth looks at certain courses. Boston received the first close look. Alan Jones obtained topographic maps of the course, and took the time to record every single contour line that crossed the course, and the distances between them. This exercise took hours of painstaking map measurement. Bob Baumel processed and smoothed Alan's data, giving a course profile that is probably the most accurate ever produced for a road course.

Alan and Bob then proceeded to use the profile for analysis which you have seen in past issues of MN.

I recently repeated this exercise for the course of the Columbus Marathon. I made some mistakes, which Bob kindly corrected. Also, I recently obtained data from Helge Ibert for Berlin Marathon.

The data has been computer-processed to produce two kinds of curve for each course. The first is the familiar course profile, which shows elevation vs distance from the start. It's probably the most helpful single graph that can be produced for a road course.

The second curve shows cumulative slope distribution. This is obtained by calculating every slope between elevation changes, and then arranging them in order and graphing them. In this way the cumulative slope distribution of the course may be shown.

As a result of the painstaking mapwork, some numbers of interest have arisen, and they are shown below, along with my estimate of the data for Rotterdam, site of the present men's marathon best:

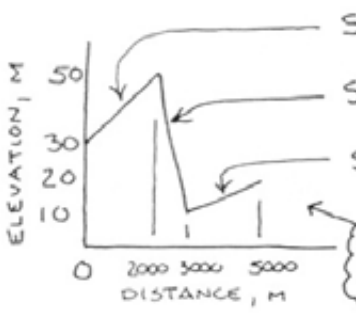
		Columbus	Boston	Berlin	Estimated Rotterdam
1	Start elevation, meters	227.1	141	35.0	2
2	Finish elevation, meters	231.6	5	34.5	2
3	Net drop, meters	-4.5	136.0	0.5	0
4	Drop, m/km	-0.1	3.2	0.01	0
5	Separation, percent	1	91	3	1
6	Total climb, meters	124.7	176.0	68.1	20
7	Total descent, meters	120.1	312.0	68.6	20
8	Steepness integral, meters	4.51	15.45	0.91	0.2
9	RMS slope, percent grade	1.03	1.91	0.46	0.3
10	Number of data points	127	208	164	n/a

The first seven course characteristics are familiar to all of us.

Steepness integral is a measure of the hilliness of a course, was originated by Baumel, and was discussed in several past MN's.

Root-mean-square (RMS) slope is an indication of the average slope of the roads on which the runner will run. Bob pointed out that it's also the square root of (steepness integral ÷ course length). Here's how it's calculated:

SAMPLE CALCULATION OF RMS SLOPE



$$S_{0-2} = \frac{30-50}{2000} \times 100 = -1.0\% \text{ FOR } 2000\,m$$

$$S_{2-3} = \frac{50-10}{1000} \times 100 = +4.0\% \text{ FOR } 1000\,m$$

$$S_{3-5} = \frac{10-20}{2000} \times 100 = -0.5\% \text{ FOR } 2000\,m$$

$$RMS = \sqrt{\frac{(-1.0)^2 \times 2000 + (+4.0)^2 \times 1000 + (-0.5)^2 \times 2000}{(2000 + 1000 + 2000)}}$$

$$= 1.92\ \%\ \text{SLOPE}$$

Number of data points is the number of elevations used in preparing the profile and cumulative slope distribution.

What do the graphs tell us?

1) Columbus has one significant hill, higher than any single hill at Boston, yet runners think of the course as "flat and fast." This may be because the hill at Columbus is a gentle one, with no steep slopes, occurring early in the race. Boston's hills, on the other hand, are generally steeper and occur late in the race. Berlin has only one hill, but it is so gradual as to be almost imperceptible. Rotterdam (not shown in graphs) is virtually flat, except for several bridges, none of which has a steep slope or great rise.

2) Almost 50 percent of the Boston course is downhill, 30 percent is flat, and 20 percent is uphill. At Columbus and Berlin the downhills and uphills are evenly divided at about 30 percent each, while 40 percent of both courses is flat. Rotterdam is about 95 percent flat except for the bridges. It may have a few undulations, but it's doubtful these would be detectable on a map with 3 meter contours.

