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v.677

*Instrumental Constants
Block Errors*

1875 - Jan. 1879

Charles W. Seyer, University Bookstore, Cambridge.



The formula used for the following computation is -

$$0 = I - R.A. + \Delta I + m + n \tan \delta$$

$$R.A. = R.A._0 + \Delta \alpha + \Delta \alpha' + (\Delta'' \alpha + \Delta''' \alpha) \tan \delta$$

$$0 = I - R.A._0 - (\Delta \alpha + \Delta \alpha') + (n - [\Delta'' \alpha + \Delta''' \alpha]) \tan \delta + \Delta I + m$$

The difference between two equations of this form, (one polar and one time equation) is -

$$0 = \Delta(I - R.A._0) + (n - [\Delta'' \alpha + \Delta''' \alpha]) \Delta \tan \delta \quad \text{whence}$$

$$n = - \frac{\Delta(I - R.A._0)}{\Delta \tan \delta} + [\Delta'' \alpha + \Delta''' \alpha]$$

$$-(\Delta I + m) = I - R.A._0 + n \tan \delta - (\Delta \alpha + \Delta \alpha') - (\Delta'' \alpha + \Delta''' \alpha) \tan \delta$$

Stars checked with a red mark were selected for obtaining the value of n ; where none are checked, the whole group was used. The mean of those chosen is given in red below the mean of the whole group. Stars whose $\tan \delta$ were above .75 were not used for the n computation except in a few cases.

The polars were reduced to the mean of the time stars used for the n computation by an approximate value of h and the first value of n obtained from the equation $n = - \frac{\Delta(I - R.A._0)}{\Delta \tan \delta}$. With this value of n , $-(\Delta I + m)$ was obtained by the equation -

$-(\Delta I + m) = I - R.A._0 + n \tan \delta$. The final values of h being obtained as given on sheets, the polars were again reduced to the mean of the selected time stars with the new value of h and n derived from the formula -

$n = - \frac{-(\Delta I + m) - (I - R.A._0)}{\tan \delta}$ for each polar; the correction $[\Delta'' \alpha + \Delta''' \alpha]$ was applied ^{to all except the 4 circumpolars,} and the corrected $-(\Delta I + m)$ obtained. This computation is given in red. If the corrected $-(\Delta I + m)$ of the stars selected for the n computation differed by .01 from the old value, the n was again obtained.

Finally the corrections $-(\Delta \alpha + \Delta \alpha') - (\Delta'' \alpha + \Delta''' \alpha) \tan \delta$ were applied to the corrected value of $-(\Delta I + m)$. The $-(\Delta I + m)$ of each star was also reduced to the mean time by the value h for convenience in comparing the separate results.

This comparison showed that in the case of 7 stars (v.p. 53) there was a constant discrepancy which indicated that the correction given to the R.A. by Pulkova was wrong. The amount thus indicated was combined with the correction which had been obtained by a comparison of Greenwich, Washington and Cambridge observations ^{since 1870} with Pulkova and these values adopted for these stars instead of the Pulkova values. The computation is given on p. 53. The corrections thus obtained were applied to the $I - R.A. - (\Delta I + m)$ already used.

A few observations have been bracketed and not used in deriving the mean values. They are given on p. 54 with the reasons for each.

Instrumental Constants and block Errors

[illegible]

Jan. 5

[illegible]

Jan. 7

[illegible]

Jan. 12

- 5	30	- 97.38.28	- .02m	+ .01	- 38.27	- 38.27	- .01	- 38.28	92.5	23	- 36.39	- .05	- .01	- 36.44	- 36.40	+ 37.2m
- 5	49	102.38.24	+ .13	- .08	.32	.32	- .01	.33	2566	11	- 49.90	- .01	- .00	- 49.91	- 49.90	+ 16.85
- 6	31	107.38.17	+ .30	- .19	.36	.36	.00	.36	1116	43	- 24.57	+ .02	+ .01	- 24.55	- 24.56	+ 20.72
- 6	36	123.38.09	+ .47	- 29.30	.38	.39	.00	.39								
- 7	13	115.38.09	+ .41	- 25.26	.34	.35	+ .01	.34	0	=	1.73	+	3.46m	n = - .50		
											11.74		17.11	.69		
6	20	- 38.17	+ .26m	- .16	- 38.334	- 38.338		- 38.340			12.62		20.46	.67		
														.620		
124					.338	+ .016										
3.4	- .012	- .0053			+ .002				0	=	1.98.94+	3.72m	n = - .52	.52		
18.6	- .4	- .16									11.57.56	16.85	.69	.69		
	- .016	- .0069			- 38.320						1377.78	20.72	.623	.627		
														.622	.62	
														- .625	.629	

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1878 Feb. 4															7				
3.13m	4	16	71 64.09	+0.31m	-23	-64.32	32	-64.32	-0.01	-64.33	360	3	5	-60.67	-1.10	-0.03	-60.77	-60.70	+4.43
4.13	4	49	79 63.94	+0.65	-147.48	.41	.42	.42	.00	.42	92	5	23	62.05	+0.01	.00	62.04	62.05	+3.72
3.72	4	54	82 63.72	+0.87	-164	.36		.36	.00	.36	256	6	11	77.42	+0.05	+0.02	77.37	77.40	-16.85
	5	8	86 63.56	+1.03	-75.76	.31		.32	.00	.32									
	5	30	97 64.34	-0.02	+1.01	.33	.33	.33	+0.01	.32	0	=		3.37	+		4.16m	n = -.81	
	5	49	102 64.17	+0.13	-0.09	.26	.26	.27	+0.01	.26				2.16			3.45	.61	
														13.23			17.12	.77	
	5	4	-63.97	+0.50m	-36.37	-64.332		-64.337		-64.335								.730	
	5	6	64.14	.27	-20	.330													
						.332		.005						0 =	3.63	+	4.43m	n = -.82	
								.000							2.28		3.72	.61	
	4.4														13.07		16.85	.78	
	12.7		+0.05	+0.009														.737	
	14.1		0	-				-64.342										+1.1	
			+0.025	+0.008														-736	

Feb. 5															7				
4.48	3	0	50 64.71	+0.85m	-59.60	-65.30		-65.31	-0.02	-65.33	360	3	5	-62.80	-1.09	-0.02	-62.39	-62.32	+4.43
3.72	4	16	71 65.14	+0.31	-22	.36	.36	.36	-0.01	.37	92	5	23	62.85	+0.01	.00	62.84	62.85	+3.72
3.85	4	49	79 64.88	+0.65	-45.46	.33	.34	.34	.00	.34	256	6	11	78.28	+0.05	+0.01	78.23	78.27	-16.85
	4	54	82 64.79	+0.87	-61.62	.40		.41	.00	.41									
	5	8	86 64.70	+1.03	-72.73	.42		.43	.00	.43	0	=		2.76	+		4.16	n = -.66	
	5	30	97 65.41	-0.02	+0.01	.40	.40	.40	+0.01	.39				2.31			3.45	.67	
	5	49	102 65.17	+0.13	-0.09	.26	.26	.26	+0.01	.25				13.08			17.12	.76	
	4	47	-64.97	+0.55m	-38.39	-65.353		-65.359		-65.360								.697	
	5	6	65.15	.27	-19	.340								0 =	3.02	+	4.43	n = -.68	
								+0.01							2.49		3.72	.67	
	5.4							+0.01							12.93		16.85	.77	
	0.0		.000	-0.018														.707	
	15.1		-1	-4				-65.357										-1	
			-0.01	-0.022														-708	

Feb. 6															7				
4.43	4	16	71 5.24	+0.31m	-20.21	-5.44		-5.45	+0.06	-5.39	92	5	23	-3.12	+0.00	+0.02	-3.12	-3.10	+3.72m
3.85	4	49	79 5.04	+0.65	-143	.47		.47	+0.03	.44	383	6	5	3.52	-0.00	-0.02	3.52	3.54	2.66
	4	54	82 4.84	+0.87	-57.58	.41		.42	+0.02	.40	256	6	11	16.75	-0.00	-0.02	16.75	16.77	-16.85
	5	8	86 4.69	+1.03	-68	.37		.37	+0.01	.36									
	5	30	97 5.39	-0.02	+0.01	.38		.38	.00	.38	0	=		2.09	+		3.48m	n = -.60	
	5	49	102 5.23	+0.13	-0.09	.32		.32	-0.02	.34				1.69			2.42	.70	
	6	31	107 5.17	+0.30	-20	.37		.37	-0.05	.42				11.54			17.09	.68	
	6	36	109 5.04	+0.47	-31	.35		.35	-0.05	.40								.660	
	5	27	-5.08	+0.47m	-31	-5.389		-5.391		-5.391				0 =	2.27	+	3.72m	n = -.61	
	5	44	5.21	.24	-16	.372									1.83		2.66	.69	
															11.40		16.85	.68	
	6.4							+0.07										.660	
	1.0		-0.05	-0.031				+0.021										-3	
	16.1		-2	-9				-5.382										-663	
			-0.07	-0.040															

Feb. 7															7				
4.43	4	16	71 5.08	+0.31m	-21	-5.29		-5.29	+0.07	-5.22	383	6	5	-3.66	-0.01	-0.02	-3.37	-3.38	+2.66m
3.72	4	29	73 5.01	+0.29	-19	.23		.23	+0.06	.17	256	6	11	-15.96	-0.01	-0.02	-15.97	-15.98	-16.85
3.85	4	54	82 4.66	+0.87	-58	.24		.24	+0.05	.19	111	6	43	+8.94	-0.02	-0.05	+8.92	+8.89	+20.72
	5	49	103 5.04	+0.13	-29	.13		.13	-0.01	.14									
	6	31	107 4.96	+0.30	-20	.16		.16	-0.04	.20	0	=		1.55	+		2.26m	n = -.69	
	6	36	109 4.79	+0.47	-31	.10		.10	-0.05	.15				11.05			17.25	.64	
	7	13	115 4.85	+0.41	-27	.12		.12	-0.08	.20				13.84			20.32	.68	
	5	41	-4.92	+0.40m	-27	-5.181		-5.181		-5.181								.670	
	7.4							+0.13						0 =	1.80	+	2.66m	n = .68	
	2.0		-0.10	-0.045				+0.02							10.80		16.85	.64	
	17.1		-3	-12				-5.166							14.07		20.72	.68	
			-0.13	-0.037														.667	
																		-1.2	
																		-669	

1878 Feb. 11															$L + 0.20 + 0.70$										
3	34	571.94	+1.09 m	-.84	-2.78	-2.78	+1.13	-2.65	92 5 23	+0.15	+0.01 +0.02	+0.16 +0.17	+3.72 m	4											
4	16	71 2.34	+0.31	-.24	.58	.58	+1.08	.50	256 6 11	-15.44	-.01 -.04	-15.45 -15.48	-16.84	4											
4	29	73 2.41	+0.29	-.22	.63	.63	+1.06	.57	111 6 43	+13.98	-.02 -.07	+13.96 +13.91	+20.72	4											
4	49	179 2.09	+0.65	-.50	.59	.59	+1.04	.55						4											
5	19	90 2.16	+0.54	-.41	.57	.57	+1.01	.56	0 =	2.50 +	3.43 m	n = -.73	5												
5	49	102 2.49	+1.13	-.10	.59	.59	-.03	.62		13.11	17.13	.77	-5												
6	31	107 2.32	+1.30	-.23	.55	.55	-.08	.63		16.80	20.43	.80	-6												
6	36	109 2.11	+1.47	-.36	.47	.47	-.08	.55				.767	-7												
7	13	115 2.14	+1.41	-.31	.45	.45	-.13	.58					-7												
5	24	2	+1.7 m	-.36	-2.579	-2.579		-2.579	0 =	2.73 +	3.72 m	n = -.73	7												
5	40	2.34	.39	-.22	.560	.560				12.92	16.84	.77	5												
										16.47	20.72	.50	6												
	11.4											.767													
	6.0	-.005	-.0011									-.768													
	21.1	-4	-17																						
		-.009	-.0028																						
Feb. 13															$L + 0.13 + 0.46$										
7	13	145.58	+1.41 m	-.30	-1.88	-1.88	+1.01	-1.87	111 6 43	+13.09	+1.01 +0.03	+13.10 +13.12	+20.72 m	4											
7	33	120.78	+1.09	-.07	.85	.85	+.00	.85	284 7 45	-42.47	-.00 -.01	-42.47 -42.48	-52.78	5											
7	38	122.51	+1.54	-.40	.91	.91	-.01	.92						5											
7	28	-1.62	+1.35 m	-.26	-1.880	-1.880		-1.880	0 =	14.72 +	20.37 m	n = -.73	-5												
										40.85	54.13	.75	-6												
	13.4											.740	-7												
	8.0	+0.06	+0.007						0 =	15.00 +	20.72 m	n = -.72	6												
	23.1	-4	-1.5							40.60	53.78	.75	6												
		+0.02	-.0008									.735													
Feb. 14															$L + 0.11 + 0.62$										
2	56	471.64	+0.06 m	-.05	-1.69	-1.69	+1.12	-1.57	256 6 11	-15.77	+1.00 +0.02	-15.77 -15.78	-16.84 m	5											
3	0	50 1.06	+0.85	-.74	.80	.80	+1.12	.68	111 6 43	+16.97	-.00 -.01	+16.97 +16.96	+20.72	5											
3	34	57 0.90	+1.09	-.95	.85	.85	+1.09	.76						5											
4	16	71 1.28	+0.31	-.27	.65	.65	+1.04	.61	0 =	14.54 +	17.17 m	n = -.85	-5												
4	29	73 1.42	+0.29	-.25	.67	.67	+1.03	.64		18.20	20.34	.89	-6												
5	49	102 1.38	+1.13	-.11	.49	.49	-.06	[55]				.870	6												
6	31	107 1.21	+1.30	-.26	.47	.47	-.10	[57]					6												
6	36	109 1.16	+1.47	-.41	.57	.57	-.10	.67	0 =	14.24 +	16.84 m	n = -.85	7												
7	13	115 1.16	+1.41	-.36	.57	.57	-.14	.66		18.47	20.72	.89	-8												
												.870	6												
4	56	-1.26	+1.43 m	-.37	-1.634	-1.634		-1.634					6												
6	32	1.23	.33	-.29	.512	.512							6												
	14.4																								
	9.0	+0.10	+0.052																						
	24.1	-3	-13																						
		+0.07	+0.039																						
Feb. 16															$L + 0.14 + 0.47$										
4	16	71 0.90	+0.31 m	-.22	-1.12	-1.12	+1.02	-1.10	92 5 23	+1.66	-.01 -.03	+1.65 +1.63	+3.72 m	4											
4	29	73 0.84	+0.29	-.21	.05	.05	+1.02	.03	256 6 11	-13.07	-.02 -.07	-13.07 -13.14	-16.84	5											
4	49	79 0.69	+0.65	-.47	.16	.16	+.00	.16						5											
4	54	82 0.58	+0.87	-.65	.01	.01	+.00	.01	0 =	2.41 +	3.27 m	n = -.74	-6												
5	8	86 0.27	+1.03	-.75	.02	.02	-.01	.02		12.33	17.29	.71	-6												
5	19	90 0.63	+0.54	-.39	.02	.02	-.02	.04				.725	-7												
4	49	-.62	+1.61 m	-.44	-1.063	-1.062		-1.060	0 =	2.72 +	3.72 m	n = -.73	-8												
4	43	.76	.48	-.33	.088	.088				12.05	16.84	.72	6												
	16.4											.725	7												
	11.0	+0.12	+0.042									.722													
	26.1	-1	-6									-.723													
		+0.11	+0.036																						

