July 17, 1995

Road Running Information Center - 5522 Camino Cerralvo - Santa Barbara, CA 93111

Dear Basil, Linda, Ryan -

Here is a ruthless cut at the results of the Santa Barbara seminar,sparing nobody's feelings. In our system we measure twice on a layout. We take the lower measurement as official, and adjust accordingly. If a validator finds us shorter than (nominal x .9995) our layout has failed.

We measured two different courses, each once. If we scale the results up to 10,000 meters for each course, we can make an approximate comparison of two measurements of a single course. If we do this we get the attached sheets.

Using all the reported results, we see that seven measurers had the required agreement within 0.0008. However, of those seven, three had measurements that would have been shot down by at least three of the others.

We thus have only four measurers whose measurements would survive these two tests - RS, PR, BL, NW.

I was not sure how to treat the measurements of BH and JB, since both incorporated non-standard methods, and since those of BH were adjusted several times after seeing the results of others. This muddies the water a bit. Perhaps they should be left out. If we do this we get a different set of five measurers who survive the cut - RS, TK, BL, ETM, NW.

Those who survive both cuts are RS, BL, NW.

I'm not sure how much relation to reality this has, but I find it amusing for contest purposes, since I enjoy the competitive aspect of this stuff. Of course, the whole thing rests on the initial assumption that the median is the correct value to use when normalizing to 10,000 m.

It sure would be nice to have the Magic Wand of Truth.
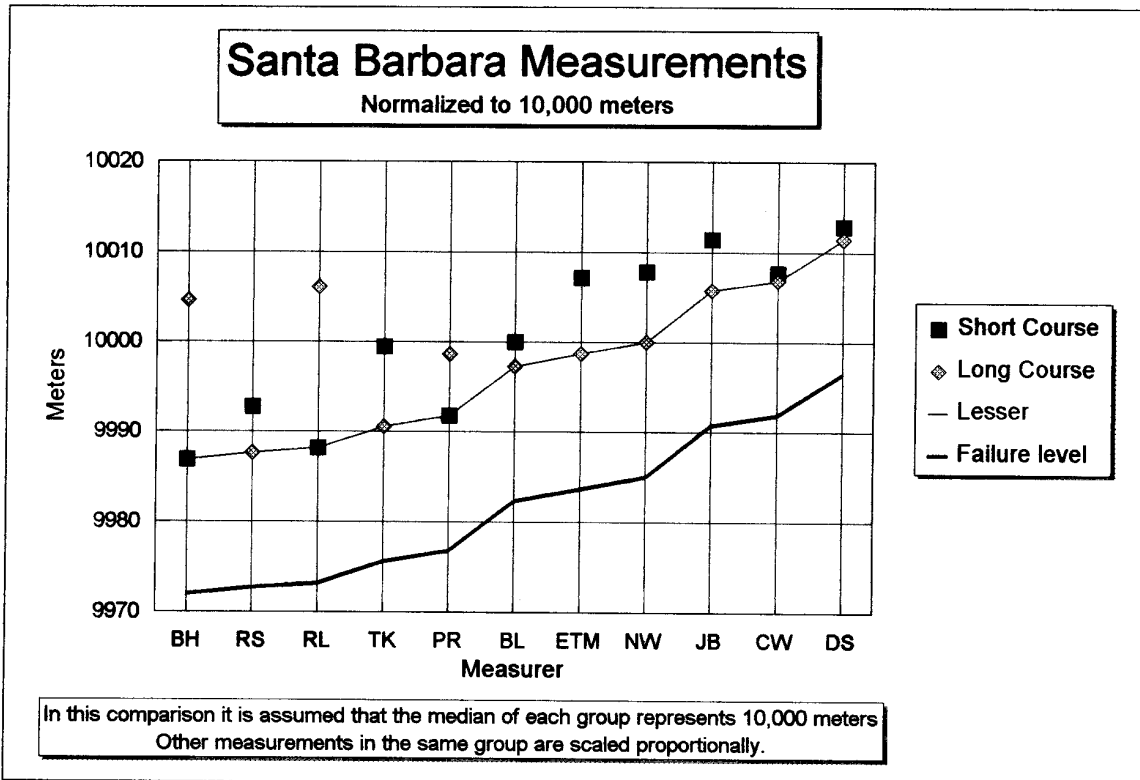
Have fun.

Best regards,

Measurements normalized to 10,000 m.

