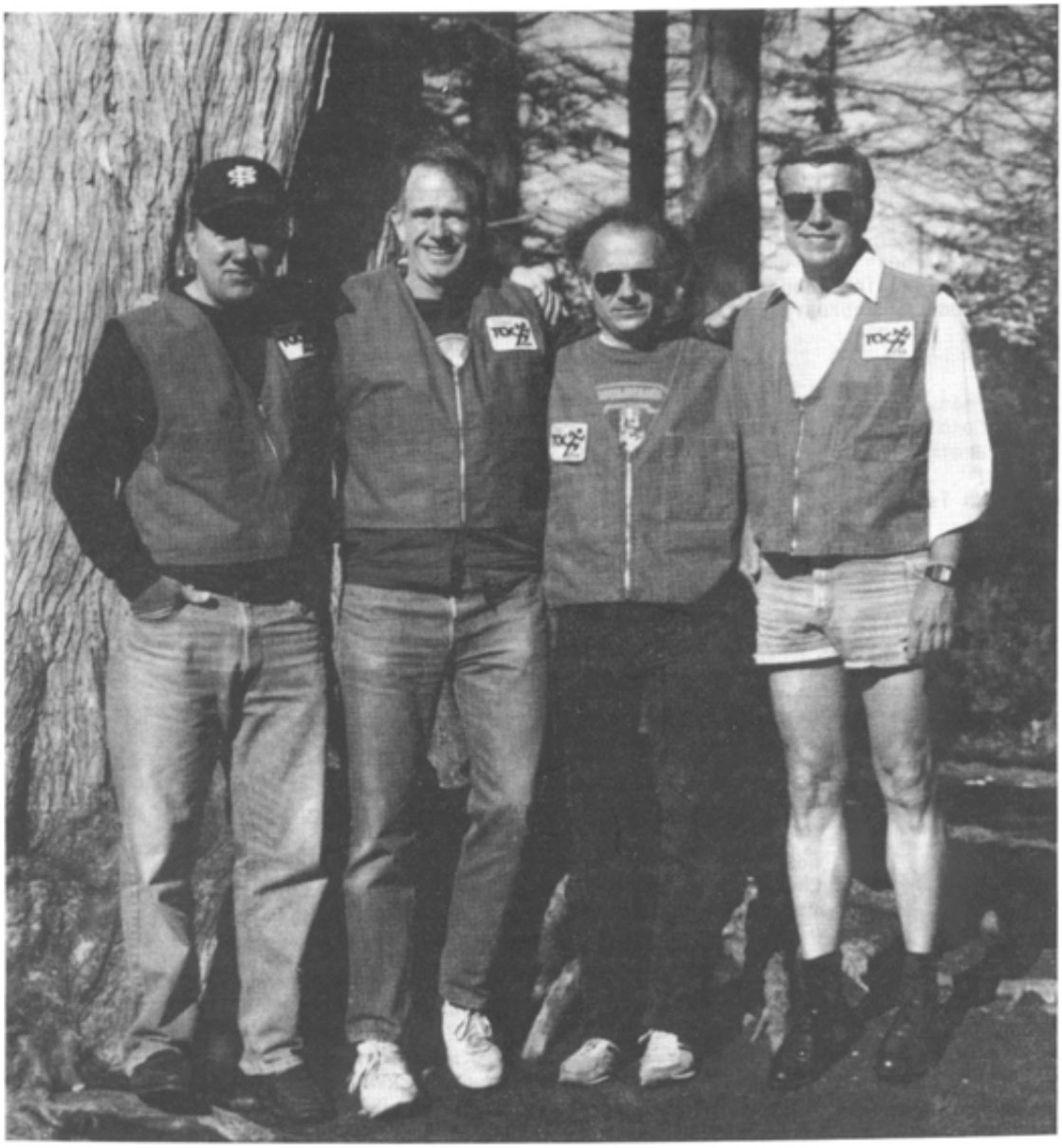
MEASUREMENT NEWS

January 1989 Issue #33



Members of the Greater Bay Area Certification Committee (San Francisco). From left to right: Tom Benjamin, Carl Wisser, Tom Knight, Paul Oerth.

MEASUREMENT NEWS

#33 - January 1989

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NOTEWORTHY PERFORMANCES

On October 9 Helge Ibert finished the Berlin Marathon in 2:51:46. Helge is 53 or so. Anna Ibert reports that he ran New York City a month later, finishing in 3:08.

Bill Noel (50) finished the Ironman Triathlon in 13:41. A postcard written that day says "I'm not sure right now that ultra distance events are my thing."

Jennifer Hesketh Young toured the NYC Marathon in an unstressed 3:56. She reports that she was careful to follow the tangents in Central Park.

At the TAC Convention, a 5k fun-run was held for delegates. It was noteworthy for the number of present and former great runners and walkers present in a small race, representing Olympians, Boston winners, International Cross-Country champion, and measurers and administrators from all across the sport. Your Editor particularly remembers being passed by Jack Moran, who said something as he flew by. I did my best to trip him but did not succeed. Later he soothed my injured feelings, saying "I didn't realize you were so slow, Pete." Thanks to Felix Cichocki and members of AZTAC, who arranged things for our pleasure.

NEW APPOINTMENTS

Mike Wickiser has been appointed Final Signatory for Indiana. Congratulations, Mike.

Wayne Nicoll is RRTC's appointee to the special committee to study the question of TAC Officials as they apply to road racing. He will be working with representatives of the LDR Committees and Officials Committees, RRCA, and TACSTATS.

ELEVATION DATA SOUGHT

Bob Baumel is studying the effects of hills on running. You'll see his article "Hill Effect to Second Order" in this issue. At the end Bob asks for elevation information relating to courses. I have bundled up all the course profiles I had and sent them to him. If you have some, please send to Bob.

COURSE LIST TO BE PRUNED

All courses that do not have maps included with the certificates will be removed from the list over the next few months. These are mostly courses from the 1982-1984 period that were certified as the new standards were settling in. Numbers will be published in MN. Send a course map if you wish the course to be relisted.

Greater Bay Area Certification Committee
San Francisco, California

In the early 1980's, Flory Rodd, an exceptional runner in his 50's, had just about had it with the poor state of course certification in The San Francisco Bay Area. Race after race he would set age group records only to have them go to waste because the courses were not certified or for that matter not even properly measured!!

Late in 1981, in a state of deep frustration, Flory invited a representative cross section of the running community to a meeting at his San Francisco apartment. This was to be a serious attempt to correct what had developed in to a serious running deficiency.

Prior to this time, for the many years that running was popular but had not yet reached the epidemic proportions of today, a lonely measurement warrior by the name of Sheldon Gersch heroically fullfilled the bay area course measurement requirements. Sheldon measured countless courses, dispensed endless information during his business hours and weekends, and performed all the time consuming certification duties which this job requires. A few intrepid souls attempted to have their course measurement efforts directly certified by Ted Corbitt, but the "official conduit" to Ted Corbitt for those early years was Sheldon Gersch. The Bay Area Running Community will always be greatful to Sheldon for his contribution.

Sheldon was at that meeting in 1981. After a great deal of discussion and "issue wrestling" by the various running community power brokers the obvious was discovered: Northern California desperately needed a well organized committee to handle its immense measurement and certification needs. A committee that would represent TAC as well the RRCA. It seems that Flory's simple need to find certified courses for his running talents might provide a benefit for everyone. (It did!!)

Tom Benjamin, Tom Knight and Carl Wisser were at that meeting and in February of 1982 and they were invited to an organizational meeting conducted by Bob Letson. Bob, as most of you know, is a course measuring luminary from San Diego and he most graciously offered to give his time. His dedication to the craft and organization of course measurement was inspirational. His ideas and his efforts were directly responsible for the formation of a brand new certification committee. Tom Benjamin, Tom Knight, and Carl Wisser were chosen to start processing the first of the many certification applications that were pending (As in "certification pending"!!) The committee was named THE GREATER BAY AREA CERTIFICATION COMMITTEE and Carl Wisser was elected its chairman. Eventually each of the three became Final Signatories.

There has been six and a half years of non stop certification: 500 or more certified courses in Northern California alone (not counting courses that the Two Toms have certified in other states.) A year or so after its formation THE COMMITTEE welcomed several other members: Paul Oerth, a PG&E engineer with a passion for measurement, became our RRCA measurer; Pete Shandera, a graphic artist by trade, is our premier map maker and his ferociously accurate bike riding makes him our premier course measurer; and Dick Hughes, a title company executive, has unselfishly given of his time in countless last minute course measurement endeavers. Unmentioned, but of prime importance to the entire process are the countless "amateur" measurerers out there who have bought or borrowed Jones counters, measured their courses and done what ever was needed to achieve national certification.

In 1983/84 Tom Benjamin put in an extremely eventful year as Vice Chairman for The Western United States and was very instrumental in "streamlining" the certification process without sacrificing its efficacy. Tom Knight ("has bike and Jones counter, will travel") was a fearless validation rider (along with David Katz) for the 1981 New York Marathon course. Tom has been asked to validate a number of other courses.
Carl Wisser organized the mountain bike measurement of the Western States 100 (a very rugged Sierra trail run) when it's nominal distance was called into question (it was some 6 miles short!) Carl does most of the actual certification work and keeps the records in his architectural office.

For the members of GBACC one of the events that stands out the most was the coming together of 13 measurers from all corners of the country to measure the 1984 Olympic Marathon course in Los Angeles. It provided an opportunity for certifiers across the country to meet and the measurement experience itself epitomized so much of what this business is all about.

JOAN RIEGEL

For the record: The Jones counter measures road-race course accuracy.

MEASUREMENTS

WHEELER DEALERS

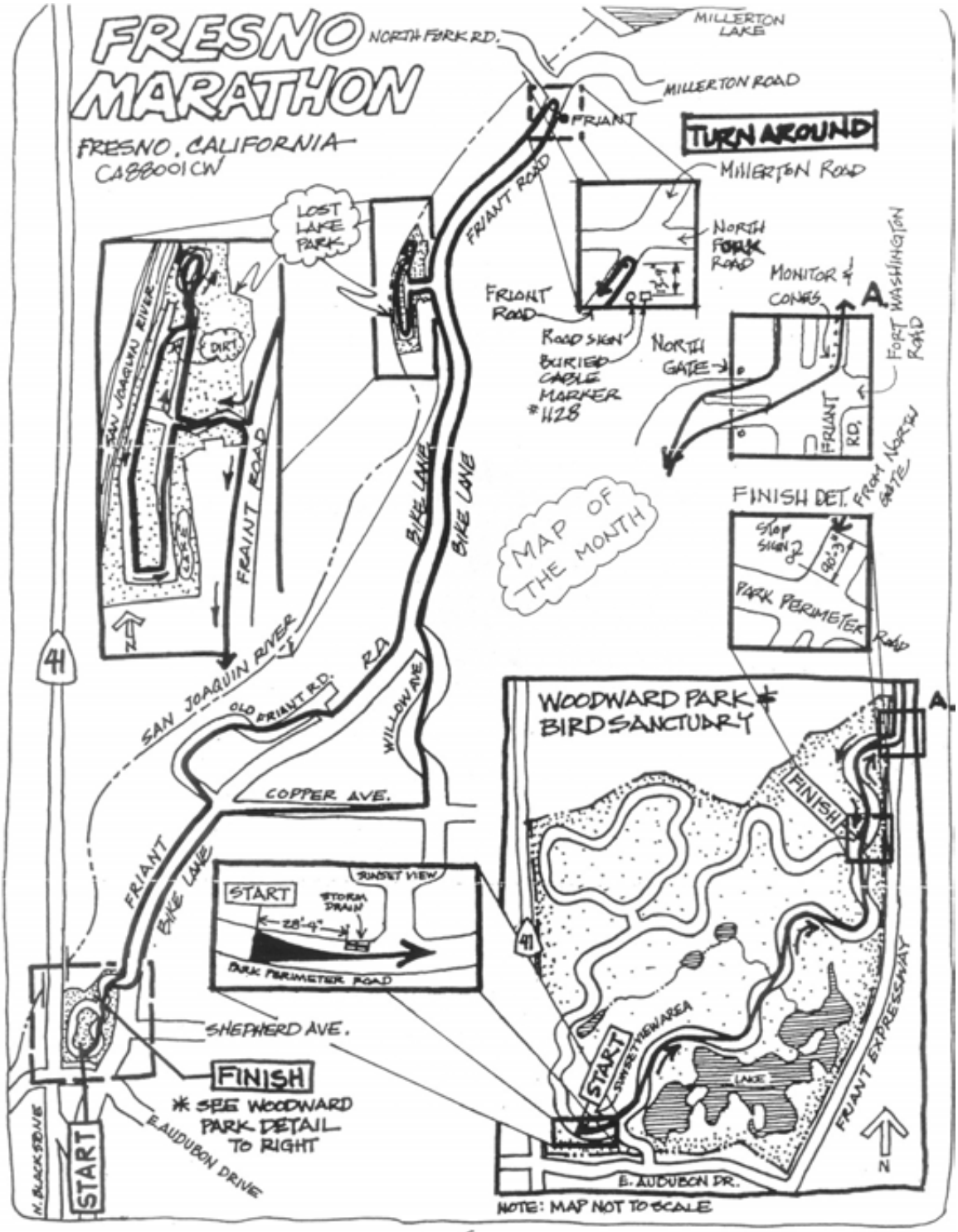
When Alan Jones of Endwell, New York, ran his first road race way back in 1970, he didn't expect much, so he was amazed at his final time in the 20-K event.