What's the use of all this? Well, it allows a highly individualized object - a race course - to be measured by various criteria. What is to be done with these observations is unclear. To date, the criteria we officially use to define race courses are drop and separation. These are easy to calculate, and not too puzzling. The more complicated criteria probably also have some usefulness, but the limiting factor is data. In order to calculate anything accurately beyond drop and separation we need to have all the data for a highly detailed course profile. Since this is awfully labor-intensive, we will probably never obtain very many of them, except when curious people produce them for some reason.

Commentary is invited.

THE ATHLETICS CONGRESS
OF THE USA

Road Running Technical Committee
Peter S. Riegel, Chairman

3354 Kirkham Road
Columbus, OH 43221
614-451-5617 (home)
614-424-4009 (office)
telex 245454 Battelle

March 16, 1990

To: Bob Baumel, Dan Brannen, Basil Honikman, Alan Jones, Wayne/Sally Nicoll

Subject: Experiments with hanging ribbons in the wind

Yesterday I took the digital anemometer, along with a recently-calibrated hot-wire anemometer, to Battelle's warehouse. I set up a large floor fan to provide the breeze. Needing something to support the ribbon, I stacked a wastebasket atop a chair, and stuck a flourescent bulb in the basket. The top end of the bulb was about 6 feet off the floor. I taped a piece of plastic construction-barrier tape (2.87 inches wide, .004 inches thick) to the top end of the bulb. Ribbon sample enclosed.

With the rig in the airstream, I took a reading with the hot-wire, then a reading with the digital on the FPM scale (since that was the same scale as the hot wire), then a digital reading on the m/s scale. Since the readings were not obtained simultaneously, there was some variability, especially in run #3 (I believe the hot-wire reading on that one). After I'd done readings at each setup, I took a picture of the blowing ribbon.

Center of the fan was about 6 inches below the top of the bulb, and that is where I took the readings.

The photo lab did not print the negative for run #4, but I elected not to have them do it over, since it looked in line with the rest, and the variability is considerable in any case.

For this particular type of ribbon, which I believe is fairly common and available, a 1 m/s breeze will produce a 45 degree angle. A 2 m/s breeze will put the ribbon at about 60 degrees from the vertical.

The ribbon is obviously very sensitive to the wind, and we should have no difficulty in deciding which way it's blowing. I think it may be difficult to use hanging ribbons to accurately quantify the wind, but some judgment will be possible.

After once again seeing how uneven a fan-induced breeze can be, I think the hanging ribbons remain our best way to estimate the presence/absence of a wind.

Attached are copies of the photos I took and the data I got. Draw your own lines and make your own conclusions.