1878
Feb. 18

4	16	-71.0.13	+0.31m	-26	-0.39	-0.39	+0.08	-0.31	2566	11	-13.62	+0.1 +0.3	-13.61	-13.59	-16.84m
4	29	-73.0.28	+0.29	-24	.32	.32	+0.07	.25	1116	43	+17.72	.50 .00	+17.72	+17.72	+20.72
4	49	+750.17	+0.65	-54	.37	.37	+0.05	.32							
4	54	+820.37	+0.87	-72	.35	.35	+0.05	.30	0	=	13.64 +	17.18m	m =	-79	
5	8	+800.56	+1.03	-85	.29	.29	+0.03	.26			17.69	20.38		.87	
5	19	90 + 0.13	+0.54	-45	.32	.32	+0.02	.30						.850	
6	31	07 0.02	+0.30	-25	.27	.27	-0.04	.31							
7	13	115 + .12	+0.41	-34	.22	.22	-0.07	.29	0	=	13.34 +	16.84m	m =	-79	
7	33	120 .12	+0.9	-07	.19	.19	-0.09	.28			17.97	20.72		.87	
7	38	123 .24	+0.54	-15	.21	.21	-0.09	.30						.830	
5	47	+ .12	+0.50m	-42	-0.293	-0.293		-0.292							
6	39	.03	.34	-28	.250										

L + 0.14 + 0.52

11

18.4
13.0 +0.04 +0.013
06 + 1 + 2
Feb. 19 +0.05 +0.015-0.25
-0.01
-0.299

L + 0.12 + 0.89

4	29	74 0.04	+0.29m	-20	-0.16	-0.16	+0.13	-0.03	925	23	+2.57	+0.1 +0.7	+2.58	+2.64	+3.72m
5	8	86 0.54	+1.03	-72	.73	.18	+0.08	.11	2566	11	-10.90	.00 .00	-10.90	-10.90	-16.84
5	19	90 0.28	+0.54	-38		.10	+0.06	.04	1116	43	+14.63	.01 -.04	+14.62	+14.59	+20.72
5	30	97 .01	-0.02	+01	.02	.02	+0.04	.06	284	45	-40.84	-0.2 -0.13	-40.86	-40.97	-53.77
6	31	107 .19	+0.30	-21	.02	.02	-0.04	.06							
7	33	120 .17	+0.09	-06	.11	.11	-0.13	.02	0	=	2.42 +	3.49m	m =	-69	
7	38	123 .42	+0.54	-38	.04	.04	-0.14	.10			11.06	17.07		.65	
6	01	+ .24	+0.40m	-28	-0.044	-0.043		-0.043			14.46	20.49		.71	
6	13	.16	.23	-16	.002						41.02	54.00		.76	
19.4					.050	.050			0	=	2.64 +	3.72m	m =	-71	
0.4	-0.02	-0.012									10.90	16.84		.65	
1.6	+ 2	+ 6			-0.043						14.59	20.72		.70	
	+0.00	-0.006									40.97	53.77		.76	
														.705	

Feb. 24

L + 0.16 + 0.70

844m	5	8	86 + 2.47	+ 1.03m	-80	.81	+ 1.67	+ 1.66	+ 0.08	+ 1.74	92	5	23	+ 4.44	+ 0.2	+ 0.8	+ 4.46	+ 4.52	+ 3.72m
72	5	19	90 2.05	+ 0.54	-42	.63	.63	.63	+ 0.07	.70	256	6	11	-10.56	+ 0.1	+ 0.2	-10.55	-10.54	-16.84
	-5	30	97 1.70	- 0.02	+ 02	.72	.72	.72	+ 0.06	.78	111	6	43	+ 18.19	.00	- 0.1	+ 18.19	+ 18.18	+ 20.72
	-5	49	102 1.86	+ 0.13	-10	.76	.76	.76	+ 0.03	.79	284	7	45	-44.93	- 0.2	- 0.09	-44.91	-45.02	-53.75
	-6	31	107 1.97	+ 0.30	-23	.74	.74	.74	- 0.02	.72									
	6	36	109 2.06	+ 0.47	-37	.69	.69	.69	- 0.02	.67	0	=	2.60 +	3.57m			m =	-73	
	7	13	115 2.16	+ 0.41	-32	.84	.84	.84	- 0.07	.77			12.41	16.49			.73		
	-8	10	123 1.93	+ 0.17	-13	.80	.80	.80	- 0.13	.67			16.33	20.57			.79		
													46.77	53.90			.87		
	6	17	+ 2.03	+ 0.38m	-30		+ 1.731	+ 1.730		+ 1.730							.780		
	6	30	1.86	.15	-12		.755												
								+ 0.03					0	=	2.76 +	3.72m	m =	-74	
	24.4							+ 0.01							12.30	16.84		.78	
	5.4	-0.07	-0.034												16.42	20.72		.79	
	6.6	+ 4	+ 18					+ 1.734							46.78	53.75		.87	
		-0.03	-0.016															.783	

Feb. 26

L + 0.17 + 0.26

4	29	74 + 2.78	+0.29m	-21	+2.57	+2.57	+0.04	+2.61	2566	11	-8.66	+0.2 +0.2	-8.64	-8.64	-16.84m
5	8	86 3.34	+1.03	-75	.59	.59	+0.03	.62	1116	43	+18.93	+0.1 +0.1	+18.94	+18.94	+20.72
5	19	90 2.96	+0.54	-39	.57	.57	+0.02	.59	284	45	-36.75	-0.1 -0.02	-36.76	-36.77	-53.74
6	31	107 2.76	+0.30	-22	.54	.54	-0.01	.53							
6	36	109 2.95	+0.47	-34	.61	.61	-0.01	.60	0	=	11.50 +	16.50m	m =	-67	
7	13	115 2.95	+0.41	-30	.65	.65	-0.03	.62			16.08	20.38		.79	
8	10	123 2.78	+0.17	-12	.66	.66	-0.05	.61			39.62	54.08		.78	
6	12	+ 2.93	+0.46m	-34	+2.599	+2.599		+2.599							
7	8	2.86	.34	-25	.615				0	=	11.26 +	16.84m	m =	-67	
26.4					-0.07						16.32	20.72		.79	
7.4	+0.03	+0.013			-0.01						39.39	53.74		.73	
8.6	+ 4	+ 16			+2.591									.730	
	+0.07	+0.029													

1878
Feb. 27

5	19	90	3.35	+0.54m	-41	+2.94	+2.94	+0.04	+2.98	256	6	11	-9.06	+0.01 +0.02	-9.05	-9.04	-16.84m	-7
5	30	97	2.97	-0.02	+0.02	.99	.99	+0.03	3.02	111	6	43	+18.89	.00 +0.01	+18.89	+18.90	+20.72	-7
5	49	102	3.04	+0.13	-0.10	.94	.94	+0.03	2.97	284	7	45	-39.77	-0.01 -0.02	-39.78	-39.79	-53.74	-8
6	31	107	3.15	+0.30	-0.23	.92	.92	+0.01	2.93									-8
6	36	109	3.30	+0.47	-0.36	2.94	.94	+0.01	2.95	0	=	12.11	+	16.94m	n =	-.71		7
8	10	123	3.14	+0.17	-0.13	3.01	3.01	-0.04	2.97			15.83		20.62		.77		7
8	20	125	4.46	+1.81	-1.37	.09	[.08]	-0.04	3.04			42.84		53.84		.79		7
8	40	128	3.11	+0.12	-0.09	.02	.02	-0.05	2.97							.757		7
6	32		+3.31	+0.44m	-0.33	+2.981	+2.980		+2.999	0	=	12.03	+	16.84m	n =	-.71		1
7	2		3.06	.10	-0.08	.990	.966					15.91		20.72		.77		1
							.012					32.78		53.74		.80		1
	274															.760		
	8.4		+0.08	+0.027														
	9.6		+0.4	+0.15					+2.952									
			+0.12	+0.042														

Feb. 28

5	8	86	+ 4.08	+1.03m	-82	.81	+3.26	+3.27	+0.08	+3.35	2566	11	-8.62	+0.02 +0.04	-8.60	-8.58	-16.84m	
5	19	90	3.77	+0.54	-43		.34	.34	+0.07	.41	111	6	43	+20.17	+0.01 +0.02	+20.18	+20.19	+20.72
5	30	97	3.39	-0.02	+0.02	.41	.41	.41	+0.06	.47	284	7	45	-42.33	-0.01 -0.04	-42.34	-42.37	-53.74
5	49	102	3.50	+0.13	-0.10	.40	.40	.40	+0.04	.44								
6	31	107	3.58	+0.30	-0.24	.34	.34	.34	+0.01	.35	0	=	12.12	+	16.94m	n =	-.72	
6	36	109	3.77	+0.47	-0.37	.40	.40	.40	.00	.10			16.66		20.62		.81	
8	10	123	3.59	+0.17	-0.13	.46	.46	.46	-0.08	.38			45.86		53.84		.85	
8	20	125	4.94	+1.81	-1.44	1.43	.50	[.51]	-0.08	.43							.793	
8	40	128	3.67	+0.12	-0.09		.52	.53	-0.10	.43								
6	28		+3.80	+0.51m	-0.40	+3.403	+3.407		+3.407	0	=	12.03	+	16.84m	n =	-.71		
7	2		3.52	.10	-0.08	.448	.394					16.74		20.72		.81		
						.450	.014					45.82		53.74		.85		
	284															.790		
	9.4		+0.12	+0.047														
	10.6		+0.2	+0.12					+3.377									
			+0.14	+0.059														

Mar. 4

5	8	86	5.84	+1.03m	-82	+5.02	+5.02	+0.05	+5.07	256	6	11	-8.86	.00 +0.01	-8.86	-8.85	-16.84m	-6
5	19	90	5.49	+0.54	-43	.06	.06	+0.04	.10	111	6	43	+21.14	.00 -0.01	+21.14	+21.13	+20.73	-6
6	31	107	5.29	+0.30	-24	.05	.05	-0.02	.03									-4
6	36	109	5.47	+0.47	-38	.09	.09	-0.02	.07	0	=	14.30	+	17.27m	n =	-.83		-8
7	13	115	5.53	+0.41	-33	.20	.20	-0.05	.15			15.70		20.30		.77		8
																.800		
6	09		+5.52	+0.55m	-44	+5.084	+5.084	+5.084										
6	25		5.44	.43	-34	.100				0	=	13.95	+	16.84m	n =	-.83		7
4.4																		
13.4			+0.02	+0.007														
14.5			0	-0.3														
			+0.02	+0.004														
								</										

Mar. 5

5	8	86	5.89	+1.03	-69	.68	+5.20	+5.21	+0.05	+5.26	256	6	11	-5.97	+0.01 +0.02	-5.96	-5.95	-16.84	4
5	19	90	5.57	+0.54	-36		.21	.21	+0.04	.25	111	6	43	+19.22	.00 .00	+19.22	+19.22	+20.73	4
5	30	97	5.16	-.02	+0.01	.17	.17	.17	+0.04	.21	284	7	45	-30.13	-.01 -.03	-30.14	-30.16	-53.72	4
6	31	107	5.49	+0.30	-.20	.29	.29	.29	+0.01	.30									8
6	36	109	5.61	+0.47	-.31	.30	.30	.30	+0.01	.31	0	=	11.36	+	17.06	n =	-.67		7
[8	20]	125	6.58	+1.81	-1.21	1.20	.37	[.38]	-.04	.34			13.82		20.51		.67		7
8	40	128	5.35	+0.12	-.08	.27	.27	.27	-.05	.22			35.54		53.94		.66		20
8	55	133	6.06	+1.10	-.73	.33	.33	.33	-.06	.27						.667			20
6	32		+5.71	+0.67	-.45	.44	+5.272	+5.270		+5.270	0	=	11.21	+	16.84	n =	-.66		3
6	49		5.40	.22	-.15	.258	.254					13.96		20.73		.66			3
							+0.06					35.42		53.72		.66			
	5.4															.663			
	0.7		-0.04	-.0005															
	15.5		-.2	-.0012					+5.261										
			-.026	-.0012															

1878
Mar. 86

84m	7	33	120	5.56	+09m	-06	+5.50	+5.58	+02	+5.52	2566	11	-5.16	+02 +08	-5.14	-5.08	-16.84m
72	-7	38	122	5.90	+54	-36	.54	.54	+01	.55	1167	18	+7.16	+01 +02	+7.17	+7.18	+2.57
74	-8	10	123	5.67	+17	-11	.56	.56	-01	.55	2847	45	-33.48	.00 .00	-33.48	-33.48	-53.72
	8	20	125	6.79	+1.81	-1.20	1.21	.59	-02	.56							
	7	47		+5.98	+65m	-43	+5.548	+5.545		+5.545	0	=	10.85 +	17.11m	n =	-.63	
	7	37		5.71	.27	-18	.523	.533					1.46	2.30		.63	
								+ .011					39.19	53.99		.73	
								+ .022								.663	
	64																
	1.7			-009	-0015								0	10.61 +	16.84m	n =	-.63
	16.5			-2	-9			+5.546					1.65	2.57		.64	
				-011	-0024								39.01	53.72		.73	
																.667	
																-1	
																-668	