Median measurement of each group is taken to be 10,000 meters
Failure level is the lesser measurement divided by 1.0015

	Long Course	Short Course	Lesser	Failure Level	Agreement	Agreement <0.0008 ?	Fail any Validations?
BH	10004.56	9986.94	9986.94	9971.98	0.00176	no	no
RS	9987.66	9992.71	9987.66	9972.70	0.00051	yes	no
RL	10006.04	9988.17	9988.17	9973.21	0.00179	no	no
TK	9990.56	9999.44	9990.56	9975.60	0.00089	no	no
PR	9998.62	9991.82	9991.82	9976.85	0.00068	yes	no
BL	9997.28	10000.00	9997.28	9982.30	0.00027	yes	no
ETM	9998.69	10007.17	9998.69	9983.72	0.00085	no	no
NW	10000.00	10007.85	10000.00	9985.02	0.00078	yes	no
JB	10005.76	10011.43	10005.76	9990.78	0.00057	yes	yes
CW	10006.86	10007.68	10006.86	9991.87	0.00008	yes	yes
DS	10011.42	10012.83	10011.42	9996.42	0.00014	yes	yes

Santa Barbara Measurements
Normalized to 10,000 meters

Legend:
- ■ Short Course
- ◈ Long Course
- — Lesser
- — Failure level

In this comparison it is assumed that the median of each group represents 10,000 meters
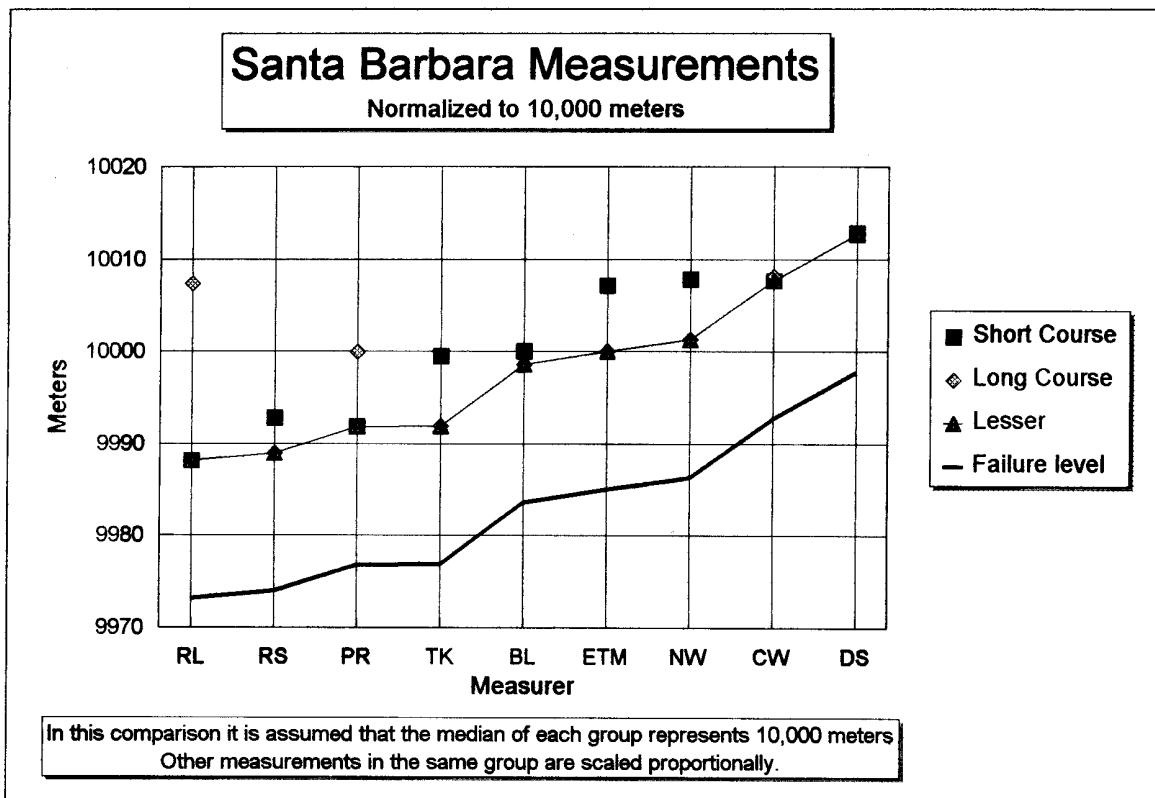Other measurements in the same group are scaled proportionally.