Best regards,

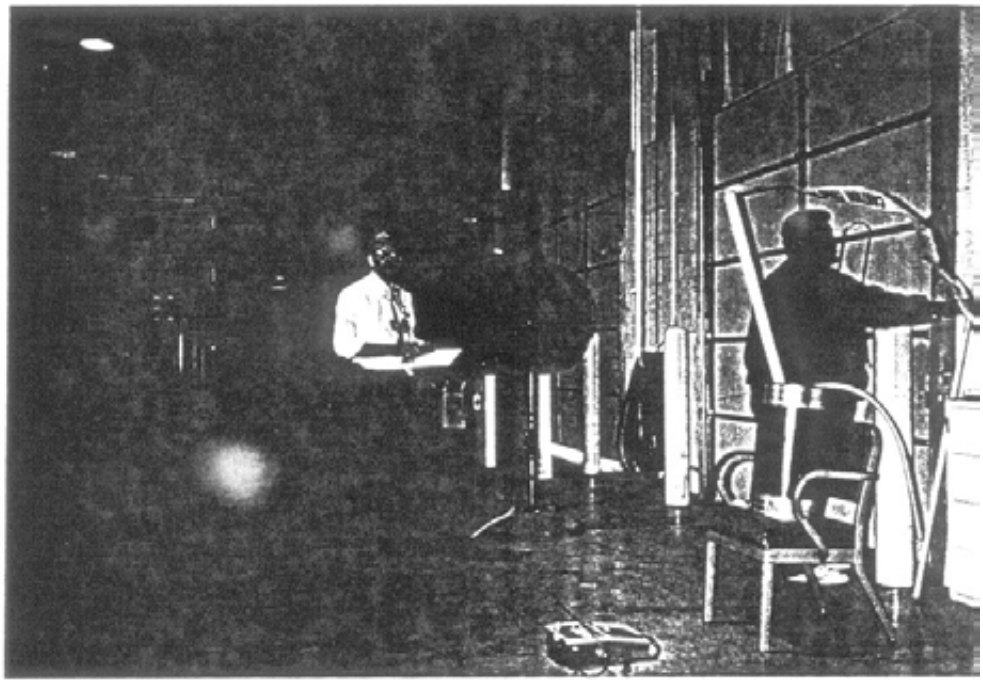
Pete

ANEMOMETER, WIND GAGE AND HANGING RIBBON EXPERIMENT

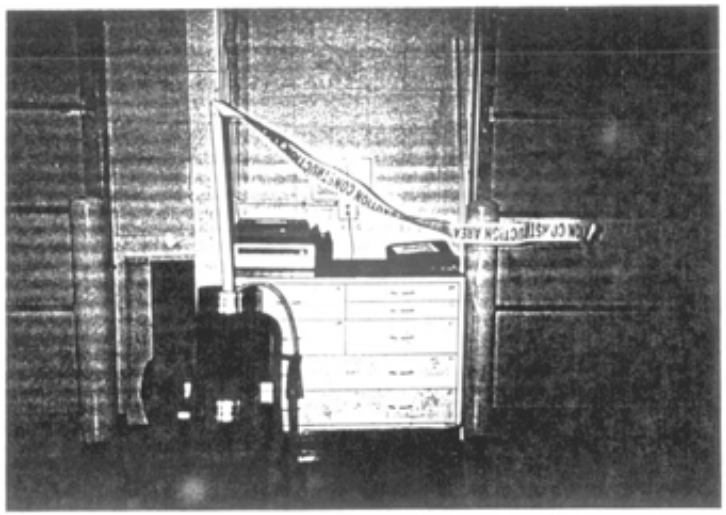
DONE BY PETE RIEGEL - 3-15-90 IN BATTELLE WAREHOUSE, BUILDING 19
USING A LARGE FLOOR FAN AS WIND SOURCE - TEMPERATURE 70 F.

A HOT-WIRE ANEMOMETER WAS OBTAINED FROM THE INSTRUMENT LAB AND
USED TO CHECK OUT THE DIGITAL ANEMOMETER

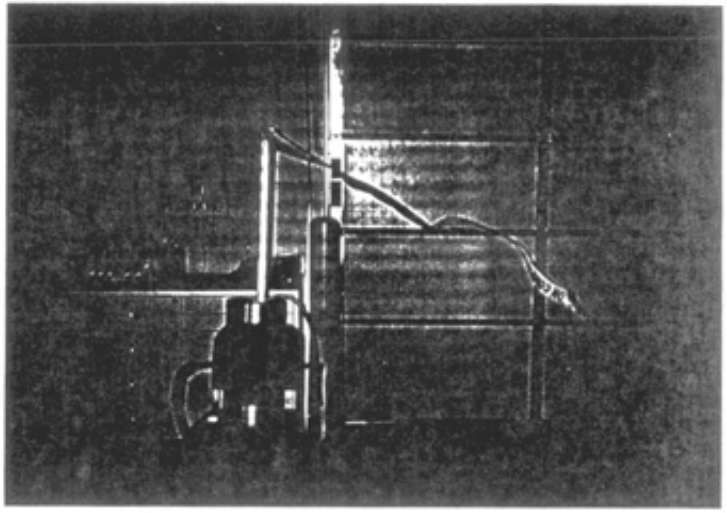
SEQ NO	HOT WIRE FPM	DIG FPM	DIG M/S	HOT WIRE M/S	HORIZ SLOPE	VERT SLOPE
1	570	500	2.5	2.90	0.39	2.53
2	360	350	1.7	1.83	0.52	1.94
3	280	350	1.4	1.42	0.57	1.76
4	250	220	1.2	1.27		
5	220	170	0.6	1.12	0.91	1.10
	Raw Data			Calculated values		