Mar. 16

84m	-6	31	107	10.24	+30m	-26	+9.98	+9.98	+08	+10.06	2566	11	-4.07	+03 +08	-4.04	-3.99	-16.84m
72	-6	36	109	10.36	+47	-40	9.96	9.96	+08	.04	116	43	+27.75	+01 +04	+27.76	+27.79	+20.73
74	-7	38	122	10.49	+54	-46	10.03	10.23	+01	.04	1167	18	+12.06	.00 .00	+12.06	+12.06	+2.57
	8	20	125	11.72	+1.81	-1.55	10.17	10.17	-03	.14	2847	45	-40.47	-01 -03	-40.48	-40.50	-53.69
	-8	40	128	10.25	+1.12	-1.10	10.15	10.15	-06	.09							
	8	55	133	11.03	+1.10	-1.04	10.09	10.09	-07	.02	0	=	14.38 +	17.20m	n =	-.84	
													17.42	20.37		.86	
	7	47		+10.68	+72m	-62	+10.063	+10.063		-10.065			1.72	2.21		.78	
	7	21		10.34	.36	-31	.030	.042					50.82	54.05		.94	
								- .009								.855	
								- .004									
	16.4												0	14.02 +	16.84m	n =	-.83
	11.7			+010	+0054			+10.029					17.76	20.73		.86	
	26.5			-1	-3								2.03	2.57		.79	
				+009	+0051								50.53	53.69		.94	
																.855	
																+1	
																-854	

Mar. 19

84m	-6	31	107	12.24	+30m	-23	+12.01	+12.01	+07	+12.08	2566	12	+0.14	+03 +07	+0.17	+0.21	-16.84m
73	-6	36	109	12.40	+47	-36	.04	.04	+07	.11	116	43	+28.69	+02 +04	+28.71	+28.73	+20.73
	-7	38	122	12.53	+54	-42	.11	.11	+01	.12	1167	18	+14.07	.00 .00	+14.07	+14.07	+2.57
	8	20	125	13.69	+1.81	-1.39	.30	.30	-03	.27	2847	45	-31.17	-01 -02	-31.12	-31.13	-53.69
	-8	40	128	12.25	+1.12	-1.09	.16	.16	-05	.11							
	8	55	133	13.01	+1.10	-1.05	.16	.16	-06	.10	0	=	12.19 +	17.20m	n =	-.71	
													16.35	20.37		.80	
	7	47		+12.69	+72m	-55	+12.130	+12.130		-12.132			1.71	2.21		.77	
	7	21		12.36	.36	-28	.080	.096					43.48	54.05		.80	
								+ .004								.770	
								- .001									
	19.4												0	11.87 +	16.84m	n =	.71
	1.1			-006	+0002			+12.099					16.65	20.73		.80	
	20			+2	+7								1.99	2.57		.77	
				-004	+0009								43.21	53.69		.80	
																.770	

Mar. 20

84m	4	13	116	13.06	+41m	-38	+12.68	+12.68	+02	+12.70	116	43	+31.51	+02 +06	+31.53	+31.56	+20.73
73	-7	33	120	12.84	+09	-08	.76	.76	+01	.77	1167	18	+15.11	+01 +02	+15.12	+15.13	+2.57
72	-7	38	122	13.25	+54	-50	.75	.75	.00	.75	2847	45	-38.22	.00 -01	-38.22	-38.23	-53.68
	8	10	123	12.94	+17	-16	.78	.78	-03	.78							
	7	38		+13.02	+30m	-28	+12.742	+12.742		-12.742	0	=	18.51 +	20.43m	n =	-.91	
													2.10	2.27		.98	
													51.24	53.98		.95	
	20.4															.930	
	2.1			-010	-0029			+ .007					0	18.82 +	20.73m	n =	-.91
	3.0			+3	+10			+ .001					2.39	2.57		.93	
				-007	-0019			+12.750					50.97	53.68		.95	
																.930	
																-1	
																-931	

1878
Mar. 21

6	31	12	13.32	+3.0	-26	+13.06	+13.06	+0.05	+13.11	2566	12	-0.50	+0.03 +0.05	-0.47 -0.45	-16.84	-8
6	36	10	13.51	+4.7	-41	.10	.10	+0.05	.15	1116	43	+31.45	+0.02 +0.03	+31.47 +31.48	+20.73	8
18	10	2	13.48	+1.7	-15	.33	.33	-0.01	.32	2847	45	-36.54	-0.01 -0.01	-36.55 -36.55	-52.68	-9
8	20	12	14.99	+1.81	-157	.42	[.41]	-0.02	.39							-9
8	40	2	13.33	+1.2	-10	.23	.23	-0.03	.20	0	=	13.88	+17.10	n = -.81		-10
8	55	13	14.12	+1.10	-96	.16	.16	-0.04	.12			18.06	20.47	.88		10
												49.96	53.94	.92		
7	52		+13.79	+1.66	-57	.58	+13.217	+13.215	+13.215							9
7	29		13.41	.26	-23	.180		+1.009		0	=	13.63	+16.84	n = -.81		9
								+0.002				18.30	20.73	.88		2
21.4												49.73	53.68	.93		16
3.1			-0.12	-0.041										.873		
4.0			+3	+12			+13.187									
			-0.29	-0.029												

Mar. 26

4	38	12	16.40	+5.4	-49	+15.91	+15.91	+0.04	+15.95	2844	45	-31.23	+0.02 +0.04	-31.21 -31.19	-53.68	-8
8	10	2	16.17	+1.7	-15	.16.02	.16.02	+0.02	.16.04	1379	20	+22.51	-0.02 -0.04	+22.49 +22.47	+6.99	8
8	20	12	17.57	+1.81	-164	.15.93	[15.93]	+0.01	.15.74							-9
8	40	2	16.14	+1.2	-11	.16.03	.16.03	-0.01	.16.02	0	=	47.49	+54.00	n = -.88		10
9	39	12	16.41	+4.5	-41	.16.00	.16.00	-0.06	.15.94			6.21	6.67	.93		9
8	32		+16.54	+1.62	-56	.15.978	+15.978	-15.978		0	=	47.18	+53.68	n = -.88		9
8	32		16.28	.82	-29	.990	.990					6.48	6.99	.93		9
							.011							.905		3
26.4								+15.979								2
8.1			+0.07	-0.008												17
4.0			+4	+13												
			+0.11	+0.005												

Mar. 30

-4	33	12	17.61	+0.9m	-08	+17.53	.53	+17.53	+0.09	+17.62	2844	45	-29.64	+0.1	+0.4	-29.63	-29.60	-53.67m	-8
4	38	12	17.94	+5.4	-49.48	.45	.46	.46	+0.09	.55	15210	25	+21.44	-0.4	-0.13	+21.40	+21.31	+4.11	8
8	10	2	17.76	+1.7	-15	.61	.61	.61	+0.06	.67									9
-10	2	14	17.88	+2.2	-20	.68	.68	.68	-0.06	.62	0	=	47.43	+	53.93m	m	= -0.88		10
10	15	14	18.41	+9.0	-82.50	.59		.61	-0.07	.54			3.60		3.85	.94			10
10	54	15	19.85	+1.54	-140.157	.75		.78	-0.11	.67						.910			10
9	5		+18.13	+1.58m	-53.52	17.602		+17.612	+17.612	0	=	47.17	+	58.67m	m	= -0.88			9
8	21		17.80	.26	-24.23	.668						3.74		4.11		.91			9
						.570		-0.009								.895			8
								-0.013								+0.93			7
30.4								+17.600								-0.8920			22
12.1			+0.08	+0.054															
13.0			+1	+8															
			+0.29	+0.029															

Mar. 31

4	33	12	18.11	+0.9	-09.08	+18.02	.03	+18.03	+0.09	+18.12	2844	45	-32.10	+0.2	+0.6	-32.08	-32.04	-53.67	-9	
4	38	12	18.41	+5.4	-51	17.90	.90	17.90	+0.8	17.98	150	10	25	+22.04	-0.3	-0.8	+22.01	+21.96	+4.11	9
8	10	2	18.26	+1.7	-16	18.10	.10	18.10	+0.6	18.16									10	
8	20	12	19.60	+1.81	-172	17.88		17.90	+0.5	17.95	0	=	50.39	+53.95	n = -.93				10	
10	2	14	18.35	+2.2	-21	18.14	.14	18.14	-0.04	18.10			3.70	3.83	.97				10	
10	15	14	18.96	+9.0	-82	18.10		18.12	-0.05	18.07					.950				11	
10	54	15	19.66	+1.54	-146	18.20		18.22	-0.08	18.14										
11	8	15	18.44	+1.39	-57	18.07	.87	18.07	-0.09	17.98	0	=	50.09	+53.67	n = -.93				10	
9	23		+18.72	+1.88	-67	18.051		+18.060	+18.063				3.91	4.11	.96				10	
8	54		18.31	.28	-27	.26	.046	.053							.940				13	
							.048	.003							+3				12	
								.004							-0.937				27	
31.4								+18.076												
13.1			+0.03	+0.023																
14.0			0	-1																
			+0.23	+0.022																

1878
Apr. 2

$L + 026 + 093$

8 40 128 19.21	+1.12	-12	+19.09	+19.09	+0.8	+19.17	137 9 20	+26.11	.00 +.01	+26.11	+26.12	+6.99m
8 55 133 20.15	+1.10	-107	.88	.88	+0.6	.14	150 10 25	+23.15	-.03 -.09	+23.12	+23.06	+4.11
9 39 142 19.64	+4.5	-44	.20	.20	-.01	.19						
9 42 143 20.68 + 06	+1.70	-166 165	.02	.02	-.02	.07	0 =	6.68 +	6.73m	n = -99		
10 2 146 19.43	+2.2	-.21	.22	.22	-.05	.17		3.69	3.85	.96		
10 15 149 20.07	+9.0	-.88 .57	.19	.20	-.06	.14				.975		
9 32 +19.86	+1.75m	-.73	+19.132	+19.137		+19.147	0 =	6.95 +	6.99m	n = -99		
9 27 19.13	.26	-.25	.170	.147				3.89	4.11	.95		
				+ .009						.970		
				-.001						+ 2		
2.4				+19.155						-9.68		
1.4	-.007	+0.020										
16.0	-2	-5										
	-.009	+0.015										

Apr. 3

$L + 030 + 063$

8 40 128 20.07	+1.12	-13	+19.94	+19.94	+0.5	+19.99	284 7 45	-32.79	+0.4 +.09	-32.75	-32.70	-53.67m
8 55 133 20.90	+1.10	-118 117	.72	.73	+0.3	.16	137 9 20	+27.98	.00 -.01	+27.98	+27.97	+6.99
9 39 142 20.34	+4.5	-48	.86	.86	-.02	.84						
9 42 143 21.61 + 06	+1.70	-182 151	.79	.80.86	-.02	.88.84	0 =	52.95 +	53.95m	n = -98		
10 15 149 20.84	+9.0	-.96	.88	.88	-.05	.83		7.78	6.71	.116		
9 26 +20.75	+1.85m	-.91	+19.838	+19.842		+19.840	0 =	62.60 +	63.67m	n = -98		
9 10 20.20	.28	-.30	.900	.854		.52		8.07	6.99	.115		
				+ .014						1.065		
				+ .002						1		
3.4				+19.870						-1.066		
2.4	-.011	-.0012										
17.0	-3	-8										
	-.014	-.0020										

Apr. 8

$L + 028 + 029$

8 40 128 23.55	+1.12	-11.0	+23.14	+23.44	+0.3	+23.47	137 9 20	+30.04	+0.1 +.01	+30.05	+30.05	+6.99m
8 55 133 24.35	+1.10	-103	.32	.32	+0.2	.34	150 10 25	27.31	-.02 -.02	+27.29	+27.29	+4.11
9 42 143 24.94 + 06	+1.70	-159 160	.35	.34.40	.00	.34 40						
10 2 146 23.69	+2.2	-.21	.48 .48	.48	-.01	.47	0 =	6.27 +	6.64m	n = -94		
10 15 149 24.25	+9.0	-.84 185	.41	.40	-.02	.38		3.51	3.76	.93		
10 46 152 24.10	+7.0	-.65 86	.45 .44	.44	-.03	.41				.935		
9 43 +24.15	+1.79m	-.74	+23.408	+23.403		+23.402	0 =	6.59.60 +	6.99m	n = -94	.94	
9 49 23.78	.35	-.33	.457	.413				3.83.84	4.11	.93	.93	
			.453	+ .001						.935	.935	
				+ .0034						-5	5	
8.4				+23.418						-9.40	.940	
7.4	+0.03	-.0037										
22.0	-4	-18										
	-.001	-.0047										

Apr. 13

$L + 030 + 063$

9 39 142 27.20	+4.5	-.42	+26.78	+26.78	+0.4	+26.82	150 10 25	+30.71	.00 -.01	+30.71	+30.70	+4.11m
9 42 143 28.31 + 06	+1.70	-160 159	.71	.72.78	+0.4	.74.82						
10 2 146 27.08	+2.2	-.21	.87 .57	.87	+0.2	.89	0 =	3.55 +	3.76m	n = -94		
10 15 149 27.73	+9.0	-.85 .84	.88	.89	.00	.89						
10 54 152 28.36	+1.54	-1.45 1.44	.91	.92	-.04	.88	0 =	3.87	4.11m	n = -94.0		
11 8 156 27.21	+3.9	-.37 36	.84 .85	.85	-.05	.80				+ 6		
10 17 +27.65	+1.87m	-.82 .81	+26.832	+26.838		+26.830				-9.34		
10 16 27.16	.35	-.33	.830	.848								
			.833	-.006								
				-.005								
13.4				+26.837								
12.4	+0.07	+0.058										
27.0	-1	-1										
	+0.06	+0.057										

Apr 14

9	39	14	28.00	+4.5m	-42	+27.58	+27.58	+0.3	+27.61	137	9	20	+34.30	+0.3	+0.5	+34.33	+34.35	+6.99	-11
9	42	14	29.11+06	+1.70	-1.58	.53	.58.59	+0.3	56.62	160	10	25	31.37	-0.1	-0.2	31.36	+81.35	+4.11	-11
10	2	14	627.84	+1.22	-1.20	.64	.64	.00	.64										-12
10	15	14	28.48	+90	-84.83	.64	.65	-0.1	.64	0	=		6.26 +	6.53m		m = -.96			-12
10	46	15	228.37	+70	-65	.72	.72	-0.4	.68				3.29	3.65		.90			-12
10	5		+28.36	+79m	-73	+27.622	+27.624		+27.626							.93			-13
10	9		28.07	.46	-43	.647	.636		.38	0	=		6.70 +	6.99m		m = -.96			-13
							- .802						3.70	4.11		.90			12
	14.4						- .004									.930			12
	13.4	+0.02		+0.054												+ .3			2
	0.4	0		+1												-9.27			4
		+0.02		+0.055			+27.630												18