Amazed and a bit disturbed. Realizing that he couldn't possibly have covered 20-K (12.4 miles) in the time credited to him, Jones drove his car around the course. The odometer read 11.4 miles.

That sort of mismeasurement was fairly typical of the early days of road racing, but no longer, thanks to the Jones Counter that Alan invented in 1973. The counter, which attaches to the front wheel of a bicycle, registers 20 counts for each revolution of the wheel. By riding the bicycle over a 1,000-yard test course that has been laid out with a steel tape, course measurers can establish the number of counts in 1,000 yards. From there, it's fairly easy to measure any length course with extreme accuracy.

In fact, the Jones Counter is the measuring method preferred by the Road Running Technical Committee, the group that certifies road-race courses throughout the United States. Only races run on certified courses qualify for American record status.

To purchase the $30 counter, contact: The New York Road Runners Club, 9 E. 89th St., New York, NY 10128.


FRESNO MARATHON
FRESNO, CALIFORNIA
CA88001CW
NORTH FORK RD.
MILLERTON LAKE
MILLERTON ROAD
FRIANT
TURN AROUND
MILLERTON ROAD
LOST LAKE PARK
FRIANT ROAD
NORTH FORK ROAD
MONITOR & CONES
A
FRIANT ROAD
ROAD SIGN
BURIED CABLE MARKER #128
NORTH GATE
FORT WASHINGTON ROAD
FRIANT RD.
FROM NORTH GATE
FINISH DET.
STOP SIGN
90°-3"
PARK PERIMETER ROAD
MAP OF THE MONTH
SAN JOAQUIN RIVER
DIRT
FRIANT ROAD
BIKE LANE
BIKE LANE
41
OLD FRIANT RD.
R.A
WILLOW AVE
COPPER AVE.
WOODWARD PARK & BIRD SANCTUARY
FINISH
FRIANT
BIKE LANE
SUNSET VIEW
START
STORM DRAIN
28'-4"
PARK PERIMETER ROAD
41
SHEPHERD AVE.
FINISH
* SEE WOODWARD PARK DETAIL TO RIGHT
START
N. BLACKSTONE
E. AUDUBON DRIVE
START
SPECTATOR AREA
LAKE
FRIANT EXPRESSWAY
E. AUDUBON DR.
N
NOTE: MAP NOT TO SCALE

glsp great lakes sports publications, inc.
~~Dexter, MI~~
~~Yaskodi, Michigan 48197~~
~~(313)~~

921 Bath
Ann Arbor, MI
48103

Dear Pete,

I won't be able to attend the Phoenix TAC convention, so, I'm sending you my thoughts about the RRTC Agenda items in the Nov MN. Sally Nicoll will present my feelings about the discrepancy at some finish lines where one sex runs longer than the other.

#1: Well, there are some, obvious, roles that officials play at races. There are 6 different places where somebody official is supposed to sign off on the TACSTATS App for Recognition of Road Race Performances. There should be a finish line judge, for order of finish.

The '84 Women's Oly Trial Marathon had officials every 200 meters along the course as marshalls.

Role of RRTC in this? If there already exists a roster of job descriptions for road race officials, then the RRTC has no role. If the roster is incomplete, for whatever reason, the RRTC can adopt an advisory capacity. Ask Don Kardong or Benji Durden for direction here.

Implementation? Some race directors will likely resist the presence of outside 'officials' or the requirement to field their own 'officals'. Some won't have any problem with it. We ought to proceed with caution, educate the road racing community with the need and role of 'officials' over a given period of time.

#2: If the course meets US cert standards, and timing can be documented as per TACSTATS standards, US records on foreign courses should be allowed.

#3: Well, sure. What would the racewalkers like the RRTC to do?

#4: Pre-validation can take the place of post-validation. It shouldn't be up to the RRTC to observe the 'conduct' of the race. There is a question on the TACSTATS app for record recognition that asks about the course runners ran on raceday. What would an 'observor' do, except maybe answer the TACSTATS query.

#5: Sally is taking care of my ammendment.

#6: Ask every regional certifier annually to identify obsolete courses and delete them from the course list.

#7: A course is certified if it's mailed before raceday and the numbers and map need no revision. If the numbers or map need more work, necessitating a change, the course doesn't get certified.

#8: Sure, courses can be too long. If a re-measurement finds a course to be more than the SCPF long, the course should be shortened to meet the SCPF minimum.

#9: Indulge me for a moment. The way we're measuring now, runners certainly aren't running short courses. My observation has been that all runners run along something other than the SPR for at least some of a race.

#9 cont: I'm not saying we should guess and measure where we think runners will run. My point is: we've been setting standards tight enough, and we're likely to with respect to questions about the prudent path to measure. It's unlikely runners are ever going to run less than the certified distance because of our concern for questions like this.

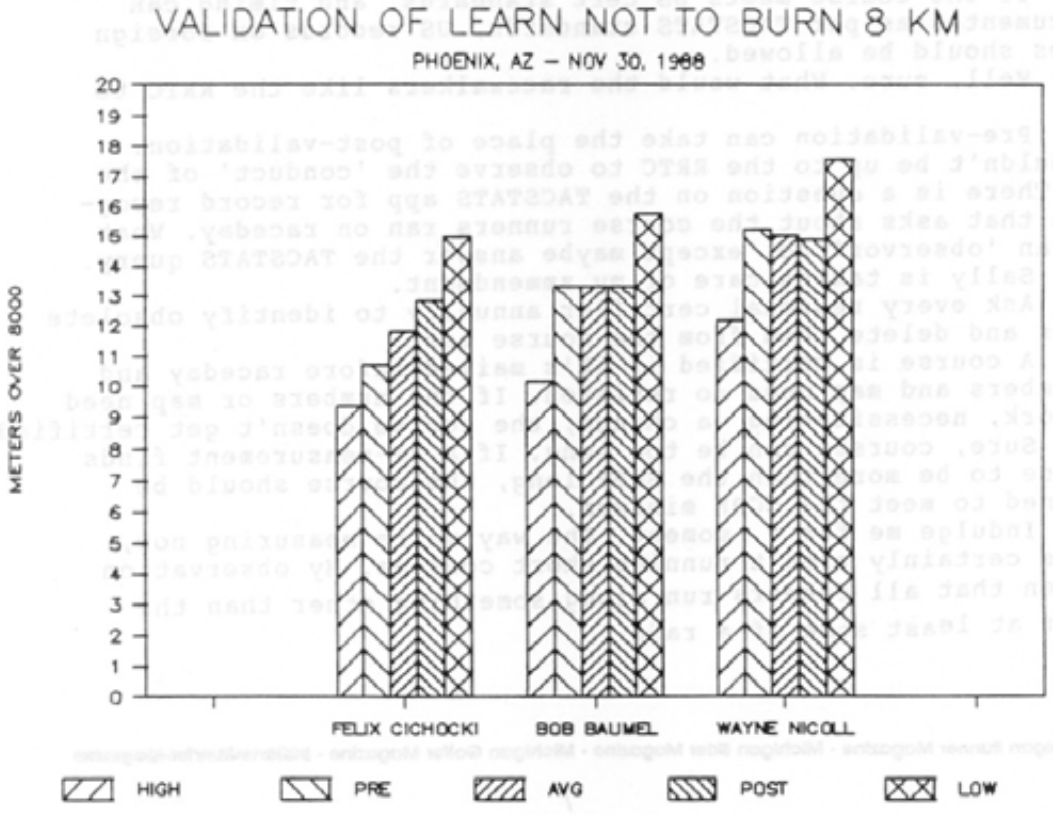
We should measure as close to any dangerous impediment as we can, and let it go at that. We should stray no more than 12" from the potential problem, and if need be, steel tape or measure by some other acceptable method, any path we think runners might be inclined to follow. If a race director says runners will be directed around a traffic island, we have to believe him/her. We need to use our best judgement on prudent pathes, considering factors like safety, camber of roads, etc.

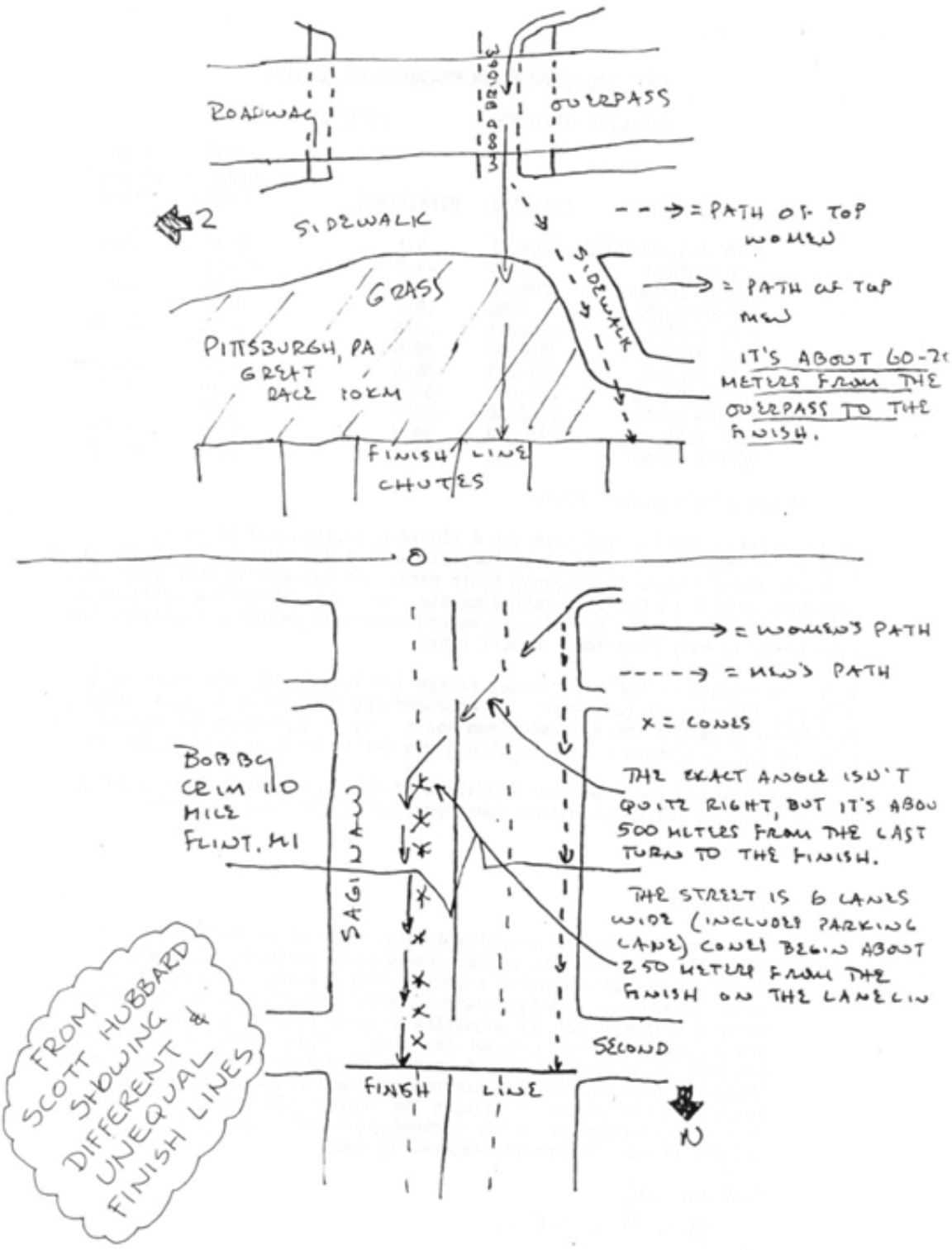
At another time, I'll tell you how I'm dealing with races that are falsely advertising TAC certification. Frankly, I'm confronting them.

11/9/88

Best,

Scott Hubbard





FROM SCOTT HUBBARD SHOWING A DIFFERENT UNEQUAL FINISH LINES

1988 TAC CONVENTION MEASUREMENT CONTEST

OFFICIAL DISTANCE = 2280.875 FEET

MEASURER	ESTIMATE	DIFFERENCE	1988 PERCENT ERROR	1987 PERCENT ERROR
MARY ANN MCBRAYER	2283.97	3.1	0.14	-2.91
DAN BRANNEN	2276	-4.9	-0.21	
**FELIX CICHOCKI	2298.32	17.4	0.76	2.14
BOB THURSTON	2300	19.1	0.84	
PETE RIEGEL	2302.44	21.6	0.95	-1.00
JOAN RIEGEL	2320.49	39.6	1.74	
RICK RECKER	2230.23	-50.6	-2.22	-0.79
TOM MCBRAYER	2226.611	-54.3	-2.38	-3.66
MIRIAM GOMEZ	2192.86	-88.0	-3.86	
FINN HANSEN	2375.812	94.9	4.16	3.31
NORMAN BRAND	2465	184.1	8.07	41.61

** not eligible for prizes

Felix Cichocki and his son laid out a figure-8 walking course at the convention center near the hotel, complete with a 200 foot calibration course, on which the striders could gauge their pace. At the second RRTC meeting he presented prizes to the four most accurate, and to the high/low estimates. Thus six out of the ten contestants walked away with pottery, t-shirts, and jars of jelly made from local desert flora.

Most contestants walked the course, except for Norm Brand, who repeated his elevated thinking of last year. He ascended the heights of a nearby high building and gauged the distance from above. If he continues to improve his technique at his present rate he should win the contest in a few more years.