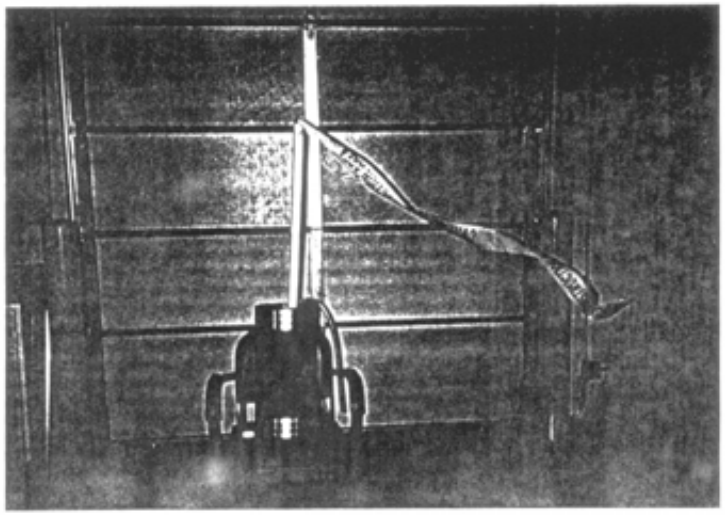
The Setup



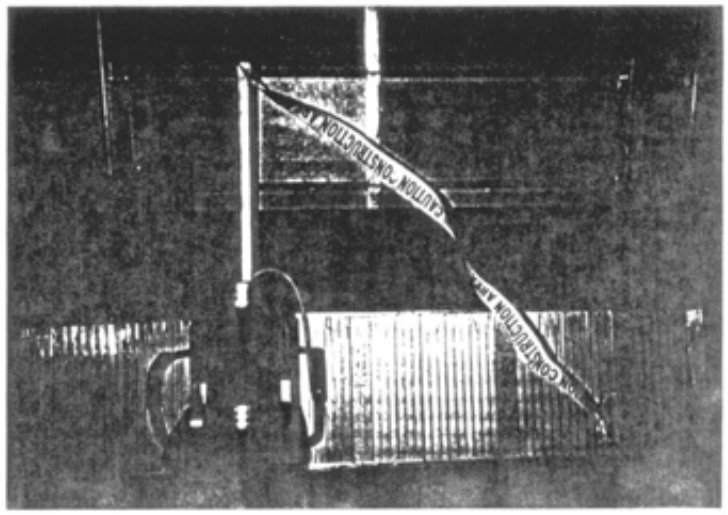
#1 2.9 m/s



#2 1.8 m/s



#3 1.4 m/s



#5 1.1 m/s

Handy Handheld Anemometers

Our test reveals a few gems and a few blowhards

By Dale Nouse

With so many boats equipped with a variety of headsails and so many sailors using polar diagrams to get the most out of their craft, a good accurate anemometer has become important to performance-oriented sailing.

A full-bore array of masthead-mounted instruments with elaborate cockpit readouts and even repeaters is very nice, indeed. However, not everyone can afford to buy and maintain such very expensive equipment.

The alternative is a handheld anemometer.

Because they're not exposed to the weather, trees, low bridges, birds and all the other threats to the masthead, small, inexpensive, stowable anemometers are a fine alternative.

In this update of our first look at anemometers (November 1, 1986), we have dropped several of the models originally examined. They were deemed not worthy of commendation. To the list, we've added four instruments that are new on the market.