L +0.32 +0.65

Apr. 16

10	15	14	30.08	+90m	-91	+29.17	+29.17	+0.2	+29.19	150	10	25	+33.30	.00 + .01	+33.30	+33.31	+4.11m	-11
10	46	15	29.86	+70	-71	.70	.15	.16	-0.2	.74								-11
10	38		+29.97	+80m	-81	+29.160	+29.165		+29.165	0	=	3.33	+	3.31m	n = -1.01			-11
	16.4									0	=	4.15	+	4.11m	n = -1.010			11
	1.7	-0.09		+0.022			+ .007								+ .03			11
	2.4	+2		+4			- .002								-1.007			4
		-0.07		+0.026			+29.170											6

L +0.28 +0.61

Apr 18

11	8	15	30.76	+39m	-40	+30.36	+30.36	+0.3	+30.39	150	10	25	+34.62	+0.3	+0.7	+34.65	+34.69	+4.11m	12
11	43	15	30.74	+27	-28	.46	.46	.00	.46	162	11	24	33.24	+0.1	+0.2	33.25	33.26	2.75	-12
12	14	17	30.49	+0.00	-0.00	.49	.49	-0.3	.46	168	12	6	35.45	-0.1	-0.2	35.44	35.43	+4.83	-13
11	42		+30.66	+22m	-23	+30.437	+30.437		+30.437	0	=		3.99 +	3.89m		m = -1.03		-13	
	18.4						+ .009						2.59	2.53		1.02			13
	3.7	-0.12		-0.000			.000						4.78	4.61		1.04			13
	4.4	+3		+1												1.030			5
		-0.09		-0.009			+30.446			0	=		4.25 +	4.11m		m = -1.03			7
													2.82	2.75		1.03			21
													4.99	4.83		1.03			
																1.030			
																-1			
																-1.031			

L +0.25 +0.58

May 1

12	49	17	37.45	+1.52m	-1.22	1.69	+35.77	+35.76	+0.1	+35.77	17	12	28	+39.02	.00	+0.3	+39.02	+39.05	+2.82m	10
12	56	17	36.08	+1.21	-1.23	.85	.85	.85	+0.1	.86	19	13	13	-10.77	.00	.00	-10.77	-10.77	-42.73	-11
13	19	18	37.38	+1.46	-1.61	1.62	.77	.76	.00	.76										-12
13	43	18	37.10	+1.19	-1.31	1.32	.79	.78	-0.1	.77	0	=	2.85 +	2.54m		m = -1.12				-12
13	49	18	36.26	+1.34	-1.38	.88	.88	.88	-0.1	.87				46.94	48.01		1.09			-12
13	19		+36.85	+94m	-1.04	+35.812	+35.806		+35.806							7.105				12
13	22		36.17	.28	-.31	.865				0	=	3.19 +	2.82m		m = -1.13					12
	1.4						+ .015						46.63	42.73		1.09				6
	3.1	-0.12		+0.026			- .003									7.110				8
	17.4	-3		+5			+35.818									+ 2				22
		-0.15		+0.31												-1.008				

L -0.04 +0.29

$$h \pm 0.02 \pm 0.02$$
May 4May 5[illegible]

May 6

[illegible]

1878
May 7

11	8	15638.92	+3.7m	-4.9	+38.43	+38.43	+0.7	+38.50	162	11	24	+41.54	+0.4	+0.5	+41.88	+41.89	+2.75m	-12
11	40	16339.88	+1.13	-1.43	.45	.45	+0.4	49	168	12	6	+44.21	+0.1	+0.2	+44.22	+44.23	+2.83	-12
11	43	16438.88	+2.7	-3.4	.54	.54	+0.4	58	171	12	28	+42.23	.00	.00	+42.23	+42.23	+2.82	-14
12	56	17638.82	+2.21	-2.7	.55	.55	-0.2	53	19	13	13	-16.43	-0.3	-0.4	-16.46	-16.47	-42.73	-14
13	43	18140.03	+1.19	-1.50	.53	.52	-0.6	46	184	14	1	+41.43	-0.7	-0.9	+41.36	+41.34	+2.14	-15
13	49	18239.03	+3.34	-4.3	.60	.60	-0.7	53										
12	30	+39.26	+3.9m	-.75	+38.517	+38.515		+38.515	0	=	2.97	+	2.45m		n = -1.21			13
12	24	28.91	30	-38	.530						5.31		4.53		1.17			14
											3.32		2.52		1.32			
	7.4										55.37		43.03		1.29			
	9.1	+0.10	-0.036								2.45		1.84		1.33			10
	23.4	-4	+2			+38.511									1.264			24
		+0.06	-0.034								0	=	3.36	+	2.75m	n = -1.22		
											5.70		4.83		1.18			
											3.70		2.82		1.31			
											55.00		42.73		1.29			
											2.81		2.14		1.31			
															1.262			

May 8

10	54	15841.35	+1.54m	-2.02	2.01	+39.33	+39.34	+1.10	+39.44	168	12	6	+45.85	.00	-0.1	+45.85	+45.84	+4.93m	-12	
-	11	8	15639.87	+3.9	-.51	.36	.36	.36	+0.8	.44	171	12	28	+43.12	-.02	-.05	+43.10	+43.07	2.82	-12
✓	11	40	16340.82	+1.13	-1.48	.34	.34	.34	+0.2	.36	19	13	13	-17.19	-.05	-.12	-17.24	-17.31	-42.73	-13
-	11	43	16439.86	+2.7	-3.5	.51	.51	.51	+0.2	.53										-13
-	12	14	17639.59	.00	.00	.59	.59	.59	-.03	.56	0	=	6.09	+	4.61m	n = -1.32				-14
	12	49	17341.60	+1.52	-1.99	.61	.61	.61	-.09	.52			3.34		2.60		1.28			-15
✓	-	12	56	18239.72	+2.1	-2.827	.44	.45	.45	-.10	.38		57.00		42.95		1.33			-15
	11	35	+40.40	+1.72m	-.94	+39.454	+39.457		+39.457								1.310			13
	12	0	39.76	122	-129	.475				0	=	6.36	+	4.83m	n = -1.32					14
	8.4		-.0002			.478	-.009					3.59		2.82		1.27				6
	10.1	+0.12	+0				.000					56.79		42.78		1.33				11
	24.4	-3					+39.448									1.307				25
		+0.09	-.0002																	

June 3

12	49	17669.48	+1.52m	-1.98	1.99	+67.50	+67.49	+0.6	+67.56	171	12	28	+71.21	+0.5	+1.0	+71.26	+71.31	+2.82	12
-12	56	17669.78	+2.1	-2.728	.51	.50	.50	+0.5	55	19	13	13	+10.87	+0.2	+0.3	+10.89	+10.90	-42.67	-12
13	19	17869.269	+1.46	-1.90	.59	.58	.58	+0.2	60	184	14	1	+70.83	-0.2	-0.3	+70.31	+70.30	+2.14	13
-13	49	18268.05	+3.4	-4.4	.64	.63	.63	-0.2	61										-13
-14	10	18768.09	+3.6	-4.7	.62	.62	.62	-0.5	57	0	=	3.28	+	2.52m	n = -1.30				-14
14	21	19069.27	+1.30	-1.69	.58	.57	.57	-0.7	50			57.09		42.97		1.33			-15
												2.33		1.84		1.27			
13	34	+68.70	+1.87m	-1.13	1.14	+67.573	+67.565		+67.565							1.500			13
13	38	67.98	.30	-3.9		.583													-14
	3.4																		
	8.8	+0.10	-0.051																
	22.9	-4	+6																
		+0.06	-0.045																

June 4

- 14	10	18469.33	+3.6m	-.47	+68.86	+68.86	+0.5	+68.91	198	14	51	+73.62	+0.2	+0.2	+73.64	+73.64	+3.64m	-13
14	21	19070.54	+1.30	-1.70	.84	.84	+0.4	.88	203	15	21	73.01	.00	-.01	+73.01	+72.00	3.13	-13
15	11	20169.75	+1.67	-.57	.88	.88	+0.1	.89										+13
- 15	30	20869.60	+5.1	-.66	.94	.94	-.02	.92	0	=	4.37	+	3.37m		n = -1.30			+14
- 15	38	21269.11	+1.12	-.16	.95	.95	-.03	.92			3.74		2.86		1.31			
- 15	45	21669.04	+0.8	-.10	.94	.94	-.04	.90							1.305			13
15	06	+69.56	+5.1m	-.67	+68.902	+68.902		+68.903	0	=	4.72	+	3.64m		n = -1.30			14
15	16	69.27	.27	-.35	.922						4.08		3.13		1.30			13
	4.4														1.307			5
	9.8	+0.12	-.0047												-4			5
	23.9	-3	+9			+68.895									-1.304			
		+0.09	-.0038															

1878
June 5

1878phae proj. 169

$L + 0.60 + 1.57$

75m	2	49	173	72.18	+1.52m	-2.11	2.13	+70.07	+70.05	+1.17	+70.22	171	12	28	+73.89	+1.10	+1.25	+75.99	+74.14	+2.82m	
83	12	56	170	70.39	+1.21	-.29		.10	.10	.10	+1.15	25	19	13	14	10.85	+1.05	+1.13	10.90	10.98	-42.67
82	4	10	187	70.50	+1.36	-.50		.30	.30	.30	-.05	25	184	14	1	73.33	.00	+1.01	73.33	73.34	+2.14
73	4	21	190	72.09	+1.30	-1.81	1.82	.28	.27		-.07	20	198	14	51	75.54	-.04	-.12	75.50	75.42	+3.64
14	15	11	201	71.35	+1.67	-.93	.94	.45	.44	.44	-.20	22									
	13	53		+71.37	+1.81m	-1.13		+70.240	+70.232		+70.232	0	=		3.13	+	2.41m	n	-1.30		
	14	6		70.896	.41	-.57		.283				59.96			43.08			1.39			
								.280	-.010			2.47			1.73			1.43			
									+.011			4.64			3.23			1.44			
	54																	1.390			
	10.8			+0.12	-.0012																
	24.9			-2	+5				+70.223			0	=		3.86	+	2.82m	n	-1.57		
				+0.10	-.0007							59.30			42.67			1.39			
												3.06			2.14			1.43			
												5.14			3.64			1.41			
																		1.400			

June 6

$L + 0.63 + 0.94$

83m	12	49	178	73.68	+1.52m	-2.09		+71.59	+71.59	+1.11	+71.70	171	12	28	+75.43	+1.10	+1.15	+75.53	+75.58	+2.82m	
82	12	56	176	71.83	+1.21	-.29		.54	.54	.54	+1.09	63	19	13	14	15.53	+1.05	+1.08	15.58	15.61	-42.67
78	13	19	178	73.56	+1.46	-2.01	2.00	.55	.56		+1.06	62	184	14	1	74.72	+1.01	+1.01	74.73	74.73	+2.14
	13	49	182	72.15	+1.34	-.47		.68	.68	.68	+1.01	69									
	14	10	187	72.17	+1.36	-.50	.49	.67	.68	.68	-.02	66			0	=	3.36	+	2.46m	n	-1.37
	15	11	201	72.68	+1.67	-.92		.76	.76	.76	-.11	65			56.59			43.03		1.32m	
	15	30	209	72.54	+1.51	-.70		.84	.84	.84	-.14	70			2.56			1.78		1.44	
																				1.377	
	13	58		+72.66	+1.72m	-.99	.98	+71.661	+71.664		+71.664	0	=		3.90	+	2.82m	n	-1.38		
	14	6		72.17	.36	-.50	.49	.682				56.07			42.67			1.31			
								.685	-.008			3.05			2.14			1.43			
	64								-.001									1.373			
	11.8			+0.09	+0.015													+1			
	25.9			-1	+3				+71.655									-1.372			
				+0.08	+0.018																

June 9

$L + 0.65 + 0.69$

82	12	49	178	75.29	+1.52m	-2.02	2.00	+76.27	+76.29	+1.06	+76.35	19	13	14	+20.36	+1.05	+1.06	+20.41	+20.42	-42.67m	
67	12	56	176	76.58	+1.21	-.28		.30	.30	.30	+1.05	35	184	14	1	79.20	.00	.00	79.20	79.20	+2.14
14	13	19	178	78.21	+1.46	-1.94	1.92	.27	.29		+1.03	32	198	14	51	81.32	-.05	-.06	81.27	81.26	+3.64
	13	49	182	76.83	+1.34	-.45		.38	.38	.38	-.01	37									
	14	10	187	76.91	+1.36	-.48	.47	.43	.44	.44	-.03	41			0	=	56.50	+	43.07m	n	-1.31
	15	11	201	77.33	+1.67	-.89	.88	.44	.45	.45	-.10	35			2.29			1.74		1.32	
															4.36			3.24		1.35	
	13	42		+77.36	+1.76m	-1.01	1.00	+76.348	+76.358		+76.358									1.327	
	14	2		76.91	.40	-.53		.388													
								.392	+.005			0	=		55.97	+	42.67m	n	-1.31		
	9.4								-.004			2.81			2.14			1.31			
	1.1			-.006	+0.054							4.87			3.64			1.34			
	1.3			+1	-3				+76.359									1.320			
				-.005	+0.054													+4			
																		-1.316			

June 13

$L + 0.58 + 0.91$

64	13	19	178	84.16	+1.46m	-1.75		+82.41	+82.41	+1.04	+82.45	19	13	14	+32.84	+1.05	+1.07	+32.89	+32.91	-42.67m
18	13	43	181	83.89	+1.19	-1.43	1.42	.46	.47	.00	.47	184	14	1	85.14	.00	.00	85.14	85.14	+2.14
	+13	49	182	82.93	+1.34	-.41		.52	.52	-.01	.57									
	+14	10	187	82.93	+1.36	-.43		.50	.50	-.04	.46			0	=	50	+	43.02m	n	-1.16
	13	45		+83.48	+1.84m	-1.01	1.50	+82.472	+82.475		+82.472					2.21		1.79		1.24
	14	0		82.93	.35	-.42		.510												1.200
									+1.005			0	=		49.60	+	42.67m	n	-1.16	
	13.4								+1.002						2.63			2.14		1.23
	5.1			-.009	-.0018															1.195
	5.3			+4	-7				+82.482											1
				-.005	-.0025															-1.196