Mary Ann McBrayer continued the tradition of female winners of the hallowed competition, to the chauvinistic consternation of the male measurers.

Dear Felix --

Thank you for your hospitality during the week of Convention. I especially enjoyed your course measurement contest. This was my first attempt at measuring a course, and I found the process very comprehensible -- mostly because I could concentrate on the method without riding a bike or adjusting a Jones counter -- just my feet and a pencil. It all became very clear. This might be a way to instruct beginners! I didn't have a calculator, so I even had a chance to dust off ancient algebra and long division skills while sitting in the plaza. I thought the cactus jelly and other prizes were fun and creative -- the contest provided a nice note of levity for all of us. I hope you enjoyed it, too.

Best regards,

Joan Riegel

MINUTES OF THE RRTC MEETING - Nov 30, 1988, 8:30 pm - TAC National Convention

Present: Bob Baumel, John Boyle, Felix Cichocki, Bill Grass, Finn Hansen, Basil Honikman, Linda Honikman, Bob Langenbach, A C Linnerud, Deb Long, E T McBrayer, M A McBrayer, Sally Nicoll, Wayne Nicoll, Rick Recker, Joan Riegel, Pete Riegel, Mike Wickiser

Pete Riegel welcomed all in attendance and invited those present to raise issues not on the printed agenda.

Basil Honikman reported on proposed rules changes that involve RRTC. Many had been rejected by the Rules Committee; those remaining were brought up for discussion in order to present RRTC's recommendations.

1) Item 110 - when is a course certified: (See also agenda item 7, next page)
This proposed rule suggests that a course is not certified until the certificate has been accepted by the chairman of RRTC. It was agreed that there is sometimes a problem between race directors and measurers, but we need to educate the race directors, not change certification procedures.

2) Item 122 - Amendment regarding loop courses:
This amendment proposes that courses with a drop exceeding 3.5 m/km be excluded from record consideration. Any drop produces an advantage for the runner. It is difficult to draw a precise line -- too much? too little? Two meters per km is already drawn. No two courses can be precisely alike. It was concluded that Riegel will report back to the Rules Committee that this is a philosophical problem, not a technical problem.

3) Item 60 - Proposed amendment which suggests that timing of distance running should begin at the signal or when the first runner crosses the start line -- whichever comes first. RRTC supports this, although wording is not perfect.

4) Item 63 - running events on tracks without curbs:
This proposed amendment suggests cones or other objects may serve as temporary borders for running events on tracks that have no curb. RRTC is wholly in agreement.

Attention turned to the RRTC agenda. Riegel called for additions. Sally Nicoll added discussion of Limited Certificates as Item 14.

Riegel opened the meeting with the remark that nothing should be determined at convention meetings without notice in Measurement News, so that ALL committee members may have an opinion on any given subject.

Agenda Item 1: The role of officials in road racing and where RRTC fits in.
It was agreed that there is a need to define the role of road racing officials and write a good book on procedures before writing a rule to make officials mandatory. After a long discussion, it was agreed that much clarification is in order. RRTC will be represented on the Officials Committee, and more will be learned and reported upon at a later date.

Agenda Item 2: US runners setting records on foreign courses.

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Agenda Item 2: US runners setting records on foreign courses.

Many foreign courses don't provide accurate maps. We don't have enough information on the measurement, nor the funds available, to go all over the world validating courses. Other national governing bodies have their own procedures. As a general rule, runners should not expect us to honor records set on foreign courses. However, if runners provide documentation and the proper forms can be filled out, we will honor the record. AIMS validation is adequate.

Agenda Item 3: Interfacing better with the racewalk community.
The correct teardrop at the end of a course was discussed. W Nicoll suggested a radial style of turn on ends with 2-3 walkers able to walk abreast. Walkers now have a recommended radius and work hard to make the turnaround. Minimize difficulty in making turns.

Agenda Item 4: How should pre-validations be handled?
"Pre-validation" should be called a "measurement check," since we validate records, not courses. Experience and objectivity are most important -- it is usually better to use a stranger from out of town.

B Honikman suggested that timing is the real problem -- it is more an art than a science. Identify a consultant to check timing before a race. Instant validating is a good goal.

S Nicoll reported that in Pittsburgh a Track & Field record form was used. We need to educate race directors and give service when requested.

B Honikman sees a need to implement a plan, however imperfect,just to get it started -- it can be corrected as we go.

Agenda Item 5: Revisions to Course Measurement Procedures
Riegel and Baumel are working on revisions and hope to have changes ready by March. Sally and Wayne Nicoll are helping with the forms.

Agenda Item #6: What to do about obsolete courses -- how to identify them and keep the course list from getting filled with deadwood. P Riegel stated that some of the older courses don't have maps. We'll publish a list of these courses, and they'll be kept separate from courses with a complete certificate. These courses ARE still certified; they're just not on the current course list.

Agenda Item 7: Just when is a course certified? W Nicoll stated that all certifiers should forward copies of certs to their vice-chairman at the same time they are sent back to the measurer or race contact. The date of postmark currently determines when a certificate is valid. It is imperative that certificates go out BEFORE the race.

The meeting adjourned at 10:45 pm. The remainder of the agenda will be discussed at tomorrow night's meeting.

Joan Riegel
Acting Secretary

MINUTES

The Thursday, December 1, 1988 meeting of the Road Running Technical Committee was called to order by Chairman Pete Riegel at 8 p.m. Present were Peter Riegel, Wayne Nicoll, Sally Nicoll, Bob Baumel, A. C. Linnerud, Bill Grass, Jack Moran, Felix Cichocki, Ken Young, Finn Hansen, Joan Riegel, Linda Philips, Bruce Robinson, Norm Green, Rick Recker, Allan Steinfeld, Bob Langenbach, Basil Honikman, Linda Honikman, Tom McBrayer, Bob Thurston, Lawrie Robertson, Norm Brand, Marty Post, and Jennifer Hesketh.

Pete reviewed the agenda and noted that most of the points had been discussed at length the evening before. He noted that a few items would be discussed this evening.

He then turned the meeting over to Felix Cichocki who presented the awards for the course measuring contest. Mary Ann McBrayer came closest to the announced measurement and was therefore declared the winner. Norm Brand's methodology netted him a closer guess than the year before although his estimate still placed him last. Pete stated that complete results would be published in the next **Measurement News.**

A major paperwork decision involved courses without maps. It was decided that the courses would remain certified but would not be published in the next complete listing.

The postmark on an envelope will continue to be the date on which a course can be considered to be certified should all paperwork show that the course was correctly measured.

It was decided that any problems which develop regarding additional length of a course due to, for example, the women's finish line which might veer more to one side or another should be taken up between the course measurer and the race director and remain a local issue to be decided.

Those present addressed the issue of lead vehicles and problems created. This issue was noted to be one which could be commented on but which was outside the purvey of the committee.

The revised version of the course measurement book is progressing. The issue of the length of the calibration course was discussed explored in depth. Those present expressed considerable support for the shorter calibration course and the need, in some fashion, to ascertain the accuracy of that course.

Pete Riegel then turned the meeting over to Lawrie Robertson. Lawrie introduced Brian McEcheron, also a member of the

Officials Committee. Progress has been made on the creation of Road Running Officials but considerable debate continues on the role and responsibility of the officials. It was noted by several that there seems to be a lack of participation on the part of the road running community in this process and committee members expressed concern that more involvement be not only encouraged but also permitted. The role of the RRTC in the development of the position of Road Running Official was explored, at times rather boisterously, by several present. It was agreed that participation is needed and wanted by many in the technical side of road racing and that the Officials Committee would welcome some sort of advisory group.

The discussion turned to the issue of downhill and wind-aided courses. Basil Honikman noted that the Road Running Community needs to reach a politically acceptable and information-backed decision in order to set standards which would work. The rule changed proposed by Dan Brannen which would essentially created three different types of standards was tabled, according to Norm Brand, for this session. The RRTC was urged to work to develop viable information on the issue in order to assist the Rules Committee to formulate a position which would work.

The issues of Limited Certification and the certification of cross-country courses were briefly touched upon. It was agreed that if the cross-country course could be reproduced, that it could be certified. Each course and the event which was connected with it would necessarily be considered individually.

The meeting was adjourned at 10:50 p.m.

Respectfully submitted,

Jennifer Hesketh, Secretary

Road Running Technical Committee Briefing
To Race Walk Committee - 2 Dec 1988

The briefing was conducted by Wayne B. Nicoll, Vice Chair East, Road Running Technical Committee (RRTC). Wayne is a race walker and is interested in assisting the RW Committee with matters regarding road race officiating and records capturing that are common to both LDR and RW. The creation of the new road race records center (TACSTATS) was important to RW since race walking road records are now being kept along with road running records. This has also led to greater attention being given to the certification of race walk loops and to the validation of RW road records.

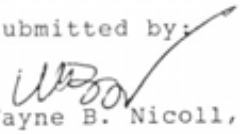
The process of validation of race walk records was discussed. The process includes a re-measurement of the race course if deemed necessary and a close examination of all of the documentation generated to support the record. The RRTC devoted a significant portion of its 1988 budget to the validation of RW road records. Considerable progress was made this year to train more course certifiers as validators so that response times following the setting of a record could be improved. With the availability of more validators, the travel costs are being reduced.

An area of concern to both the RRTC and the Records Committee is the lack of progress in the recording, preparation and submission of road record performances by Masters race walkers. There is no reason why the Masters walkers cannot fill several pages in the TAC/USA rule book with ratified road records. A volunteer record keeper is badly needed. He or she would function in coordination with Steve Vaitones, who processes Open mens and womens RW records and works closely with TACSTATS and the RRTC Validations Chairman.

The setting of US road records on foreign soil continues to be a difficult problem that is taking years to overcome. We have not yet reached a point where we have confidence in all foreign governing bodies to insure that courses are measured correctly and that correct timing procedures are followed. There has been some progress through the RRTC's work with the Association of International Marathons (AIMS) which has spearheaded the adoption of USA course measurement procedures in foreign countries. The RRTC has been active closer to home, developing programs and materials to assist measurers in Canada and the Latin American countries. It is not uncommon for a race director in a neighboring country to request a TAC certification, which is issued if all RRTC requirements are met. Any US RW record set on foreign soil will be scrutinized by the RRTC Validations Chairman, Sally Nicoll, and TACSTATS for possible examination and/or acceptance for ratification

The next year will see even a closer relationship between the RW Committee, RRTC, and the LDR committees as work begins on the project to accredit road racing officials.

Submitted by:



Wayne B. Nicoll, 3535 Gleneagles Drive, Augusta, GA 30907

OFFICIAL ROUTE OF

JINGLE BELLS 10K

WESTON, FLORIDA

MAP OF THE MONTH FL 88039 BH

RACE DIRECTOR:

WAYNE WINDSOR
1121 SW 73 AVE
NO. LAUDERDALE, FL
33068
(305) 726-6651

START - ON ARVIDA PARKWAY 21 FT. 4 IN. S OF LIGHT POLE AT E END OF BRIDGE.

MILE ① - ON COLUMBIA 24 FT. 8 IN. W OF LIGHT POLE ACROSS FROM 2229.

MILE ② - ON LAKESHORE CIRCLE 31 FT. 11 IN. SW OF WATER METER (IN SIDEWALK) AT 1730.

MILE ③ - ON THREE VILLAGE RD. 11 FT. 11 IN. W OF STORM DRAIN IN SWALE AT THE INTERSECTION WITH SPRINGSIDE DR.