Measurements normalized to 10,000 m.

Median measurement of each group is taken to be 10,000 meters
Failure level is the lesser measurement divided by 1.0015

	Long Course	Short Course	Lesser	Failure Level	Agreement	Agreement <0.0008 ?	Fail any Validations?
RL	10007.35	9988.17	9988.17	9973.21	0.00192	no	no
RS	9988.97	9992.71	9988.97	9974.01	0.00037	yes	no
PR	9999.93	9991.82	9991.82	9976.85	0.00081	no	no
TK	9991.87	9999.44	9991.87	9976.90	0.00076	yes	no
BL	9998.59	10000.00	9998.59	9983.61	0.00014	yes	no
ETM	10000.00	10007.17	10000.00	9985.02	0.00072	yes	no
NW	10001.31	10007.85	10001.31	9986.33	0.00065	yes	no
CW	10008.17	10007.68	10007.68	9992.69	0.00005	yes	yes
DS	10012.73	10012.83	10012.73	9997.73	0.00001	yes	yes

Santa Barbara Measurements
Normalized to 10,000 meters

Legend: ■ Short Course; ◈ Long Course; ▲ Lesser; — Failure level

X-axis: Measurer (RL, RS, PR, TK, BL, ETM, NW, CW, DS)
Y-axis: Meters (9970 to 10020)

In this comparison it is assumed that the median of each group represents 10,000 meters
Other measurements in the same group are scaled proportionally.

Unequal length of Calibration Courses?

The north calibration course was measured several times. PR and ETM made the only measurement of the south side, in an effort to get a parallel course which was equal to the north baseline. They used the same tape, and laid out the same distance they had just obtained on the north course. The consensus length of the north calibration course was 303.40 meters, and this value was used in all calculations.

Normally the direction of calibration riding was to ride on the right i.e. to ride uphill on the north calibration course and downhill on the south course. Uphill and downhill calibration commonly produce unequal counts, because of the different load on the front wheel. However, if the two calibration courses differ in length, this will also produce different counts.

Pete Riegel and Norrie Williamson decided to see if a difference could be measured using bicycles. They did a series of "normal" 4 rides, and followed it by a series of 4 ridden in the opposite direction.

	North Side Uphill	South Side Downhill	South Side Uphill	North Side Downhill
Pete	3459.5	3460.5	3460.5	3460.5
	3460.5	3462	3460	3460.5
Average	3460	3461.25	3460.25	3460.5

Avg North	3460.25	
Avg South	3460.75	South side exceeds north by 0.5 counts

Avg Uphill	3460.125	
Avg Down	3460.875	Downhill exceeds uphill by 0.75 counts

	North Side Uphill	South Side Downhill	South Side Uphill	North Side Downhill
Norrie	3448.5	3450	3449.5	3450
	3448	3450	3449.5	3449.5
Average	3448.25	3450	3449.5	3449.75

Avg North	3449	
Avg South	3449.75	South side exceeds north by 0.75 counts

Avg Uphill	3448.875	
Avg Down	3449.875	Downhill exceeds uphill by 1 count

From the above, it may be that the south calibration course is longer than the north course by 5 to 8 cm. Also, in accordance with theory, downhill calibration produces more counts than uphill calibration.
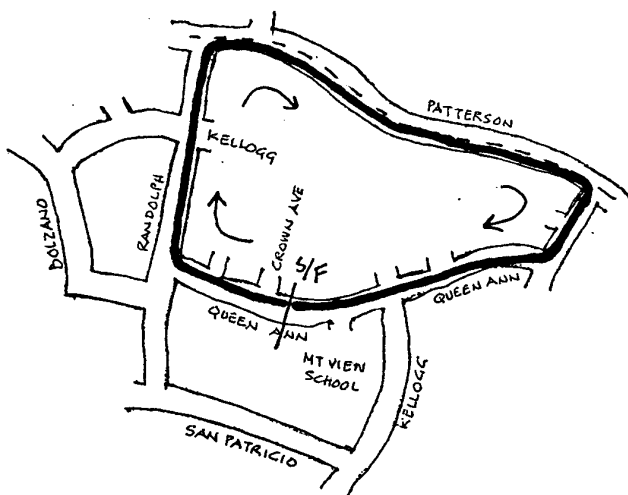
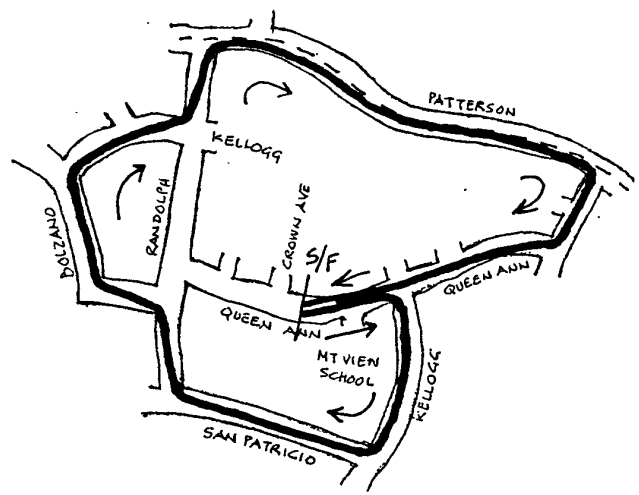July 13, 1995