1878

June 19

14 10	187	30.51	+36m	-50	+1 30.01	30.01	+10	+30.11	19 13 14	0	33.33	+12	+19	33.45	33.52	-42.67m
15 11	201	31.04	+67	-93.94	.11	.10	+0.1	.11	18 14 14	1	33.01	+07	+12	33.08	33.13	+2.14
15 30	209	30.88	+51	-71	.17	.17	-0.2	.15	19 8 14	51	35.34	+02	+04	35.36	35.38	+3.64
15 38	212	30.59	+12	-17	.22	.22	-0.4	.18	21 7 15	48	37.02	-03	-05	36.99	36.97	+4.77
15 45	216	30.37	+08	-11	.26	.26	-0.5	.21								
15 15	+1	30.64	+35m	-49	+1 30.154	30.152		+30.152	0 =	57.19	+	43.02m		m = -1.33		
										2.44				1.36		
										4.72		3.29		1.43		
										6.35		4.42		1.44		
19.4						- .014										
11.1	+0.12		-0023			+ .001										
11.3	+2		-7												1.370	
	+0.14		-0030													
					+1 30.139				0 =	56.63	+	42.67m		m = -1.33		

June 20

[illegible]

June 24

13	49	182	46.23	+ .34m	- .66	- 46.69	- 46.69	+ .10	- 46.59	18414	1	- 43.78	+ .09	+ .07	- 43.69	- 43.71	+ 2.14m
14	10	187	46.26	+ .36	- .48	.74	.74	+ .08	.66	19814	51	41.71	+ .00	.00	41.71	+ 3.64	
15	11	201	45.75	+ .67	- .90	.65	.65	.00	.65	20315	21	42.36	- .04	- .03	42.40	42.39	+ 3.13
15	53	219	45.83	+ .51	- .69	.52	.52	- .05	.52	0	=	2.48	+ 1.82m		m = -1.36		
[6	22	226	44.06	+ 1.66	- 2.51	.59	[.59]	- .09	.68			4.46	3.32		1.34		
15	12	-	45.15	+ .64m	- .86	- 46.612	- 46.612		- 46.612			3.77	2.81		1.34		
14	54		46.17	.32	- .43	.608	.616								1.347		
24.4							+ .013			0	=	2.90	+	2.14m	m = -1.36		
2.4		- .011		+ .0052			- .024					4.90		3.64	1.35		
16.3		- .2		+ .7			- 46.607					4.22		3.13	1.35		
		- .013		+ .0159											1.353		

June 25

[illegible]

June 26

L+0.86+0.90

13	49	18241.81	+34m	-149	-42.30	30	-42.30	+14	-12.16	184	14	1	-39.23	+0.9	+0.9	-39.14	-39.14	+2.14m
14	10	18741.75	+36	-52	42.27	27	42.27	+11	.16	198	14	51	36.93	+0.2	+0.2	36.91	36.91	+3.64
15	11	20141.18	+67	-96	42.14		42.14	+0.2	.12	203	15	21	37.55	-0.3	-0.3	37.58	37.58	+3.13
15	45	21641.96	+0.8	-12.11	42.08	07	42.07	-0.3	.16	217	15	48	35.43	-0.6	-0.7	35.49	35.50	+4.77
16	16	22440.47	+1.06	-152	41.99		41.99	-0.8	.07.12									
16	22	22839.43	+1.56	-266	42.09		42.09	-0.8	.17	0	=		2.60	+	1.84m	n=-1.41		
16	25	22841.46	+4.0	-57	42.03	.03	42.03	-0.9	.12				4.83		3.34	1.45		
15	25	-41.15	+68m	-97	-42.129		-42.127						4.16		2.83	1.47		
15	2	41.74	.30	-43	.176		.142						6.25		4.47	1.40		
					.168		+ .014										1.432	
264							- .022						0	=	3.03	+	2.14m	n=-1.42
44		-0.11	+0.19										5.26		3.64	1.45		
18.3		-3	+12				-42.130						4.59		3.18	1.47		
		-0.14	+0.31										6.67		4.77	1.40		

July 1

L+0.76+1.09

15	11	20431.15	+67m	-102	-32.17	-32.17	+0.6	-32.11	198	14	51	-26.54	+0.6	+0.8	-26.48	-26.46	+3.64m
15	38	21281.90	+12	-18	32.08	.08	+0.1	.07	203	15	21	27.48	+0.2	+0.3	27.46	27.45	+3.13
15	45	21631.93	+0.8	-12	32.05	.05	+0.0	.05	217	15	48	24.66	-0.1	-0.2	24.67	24.68	+4.77
15	53	2181.25	+5.1	-78	32.03	32.03	-0.1	.04									
16	16	22450.23	+1.06	-161	31.94	31.9532.00	-0.6	.04.06	0	=		5.08	+	3.30m	n=-1.54		
15	45	-31.31	+49m	-75	-32.054	-32.056		.66				4.10		2.79	1.47		
15	37	31.56	.34	-52	.082	.066		-32.056				6.89		4.43	1.56		
						.028									1.523		
14							+ .022					0	=	5.62	+	3.64m	n=-1.54
9.4		+0.12	-0.53									4.63		3.13	1.48		
23.3		-4	+11				-32.072					7.40		4.77	1.55		
		+0.28	-0.42												1.523		
															- .4		
															-1.527		

July 2

L+0.77+1.10

14m	-15	53	21929.60	+51m	-82	-30.42	-30.42	+0.5	-30.37	217	15	48	-22.54	+0.5	+0.8	-22.49	-22.46	+4.77m	
4	16	5	22128.68	+1.01	-162	.30	.30.88	+0.3	.27	35	235	16	59	18.89	-0.4	-0.6	18.93	18.95	+7.33
13	16	16	22428.64	+1.06	-170	.34	.34.39	+0.1	.33	.38									
	-16	25	22829.68	+1.40	-64	.32	.32	-0.1	.33	0	=		7.23	+	4.38m	n=-1.65			
	-17	9	23729.88	+26	-42	.30	.30	-0.9	.39				10.79		6.94	1.55			
																1.600			
	16	22	-29.30	+65m	-104	1.05	-30.336		-30.338										
	16	29	29.72	.39	-62	.63	.347		.64	0	=		7.89	+	4.77m	n=-1.65			
													11.40		7.23	1.56			
	24															1.605			
	10.4		+0.12	-0.46												-	4		
	24.3		-3	+10			-30.369												
			+0.29	-0.36													-1.609		

July 3

L+0.86+0.99

4m	15	11	20427.46	+67m	-104	1.05	-28.50	-28.51	+0.8	-28.43	198	14	51	-22.83	+0.9	+1.1	-22.74	-22.72	+3.64m
7	15	38	21288.20	+12	-19	.39	.39	+0.4	.35	203	15	21	23.68	+0.6	+0.7	23.62	23.61	+3.13	
	15	45	21628.29	+0.8	-12	.41	.41	+0.2	.39	217	15	48	20.78	+0.2	+0.2	20.76	20.76	+4.77	
	15	53	21927.57	+5.1	-79	.80	.36	+0.1	.36										
	16	25	22857.71	+1.40	-62	.33	.33	-0.4	.37	0	=		5.11	+	3.30m	n=-1.55			
	17	9	23727.89	+26	-40	.44	.29	-0.11	.41				4.23		2.79	1.52			
													7.09		4.43	1.60			
8	16	0	-27.85	+34m	-53		-28.380	-28.385	-28.385							1.557			
15																			
65	34						- .028												
5	11.4		+0.10	-0.23			+ .028						0	=	5.66	+	3.64m	n=-1.55	
360	25.3		-2	+8			-28.392						4.77		3.13	1.53			
			+0.08	-0.15									7.62		4.77	1.60			
																1.560			
																- .2			
																-1.562			

1878
July 7

15	11	20	19.13	+ .67m	- .98	-20.11	-20.11	+ .07	-20.04	203 15 21	-15.54	+ .04 + .06	-15.50	-15.48	+3.13m	15
15	30	20	19.29	+ .51	- .75	20.04	20.04	+ .04	20.00	217 15 48	12.82	+ .01 + .01	12.81	12.81	+4.77	15
15	45	21	19.85	+ .08	- .12	19.97	19.97	+ .01	19.96							15
15	53	21	19.22	+ .51	- .75	19.97	19.97	- .01	19.98	0 =	3.93 +	2.75m	m = -1.43			15
16	5	22	18.34	+ .01	- .48	19.82	18.90	- .03	19.85	93	6.62	4.39	1.51			16
16	25	22	19.35	+ .40	- .59	19.94	19.94	- .07	20.01				1.470			16
15	48	-	19.20	+ .53m	- .78	-19.975	-19.975		19.943	0 =	4.50 +	3.13m	m = -1.44			17
15	53	-	19.43	.88	- .56	19.80	19.88		19.987		7.17	4.77	1.50			16
74								+ .007					1.470			16
1.8								- .002					+ .5			16
1.8								-19.983					-1.465			13
																7

L +086 +119

July 8

15	30	20	17.32	+ .51m	- .79 .80	-18.11	-18.12	+ .06	-18.06	203 15 21	-13.38	+ .06 + .08	-13.32	-13.30	+3.13m	15
15	38	21	17.76	+ .12	- .19	17.95	17.95	+ .05	17.90	217 15 48	10.15	+ .02 + .03	10.13	10.12	+4.77	15
15	45	21	17.41	+ .08	- .12	17.93	17.93	+ .03	17.90							15
15	53	21	17.18	+ .51	- .79 .80	17.97	17.98	+ .02	17.96	0 =	4.14 +	2.82m	m = -1.47			15
16	25	22	17.29	+ .40	- .62	17.91	17.91	- .04	17.95		7.33	4.46	1.64			16
17	9	23	17.41	+ .26	- .40 .41	17.81	17.82	- .13	17.95				1.555			17
16	3	-	17.46	+ .31m	- .48	-17.947	-17.952		17.953	0 =	4.65 +	3.13m	m = -1.49			17
84								+ .029			7.83	4.77	1.64			17
2.8								- .001					1.565			16
2.8								-17.944					+ .4			16
													-1.561			16

L +085 +118

July 9

16	16	22	14.19	+ .05	-1.70 1.69	-15.89	-15.88 .93	+ .06	-15.82	235 16 59	-4.01	.00 .00	-4.01		+7.33m	15
16	22	22	13.06	+ .186	-2.98 2.97	16.04	[16.03]	+ .05	.98							15
16	25	22	15.22	+ .40	- .64	15.86	15.86	+ .04	.82	0 =	11.27 +	7.04m	m = -1.60			15
17	9	23	15.33	+ .26	- .42 .42	15.75	15.75	- .05	.80							16
17	29	24	15.28	+ .22	- .35	15.63	15.63	- .09	.72	0 =	11.74 .74	7.33m	m = -1.60	1.60		16
16	44	-	14.62	+ .46m	-1.22 1.21	-15.834	-15.830		-15.828				+ .3			16
17	1	-	15.28	.29	- .46	.747	.792						-1.597	1.597		17
9.4								+ .029								17
3.8								- .002								16
3.8								-15.785								16

L +090 +123

July 10

15	11	20	12.75	+ .67m	-1.06	-13.81 .81	-13.81	+ .15	-13.66	203 15 21	-8.92	+ .05 + .09	-8.87	-8.88	+3.13m	15
15	30	20	12.96	+ .51	- .50 .51	.76 .77	.77	+ .11	.66	217 15 48	5.95	+ .01 + .02	5.94	5.93	+4.77	16
15	38	21	13.51	+ .12	- .19	.70 .70	.70	+ .09	.61							16
15	45	21	13.49	+ .08	- .13	.58 .58	.58 .62	+ .07	.51 .55	0 =	4.29 +	2.81m	m = -1.53			16
17	29	24	13.12	+ .22	- .35	.47 .47	.47	- .20	.67		7.22	4.45	1.62			16
17	36	24	13.82	+ .04	-1.64 1.65	.46	.47	- .21	.68				1.575			17
16	12	-	12.94	+ .44m	- .69 .70	-13.630	-13.633		-13.633	0 =	4.83 .84	3.13m	m = -1.54	1.55		17
15	55	-	13.16	.82	- .50 .51	.664	.640				7.73 .74	4.77	1.62	1.62		16
10.4							.666 + .006						1.585			16
4.8							- .000						+ .1			16
4.8							-13.634						-1.579	1.534		22

L +092 +151

$$L + 0.90 + 1.90$$

July 15

$$h = 0.87 \pm 0.072$$

July 16

$$L + 0.88 + 0.070$$

July 22

$$L + 0.93 \pm 1.15$$
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July 23

15	30	209	15.45	+51m	-77	+14.68	+14.68	+12	+14.80	217	15	48	+21.92	+10	+11	+22.02	+22.03	+1.477	-17
15	38	212	14.90	+12	-18	.72	.72	+11	.83	235	16	59	25.70	.00	.00	25.70	25.70	+7.33	-17
15	53	219	15.46	+51	-77	.69	.69	+09	.78	256	18	12	41.06	-11	-12	40.95	40.94	+16.88	-17
16	5	221	16.36	+1.01	-1.53	1.62	.83	+07	.95	83								+16.88	-18
16	22	226	17.55	+1.86	-2.74	2.51	.84	+04	.81		0	=	6.60	+	4.37m	n = -1.51			-18
17	36	244	16.41	+1.04	-1.58	1.57	.83	-08	.76				10.28		6.93	1.48			-18
17	54	252	16.85	+1.26	-1.91	1.90	.94	-10	.54				25.53		16.48	1.55			17
18	3	255	15.76	+55	-83		.93	-12	.81							1.513			18
18	18	258	15.55	+40	-61	.60	.97	-14	.84										
16	45	52	+16.04	+81m	-1.23	1.22	+14.826	+14.822	+14.82		0	=	7.20	+	4.77m	n = -1.51			12
16	58		15.42	.40	-61	.60	.828	.819	.12				10.87		7.33	1.48			16
							.830	+ .015					26.11		16.88	1.55			16
23.4								- .025								1.513			
4.1				+8.144												+ 4			
17.8				+ 13				+14.829								-1.509			
				- .015															