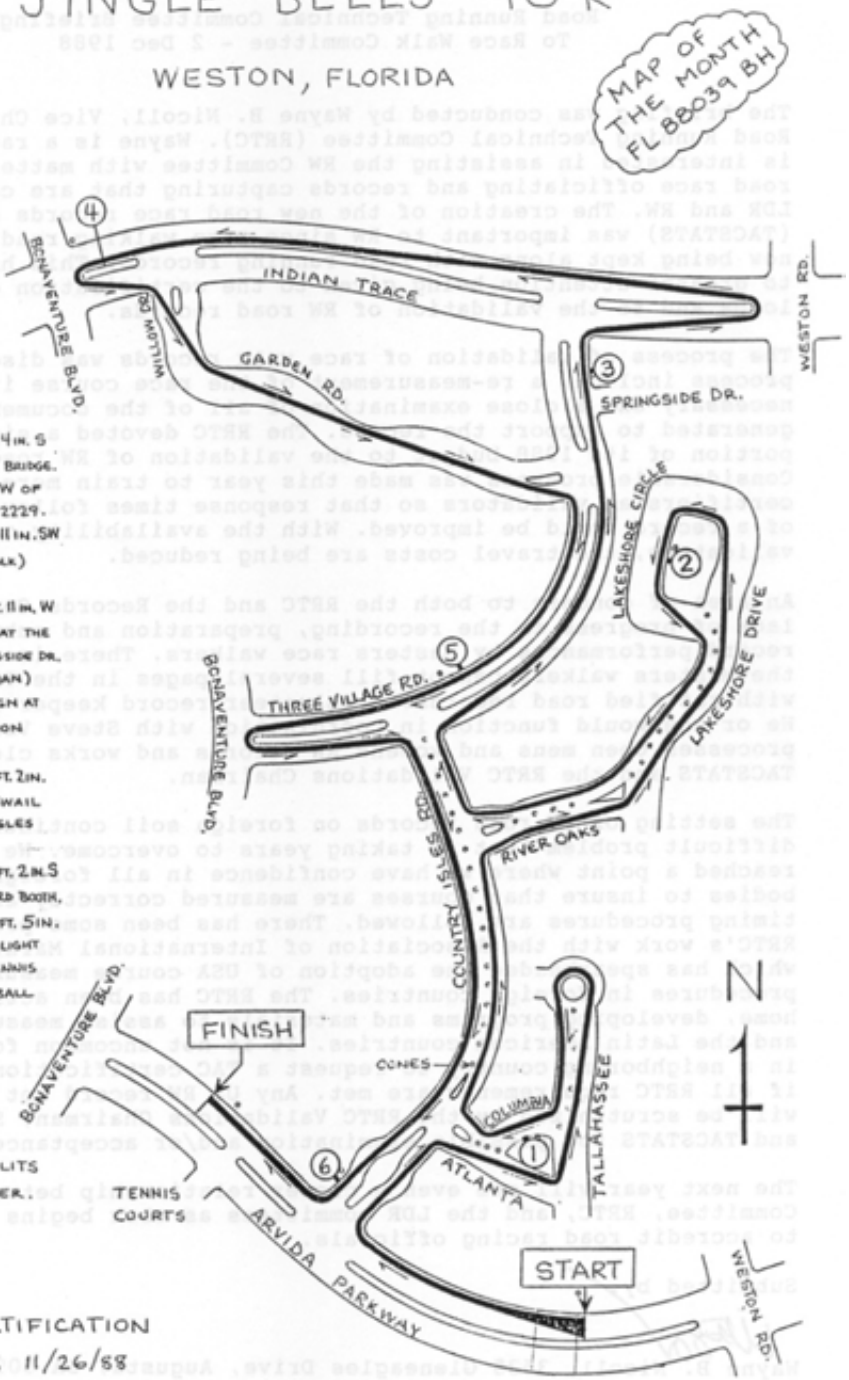
MILE ④ - ON INDIAN TRACE (BY MEDIAN) 119 FT. 6 IN. E OF STOP SIGN AT NE CORNER OF INTERSECTION WITH BONAVENTURE BLVD.

MILE ⑤ - ON THREE VILLAGE RD. 51 FT. 2 IN. NE OF STORM DRAIN IN SWALE ACROSS FROM COUNTRY ISLES ELEMENTARY SCHOOL.

MILE ⑥ - ON COUNTRY ISLES RD. 14 FT. 2 IN. S OF STORM DRAIN NEAR GUARD BOOTH.

FINISH - ON ARVIDA PARKWAY 131 FT. 5 IN. NW OF LIGHT POLE (1ST LIGHT POLE W OF ENTRANCE TO TENNIS COURTS) ACROSS FROM BALL FIELD.

NOTE: START, FINISH, AND SPLITS MARKED WITH NAIL & WASHER.



MEASURED FOR CERTIFICATION
BY FRED SHIELDS 11/26/88
CALIBRATION COURSE FL 85024 BH

TAC Delegates Fun Run/Walk
5K
by RUNNING MASTERS

TAC Sanctioned Event

Phoenix, AZ Dec 1, 1988 7:30 A.M. Weather: Sunny, 45 degrees

Overall Order of Finish

PLACE	NO.	NAME		AG	S	CITY	ST	TIME	PACE
1	466	HODGE BOB		33	M	CLINTON	MA	0:17:17	5:34
2	454	VIRGIN CRAIG		33	M	LEBANON	IL	0:17:17	5:34
3	465	TRUJILLO MICHAEL		26	M	LOS ANGELES	CA	0:17:20	5:35
4	424	WEBB BRENDA		34	F	AUSTIN	TX	0:17:27	5:37
5	252	HUGHES JON		30	M	ORLANDO	FL	0:17:42	5:42
6	412	BRANNEN DAN	+	35	M	WALLINGTON	NJ	0:17:44	5:42
7	408	RECKER RICK	+	41	M	MINNEAPOLIS	MN	0:17:48	5:44
8	6	BABINGTON JOHN		43	M	CAMBIRDGE	MA	0:17:50	5:44
9	429	DENOON DONALD		45	M	CARBONDALE	IL	0:18:04	5:49
10	414	SAVAIRK GEORGE		50	M	BURNSVILLE	MN	0:18:17	5:53
11	249	DALY MARK		33	M	INDIANAPOLIS	IN	0:18:36	5:59
12	471	BOLYLE JOHN		46	M	DELAND	FL	0:18:44	6:02
13	260	HESTER CONNIE		29	F	HAYWARD	CA	0:18:50	6:04
14	254	FULTZ JACK		40	M		MA	0:18:58	6:06
15	258	VICENIK LOU		40	M		TX	0:19:02	6:08
16	461	FARRELL PETER		41	M		NJ	0:19:04	6:08
17	444	SHONTS DEAN		42	M	MILLBURN	NJ	0:19:05	6:09
18	452	SNAGG DEBORAH		32	F	RICHMOND	VA	0:19:08	6:10
19	19	SHESKEY LINDA		26	F	WOODSTOCK	GA	0:19:49	6:23
20	462	SHEA SUZANNE		28	F	BRONX	NY	0:20:04	6:28
21	13	BIGELOW VICKI		53	F	SAN LORENZO	CA	0:20:05	6:28
22	18	SHESKEY BILL		26	M	WOODSTOCK	GA	0:20:20	6:33
23	28	PETERS VINCENT		34	M	FAIRBORN	OH	0:20:22	6:33
24	255	BLLAISDELL JAMES		43	M	OGDEN	UT	0:20:24	6:34
25	441	WICKISER MIKE	+	37	M	SILVER LAKE	OH	0:20:37	6:38
26	456	BURMES JAMES		28	M	CLIFTON PARK	NY	0:20:43	6:40
27	453	MORAN JACK		54	M	EDINA	MN	0:20:46	6:41
28	4	DES`JARDINS CHARLES		52	M	FAIRFAX	VA	0:20:50	6:42
29	425	KLITZKE CAROL		41	F	OSSEO	MN	0:20:55	6:44
30	422	PHELPS WILLIAM		40	M	PITTSBURGH	PA	0:20:58	6:45
31	420	HICKEY ROBERT		50	M	WESTMINSTER	CA	0:21:16	6:51
32	469	MCNICHOLS JOHN		38	M	TERRE HAUTE	IN	0:21:21	6:52
33	246	CROCKETT JERRY		60	M		OK	0:21:32	6:56
34	463	MOORHEAD KEVIN		32	M	MINNEAPOLIS	MN	0:21:57	7:04
35	247	HISLOP CHICK		52	M	OGDEN	UT	0:21:58	7:04
36	459	FUNKHOUSER RAY	•	38	M		NJ	0:22:08	7:07
37	20	BOYAJIAN ANDREW		47	M	HASBROUCK HGTS	NJ	0:22:13	7:09
38	445	HUDDLESTON JODY		35	F	CHARLESTON	SC	0:22:14	7:09
39	248	GROSVENOR DALE		63	M		IA	0:22:16	7:10
40	15	WHITE NATHANIEL		69	M	FAYETTEVILLE	NY	0:22:49	7:21
41	21	PETERS JENNIFER		24	F	FAIRBORN	OH	0:23:02	7:25
42	250	NAULT WILLIAM		41	N		KY	0:23:04	7:25
43	417	RIEGEL PETE	+	53	M	COLUMBUS	OH	0:23:14	7:29
44	11	HERRING JOHN		52	M	ANCHORAGE	AK	0:23:30	7:34
45	460	MORETON OLIVIA		41	F	SALT LAKE CITY	UT	0:23:42	7:38
46	12	EPPRIGHT BILL		68	M	NORCROSS	GA	0:23:48	7:40
47	468	SAMUELSON JAN		32	F	BELMONT	MA	0:23:55	7:42
48	256	BOEMKER RON		39	M		RI	0:23:56	7:42
49	446	BACHE LONITIA		46	F	SAN DIEGA	CA	0:24:18	7:49
50	251	GRASS BILL	+	49	M	MILWAUKEE	WI	0:24:19	7:50

12/06/1988 2:08

• = RACEWALKER + = RRTC

TAC Delegates Fun Run/Walk
5K
by RUNNING MASTERS

TAC Sanctioned Event

Phoenix, AZ Dec 1, 1988 7:30 A.M. Weather: Sunny, 45 degrees

Overall Order of Finish

PLACE	NO.	NAME		AG	S	CITY	ST	TIME	PACE
51	415	BAUMEL BOB	+	41	M	PONCA CITY	OK	0:24:28	7:53
52	442	MELILLO DIANE		45	F	BUFFALO	NY	0:24:41	7:57
53	29	WOODS JOHN		70	M	HARDSWELL	MA	0:24:57	8:02
54	458	COOTS JIM		47	M	LONG BEACH	CA	0:24:59	8:02
55	434	CARRIGAN KATHLEEN		39	F	ALBANY	NY	0:25:00	8:03
56	457	MOORE GARY		32	M	ALFRED	NY	0:25:14	8:07
57	438	BEISHLINE JOHN		57	M	TONAWANDA	NY	0:25:15	8:08
58	411	WETZORK GAIL		58	M	ALAMEDA	CA	0:25:21	8:10
59	14	ANDERSON RUTH		59	F	OAKLAND	CA	0:25:23	8:10
60	253	JENSEN RON		41	M		MA	0:25:24	8:11
61	467	BROWN JIM		64	M	GRAND ISLAND	NY	0:25:29	8:12
62	435	LAWRENCE DAVID	•	33	M	BUFFALO	NY	0:25:40	8:16
63	423	MEYER LEE`ANN		45	F	WHITE BEAR LAKE	MN	0:25:43	8:17
64	443	HYER EDNA		54	F	SOUTH WALES	NY	0:26:37	8:34
65	439	KNATT THOMAS	•	48	M	CONCORD	MA	0:27:18	8:47
66	450	GWYN DAVE	•	37	M	HOUSTON	TX	0:27:20	8:48
67	245	BOAL BOB		76	M		NC	0:27:44	8:56
68	451	CORRALLO SAL	•	57	M	ARLINGTON	VA	0:27:51	8:58
69	436	MILO ELIZABETH		48	F	GUILDERLAND CTR	NY	0:28:09	9:04
70	448	BREEN-GREDO ANN		47	F	CHICAGO	IL	0:28:29	9:10
71	416	SHRADER WILLIAM		73	M	MIDDLEBURGH	NY	0:29:12	9:24
72	410	FINE ROBERT	•	57	M	DELRAY BEACH	FL	0:29:28	9:29
73	419	NICOLL WAYNE	+•	56	M	AUGUSTA	GA	0:29:31	9:30
74	259	LAIRD RON	•	50	M	LONG BEACH	CA	0:30:42	9:53
75	437	DEITZER JOSEPH		72	M	KENMORE	NY	0:30:51	9:56
76	428	CARLSON BOB		63	M	DENVER	CO	0:30:54	9:57
77	470	DENMAN ELLIOTT	•	54	M		NJ	0:31:40	10:12
78	447	DOWLING JACK		49	M	EAST MEADOW	NY	0:32:14	10:23
79	17	WHITE EVELYN		55	F	FAYETTEVILLE	NY	0:34:25	11:05
80	257	GUILLER JERRY		46	M	LOUISVILLE	CO	0:34:41	11:10
81	455	AYRES BARBARA		49	F	AUSTIN	TX	0:39:47	12:48
82	426	CHARLES RICHARD		65	M	NEW ORLEANS	LA	0:39:48	12:49
83	427	BYERS MARY		60	F	MILWAUKEE	WI	0:47:29	15:17
84	464	DEPETRA GILLIO	•	77	M			2:00:00	38:37

12/06/1988 2:08

• = RACEWALKER + = RRTC

VARIATION OF TIMES IN THE 100 METER DASH

In this analysis the sprinter is treated as an object that is accelerated across a distance, aided by a downhill slope and aided or opposed by prevailing wind. Because the conditions change as the runner increases his speed, an iterative calculation was used which split the 100 meters into 100 separate segments. In each segment initial conditions are established at the beginning of the segment, and new conditions are calculated for the end of the segment, which becomes the beginning of the next one.

The runner is assumed to begin with a strong pushoff force out of the blocks, and to proceed thereafter at a constant power output. Force is greatest at the early portion of the sprint. This is consistent with reality, since the runner can only accelerate when his foot is in contact with the ground, and the feet contact the ground more often at the beginning. The runner actually slows a bit when he is not in contact with the ground. The analysis does not attempt to account for this small variation in speed, but rather assumes a gradual increase in speed, and a corresponding decrease in applied force as the distance is covered.

The force of the air against the runner is established by using a conventional expression for aerodynamic drag, using experimentally established drag coefficients for ski-runners in wind tunnel experiments.

Calculation method and summary are shown in the attached pages.

In the calculation, initial force and power output are juggled until time to reach 100 meters comes out to the desired value. Then the effect of changing the different variables is calculated. In the analysis, 10 seconds is taken as the standard time for 100 meters, since it is a nice round number. The relative effects of varying the other conditions are then calculated. For comparison purposes, the recent AR of Carl Lewis at the 1988 Seoul Olympics is shown, as well as the disqualified run of Ben Johnson. In both cases the theoretical calculation comes quite close to duplicating their reported times at various points in the race. The power output of about 990 watts compares reasonably with published values of 1200 watts as the maximum external work that can be done by a human over a 10 second period. Thus I presume that the method does a reasonable job of describing the reality.