The new ones are the small, inexpensive German-made Holland W-10, the electronic French-made Plastimo Wind Gauge, the innovative U.S.-made Kilo Marine Seewind that uses interesting technology, and the superlative Sims Model BTC, also made in the U.S. We've added them to three old reliables: the Dwyer Wind Meter, Davis Wind Wizard and Davis Turbo Meter.

Checking the accuracy of the seven instruments was difficult and time-consuming. Here's how it was done:

We mounted the seven anemometers on a thin board to offer the least turbulence and attached the board to a 6' pole fitted with a swivel. We used no metal fasteners. The swivel was necessary because four of the seven anemometers must be oriented carefully to the constantly changing wind direction. (A distinct advantage of the rotor-type anemometers is that the precise wind direction is not really an issue.)

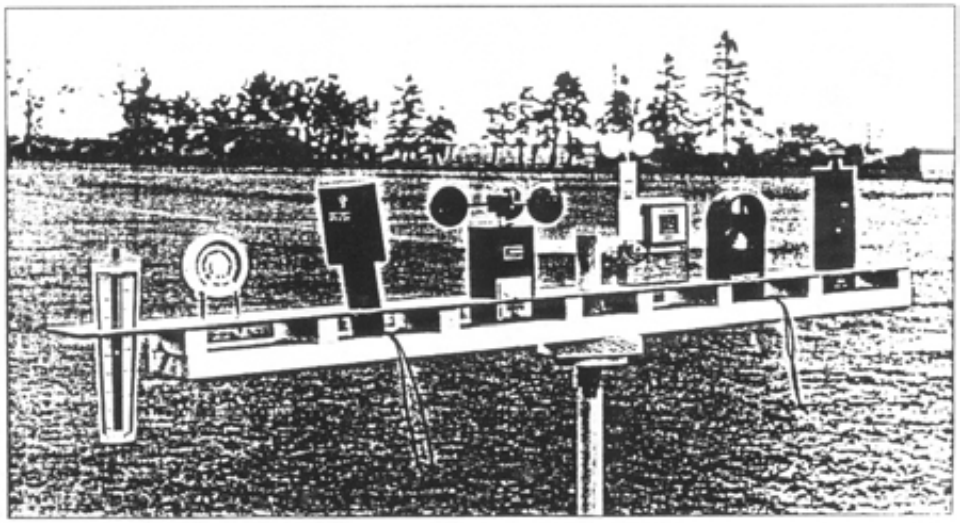
It took four trips to the middle of an enormous tract of high, flat land about the size of four football fields to get a variety of wind velocities.

Using a very expensive anemometer tested in a special wind tunnel for all wind ranges, we took multiple readings with each of the seven anemometers with instantaneous readings on the expensive instrument, which was held close to the anemometer being checked.

By simple arithmetic means, we averaged the deviations, which are shown as decimal figures on the adjoining chart. Because we got readings only in the low to middle 20s on the windiest day of our test, we were unable to determine the accuracy of these instruments in the upper ranges of wind speed.

Inadvertently, the wind speeds to which these instruments were subjected may constitute a fairly practical test. It might be nice to know at the dock or while at anchor just how much of a gale is a'blowing. However, if under way, it seems likely that if the wind is getting up to 30 mph or more, a sailor would be too busy to brace himself in the cockpit taking wind readings. In any case, the instruments all read up into the "bare pole" ranges.

Perhaps it's unnecessary, but we note further that because of the range in price of these anemometers, especially the sharp delineation between the mechanical and the electronic models, this is something of an "apples and oranges" evaluation.



Shown mounted on our swiveling 'test bed' are, left to right, the Dwyer Wind Meter, the Holland W-10, the Davis Wind Wizard, the Kilo Marine Seewind, the Sims Model BTC, the Davis Turbo Meter and the Plastimo Wind Gauge.