July 24

16	5	224	18.46	+1.01m	-1.55	1.54	+16.91	+16.9284	+10	+17.02	1694	235	59	+28.04	+03	+04	+28.07	+28.08	+7.33	-18
16	16	224	18.43	+1.06	-1.62	1.61	16.81	16.877	+08	16.90	85	2598	12	43.18	-08	-10	43.10	43.08	+16.88	-18
[16	22	226	19.51	+1.86	-2.85	2.83	16.66	[16.8]	+07	16.95										-19
16	25	228	17.54	+1.40	-1.61		16.93	16.93	+07	17.03	0	=	10.47	+	6.94m	n = -1.51				-19
-17	29	241	17.38	+1.22	-1.34		17.04	17.04	-05	16.99			25.50		16.49	1.55				18
17	36	244	18.55	+1.04	-1.59	1.58	16.96	16.97	-07	16.90						1.530				18
17	54	252	19.01	+1.26	-1.93	1.92	17.08	17.09	-10	16.99										18
-18	3	255	17.89	+1.55	-1.84		17.05	16.85	-11	16.94	0	=	11.07	+	7.33m	n = -1.51				18
17	47		+18.35	+92m	-1.41	1.40	+16.930	+16.938		16.956			26.07		16.88	1.54				18
17	19		17.60	.39	-1.60	.59	17.007	.956		20						1.525				18
								+ .013								+ 2				18
								- .024								-1.523				18
24.4																				18
5.1				+20.29																18
18.8				+ 16				+16.965												18
				- .013																18

July 28

-17	9	237	25.81	+26m	-41	+25.40	+25.40	+0.08	+25.48	256	18	12	+52.25	-03	-04	+52.22	+52.21	+16.88m	-17
-17	29	241	25.77	+22	-35	42	.42	+0.04	.46										-18
-17	36	244	27.02	+1.04	-1.65	37	.37	+0.03	.40	0	=	26.11	+	16.46m		n = -1.59			-19
-17	54	252	27.40	+1.26	-2.00	40	.40	-0.01	.39										-19
-18	18	258	26.14	+40	-64	.50	.50	-0.06	.44	0	=	26.77	+	16.88m		n = 1.59			-19
-18	33	260	26.73	+80	-127	.46	.46	-0.08	.38										-19
17	50		+26.48	+66m	-1.05	+25.425	+25.425		+25.425										18
17	47		26.11	.42	-67	.445													18
	52							- .006											19
								+ .002											12
28.4								+25.421											12
9.1			+0.10	-0.046															
22.8			- 4	+ 15															
			+0.06	-0.031															

July 31

17	29	244	32.14	+22 ~	-35		+31.79	+31.79	+02	+31.81	235	16	59	+43.32	+04	+06	+43.36	+43.38	+7.33	-17
✓ 17	36	244	33.21	+1.04	-1.64	1.65	.57	.56	+01	.57										-17
17	54	252	33.83	+1.26	-1.99		.84	.84	-03	.81		0	=	11.22	+	7.11m	n = -1.58			-17
17	40		+33.06	+84m	-1.33		+31.733	+31.730		+31.730		0	=	11.59	+	7.82m	n = -1.580			-19
17	29		32.14	.22	-35		.790													-19
	31.4							- .007												-19
	12.1			+0.08	-0.033			+ .002												-19
	25.8			- 1	+ 9			+31.725												18
				+0.07	-0.024															19

1878
Aug. 12

$$L+110 \begin{matrix} 245 \\ +143 \end{matrix}$$
[illegible]

Aug. 13

$$L + 106 + 139$$
[illegible]

Aug. 14

$$R + 102 + 142$$

8.8m	-17 29 ~~241~~ 4.53	+22 ~	-34	+1 4.19	4.19	+20	+1 4.39 2.3576 59	+1 15.04 +1.18 +26	15.22 15.30	+7.33 ~
	-18 33 260 5.46	+80	-1.23		.23	+0.4	.27 2.5618 12	30.89 +0.6 +0.8	30.95 30.97	+16.89
	19 14 2.72 6.40	+1.33	-2.05		.35	-.05	.80			
	-19 26 2.75 5.15	+53	-82		.33	-.08	.35 0 =	10.25 +	6.90m	n = -1.49
	-19 40 2.77 4.75	+18	-28		.47	-.11	.36	2598	16.46	1.59
	18 52 +1 5.26	+ .61 ~	-.94	+1 4.314	4.314		+1 4.314			1.540
	18 47 4.97	.43	-.66		.305		0 =	11.00 +	7.33 ~	n = -1.50
						- .009		26.67	16.89	1.58
	14.4					+ .003				1.540
	12.4	+ .007	-.0038							- 2
	12.2	+ 2	- 6	+1 4.308						-1.542
		+ .009	-.0044							

Aug. 18

$$A + 107 + 186$$
[illegible]

$$A = +112 + 158$$

Aug. 29

$$L + 0.96 + 1.06$$

Aug. 31

$$2 + 0.93 + 126$$
Sept. 1
$$R + 104 + 137$$

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28¹⁸⁷⁸
Sept. 2

19	3	494	+1 52.19 ⁺⁰³	+72 ^m	-1.04	+1 51.15	51.15.18	+12	+ 51.27.30 11/18 43	+1 21.32	+11	+15	21.43	21.47	-20.65 ^m	19
19	14	272	53.19	+1.33	-1.93	.26	.26	+09	.35							19
19	26	275	52.12	+0.53	-1.77	.35	.35	+07	.42	0	=	30.91	+ 21.35 ^m		$n = -1.45$	19
20	10	288	52.87	+1.05	-1.82	.35	.35	-03	.32							20
20	37	294	52.85 ⁺⁰⁵	+0.99	-1.44	.41	.44	-10	.31.36	0	=	29.85	+ 20.65 ^m		$n = -1.45$	20
20	53	300	52.70	+0.86	-1.25	.45	.45	-14	.31							20

19	54		+1 52.65	+0.91 ^m	-1.32	+1 51.328	51.328		+1 51.328							20
19	47		52.34	.70	-1.02	.317	.340		.43							20
24							+ .009									
4.1			-0.12	+0.053			- .024									
3.7			+ 3	- 11												
			-0.09	+0.042												
							+1 51.345									

Sept. 6

J. Full.

L +112 +145

17	29	241	+2 2.03	+1.22 ^m	-31	+2 1.72	1.72	+09	+ 1.81 256 18 11	+2 25.95	-01	-01	25.94	25.94	+16.89 ^m	18
18	18	258	2.56	+1.40	-57	.99	.99	-03	.96							18
✓ 18	33	260	2.74	+1.80	-1.14	.60	.60	-06	.54	0	=	23.50	+ 16.42 ^m		$n = -1.43$	19

18	7		+2 2.44	+1.44 ^m	-67	+2 1.770	1.770		+2 1.770	0	=	24.17	+ 16.89 ^m		$n = -1.43$	18
64							- .011									
8.1			+0.07	-0.027			+ .022									
4.7			+ 4	- 17												
			+0.11	-0.044												
							+2 1.761									

Sept. 7

J. Full.

L +112 +145

18	18	258	+2 5.08	+1.40 ^m	-59	+2 4.49	4.49	+04	+ 4.53 256 18 11	+2 29.53	+04	+05	29.57	29.58	+16.89 ^m	19
18	33	260	5.62	+1.80	-1.18	.44	.44	.02	.44							19
18	46	264	5.67	+1.65	-96	.71	.71	-04	.67	0	=	24.11	+ 16.27 ^m		$n = -1.48$	18

18	32		+2 5.46	+1.62 ^m	-92	+2 4.547	4.547		+2 4.547	0	=	25.03	+ 16.89 ^m		$n = -1.48$	18
74							- .014									
9.1			+0.10	-0.040			+ .033									
8.7			+ 4	- 16												
			+0.14	-0.056												
							+2 4.536									

Sept. 8

J. Full.

L +109 +143

17	29	241	+2 7.46	+1.22 ^m	-30	+2 7.16	7.16	+11	+ 7.27 256 18 11	+2 30.34	+01	+01	30.35	30.35	+16.89 ^m	19
18	18	258	7.71	+1.40	-55	7.16	7.16	.02	7.16							19
18	33	260	8.08	+1.80	-1.10	.698	.698	-04	.694	0	=	22.52	+ 16.37 ^m		$n = -1.38$	20
18	46	264	8.06	+1.65	-92	7.16	7.16	-07	7.09							20

18	16		+2 7.83	+1.52 ^m	-72	+2 7.115	7.115		+2 7.115	0	=	23.23	+ 16.89 ^m		$n = -1.38$	20
84							- .015									21
10.1			+0.12	-0.052			+ .023									19
9.7			+ 3	- 14												19
			+0.15	-0.066												
							+2 7.103									

1878
Sept. 9

L +102 +163

1979phae p	19 3	42 10.68	+03	+7.2m	-98.97	+2 9.70	9.77.74	+2.0	+ 9.97.94	284.19	46	+3 42.68	+0.6	+10	42.74	22.78	+54.21m	
	19 14	272 11.63		+1.33	-1.81 1.80		9.82	.83	+1.16	9.99	308.21	27	2 13.94	-1.1	-18	13.83	13.76	+2.75
	19 26	275 10.59		+1.53	-72		9.87.87	9.87	+1.13	10.00								
	21 32	292 10.44		+2.5	-34		10.10	10.10	+1.05	10.05	0 =	7	2.11 +	53.76m	n = -1.34			
	21 37	294 11.37	+05	+9.9	-1.35 1.34		.02	.03.08	-0.6	9.97.10.02		3.20	2.30		1.39			
	20 53	300 11.25		+5.6	-1.17 1.16		.08	.09	-1.10	.99					1.365			
	21 8	303 10.87		+5.7	-1.87.77		.09.10	.10	-1.15	.95								
	21 10	305 11.15		+1.7	-1.05 1.04		.10	.11	-1.15	.96	0 =	72.76 +	54.21m	n = -1.34				
												3.74	2.75		1.36			
																1.350		
	20 15	+2 11.00		+1.75m	-1.02 1.01	+2 9.97.2	9.980		+2 9.97.2	88					-3			
	20 22	10.63		.45	-.61	10.02.0	.990								-1.353			
						.023	.014											
	9.4						+ .025											
	11.1	+0.12		-0.054														
	10.7	+2		-10			+2 9.981											
		+0.14		-0.064														

Sept. 10

L +100 +133

89m	18	3	255	+2	12.89	+1.55m	-78	+2	12.11	12.11	+0.5	+12.16	256.18	11	2	36.27	+0.3	+04	36.30	36.31	+16.89m
	18	15	257		12.06	-0.5	+0.7		.13	.13	+0.3	.16	111.18	43	1	43.30	-0.3	-04	43.27	43.26	-20.65
	19	3	494	13.13	+03	+7.2	-1.02		.11	.11.14	-0.8	.03.06									
	18	27		+2	12.69	+4.1m	-58	+2	12.117	12.117		+2	12.117			23.61	+	16.48m	n = -1.43		
										.12.7						29.42		21.06	1.40		
		11.1								.010									1.415		
		12.1		+0.08		-0.055				+ .002						0	=	24.19	+	16.89m	n = -1.43
		11.7		+2		-8										28.86		20.65	1.40		
				+0.10		-0.046				+2	12.119								1.415		

Sept. 12

L +108 +145

	19	54	252	+2 18.71	+1.26m	-1.71 1.73	+2 17.00	16.98	+1.5	+ 17.13	111.18	43	+1 45.64	+0.3	+03	45.64	-20.65m	
	18	3	255	17.76	+1.55	-.75	.01	17.01	+1.3	.14	256.18	11	+2 40.05	+0.8	+11	40.13	40.16	+16.89m
	18	15	257	17.04	-.05	+0.7	.11 .11	.11	+1.0	.21	0	=	22.63	+	16.63m	n =	-1.36	
	18	18	258	17.64	+1.40	-.54 .55	.10 .09	.09	+0.9	.18								
89m	19	26	275	17.93	+1.53	-.72 .93	.21 .20	.20	-0.7	.13	0	=	23.00.01+	16.89m	n =	-1.36	1.36	
	19	45	280	17.41	+1.15	-.20 .21	.21 .20	.20	-1.2	.08			28.47.48	20.65		1.38	1.38	
	20	53	300	18.64	+1.86	-.117 1.18	.47	.46	-2.8	.18						1.370	1.370	
	18	56	+2 17.88	+1.53m	-.72 .73	+2 17.159	17.150		+2 17.150									
	18	56	17.50	.26	-.35.36	.158	.150	+ .023										
								.070										
	12.4																	
	0.5		-0.03		-.0001													
	13.7		0		-20													
			-0.03		-.0001													
							+2 17.153											

Sept. 14

L +116 +154

17	54	252	+2 24.16	+1.26m	-1.76	+2 22.40	22.40	+2.6	+ 22.66	256.18	11	+2 46.16	+1.2	+16	46.28	46.32	+16.89m
18	3	255	23.19	+1.55	-77	.42	.42	+2.4	.66	111.18	43	1 53.90	+0.6	+07	53.96	53.97	-20.65
-18	105	257	22.38	-.05	+0.7	.45	.45	+2.1	.67								
-18	18	258	23.01	+1.40	-.56	.45	.45	+2.0	.65	0	=	23.42	+	16.70m		m = -1.40	
19	14	272	24.53	+1.33	-1.86	.67	.67	+0.6	.73			28.90	20.84			1.39	
19	26	275	23.84	+1.53	-74	.60	.60	+0.3	.63							1.395	
-19	45	280	22.85	+1.15	-21	.64	.64	-0.2	.62								
-20	32	292	23.19	+1.25	-35	.84	.84	-1.4	.70	0	=	23.72	+	16.89m		n = -1.40	
20	37	294	24.17	+0.5	+9.9	.79	.79.84	-1.6	.63.68			28.63	20.65			1.39	
20	53	300	24.03	+1.86	-1.20	.83	.83	-2.0	.63							1.375	
21	8	303	23.75	+1.57	-80	.95	.95	-2.3	.72								
21	10	305	23.92	+1.77	-1.07	.85	.85	-2.4	.61								
19	36	+2 23.54	+1.03m	-88	+2 22.658	22.658		+2 22.658									
19	12	22.86	.19	-27	.595	.662											
						+ .013											
	14.4					- .003											
	2.5	-.011	+0.035														
	15.7	-2	+8														
		-.013	+0.043			+2 22.672											