The calculations are certainly not an exact representation of reality - few theoretical calculations achieve this - but I believe they do show fairly well the effects of wind, altitude and slope on the runner in the 100 meter event.

Why should 100 meters interest road runners? At the recent TAC convention, it was proposed that the permissible elevation variation of 2 m/km be reduced to 1 m/km, in an effort to minimize the effect of slope and make things fairer. At the time it was recognized that there was no one value that shouts out that it is fair, while the rest are unfair. Instead, as slope increases we have increasing aid to the runner, and we seek to find a rational way to choose the one value that is right for us.

The track people use a wind gauge set up at the 50 meter mark. If the observed wind is greater than 2 meters per second tailwind, no run may count as a record. This has long been considered as fair enough by the track

people. The 100 meters is one of the hallowed events, establishing as it does the "world's fastest human". Actually, the average speed in the 200 meters is higher, but peak speeds in the 100 exceed those in the 200. In any case, the track sport is willing to accept whatever aid is given by the wind, within the 2 MPS envelope.

The calculations show that the effect of legal wind amounts to about 0.3 seconds. This is three percent of the finish time, a relatively large variation for an event which is timed to 0.01 seconds.

Why does the track sport accept such an enormous effect? I suspect it's because it's a rare day when there is no wind at all, and there would not be much of a chance for runners to set records if they had only totally windless days which would allow them to have their best efforts count. Thus these undesirable wind effects are accepted because there is no good alternative.

The figures show that a runner who can sprint 10.00 on a windless day would do 9.71 with a legal 2 MPS tailwind. For a 10k, this same variation would allow a 30:00 minute runner to do 29:08. The actual effect on a 10k runner would be larger, because the runner is moving slower relative to the wind change.

Slope has an effect of about 0.02 seconds for the legal track slope of 1 m/km. This same slope would move our 30:00 10k runner down to 29:56.

Each 1000 meters of elevation reduces the time by about 0.1 seconds.

If a good sprinter really wants to set a record, it would require some fancy organizational footwork, but an astounding time could result if a legally-sloped track were to be built at, say, Leadville, Colorado (elevation about 3000 meters). If the event waited until there was a nice legal tailwind, a "standard" 10.00 runner would cover the 100 meters in 9.52 seconds.

Track & Field News has recognized the effect of altitude, and puts asterisks after records set at altitudes, even though they may be officially-recognized records.

Asterisks might also be in order for wind, but the present wind gauging techniques are regarded with skepticism by some, and their accuracy is questioned.

In spite of the time variations produced by things beyond our control, we still accept records that may have a generous element of luck. The system is in place, and few have expressed any desire to tighten the standards, because tightening has the effect of reducing the number of record opportunities, while increasing the credibility of the records that are set.

I have put the calculations in Lotus 1-2-3. Readers who wish to delve deeper should get in touch with Pete Riegel.

Pete

UNIFORM POWER OUTPUT OVER 100 METERS

STANDARD CONDITIONS TO PRODUCE 10.00 SEC FINISH

WT =	175.000	LB
	5.435	SLUG
POWER =	727.900	FT-LB/SEC
INITIAL FORCE =	225.000	LB
WIND VELOCITY =	0.000	M/SEC (MINUS = TAILWIND)
	0.000	FT/SEC
AIR DENSITY =	0.075	LB/CU FT
DRAG AREA =	6.000	SQ FT
TRACK SLOPE =	0.000	M/M (0 TO .001 IS ALLOWABLE)
EXTRA FORCE =	0.000	LB
100 M TIME, SEC =	10.000	

TIMES BASED ON VARYING CONDITIONS

TRACK SLOPE	TIME SEC
0.0000	10.000
0.0005	9.990
0.0010	9.980
0.0015	9.970
0.0020	9.959

HEAD WIND M/SEC	TIME SEC
2	10.370
1	10.174
0	10.000
-1	9.847
-2	9.714

ELEV METERS	TIME SEC
0	10.000
1000	9.902
2000	9.813
3000	9.749

DRAG AREA SQ FT	TIME SEC
7	10.136
6	10.000
5	9.864
4	9.727

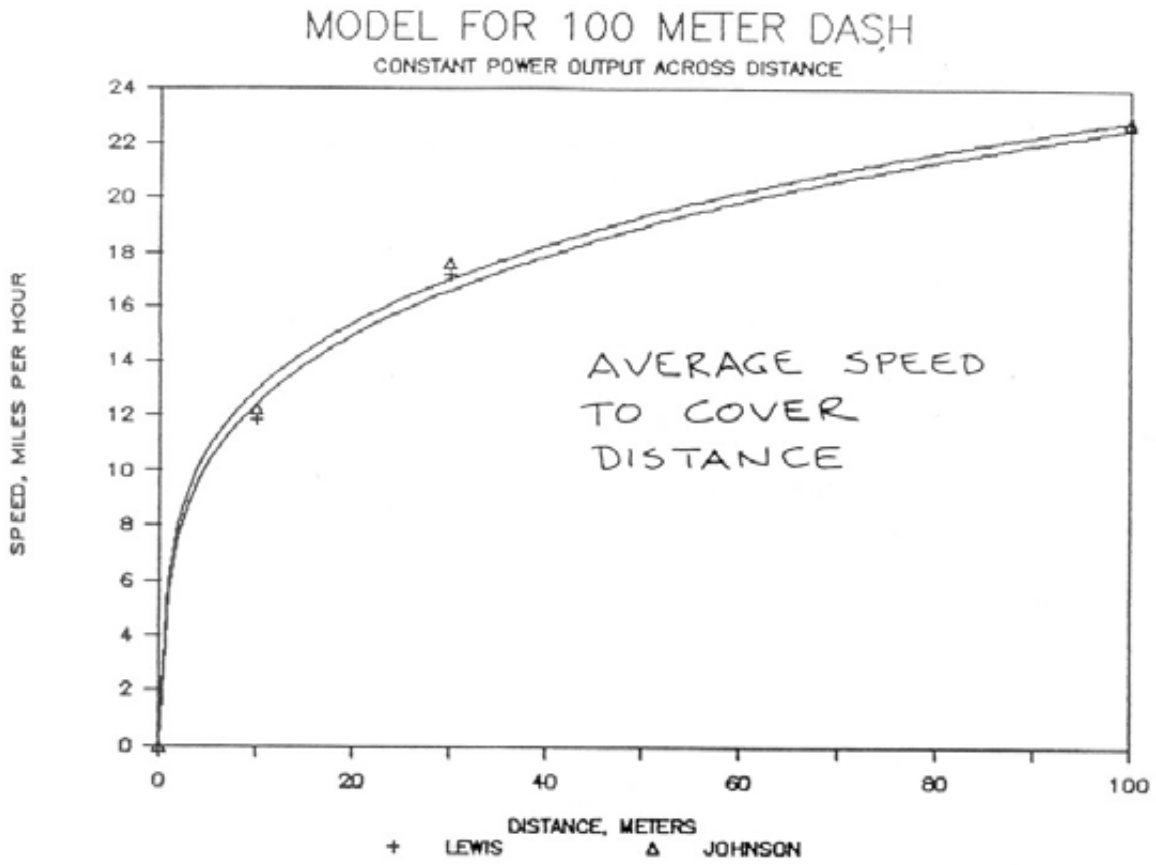
INITIAL FORCE LB	TIME SEC
50	10.910
100	10.548
200	10.093
225	10.000
300	9.749
400	9.455

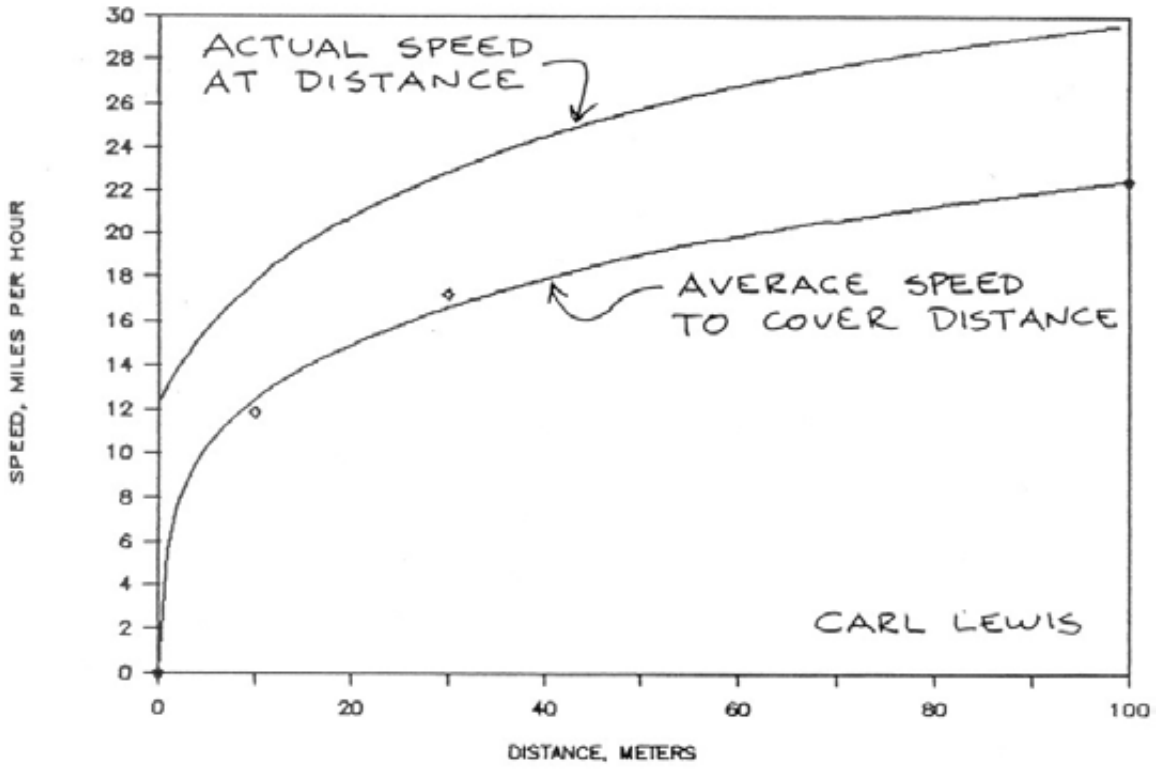
BODY WT LB	TIME SEC
125	9.147
150	9.588
175	10.000
200	10.386

COMPARISON WITH SEOUL 1988

	LEWIS	JOHNSON
WT	175.000	165.000
POWER	704.800	672.500
I FORCE	225.000	240.000
D AREA	6.000	5.720
WIND	-1.100	-1.100
SLOPE	0.000	0.000
AIR D	0.075	0.075

	ACTUAL		THEORETICAL	
	LEWIS	JOHNSON	LEWIS	JOHNSON
10M TIME	1.890	1.830	1.800	1.730
30M TIME	3.900	3.800	4.037	3.938
FINISH	9.920	9.790	9.920	9.790


MODEL FOR 100 METER DASH
CONSTANT POWER OUTPUT ACROSS DISTANCE
SPEED, MILES PER HOUR
0
2
4
6
8
10
12
14
16
18
20
22
24
AVERAGE SPEED
TO COVER
DISTANCE
0
20
40
60
80
100
DISTANCE, METERS
+ LEWIS
Δ JOHNSON


SPEED, MILES PER HOUR
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
ACTUAL SPEED
AT DISTANCE
AVERACE SPEED
TO COVER DISTANCE
CARL LEWIS
0
20
40
60
80
100
DISTANCE, METERS

Dear Peter Riegel:

Nobody specifically asked, but, on the attached sheet, are my thoughts about the best way to measure race courses when the surface is such that a bike can't be used.

Thanks for doing Measurement News. I always read it eagerly.

I'd like to see more information about traffic control for measurers. There have been interesting tidbits presented as part of measuring reports, but I don't recall a specific discussion of the subject.

The one time I measured with a police escort, the police escort consisted of one man in a police car who drove in front of us and he was of little use. When driving into traffic, he ran a great risk. Maybe that's why, after a few miles, he said he had to go deal with a domestic dispute, and definitely wouldn't be back to help us that day. We continued without him. A man on a non-measuring bicycle was of more use. He rode up to blind curves and waved us on when it was safe to proceed.

Police escorts that are useful seem to involve more than one vehicle, oftentimes motorcycles, and some sort of leapfrogging technique that allows the policemen to actually shut down traffic when measurers are heading into traffic. I would think that the policemen would have to know where on the road the measurers would be before the measurers got there, but I don't know how that is communicated.

I'd like to see instructions written by a policeman that could be given to policemen who are going to escort measurers. The policemen I've worked with don't seem interested in my advice or instructions but maybe they'd pay attention to instructions written by another policeman.

While I'm writing, I can't resist the temptation to make some comments on the contents of the latest "Measurement News".

I don't like those puzzles because they make me feel like an idiot. They seem to require math above the eighth grade level. I find that, relative to the average educated adult, I'm a math wiz because I can figure out my average pace per mile for any distance (the average lawyer will tell you he can do it, but he's lying), but my mathematical knowledge pretty much stops with long division.

About your article on where on the road to measure. Course Measurement Procedures says, on page 13:

> "When making a turn, measure prudently close to the curb or edge of the roadway. Thirty centimeters (one foot) from the edge of the roadway is a good guide. Often man-holes, storm drains, broken pavement, and other hazards render this impractical. In such cases, attempt to measure the shortest route that a runner may be expected to take. You may wish to walk the bicycle through such sections if they are relatively short."