Dear Jean-Francois,

Joan and I have just returned from Santa Barbara, California. I had fun at a measurement seminar. It was organized by Basil Honikman. I did not have to do any organization work.

After the seminar we drove 600 km north along the Pacific coast, from Los Angeles to San Francisco. Very beautiful.

Here is how the measurements looked. DS and RL are beginners. All the rest are experts. The course had many turns and parked cars.

SHORT COURSE

LONG COURSE

Best regards,

Pete

USA TRACK & FIELD

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July 13, 1995

Road Running Information Center - 5522 Camino Cerralvo - Santa Barbara, CA 93111

Dear Basil, Linda, Ryan -

Thanks for providing Joan and me with such fine hospitality and such a worthwhile program. Joan is planning to have the timing people give their system a trial at Columbus.

We enjoyed our drive up the coast, the visit to San Simeon, and a day of loafing in Monterey. Now we're back and it is 95 degrees outside, with high humidity.

I have completed such analysis of the data as I intend to do, and it's enclosed. The disk is a file in Lotus 1-2-3, saved in various versions. One should work for you. Brennand's data is incomplete - I didn't get his calibration rides on the long loop nor his course counts on the short loop. I think I have correctly represented Basil's values for his measurements. If I didn't, correct me if you want to.

I intend to reproduce the page with the graphs in next MN, but nothing else. If I get something better, I'll use it, but for now I consider myself done.

Now it's time to go out and mow the grass, followed by a restorative beer.

Best regards,

July 14, 1995

Norrie Williamson - 157 Mansfield Rd - Durban 4001 - Natal - SOUTH AFRICA

Dear Norrie,

I'm mailing this in the expectation that it will be waiting for you when you complete your odyssey via UK. Joan and I left Santa Barbara Monday morning, and drove up the Pacific Coast via the coastal highway (US 1), stopping at Hearst Castle enroute. Made me happy that there are rich people in the world - it would be a dull place indeed if we could not see what can be done with limitless wealth. I'd be no richer if they were poorer. Then we continued on to Monterey, where we spent a day in idleness, thence home to a dead battery in the car at the airport parking lot. Fifteen minutes got us a jump-start, and then home. It's 35C outside now, and high humidity. Not at all like the weather in Santa Barbara.

Since Basil is the organizer of the symposium, his also is the responsibility for reporting on the symposium. However, it's my mania to collect and play with data, and what's enclosed is about as far as I care to take it. Basil may make a fuller report, but I have no idea of what form it will take.

Here is what I've got. I was not careful when I collected the data, and I didn't get a full picture of John Brennand's data, missing his calibrations on one course and his measurements on the other. Both he and Basil employed some sort of mumbo-jumbo on the turns on Patterson. I think John's were the more accurate - he at least used an accurate map to determine the degrees of curvature. I think Basil may have fudged his answers as he saw the results coming in. Nevertheless, the page with the graphs is based on the on-site reported results. They do not differ substantially from the bicycle measurements, except for Basil and John, and that was intended.

I also tried to make some sense out of our calibration experiment. TK did a set of backwards calibrations too, but did not do a side-by-side setof normal calibrations. Maybe there is a difference between the calibration courses. Of course, there certainly is - the question is, is the difference noticeable? It looks like we tagged the southern course as being 5 to 8 cm shorter than the northern one. If we had had more time (or more inclination) we might have pinned it down more closely. Two EDM shots would settle the matter.