1878 Sept. 15															L +112 +156	
17 54	252	+2 27.00	+1.26m	-1.73	+2 25.27	25.27	+1.18	+ 25.45	25618	11	+2 48.61	+0.2 +.13	48.63	48.74	+16.89m	19
18 3	255	26.03	+55	-75 .76	25	27	+1.16	43	111 18	48	1 57.14	+0.3 +.04	57.17	57.18	-20.65	19
18 15	257	25.22	-.05	+0.7	29	29	+1.12	41								19
18 18	258	25.81	+4.0	-.55	26	26	+1.12	38	0	=	22.99	+ 16.72m		n = -1.37		-19
19 14	272	27.35	+1.33	-1.82-183	53	52	-.03	49			28.47	20.82		1.37		-19
19 26	275	26.25	+53	-.73	52	52	-.06	46						1.370		-20
19 40	277	25.79	+1.8	-.25	54	54	-.09	45								20
19 45	280	25.73	+1.15	-.21	52	52	-.10	42	0	=	23.34	+ 16.89m		n = -1.38		21
20 53	300	26.94	+86	-1.18	76	76	-.29	41			28.22	20.65		1.37		21
															1.375	
19 3	+2 26.24	+1.58m	-.79 .80	+2 25.441	25.439		+ 2 25.440									20
19 0	25.64	.17	-.23	.402		+ .015										19
															- .004	
15.4																
3.5	-.012	+ .0052														
16.7	- 3	+ 11														
	-.015	+ .0063														
Sept. 16															L +104 +090	
18 3	255	+2 28.61	+55m	-.73	+2 27.88	27.88	+1.10	+ 27.98	25618	11	+2 50.34	+0.2 +.01	50.36	50.35	+16.89m	19
18 15	257	27.86	-.05	+0.7	.93	.93	+1.08	28.01	111 18	43	2 0.53	-.04 -.04	0.49	0.49	-20.65	19
18 18	258	28.34	+4.0	-.53	.81	.81	+1.07	27.88								19
18 46	264	28.75	+65	-.86	.89	.89	+1.03	27.92	0	=	26.97	+ 16.50m		n = -1.33		19
19 14	272	29.64	+1.33	-1.77	27.87	27.87	-.01	27.86			27.90	21.04		1.33		18
19 26	275	28.70	+53	-.70	28.00	28.00	-.03	27.97						1.330		19
19 40	277	28.29	+1.8	-.24	.05	.05	-.05	28.00								19
19 45	280	28.26	+1.15	-.20	.06	.06	-.06	28.00	0	=	22.47	+ 16.89m		n = -1.33		19
20 32	292	28.46	+25	-.33	.11	.11	-.13	27.98			27.39	20.65		1.33		19
															1.330	
19 7	+2 28.55	+1.44m	-.59	+2 27.956	27.956		+ 2 27.956									19
18 20	28.39	.39	-.52	.878		+ .014										19
															= .023	
16.4																
4.5	-.011	+ .0053														
17.7	- 3	+ 13														
	-.014	+ .0066														
Sept. 17															L +101 +188	
18 33	260	+2 31.26	+80m	-.103	+2 30.33	30.33	+1.14	+ 30.47	25618	11	+2 52.13	+1.5 +.21	52.28	52.34	+16.89m	19
18 46	264	31.17	+65	-.84	.33	.33	+1.11	44	111 18	43	2 3.96	+1.0 +.14	4.06	4.10	-20.65	19
19 3	264	31.23	+72	-.93	.35	.35	+1.08	43.46								20
19 40	273	30.70	+1.8	-.23	.47	.47	-.01	46	0	=	21.42	+ 16.58m		n = -1.29		20
19 45	280	30.65	+1.15	-.19	.46	.46	-.02	44			26.80	20.96		1.28		20
20 32	292	30.94	+25	-.32	.62	.62	-.13	47						1.285		20
20 53	300	31.71	+86	-1.11	.60	.60	-.18	42								21
19 36	+2 31.12	+1.52m	-.67	+2 30.451	30.451		+ 2 30.450	0	=	21.87	+ 16.89m		n = -1.29			21
19 41	30.86	.81	-.40	.470	.456		4	26.37			20.65		1.28			20
															1.285	
17.4																
5.5	-.007	+ .0047														
18.7	- 4	+ 14														
	-.011	+ .0061														
Sept. 18															L +100 +073	
18 3	255	+2 33.45	+55m	-.72 .71	+2 32.73	32.74	+1.09	+ 32.83	25618	11	+2 54.77	+0.2 +.01	54.79	54.78	+16.89m	19
18 15	257	32.71	-.05	+0.6 .7	.77	.77	+1.07	84	111 18	43	2 6.10	-.04 -.03	6.06	6.07	-20.65	20
18 18	258	33.28	+4.0	-.62	.76	.76	+1.07	83								20
18 46	264	33.60	+65	-.84	.76	.76	+1.04	80	0	=	21.53	+ 16.50m		n = -1.31		20
19 3	264	33.76	+72	-.94 .93	.82	.83	+1.01	84.87			27.20	21.04		1.29		21
19 40	273	33.14	+1.8	-.23	.91	.91	-.03	88						1.30		21
19 45	280	33.06	+1.15	-.20 .19	.86	.87	-.04	83								22
20 32	292	33.26	+25	-.32	.94	.94	-.09	85	0	=	22.02	+ 16.89m		n = -1.30		20
20 53	300	34.05	+86	-1.12 1.11	.93	.94	-.12	82			26.69	20.65		1.29		20
															1.295	
19 15	+2 33.44	+1.42m	-.53	+2 32.831	32.836		+ 2 32.836									20
18 20	33.26	.86	-.51	.755	.839		9									20
															+ .006	
18.4																
6.5	-.002	+ .0027														
19.7	- 4	+ 15														
	-.006	+ .0042														
															+ 2 32.843	

1878
Sept. 19

$$h + 152 + 106$$
[illegible]

Sept. 22

$$h + .098 + .131$$
[illegible]

Sept. 23

$$L + 0.87 + 1.63$$
[illegible]

Sept. 25

$$1 + 0.86 + 0.119 + 0.002$$
[illegible]

32 1878
Sept. 28

[illegible]

Sept. 30

[illegible]

Oct. 1

[illegible]

Oct. 2

[illegible]

1878phae, proj. 1681

33

1878 Oct. 3															L +090 +182					
4.26 1.75	20 10	288 +3 6.36	+1.05m	-150	+3 4.86	4.86	+16	+5.02	28419 45	4 19.25	+14 +29	19.39	19.84	+54.27m						
	20 32	2925.36	+25	-36	5.00	5.00	+09	.09	30821 27	3 9.22	-.01 -.01	9.21	9.21	+2.75						
	20 37	2946.37	+05 +.99	-142.141	4.95	446.501	+07	.62.08												
	20 53	3006.26	+86	-123.122	5.03	5.04	+03	.07	0 =	73.91 +		54.03m		m = -1.37						
	21 8	3035.95	+57	-82.81	.13 .14	.14	-.02	.12		3.73		2.51		1.49						
	21 10	3056.26	+77	-110	.16	.16	-.02	.14						1.430						
	21 38	3095.42	+16	-.23	.19 .19	.19	-.11	.08												
	22 15	3175.20	-.03	+04	.24 .24	.24	-.22	.02	0 =	74.40 +		54.27m		m = -1.37						
										4.07		2.75		1.48						
	21 3	+3 5.90	+58m	-.83	+3 5.070	5.074		+3 5.0717						1.425						
	21 23	5.48	.84	-.34	.140	.080								+1						
					.142	-.009								-1.424						
	3.4																			
	7.8	+005	+0024																	
	7.1	+4	-18																	
		+009	+0011																	
					+3 5.070															
Oct. 8															L +086 +119					
4.26 1.75	20 10	288 +3 16.76	+1.05m	-123	+3 15.53	15.53	+03	+15.56	28419 45	+4 19.27	+07 +09	19.34	19.36	+54.28m						
	20 32	29215.95	+25	-.29	.64	.64	-.01	.63												
	20 37	29416.78	+05 +.99	-116	.62	.62.67	-.02	.60.65	0 =	63.41 +		54.03m		m = -1.17						
	20 26	+3 16.49	+76m	-.89	+3 15.597	15.597		+3 15.597	0 =	63.72 +		54.28m		m = -1.17						
	20 32	15.98	.25	-.29	15.640	.613		.613												
						-.007														
	8.4					+ .004														
	12.8	+005	-.0049																	
	12.1	+2	-6																	
		+007	-.0055																	
					+3 15.610															
Oct. 10															L +090 +225					
75 20	20 10	288 +3 20.95	+1.05	-142.137	+3 19.53	19.58	+21	+19.79	30821 27	+3 23.53	+01 +02	23.54	23.55	+2.75m						
	20 57	29420.98	+05 +.99	-124.129	.64	.64.74	+11	.80.85	325 22 45	22.94	-.11 -.28	22.83	22.66	+2.20						
	20 53	30020.89	+86	-116.112	.73	.73	+05	.82												
	21 8	30320.60	+57	-77.84	.83 .86	.86	-.00	.86	0 =	3.19 +		2.38m		m = -1.34						
	21 10	30520.77	+77	-104.101	.73 .76	.76	-.01	.75		2.48		1.83		1.36						
	21 38	30920.11	+16	-.22.21	.89 .90	.90	-.11	.79						1.350						
	22 15	31719.93	-.03	+04	.97 .97	.97	-.26	.71												
	21 4	+3 20.60	+68m	-.84.81	+3 19.760	19.790		+3 19.784	0 =	3.69.68+		2.75m		m = -1.34	1.34					
	21 38	20.35	.37	-.50.48	.865	.797		.790		2.80.79		2.20		1.27	1.27					
					.872	+ .007								-1.305	1.305					
						+ .001								-2	2					
	10.4													-1.307	1.307					
	11	-.007	-.0021																	
	14.1		+1																	
		-.007	-.0020																	
					+3 19.805															
Oct. 14															L +090 +194					
6.27 1.75	20 10	288 +3 30.19	+1.05	-139.185	+3 28.80	28.84	+18	+29.02	28419 45	4 32.90	+16 +35	32.06	32.25	+54.28m						
	20 37	29430.18	+05 +.99	-131.128	.87	.90.95	+10	29.05.05	30821 27	3 32.76	+01 +02	32.77	32.78	+2.75						
	20 53	30030.05	+86	-114.111	28.91	28.94	+05	28.99	325 22 45	32.26	-.11 -.23	32.15	32.03	+2.20						
	21 8	30329.78	+57	-75.78.73	29.03.04	29.05	-.00	29.05												
	21 10	30529.93	+77	-102.100.99	28.91.93	28.94	-.01	28.93	0 =	63.52 +		53.91m		m = -1.18						
	21 38	30929.27	+16	-.21	29.06.06	29.06	-.10	28.96		3.23		2.38		1.36						
	22 15	31729.17	-.03	+04	.21.21	.21	-.22	28.99		2.61		1.83		1.43						
														7.323						
	21 4	+3 29.80	+63m	-.82.80	+3 28.970	28.991		+3 28.996												
	21 33	29.54	.37	-.49.48	29.062	.999			0 =	64.20.19+		54.28m		m = -1.18	1.18					
					.060	+ .012				3.73.72		2.75		1.36	1.35					
						-.004				2.98.97		2.20		1.35	1.35					
	14.4													1.297	1.293					
	5.1	-.009	+0056											+ .004	1.289					
	18.1	-3	+10											-1.293						
		-.012	+0066																	
					+3 29.007															

[illegible][illegible][illegible][illegible]

1878 Oct. 29															$L+089+125$				
21 8	303	+4 2.45	+57m	-.69	+4 1.76	1.76	+1.18	+ 1.94	325.22	45	+4 4.55	+02 +03	4.57	4.58	+2.20m				
21 10	305	2.60	+57	-.94	1.66	.67	+1.18	1.85	334.23	34	7.52	-.05 -.07	7.47	7.47	+4.31				
22 15	317	1.92	-.03	+0.04	.96	.96	+1.04	2.50											
22 37	322	2.59	+57	-.69	1.90	.90	-.01	1.89											
23 11	330	2.12	+0.05	-.06	2.06	.06	-.08	1.98											
23 32	331	3.16	+1.03	-.125	1.91	1.91	-.12	1.77											
0 2	1	2.73	+54	-.66	2.07	.08	-.18	1.90											
22 38	4	+4 2.57	+50m	-.61	1.903	1.906		1.907											
23 1	2.34	.28	-.34		1.998														
					2.000														
29.4																			
6.5		-.002	+0.058																
5.6		+4	-6																
		+0.02	+0.052																

Nov. 2															$L+086.114$				
19 45	280	+4 10.16	+15m	-.17	+4 9.99	9.99	+1.24	10.23	284.19	45	+5 9.23	+18 +24	9.41	9.47	+54.30m				
19 49	283	10.14	+11	-.12	10.02	10.02	+1.24	.26	308	21	+4 13.34	+03 +05	13.37	13.39	+2.75				
20 11		9.84	-.23	+1.26	10.10	10.10	+1.19	.29											
22 0	311	10.27	-.02	+0.02	.29	.29	-.02	.27											
22 15	317	10.24	-.03	+0.03	.27	.27	-.05	.22											
22 37	322	11.03	+0.57	-.64	.39	.39	-.09	.30											
0 2	1	11.10	+54	-.60	.50	.50	-.25	.25											
0 7	3	10.78	+26	-.29	.49	.49	-.26	.23											
21 51	+4 10.44	+17m	-.19	+4 10.256	10.256			10.256											
24																			
10.5		+0.12	-.0033																
9.6		+3	-7																
		+0.15	-.0040																