Nothing about 20cm from the edge of non-curbed roads. Actually, it's unclear that "The Book" (unless there is a contradictory passage I missed) suggests anything different from what you suggest. In fact, maybe you wrote the above-quoted passage. However, in your "Measurement News" article, you say nothing about walking the bike through stretches that are

difficult to ride. I think that is very important. There are places in many courses a runner wouldn't have to perform any impressive heroics to run through but that would be difficult or impossible to pedal through. I find I have to "scooter" through most 90-degree turns in order to stay within 30cm of the curb or road edge. I can't pedal through because of the danger (or certainty) of a pedal, or the rear wheel, hitting the curb, or of falling because of sand. One can often run where one could not pedal. And what's this, both in "The Book" and in your article, about storms drains being obstacles? Many runners may avoid them, but many don't. Try it on your next run; unless your stride length is miniscule, you should have no trouble going over them. Some designs may grab bike tires, but a bike can always be walked over them. This stuff about how close to the edge of the roadway you measure at turns is very important. My calculations indicate that if your average 10km (about twenty 90-degree turns) is measured three feet from the edge of the road at turns instead of one foot, it will come out nine meters short on a validation ride.

About the issue of conveying to runners that a course is certified. I don't want to block the insurance that comes with sanctioning to any race as long as the race isn't guilty of false advertising. But I don't like it that entry forms for races with non-certified courses proclaim themselves "TAC sanctioned". We know that sanctioning doesn't mean anything, but the general public will always believe that sanctioning requires the race to adhere to certain standards, which people rationally assume include an accurate course. Maybe we should try to get races to agree not to advertise the fact that they are TAC sanctioned unless they are using a certified course.

Sounds like Scott Hubbard was using a calibration course with more uphill in one direction than the other and was wobbling more in the uphill direction. Maybe he could try using a lower gear-- it's hard to keep from wobbling when one is straining against the pedals.

About the "Handicap Racing" article. People seem to enjoy handicap races, but it frustrates me that it's impossible (as you point out) to handicap people so that the winner necessarily ran the highest caliber time, that is, ran the time that is the closest proportionately to the theoretical world record time for the runner's age and sex. Therefore, I'd be more interested in putting on a race where everybody started together, but that awarded prizes based on the caliber of performance, determined by percentage of the theoretical single-age record. I might give prizes to the thirty "best" times. The only problem with that is that many older runners who normally win prizes wouldn't. There are many more men 19-34 who can break 33 for the 10k than there are women 50-54 who can break 45, although I calculate those standards to be about equal in quality. Actually, I know of two area women 50+ who run under 45 for the 10k, but the women 50+ who run in the eight-minutes-a-mile range and always win a prize might be a little disappointed. Simple "envelope of excellence" tables would be what I'd like to see, tables that indicate what the record should be for each age and sex if all the records were on the curve established by the best single age records.

About Alan Jones's column. I enjoy it, but I think there is too much emphasis on computers. As pointed out in the TAC finish line book, computers are not required to produce accurate

results. The most accurate way to establish an order-of-finish list is with placecards the runners fill out. Even if a runner is running with the wrong number, or no number at all, you know who he is. Unlike tear-off tags, you can throw placecards up into the air, and can still put them back into the correct order. Surprisingly, if given enough space, most runners, even seconds after finishing and without their glasses, write as legibly on placecards as on entry forms. Unlike order of finish lists determined solely by lists of race numbers, runners are not misidentified if a digit is ambiguously written.

I like to produce complete results by starting with a list of all the times from the printing timer, and a list of all the finishers (in order of finish) that includes select times written next to the appropriate runners, as well as each runner's town, age and sex. Each list has to have the same number of lines per inch. I then cut and paste, leaving blank lines, in one column or the other, where necessary but never eliminating any times or finishers, so that each runner is given the slowest time the evidence will support. The results that are produced allow anyone looking at them to see how the times and finishers were matched. As I understand computers, the sort of cutting and pasting I describe is near-impossible to do with one. Does either Alan Jones's or Jack Moran's computer program allow this to be done without the use of scissors and rubber cement? I think it would be neat if those computer programs bolded or underlined all the performances that met the TACSTATS standards.

Sincerely yours,

David Reik

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

MEASURING WITH A FIBERGLASS TAPE

by David Reik, Connecticut

I don't think fiberglass tapes should be used for measuring calibration courses, but I think they are better than steel tapes for measuring race courses or sections of race courses.

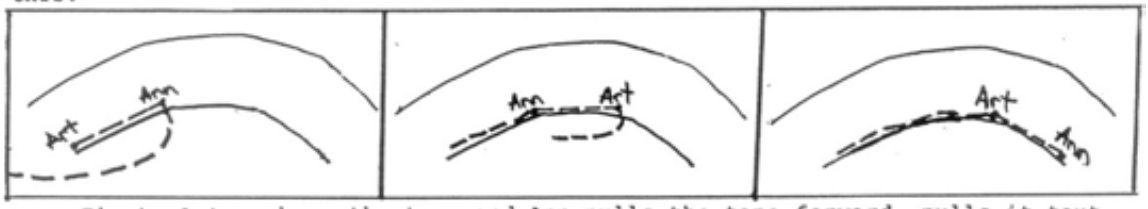
Unlike fiberglass tapes, steel tapes, when used for measuring wet, curvy, and/or car-infested race courses, kink, rust, and break. Unlike steel tapes, fiberglass tapes can be repeatedly driven over without breaking. Relative to the other sources of inaccuracy when measuring race courses, the difference in accuracy between steel and fiberglass tapes is not crucial.

300' fiberglass tapes are readily available since they are used by high schools and colleges for measuring javelin, discus and hammer throws. I saw a 300' Lufkin fiberglass tape for sale in a local discount tool store for about $60.

A 300' fiberglass tape seems to be the most practical tool with which to measure a bumpy or slippery surface with accuracy similar to the sort of accuracy one can achieve with bike measurements on smooth pavement. The 300' fiberglass tape I tested on a 300' steel-taped calibration course was, when pulled with the minimum tension needed to make it taut, within 0.03% of accurate, and when pulled hard, about 0.1% long. I was not able to detect any temperature-caused change. Although fiberglass tapes are more stretchy than steel tapes, that stretchiness tends to produce long courses, and not intolerably long courses. I twice measured three dirt stretches of a race course with a 300' fiberglass tape. These are the results:

	First Measurement	Second Measurement
Section A	1310.1'	1309.0'
Section B	1565.3'	1564.0'
Section C	7668.7'	7671.3'
	10544.1	10544.3

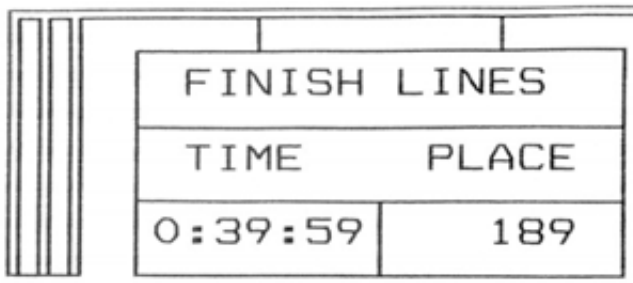
My experience indicates that the best way to measure a race course with a fiberglass tape is like this: Take the the tape off the reel. Use full tape lengths. Mark each endpoint with a sheet from a pad of paper. Before measuring, label the sheets with the distances they will mark, 300', 600', 900', etc., and check them while they are still all together so you can be sure you didn't miss a number, or use one twice. Work with a partner. Make sure the tape is anchored, by yourself or your partner, at at least one point on the shortest possible route at all times. The partners should leap frog each other like this:



First, Art anchors the tape and Ann pulls the tape forward, pulls it taut, and anchors it. Then, Art pulls the tape forward, pulls it taut, and anchors it, and so on.

There are courses that we'd like to measure accurately, and have certified, but that we can't, with any certainty of accuracy, measure with a bike or wheel. We know that the slipperiness of grass can cause a bike measurer to lay out a long course, and a hard, bumpy surface such as cobblestones can cause a bike measurer to create a short course. There are major races in which notable times are run that include sections of grass or cobblestones. I suppose a measurer could establish a calibration course for each type of surface, but that would get tricky if there was a mixture of surfaces.

Course Measurement Procedures says that all calibration courses must be paved, and that steel tapes are the only sort of tapes acceptable for measuring race courses, although it doesn't describe how one should measure around curves with a steel tape. The new version of The Book should have more information on measuring non-paved courses.



Finish Line Sub-Committee
Alan Jones, Chairman
3717 Wildwood Drive
Endwell, NY 13870
(607) 754-2339
January 1989

NON-COMPUTER RESULTS

I've had some correspondence with David Reik who suggests that this column puts too much emphasis on computers. He states in a letter to Pete Riegel:

> The most accurate way to establish an order-of-finish list is with place cards the runners fill out. Even if a runner is running with the wrong number, or no number at all, you know who he is. Unlike tear-off tags, you can throw place cards up into the air, and can still put them back into the correct order. Surprisingly, if given enough space, most runners, even seconds after finishing and without their glasses, write as legibly on place cards as on entry forms. Unlike order of finish lists determined solely by lists of race numbers, runners are not misidentified if a digit is ambiguously written.

He then goes on to describe how he sticks the finish cards on the printing timer list and cuts and pastes as errors are uncovered. He says, "Does either Alan Jones' or Jack Moran's computer program allow this to be done without the use of scissors and rubber cement?" I can't answer for Jack but I assume his does. My program displays the results on the computer screen and allows the user to delete a time (extra hit on push button or bandit), insert a time (missed one), delete a bib number, insert a bib number, delete bib number and time together (bandit), or insert a bib number and time (missed someone completely).

First of all, let me say that I am delighted to receive letters such as David's. He makes some good points. At the very least, it tells me I have one reader. I agree with David that races can be scored without a computer. In fact I scored races from 1971 through 1976 with nothing more than a typewriter and a Ditto machine. One characteristic of races I score is that **all** the runners leave with a copy of the results. When I told David this, he asked what size races I was talking about and assumed it was under 300. He's right although I have done one that had 400. As he points out, as the number of finishers doubles, the number of sheets one has to run off quadruples.

David thought I should describe in this column how I handle races and accomplish the feat of getting results out so fast. Okay, but it's a bit embarrassing. You see, I've given talks, run workshops, and advised a number of people about how to use tear-off tags. However, as David (and Ken Young before him) has stated, if the tear-off tags are your only record, a dropped stringer or an insufficiently trained helper can cause a disaster. How many times have you had a person collect several tags together and then put them on the stringer in the wrong order?

The way I handle a finish line is simple yet has built-in checks. And it has nothing (or almost nothing) to do with the fact that I'm using a computer. We have four people right at the finish line, one runs the printing timer, one calls out times, one calls out bib numbers and the third puts check marks and, when possible, bib numbers next to times on a pre-printed tick sheet. The runners wear economy numbers with no advertising and no tear-off tags. As they leave the chute, one person calls out the numbers and **two** teams write down the numbers. I always use

women for writing down the numbers. Men have lousy handwriting. (Okay, so I'm sexist.) As I've mentioned before in this column, the toughest task is the tick sheet. I try to find an intelligent person who can work under pressure. However, I have had competent people absolutely panic when things get wild. The only advice on finding a person to handle the tick sheet is that once you find one, don't let him go. Break his leg if he (or she) is starting to show interest in running himself. The one change in the finish line procedure brought about by computers is that technology now allows us to collect **all** the times and as many select times as we can electronically and feed them directly into the computer -- a real time saver which also gives more accurate results. Of course, for a large race a computer is a necessity.

The point I am making is that the use of a computer does not really change the finish line procedures much at all. The advantage of having a computer is that results can be printed quickly and, more important, when errors are found, corrections can be made and new result sheets printed.

Another point David makes is that his method eliminates the problem of people running with the wrong number. He is correct. This is a problem. Sometimes one person picks up numbers for several people at the same time. When this is done, your worker should write the name of each competitor on each number. The other problem is that a person signs up for one race and runs in the other race. Even if the two races have separate series of numbers, this slows the results down since the person's entry form has to be dug up and the information typed into the computer. You can't just eliminate the place because if might not have been the runner's fault; he might have been given the wrong number by a volunteer.

One problem I have had with place cards which the runners turn in that there are always a few that just won't bother. Others will be too exhausted. I just think that when a runner finishes a race she should not have to do anything other than accept a drink from a volunteer. Sometimes we do hand out finish tags which are just pre-numbered cards. Of course, due to unregistered runners and other problems, the finish number on the tag and the number on the result sheet are often off by one or two. When a runner comes up to me and asks about the discrepancy, I reply, "Yes, I know. But your time is right." "My time is right?" he replies. And off he goes very happy.

David asked me to also point out limitations of our system. I would say that right now the biggest problem is a race where there are too many race-day registrants. This can be alleviated somewhat by having more computers.

WHO'S IN CHARGE?

Bill Glauz described a terrible experience he had where he was in charge of results and someone else did all the registration. When they ran out of printed numbers they made up new ones by hand but different teams used the same numbers! I, too, have had problems where I was not in charge of the registration and the finish line and assumed that things were in good shape.

Alan's rule of race organization:

Don't assume anything!

This is similar to Ken Young's:

All screw-ups are caused by assumptions.