Our comparative cal course riding, besides indicating that the south course was a bit longer than the north, also shoes that we both accumulated more counts when riding downhill than uphill. On the downhill riding I was hardly pedaling at all. I would have expected that I'd be steadier, thus would ride straighter. Maybe I did, but it was overcome by the tire load factor. Who knows. There are a zillion things one can do at these seminars if only one has the time.

PLEASE REPLY TO: PETER S. RIEGEL, *CHAIR, ROAD RUNNING TECHNICAL COUNCIL*
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As for the prizegiving, I'm inclined to look at how things graphed out. On the long course, I take the measurements of BL, PR, ETM and NW as representing most closely the probable length. On the shorter course, I'd take PR and RS (and maybe TK and BL). The ones on both lists are PR and BL - so the right guy got the shirt. Of course, the truth is unknown.

In reporting on seminars I have found only three things on which to base a report. One is the determined length. Another is a detailed spreadsheet that shows everybody's data and calculated values, and compares them with what they calculate exactly. The last is the calibration steadiness, as represented by calibration variation. It's calculated as follows, using your data: On the long course, your precalibration rides were 3448.5, 3450, 3448, 3450. The span is 2.0 counts. On the postcal you had 3451.5, 3448.5, 3451.5, 3448.5, 3451, for a span of 3 counts. Your average is 2.5 counts per set of calibration rides.

I'm not terribly impressed with the rides of those who had no variation whatsoever - I think they should have had some. Given the uphill-downhill nature of the cal courses, and the fact that we were riding on two distinct cal courses, I am not sure just what the calibration variation figures mean. But it is interesting to note that Dennis Scott, who doesn't measure a lot, had both the most calibration variation and the longest measurement. On the other hand, Ryan Lamppa, who has never measured in his life, but who has worked with Basil and Linda for years with race results and record-keeping, and who has great mental acuteness, managed to put theory and practice together quite nicely. Or maybe I am just prejudiced. In the last two MN's Dennis Scott was the measurer of the Helen Klein 100 km course that Dan Brannen "validated." He still has not got the paperwork in, and is full of excuses why not. In theory, our Records Committee should disregard any marks set on an uncertified course, but Brannen's "validation" shows the course was probably OK, and we will likely accept the record - if Scott ever gets off his ass and finishes the work.

We cracked open your wine last night, and had a glass with dinner. It tasted good, and I thank you.

It was a special treat to meet Karin. She's charming and beautiful. What else can I say?

I hope the rest of your trip is pleasant, and also that we can find a way to get to South Africa some day. Then you can figure some ways to torture me on the bike, and twist my mind. Oh - for a definition - we could say that a curb (kerb) or edge is "the outer limit of the runnable surface."

Best regards,

Summary of Bicycle Measurements - Santa Barbara Seminar - July 8, 1995

Length of Calibration Course: 303.40 meters

All calculations include 1.001 Short Course Prevention Factor

Long Course

	TK	RS	NW	ETM	BH	PR	CW	BL	DS	RL	JB
Precalibration Counts	2856	2896.5	3448.5	3433.5	2904	3459.5	3443	2883	3089	2952	
	2857	2896.5	3450	3434	2903	3460.5	3444	2885	3093	2955	
	2856	2896.5	3448	3432.5	2905	3460.5	3444	2885	3091	2952	
	2857.5	2897	3450	3435	2904	3462	3445	2885	3094	2954	
Precal Constant, counts/m	9.424791	9.556762	11.379611	11.328885	9.581094	11.417553	11.362703	9.516758	10.200533	9.743584	
Calibration Variation, Counts	1.5	0.5	2.0	2.5	2.0	2.5	2.0	2.0	5.0	3.0	
Postcalibration Counts	2857	2896	3451.5	3434	2904	3461.5	3445	2885	3091	2951	
	2857	2896	3448.5	3434.5	2905	3460	3444	2884	3095	2954	
	2856	2896.5	3451.5	3433	2903	3462	3446	2885	3092	2952	
	2858	2897	3448.5	3434.5	2904	3459.5	3445	2884	3093	2953	
			3451								
Postcal Constant, counts/m	9.426028	9.555937	11.383158	11.329710	9.581094	11.417966	11.366002	9.516758	10.203832	9.741109	
Calibration Variation, Counts	2.0	1.0	3.0	1.5	2.0	2.5	2.0	1.0	3.0	2.0	
Calibration Change, Counts/km	-1.2	0.8	-3.5	-0.8	0.0	-0.4	-3.3	0.0	-3.3	2.5	
Avg Cal Variation, Counts	1.75	0.75	2.50	2.00	2.00	2.50	2.00	1.50	4.00	2.50	
Larger Constant, counts/m	9.426028	9.556762	11.383158	11.329710	9.581094	11.417966	11.366002	9.516758	10.203832	9.743584	
Average Constant, counts/m	9.425410	9.556350	11.381385	11.329298	9.581094	11.417759	11.364352	9.516758	10.202183	9.742346	
Start Count	43000	359006	798750	59900	50065	71987	91131	56535	96199	74115	31251
Finish Count	69640	386007.5	830951.5	91947	77195	104282.5	123306	83447	125098	101695	58514
Measured Counts	26640	27001.5	32201.5	32047	27130	32295.5	32175	26912	28899	27580	27263
Meters by Average Constant	2826.40	2825.50	2829.31	2828.68	2831.62	2828.53	2831.22	2827.85	2832.63	2830.94	
Meters by Larger Constant	2826.22	2825.38	2828.87	2828.58	2831.62	2828.48	2830.81	2827.85	2832.17	2830.58	
Meters as Reported	2826.2	2825.38	2828.87	2828.5	2830.16	2828.48	2830.81	2828.1	2832.1	2830.58	2830.5