	Price	Range	Type	Accuracy 5	Accuracy 10	Accuracy 20	Comments	Maker
Dwyer Wind Meter	$13.90	2-62 mph	Mechanical, floating ball	5.5	7.7	19.7	This dancing ball in a tapered tube is inaccurate in medium winds. It tends to pick up mildew and dirt, but for the money it's still the best and least expensive of all. It's very easy to read. Reads only in mph.	Dwyer Instruments Box 373 Michigan City, IN 46360 (219) 872-9141
Holland W-10	$22.50	5-55 mph	Mechanical, air pressure	6.0	8.0	17.3	This circular gauge made in Germany reads simultaneously in mph, kts, m/s and Beaufort. It's ineffective below 10 mph and not very accurate. Its size makes it handy but the scale is not easy to read.	Holland Yacht Equipment Box 4048 Foster City, CA 94404 (415) 595-2009
Davis Wind Wizard	$35.95	0-60 mph	Mechanical, damped air pressure	5.6	9.2	18.4	This is another straight wind pressure gauge working in a circular mode. The scale, in mph, m/s and Beaufort, is easy to read. It is held sideways to the wind and read from 90 degrees. It's fairly accurate.	Davis Instruments 3465 Diablo Avenue Hayward, CA 94545 (415) 732-9229
Kilo Marine Seewind	$89.95	0-99 knots	Light pulser, battery-powered dial	4.7	8.3	20.2	The 3-bowl rotor (waterproof; can be mast-mounted) pulses light, daylight or artificial, through a fiber optic cable to a lithium powered digital gauge. Easy to read (kts only). A clever new design.	Kilo Marine Box 520 El Toro, CA 92630 (714) 837-1149
Sims Model BTC	$129	5-70 mph	Electronic, self-powered	5.0	9.9	19.8	Most accurate of all, this gauge (mph and kts) from a long-established firm is magnificently made, with fine bearings, a fold-up rotor and a leather case. By far, the best electronic instrument.	Simerl Instruments 238 West Street Annapolis, MD 21401 (301) 849-8667
Davis Turbo Meter	$135	0-87.9 knots	Electronic, battery-powered	4.8	10.2	19.5	Second best electronic gauge, this popular fan is compact, well designed and quite accurate. Its liability: tiny figures on the readout. Reads in tenths (mph, kts and m/s). Must be switched on and off.	Davis Instruments (see above)
Plastimo Wind Gauge	$140	0-99 knots	Electronic, battery-powered	5.9	11.6	17.0	A slick design but not as accurate as others, this gauge is very nice to handle and has a big, bright readout. The case has a flange to protect the rotor when it is stowed on its back. It reads only in kts.	Plastimo USA 6605 Selnick Drive Baltimoire, MD 21227 (301) 796-0002

mph-miles per hour kts-knots m/s-miles per second

A NEW MEASUREMENT TECHNIQUE

I recently received measurements of a track. The measurer used the Baumel instructions you saw in last MN. The measurements disagreed more than they should have, and the length came out to around 280 meters for a supposed standard track. I called with questions, and when I asked what he used to measure, he said "a yardstick!"

I told him to buy a 100 foot steel tape and do it over again. I am sure he will eventually turn in credible data, at which point I will certify the track. But I'll still have a hard time believing it's right. Thank goodness for our validation program.

THIS MONTH'S PUZZLE

The prize for winning this month's puzzle will be the announcement, next issue, that you are a uniquely perceptive individual, elevated intellectually above your fellows. And a t-shirt.

ILLINOIS TAC

Ray Vandersteen, Executive Director
708/833-7303, FAX 708/833-5162

Pete -
Enjoyed your response to Guy Morse's proposed amendment.
Hold tough!
Ray

TIPS 'N TECHNIQUES FOR AN EASIER MEASUREMENT RIDE:

Wayne Nicoll uses a rat-trap mounted on his handlebars to hold a notebook.

Mike Wickiser has a wire mounted on his spoke to point to his Jones Counter.

Fred Shields told me about 5 great tips, none of which I can remember.

Please send in YOUR Tips 'n Techniques, and we'll publish them in the next issue. Send to Joan Riegel, 3354 Kirkham Rd, Columbus, OH 43221.