HANDICAP RACES

Pete Riegel has been having fun with handicap races where people start at different times according to their handicap. We did this for a while at our monthly club races but I just couldn't control the people. Several people would decide that they didn't like the handicap they were given and would start whenever they darn well pleased. However, the races were fun. We'll have to try it again using Pete's handicap chart. It would also be interesting, as David Reik has suggested, to start everyone at the same time but then re-process the results based on adjustments according to Pete's formulae. We used to do this, also, based on a similar formulae I derived. This worked better than the staggered starts.

DOWNHILL COURSES

Dan Brannen sponsored an amendment at the TAC Convention. It proposed that all courses having a drop in excess of 3.5 meters per kilometer be dropped from any record consideration at all. This item received the most spirited and prolonged RRTC discussion of all the amendments. Action on the amendment was deferred until next year, because we did not have adequate facts at hand to intelligently deal with the matter. In this MN are presented some numbers which may give some of the needed information.

If the amendment is adopted we would have three types of courses:

1) Record-quality courses, with drop less than 2 meters per kilometer. Note: This category presently includes 95 percent of certified courses.

2) "Aided" courses, with drop of 2 to 3.5 meters per kilometer (this range includes the Boston Marathon). 2.1 percent of certified courses have a drop exceeding 2 m/km, but not exceeding 3.5 m/km.

3) Courses that are accurate but unsuitable for record consideration because of extreme drop, exceeding 3.5 m/km. This includes 3.1 percent of certified courses.

Subsequent discussion brought out the opinion of some that even 2 meters per kilometer was too much aid, and it was suggested that slope for "real" records be limited to 1 meter per kilometer. 8.4 percent of certified courses exceed this drop. A running track with a slope of 1 m/km is presently legal.

Everyone agreed that drop gives aid, but also that there was no obvious place to draw a line, if one was to be drawn at all. Any line would be arbitrary, even if based on rational thinking. Bob Langenbach suggested that in track events an arbitrary value of 2 meters per second tailwind was allowed, and that maybe the effect of this wind might somehow be equated to allowable drop in road racing. This would make road records roughly equivalent to track records in the amount of aid offered to the lucky runner.

My own view is that the courses exceeding 2 m/km drop are adequately covered as "aided" or "point-to-point" records, already recognized as lesser quality than those set on flatter, loop courses. I see no reason to further subdivide the range, since it's already a category of non-credible performances. It is true that the media seize upon the fastest "record" they can find. Should this result of ignorance or cynicism be a problem for us?

As for whether we should tighten our criterion from 2 m/km to 1 m/km, I think we should think about this long and hard before we change. Certainly 2 m/km gives more aid than 1 m/km. The question is, how much is too much?

If it ain't broke, don't fix it. Are we broke? We have an established and well-accepted system, and changing it will cause a disruption. Will the records need to be winnowed of those set on courses between 1 and 2, to eliminate the newly-aided ones? Is the disruption worth the added benefit of a small increase in record credibility? If we seek no aid at all, the logical thing would be to consider only closed loops, and accept no drop at all. Do we want this? Commentary is invited.

FREQUENCY DISTRIBUTION OF 2040 TAC CERTIFIED COURSES. THIS DISTRIBUTION INCLUDES ALL COURSES WHICH HAVE A LISTED DROP - PRINCIPALLY THOSE CERTIFIED IN 1987 OR LATER.

ALL COURSES
M/KM DROP

DROP	FREQ
-8	0
-7	1
-6	1
-5	1
-4	6
-3	3
-2	6
-1	21
0	1536
1	294
2	75
3	26
4	19
5	4
6	6
7	7
8	2
9	1
10	5
11	5
12	4
13	3
14	3
15	1
16	3
17	2
18	2
19	1
20	0
21	0
22	0
23	0
24	0
25	1
26	0
27	1
28	0
29	0
30	0
31	1

3 TO 4

ALL COURSES
PERCENT SEP

SEP	FREQ
0	356
10	1431
20	65
30	23
40	17
50	16
60	9
70	19
80	24
90	24
100	57

(THERE ARE 356 COURSES WITH A SEP OF 0. THERE ARE 1431 COURSES WITH SEP FROM 0 TO 10)

(ALL THE CHARTS ON THIS PAGE ARE READ AS ABOVE)

70 TO 80

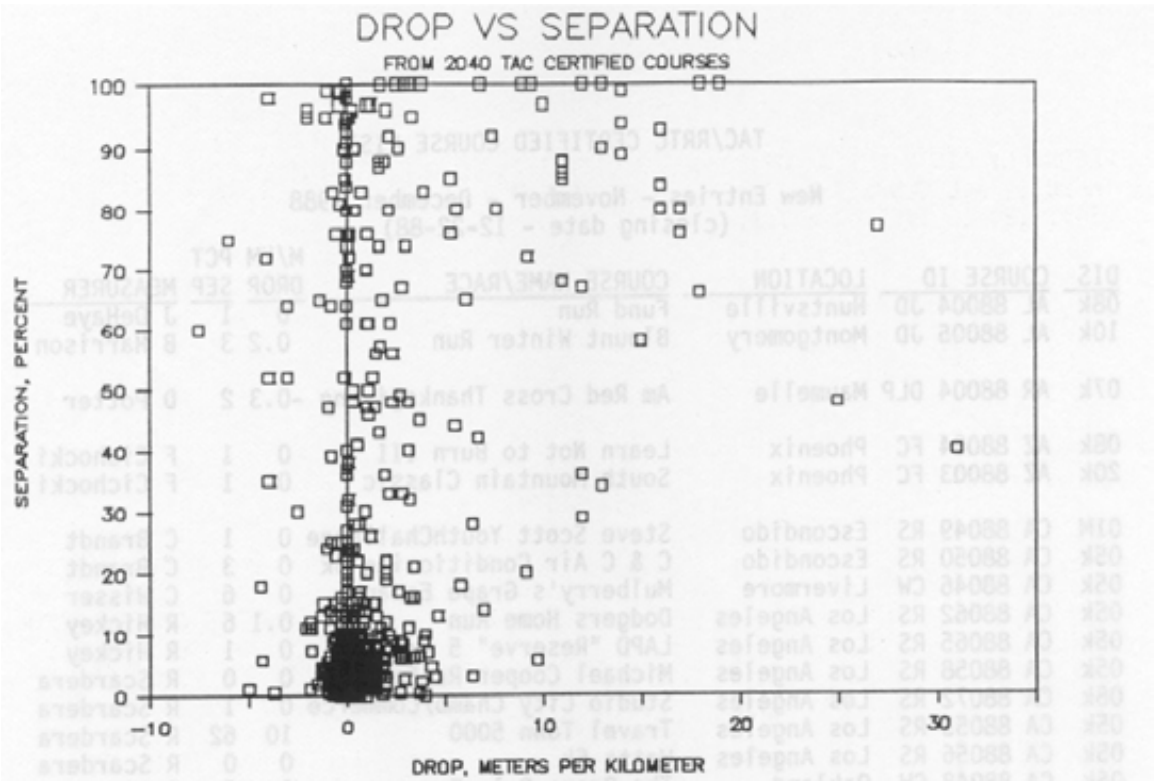
PRESENTLY LEGAL COURSES (DROP <2, SEP <10)
M/KM DROP

DROP	FREQ
-6	0
-5	1
-4	1
-3	1
-2	0
-1	12
0	1446
1	254
2	47
3	0

-1 TO 0

Listed Extremes

06+M	CA	88018 RS	San Diego	LeukemiaCoronadoBridge	6.5	-7.5	60	C Brandt
05k	CO	87019 TK	Evergreen	Freedom Run 5 km		31	40	B Durden



Don't spit or throw stuff in class. Just work.

PROGRAM FOR HANDLING COURSE LIST

Pete Riegel and I have been having fun managing the Certified Course List using my program Running Score II. If you would like this same capability, I am making this Running Score II available at cost provided you don't go out an score races with it since I market it for that purpose and my customers might get upset. Here is the offer:

For $5.00 you receive:

1. A diskette with Running Score II
2. Two diskettes with the course list (won't fit on one)
3. A READ.ME file on diskette 2 telling how to install and get started.

What you can do:

1. Print out the entire list.
2. Print out the list for any state.
3. Print out the list for any certifier.

For an additional $20.00 you receive:

1. The Running Score II manual

With the manual you get directions on how to set up your own command files so you can get other listings.

What you need:

An IBM PC or compatible with a fixed disk (hard disk). If you have a 1.2 Meg diskette or a 720 KB 3.5" the course list will fit on one diskette. Specify if this is the case.

Where to order (be sure to specify what size diskette you wish):

Alan Jones
3717 Wildwood Drive
Endwell, NY 13760
607-754-2339

Updates to the Course List -- As Pete Riegel updates the course list every two months for **Measurement News**, he sends me a diskette and I convert it to the correct form for Running Score II. You can keep yourself up-to-date by sending me two diskettes and a stamped self-addressed diskette mailer every time MN is published.

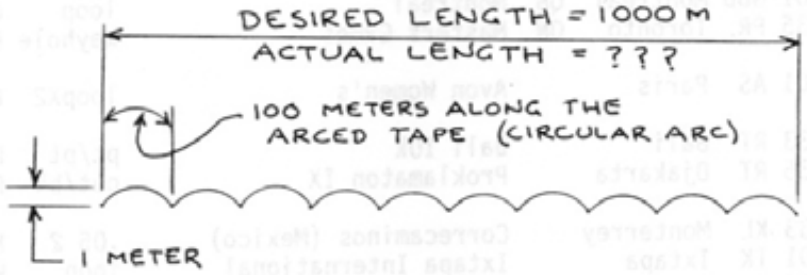
TAPING ON A WINDY DAY - THIS MONTH'S PUZZLE

You set out to measure a calibration course 1000 meters long, using 10 lengths of a 100 meter tape. The wind is crosswise to your calibration course, and try as you will the tape is blown into a circular arc, sideways from the direction you are going. It is blown 1 meter sideways at its midpoint. You are seized with consternation, since you realize your calibration course will be short!

Since you need the calibration course right now, windy or not, you lay down 10 lengths, each one being blown sideways 1 meter, and mark the ends, figuring that you can calculate the difference later.

You are now all done measuring and it's time to lick the pencil: How long is the calibration course?

Readers may thank Stan Wagon for this gem. He's also a math professor at Smith College, and likes to torture me with these things. This puzzle is a variation of one he sent which involved a mile-long railroad rail into which a prankster welded an extra foot. I worked it out by trial and error, and later found another way. There will be two winners this month: First answer using trial and error, and first answer that doesn't need it.



LAST MONTH'S PUZZLE

Brian Smith was first with the shortest route. He complained that the puzzle was too easy. Stan Wagon, editor of Ultrarunning Magazine, was next. He also pointed out part of the problem of measuring the pyramid, in that the line-of-sight distance between the peaks of the pyramids is not the shortest route. Bob Edwards sent a treatise in which he discussed which faces of the pyramids the rider should ride on, and why.

November 4, 1988

Pete Riegel
3354 Kirkham Rd
Columbus, Oh 43221

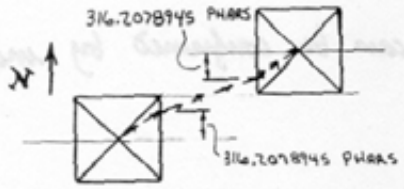
Pete,

This months' puzzle was a little tougher than usual I thought. However, we can't let ourselves be shown up by some ancient 'master measurer', can we? If the ancient measurer went through the same kind of gyrations I did on this one, I can understand why the papyrus was undecipherable. I'm only sending you an outline of my calculations, since the rest was also undecipherable.

I tried solving this as a general problem, planning to put in the specific values later. Well, it turned out to be a fairly involved constrained optimization problem which I would probably have to write a computer program to solve. I didn't want to get into all that, so I decided to scrap the general solution idea and go for just this specific case. As you can see from my outline, there are 3 cases to evaluate. I set up the 3 on a spreadsheet, and began to zero in on the solution. I soon discovered that case 2 would give me the shortest route. I calculated the shortest route on the spreadsheet, and then used calculus to verify the answer.

1.) Shortest route - 2898.4358 Phars

To get this shortest route, you start at the peak of one pyramid, travel down to a point on the base which is 316.2078945 Phars N. of the centerline on the pyramid. Then you travel in a straight line to a point on the base of the second pyramid which is 316.2078945 Phars S. of the centerline, and then straight up to the peak. (See sketch)



DROP = 0
SEP = 77.1%

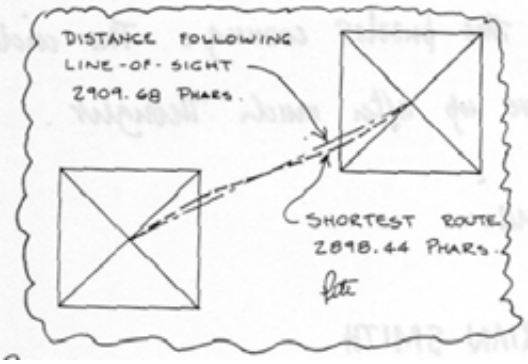
VERY GOOD!

2.) The reason this course would be difficult to measure without haveing some prior knowledge about the pyramid size and separation is that the course is very dependent on those variables. You couldn't even determine which face to travel on without knowing that information.

One of these days I know I'm going to make a math error, but I've looked at this one enough to be fairly confident.