Summary of Bicycle Measurements - Santa Barbara Seminar - July 8, 1995

Length of Calibration Course: 303.40 meters

All calculations include 1.001 Short Course Prevention Factor

Short Course

	TK	RS	NW	ETM	BH	PR	CW	BL	DS	RL	JB
Precalibration Counts	2857 2856 2856 2856.5	2896.5 2896.5 2896.5 2896.5	3450.5 3448 3450.5 3449.5 3451.5 3449.5	3436 3434 3433 3435	2905 2906 2905 2906	3459.5 3461.5 3459.5 3460.5	3444 3445 3444 3445	2884 2884 2884 2885	3091 3094 3092 3095	2950 2953 2949 2954	2913 2916 2914 2916 2915
Precal Constant, counts/m	9.423966	9.556350	11.382223	11.331360	9.586043	11.416316	11.364352	9.515934	10.204657	9.737810	9.616726
Calibration Variation, Counts	0.5	0.0	2.0	2.0	1.0	1.0	1.0	1.0	3.0	5.0	2.0
Postcalibration Counts	2856.5 2856.5 2856 2857.5	2896 2896 2895.5 2895.5	3448.5 3449 3450 3450.5 3450	3433 3434.5 3432.5 3433.5	2904 2903 2906 2905	3459.5 3460.5 3459.5 3461.5	3444 3445 3443 3445	2885 2883 2885 2884	3090 3095 3091 3094	2949 2951	2914 2916 2914 2915 2915
Postcal Constant, counts/m	9.424791	9.553875	11.381179	11.327648	9.582744	11.416316	11.363528	9.515934	10.203008	9.732861	9.616726
Calibration Variation, Counts	1.5	0.5	1.5	2.0	3.0	2.0	2.0	2.0	4.0	0.0	2.0
Calibration Change, Counts/km	-0.8	2.5	1.0	3.7	3.3	0.0	0.8	0.0	1.6	4.9	0.0
Avg Cal Variation, Counts	1.00	0.25	1.75	2.00	2.00	1.50	1.50	1.50	3.50	2.50	2.00
Larger Constant, counts/m	9.424791	9.556350	11.382223	11.331360	9.586043	11.416316	11.364352	9.515934	10.204657	9.737810	9.616726
Average Constant, counts/m	9.424379	9.555112	11.381701	11.329504	9.584394	11.416316	11.363940	9.515934	10.203832	9.735335	9.616726
Start Count	86817.5	274051.5	688628.5	44600	86012	49174	56167	91560	1245	75593	
Finish Count	103633	291098	708952	64833.5	103132	69527.5	76460	108538	19476	92948	
Measured Counts	16815.5	17046.5	20323.5	20233.5	17120	20353.5	20293	16978	18231	17355	
Meters by Average Constant	1784.26	1784.02	1785.63	1785.91	1786.24	1782.84	1785.74	1784.17	1786.68	1782.68	
Meters by Larger Constant	1784.18	1783.79	1785.55	1785.62	1785.93	1782.84	1785.67	1784.17	1786.54	1782.23	
Meters as Reported	1784.2	1783	1785.7	1785.58	1781.97	1782.84	1785.67	1784.3	1786.59	1782.19	1786.34