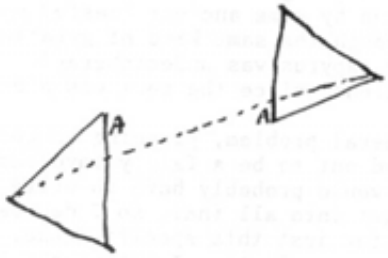
Bob Edwards

Bob Edwards



Why such an easy one ?

Lie the facing sides of the pyramids down flat



and intuitively the straight line seems the shortest distance, by right angle triangulation this distance is :

```
1000 H#=((700#*700#)+(500#*500#))^.5#
1001 B#=2*H#+(1000)
1002 D#=((B#*B#)+(1000*1000))^.5#
1003 PRINT"SHORTEST DISTANCE =":D#:"PHARS"

SHORTEST DISTANCE = 2898.435803466595 PHARS
```

That this is the shortest distance can be confirmed by increasing and decreasing A above

	A
2898.4358034668	183.7918
2898.4358034668	183.7919
2898.4358034666	183.792
2898.4358034666 ⟷	183.7921
2898.4358034666	183.7922
2898.4358034668	183.7923
2898.4358034668	183.7924

```
FOR A=183.791 TO 183.793 STEP .0001
X=((500*500)+(A*A))^.5
H=((500*500)+(700*700))^.5
Y=(((500-A)*(500-A)+(H*H)))^.5
D=(X+Y)*2
LPRINT CDBL(D);TAB(23);A
```

Keep the puzzles coming. The circle about the S pole was a doozie I gave up after much Thought.

Brian

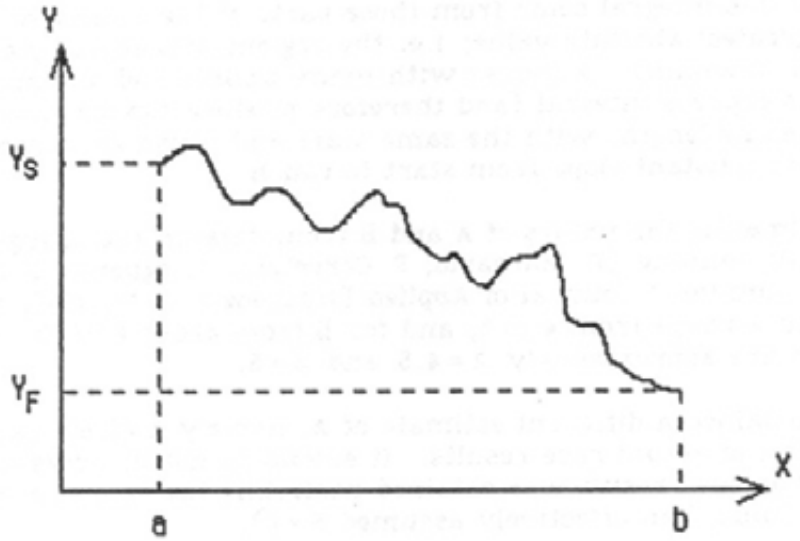
BRIAN SMITH
SOUTH CAROLINA 11.1.88

Hill Effect to Second Order

by Bob Baumel

To a first order approximation, the effect of an uphill or downhill course on racing performance is determined entirely by just one number — the net elevation difference between start and finish; at this level of approximation, the precise pattern of uphills and downhills doesn't matter. Nevertheless, a race director might say: "Sure my course drops 500 meters, but it's really tough because it climbs 1000 meters before falling 1500 meters!" To see if such claims have any validity, I have tried deriving the form of the "second order correction" for the hill effect. These calculations may not have much impact on our final decision regarding legal drop for road records, but may nevertheless provide insight on the effects of hilly courses.

To fix our notation, consider a course profile represented by an X-Y curve such as you have surely seen if you've ever taken a calculus course:



The difficulty of running the course can be quantified by assigning it an "effective length" L_{eff} defined as the length of the perfectly flat course that would produce times identical to those run on the actual race course. My formula for this effective length is:

$$L_{eff} = L + A(Y_F - Y_S) + B\int_a^b (dy/dx)^2\, dx$$

where L is the actual length of the course, and A and B are coefficients whose values probably vary somewhat for different runners, but we'd better assume they have universal values if we want to make any general statements regarding the difficulty (or "aidedness") of various race courses.

I derived the above equation by considering the shape of the curve obtained if you plot energy consumption per unit course length (dE/ds) as a function of slope (dy/dx). (This can be measured in an exercise physiology lab by hooking up oxygen measuring equipment to people running on inclined

treadmills.) Astute readers with a knowledge of calculus will realize that the net elevation difference ($Y_F - Y_S$), which appears in the "first order" term (multiplying the A coefficient), is really the integral of (dy/dx) to the first power. The second order term (multiplying the B coefficient) involves the integral of $(dy/dx)^2$. Similarly, the third order term would involve the integral of $(dy/dx)^3$. (But considering how hard it is to get a handle on the 2nd order term, there's not much point in considering a 3rd order term!)

The coefficients A and B are dimensionless (i.e. have no units) and must surely be *positive* numbers (otherwise the predictions of the equation would violate our experience and common sense). The entire first order (A) term of the equation turns out to be positive (denoting effective *lengthening*) when the course has a net climb ($Y_F > Y_S$), but is negative (indicating effective *shortening*) for courses with a net drop ($Y_F < Y_S$).

The second order (B) term is always positive, and thus always corresponds to an effective lengthening of the course. I will refer to the integral multiplying the B coefficient as the "steepness integral" because the greatest contributions to this integral come from those parts of the course where dy/dx has the greatest absolute value; i.e. the regions of steepest grade (either uphill or downhill). A course with many uphills and downhills will have a greater steepness integral (and therefore produce slower times) than a course of the same length, with the same start and finish elevations, that simply maintains constant slope from start to finish.

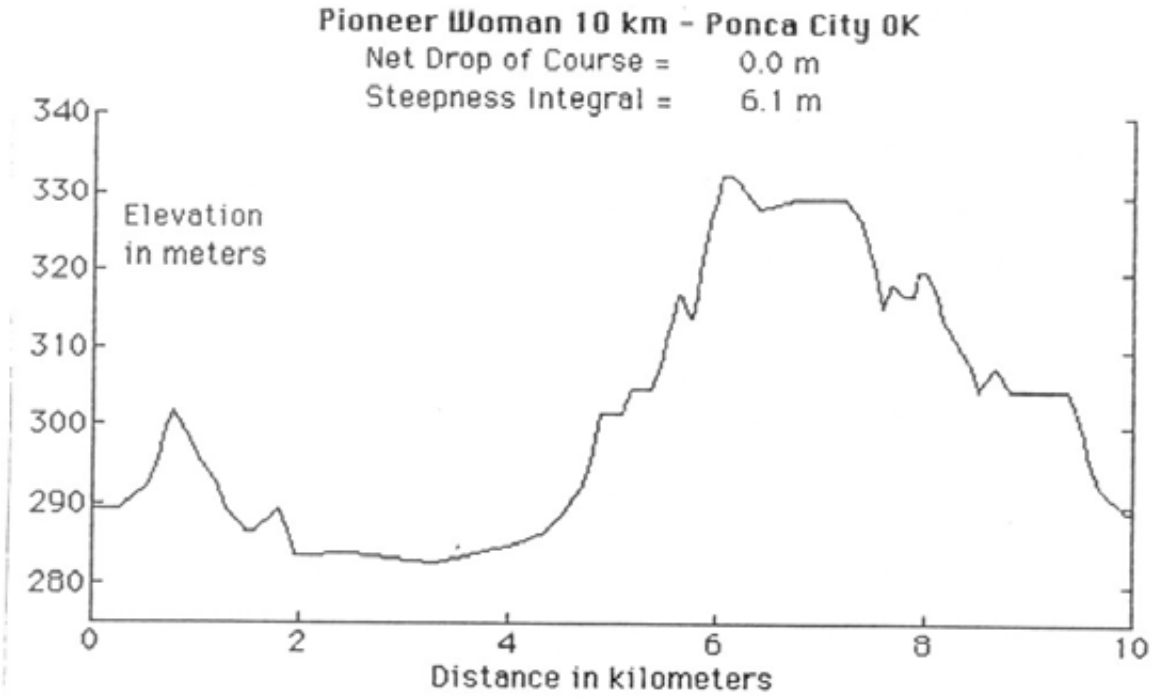
I have tried estimating the values of A and B from data on the energy cost of inclined treadmill running (R. Margaria, P. Cerretelli, P. Aghemo, G. Sassi, "Energy cost of running," Journal of Applied Physiology, v. 18, 1963, p. 367). My estimates for A range from 4 to 5, and for B from about 4 to 10. My "best" estimates are approximately $A = 4.5$ and $B = 5$.

Ken Young has obtained a different estimate of A, namely $A = 2.65$, based on statistical analysis of actual race results. It should be noted, however, that this empirically-derived result was obtained neglecting the second order term in my equation (thus, Ken effectively assumed $B = 0$).

I have no idea, at this time, just how big the 2nd order (B) term typically is compared with the 1st order (A) term. One possibility is that the 2nd order term is big enough as to partially cancel the 1st order term for most courses with a lot of drop. This could explain why Ken Young's empirical $A = 2.65$ figure (derived neglecting 2nd order effects) is so much smaller than the $A = 4.5$ figure I derived from inclined treadmill data.

The other possibility is that the 2nd order term is really quite negligible compared with the 1st order term in all cases of practical interest. If so, then the difference between Ken Young's $A = 2.65$ and my $A = 4.5$ is probably due only to experimental error in the inclined treadmill data I used.

To find out how important the 2nd order term really is, we must evaluate the "steepness integral" for a suitable variety of actual race courses (especially for some of the well-known courses with significant amounts of drop such as the St. George Marathon, Boston Marathon, etc.). I have written a program to calculate this integral, given proper input data.



The above graph shows the output of this program for a local 10 km course in Ponca City. The first-order term vanishes for this course because it has no net elevation difference. The "steepness integral", as calculated by the program, is about 6 meters. Assuming B=5, the 2nd order term produces an effective lengthening of about 30 meters. This predicts that times on this course should be slower than on a flat 10 km course by about 5 seconds for race leaders running at 3 min/km pace, or by about 9 seconds for a middle-of-the-pack runner doing 5 minute kilometers.

I appeal to all readers for data so I can compute steepness integrals for other courses. The following columns of numbers show the sort of data I used for the above Pioneer Woman course. The left-hand column contains distances along the course, measured on the map in millimeters. (The map scale is 1:24 000, so that 1 mm on the map denotes 24 m on the ground.) The right-hand column contains elevations in feet (I didn't have a topo map with elevations in meters for this area).

I obtained the ~~above~~ *below* data by holding the edge of a piece of paper alongside the map representation of the course, recording data for every contour line that crosses the course. The computer has plotted the profile graph, and done the conversions to the units displayed on the graph.

0	950
9.3	950
22.2	960
25.9	970
27.6	980
32.25	990
38	980
42	970
49	960
53.1	950
61	940
64.1	940
74.7	950

SOLID TIRES

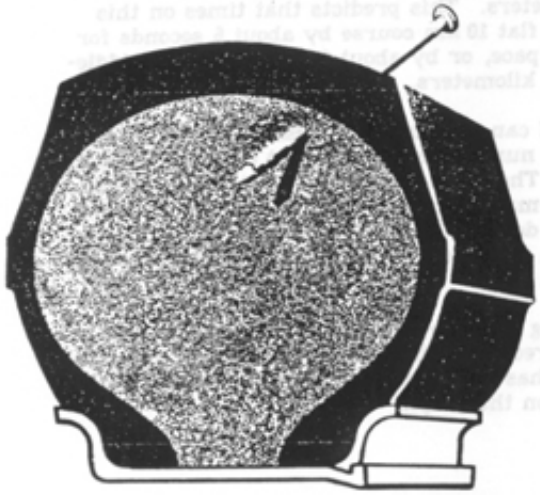
Mike Wickiser had his rear tire filled with "PermaFoam" by Goodyear. They put the valve stem at 6 o'clock and drilled a vent hole at 12 o'clock. Then they pumped in liquid goop until it rose and came out the vent hole. As it cured it expanded to form a flexible core, giving the tire "a combination of the best performance features of both solid and pneumatic tires" (according to the Goodyear brochure).

Mike said when he brought them a bike tire they were somewhat flabbergasted, since they normally do this to large truck tires, but they did it for him and charged him five dollars. Mike will report further when he's ridden on it a while.

I will be checking to see what's available. If you decide to do some local checking with Goodyear, please let me know what you find out.

GOODYEAR

Pneumatic Tires Inflated With PermaFoam



PERMAFOAM is a synthetic foam rubber compound developed by Goodyear for inflating industrial tires. The PERMAFOAM compound, while curing, expands to form a flexible core, giving the tire a combination of the best performance features of both solid and pneumatic tires.

In U.S. military applications under rugged conditions, PERMAFOAM inflated tires have demonstrated distinct advantages over pneumatic tires. First, they eliminated the expensive problem of equipment downtime due to flat tires. In addition, Goodyear tires inflated with PERMAFOAM maintain constant pressure—there's no need for pressure checks.

PERMAFOAM inflated tires also provide a ride equal to air inflated tires. Their cushioned ride often prevents cargo breakage and reduces vehicle wear, consequently reducing maintenance. Driver fatigue is substantially lessened by the cushioned ride, and Goodyear tires inflated with PERMAFOAM give better flotation on soft ground than solid tires.

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