Nov. 3															$L+083.122$				
19 45	280	+4 12.18	+15m	-.18	+4 12.00	12.00	+1.27	12.27	284.19	45	+5 16.05	+18 +27	16.23	16.32	+54.29m				
19 49	283	12.20	+11	-.13	.07	.07	+1.26	.33	308	21	+4 15.64	+04 +06	15.68	15.70	+2.75				
20 11		11.82	-.23	+1.28	.10	.10	+1.21	.31											
22 0	309	12.33	+16	-.19	.14	.14	+1.04	.18											
22 15	311	12.34	-.02	+0.02	.36	.36	-.01	.35											
22 37	317	12.34	-.03	+0.04	.38	.38	-.04	.34											
22 41	323	12.87	+42	-.51	.36	.36	-.09	.27											
22 59	329	12.67	+26	-.31	.36	.36	-.12	.24											
0 2	1	13.28	+54	-.65	.58	.58	-.26	.32											
0 7	3	12.84	+26	-.31	.53	.52	-.27	.26											
21 59	+4 12.48	+16m	-.19	+4 12.288	12.285			12.287											
341																			
11.5		+0.10	-.0855																
10.6		+2	-6																
		+0.12	-.0061																

Nov. 4															$L+078.122$				
19 45	280	+4 14.10	+15m	-.17	+4 13.93	13.93	+1.25	14.18	284.19	45	+5 13.28	+16 +24	13.44	13.52	+54.29m				
20 11	280	13.80	-.23	+1.26	14.06	14.06	+1.20	.26	325	22	+4 16.98	-.08 -.12	16.90	16.86	+2.75				
20 32	292	14.36	+25	-.28	.08	.07	+1.15	.28	22	45									
20 37	294	15.20	+05	-.13	.07	.07	+1.14	.28	22	45									
22 0	311	14.30	-.02	+0.02	.32	.32	-.02	.30											
22 15	317	14.30	-.13	+0.03	.33	.33	-.06	.27											
22 37	322	15.00	+57	-.65	.35	.35	-.10	.25											
0 2	1	15.14	+54	-.62	.52	.52	-.27	.28											
0 7	3	14.76	+26	-.30	.46	.46	-.28	.18											
21 47	+4 14.55	+28m	-.32	+4 14.236	14.234			14.237											
441																			
12.5		+0.06	-.0057																
11.6		+2	-5																
		+0.08	-.0062																

36 pp 36-40 used in Gill stars only. Dates after Nov. 4 recomputed for the

Nov 5

$L + .072 .072$

19 40	274	16.09	+18m	-20	+4 15.89	+13	16.02	284 19 45	+5 14.97	+13.29	+54.29m	21 3
19 45	280	16.25	+15	-16	.89	+13	.02	308 21 27	+4 19.05	.00	+2.75	22 1
19 49	283	16.02	+11	-12	.90	+12	.02	325 22 45	18.53	-09	+2.20	22 1
20 11		15.74	-23	+25	.99	+10	.09					22 3
21 10	305	16.53	+77	-84	.99	+03	.02					22 4
21 38	309	16.25	+16	-17	16.08	-01	.07	0 =	+58.39	+54.04m	$n = -1.09$	0 1
22 0	311	16.73	-02	+02	.15	-04	.11		2.74	2.50	1.10	0 1
22 37	322	16.70	+57	-62	.08	-08	.00		2.13	1.95	1.09	0 3
0 2	1	16.80	+54	-59	.21	-18	16.03				1.093	-1
0 7	3	16.46	+26	-28	.18	-19	15.99	0 =	+59.06	+54.29m	$n = -1.09$	23 1
21 24	+4	16.31	+25m	-27	+4 16.036		16.037		3.01	+2.75	1.09	23
30					16.04				2.40	+2.20	1.09	
											1.090	

Nov 6

$L + .071 .102$

- 19 49	283	17.64	+11m	-12	+4 17.52	+22	17.74	308 21 27	+4 20.84	+04 +06	+2.75m	20 3
20 10	288	18.66	+105	-118 1.17	.48	+19	.68	5 0 26	20.02	-17 +24	+1.90	22 1
- 20 11		17.40	-23	+26	.66	+19	.85					22 1
21 8	303	18.34	+57	-64 .63	.70	+09	.84					0
21 10	305	18.53	+77	-84 .85	.66	+09	.77	0 =	+2.45	+2.11m	$n = -1.16$	0
- 22 0	311	17.81	-02	+02	.83	.00	.83		1.37	1.26	1.09	22 4
22 37	322	18.38	+57	-64 .63	.74	-06	.69				1.125	22 4
- 0 2	1	18.49	+54	-61 .60	.88	-20	.64					23
0 34	10	17.62	+148	-166 164	17.96	-25	.73	0 =	+3.19	+2.75m	$n = 1.16$	
0 42	12	17.90	+155	-174 172	18.16	-27	.91		2.02	+1.90	1.06	
22 2	+4	18.48	+64m	-72 .71	+4 17.759		17.769				1.110	
21 30	17.84	+0		17.76	.769		17.769					

Nov 10

$L + .068 .072$

18 33	260	25.27	+80m	-87	+4 25.40	+19	24.59	334 23 34	+4 29.52	-16 -17	+4.32m	0 3
18 46	264	25.17	+65	-71	.46	+18	.64					0 7
- 21 38	309	24.86	+16	-17	.69	+03	.66					0 3
- 22 0	311	24.73	-02	+02	.75	-06	.69	0 =	+4.32	+3.96m	$n = -1.09$	0 4
- 22 15	317	24.70	-03	+03	.73	-07	.66					0 4
- 22 37	322	25.35	+57	-62	.73	-10	.63	0 =	+4.71	+4.32m	$n = -1.09$	1 3
- 22 41	323	25.19	+42	-46	.73	-11	.62					0 4
21 13	+4	25.04	+36m	-39	+4 24.641		24.641					0 4
22 14	24.97	+22		24.65								0 3

Nov 12

$L + .066 .102$

22 37	322	28.36	+57m	-68	+4 27.68	+08	27.76	334 23 34	+4 32.92	-01 -02	+4.32m	22 4
22 41	323	28.21	+42	-50	.71	+08	.79					22 5
0 2	1	28.46	+54	-64	.82	-08	.74					0 3
0 7	3	28.17	+26	-31	.86	-02	.78	0 =	+4.61	+3.87m	$n = 1.19$	0 4
23 22	+4	28.30	+45m	-54	+4 27.768		27.768	0 =	+5.13	+4.32m	$n = -1.19$	1 18
				27.76								1 39
												1 4
												0 32
												0 1

Coast Survey Catalogue. v. p. 42 et seq.

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Nov. 13

L+.062.093

21 38	309	29.44	+1.6m	-.18	+4	29.26	+1.15	29.41	308	21 27	+4	32.28	+1.1	+1.17	+2.75m
22 0	311	29.32	-.02	+1.02		.34	+1.12	.46	334	23 34	4	34.32	-.02	-.03	+4.32
22 15	317	29.31	-.03	+1.03		.34	+1.09	.43	19	1 15	5	19.15	-.12	-.19	+4.302
22 37	322	29.96	+1.57	-.64		.32	+1.06	.38							
22 41	323	29.86	+1.42	-.47		.39	+1.05	.44							
0 2	1	30.09	+1.54	-.60	.61	.49	-.07	.41		0 =	+2.51	+2.35m		n = -1.07	
0 7	3	29.83	+1.26	-.29		.54	-.08	.46			4.42	3.92		1.13	
0 34	10	31.19	+1.48	-.65	.67	.54	-.12	.40			49.15	42.62		1.15	
-1 25	22	29.91	+1.26	-.29		.62	-.20	.42						1.117	
23 15	+4	29.88	+1.48m	-.45	+4	29.427		29.423	0 =		+3.02	+2.75m		n = -1.10	
~~23 5~~		29.56	-.13			.428					4.86	+4.32		1.13	
				29.43							49.53	+43.02		1.15	
														1.127	

Nov. 14

L+.056.082

20 37	294 +4	31.56	+1.99m	-1.13	114	+4	30.43	.42	+1.17	30.59	+308	21 27	+4	33.60	+1.07	+1.11	+2.75m
22 15	317	30.68	-.03	+1.03			.71		+1.04	.75	334	23 34		36.01	-.05	-.07	+4.32
22 41	323	31.30	+1.42	-.48			.82		.00	.82							
0 2	1	31.40	+1.54	-.62			.78		-.11	.67							
0 7	3	31.22	+1.26	-.30			.92		-.11	.81	0 =		+2.44	+2.31m		n = -1.06	
22 44	+4	31.23	+1.44m	-.50	.51	+4	30.732			30.728			4.73	3.88		1.22	
23 16		31.15	-.30				.730									1.140	
				30.73							0 =		+2.98	+2.75m		n = -1.09	
													5.21	+4.32		1.21	
																1.150	

Nov. 23

L+.060.086

0 2	1+4	41.42	+1.54m	-.56	.57	+4	40.86	.85	+1.06	40.91	5	0	26	+4	42.92	+1.02	+1.03	+1.90m
0 7	3	41.16	+1.26	-.27			40.89		+1.05	.94	19	1	15	5	27.59	-.03	-.04	+4.304
0 34	10	42.57	+1.48	-.65	.66		41.02	.01	+1.01	41.02								
0 42	12	42.74	+1.55	-.62	.64		.12	.10	.00	.10								
1 25	23	41.34	+1.26	-.27			.07		-.06	.01	0	=		+1.04	+1.03m		n=-1.01	
1 31	23	42.19	+1.11	-.16	.117		.03	.02	-.07	40.95				45.66	42.17		1.08	
										40.988							1.045	
0 44	+4	41.70	+1.87m	-.91	.92	+4	40.998											
~~0 31~~		~~41.31~~	~~.35~~				~~.990~~				0	=		+1.95	+1.90m		n=-1.03	
				40.99										46.55	+43.04		1.08	
																	1.055	

Nov. 24

L+.055.044

22 41	323	+4 42.76	+1.42 m	-.46	+4 42.30	+0.8	42.38	325 22 45	+4 44.69	+0.9	4.08	+2.20 m
22 59	329	42.65	+1.26	-.28	.37	+0.7	.44	5 0 26	44.47	.00	.00	+1.90
0 34	10	44.07	+1.48	-.61	.46	.00	.46	19 1 15	5 32.83	-.05	-.03	+4.304
0 42	12	44.29	+1.55	-.62	.60	-.01	.59					
1 18	20	44.34	+1.70	-.65	.49	-.03	.46					
1 39	25	42.63	+1.15	-.16	.47	-.05	.42	0 =	+ 1.41	+ 1.35 m	n = -1.05	
1 48	30	42.58	+1.37	-.40	.48	-.06	.42		1.10	1.05	1.05	
0 32	+4	43.37	+1.85 m	-.93	+4 42.453		42.453		49.41	42.19	1.17	1.090
0 17		42.72	.30					0 =	+ 2.32	+ 2.20 m	n = -1.05	
				42.44					2.02	+ 1.90	1.05	
									50.35	+43.04	1.17	1.090

28

Nov. 26

 $L + .046 .078$

22	37	322	+4	45.25	+0.57m	-1.65	.66	+4	44.60	.59	+1.14	44.73	325	22	45	+4	47.05	+0.7	412	+2.20m
22	41	323		45.13	+1.42	-1.48			.65		+1.13	.78	5	0	26		46.95	-0.1	-0.1	+1.90
22	57	329		44.96	+1.26	-1.30			.66		+1.11	.77	19	1	15	5	37.08	-0.5	-0.7	+43.05
0	34	10		46.43	+1.48	-1.69	1.71		.74	72	-0.02	.70								
0	42	12		46.70	+1.55	-1.77	1.79		.93	91	-0.02	.89								
1	3	16		45.57	+1.70	-1.80	.81		.77	76	-0.05	.71	0	=			+1.47	+1.40m	n=-1.05	
1	18	20		46.65	+1.70	-1.94	1.96		.71	69	-0.07	.62					1.26	1.10	1.15	
1	39	25		45.13	+1.15	-1.17			.96		-0.10	.86					51.35	42.25	1.22	
1	48	30		45.33	+1.37	-1.42	.43		.91	90	-0.11	.80							1.140	
0	22		+4	45.68	+1.80m	-1.91	.92	+4	44.770			44.762	0	=			+2.43	+2.20m	n=-1.11	
0	17			45.14	.30				1.760								2.17	1.90	1.14	
									44.77								52.24	43.05	1.21	
																			1.153	

Nov. 30

 $L + .045 .034$

22	0	311	+4	48.89	-0.02m	+0.02		+4	48.91		+0.07	48.98	334	23	34	+4	53.76	+0.1	4.01	+4.32m
22	15	317		48.85	-0.03	+0.03			.88		+0.06	.94	5	0	26		51.15	-0.3	-0.2	+1.90
23	11	330		48.98	+0.05	-0.06			.92		+0.03	.95	19	1	15	5	40.42	-0.7	-0.4	+43.06
0	7	3		49.38	+1.26	-1.30			49.03		-0.01	49.02								
0	34	10		50.60	+1.48	-1.70	1.71		48.90	89	-0.02	48.87								
0	42	12		50.76	+1.55	-1.78	1.79		.98	97	-0.03	.94	0	=			+3.94	+3.56m	n=-1.11	
1	18	20		50.88	+1.70	-1.95	1.96		.93	92	-0.05	.87					1.29	+1.14	1.14	
1	31	23		50.35	+1.11	-1.27			49.08		-0.05	49.03					50.54	+42.30	1.19	
23	57		+4	49.83	+1.76m	-1.87	.88	+4	48.954			48.950	0	=			+4.82	+4.32m	n=-1.12	
22	53			49.01	.06				48.96								2.18	1.90	1.15	
																	51.43	43.06	1.19	
																			1.153	

Dec. 1

 $L + .046 .039$

22	37	322	+4	50.53	+0.57m	-1.59	.60	+4	49.94	.93	+0.05	49.98	334	23	34	+4	54.63	+0.1	4.02	+4.32m
22	41	323		50.53	+1.42	-1.44	.45		50.09	.08	+0.05	50.13	5	0	26		51.98	-0.3	-0.2	+1.90
22	57	329		50.24	+1.26	-1.27	.28		49.97	.96	+0.04	50.00	19	1	15	5	38.81	-0.7	-0.5	+43.06
23	11	330		50.00	+1.05	-1.05			49.95	.95	+0.03	49.98								
0	34	10		51.75	+1.48	-1.54	1.57		50.21	.18	-0.02	50.16								
0	42	12		51.87	+1.55	-1.62	1.64		.25	.23	-0.03	.20	0	=			+3.64	+3.43m	n=-1.06	
1	18	20		51.88	+1.70	-1.77	1.80		.11	.08	-0.05	.03					0.95	1.01	0.94	
1	31	23		51.24	+1.11	-1.16	1.18		.08	.06	-0.06	.00					47.74	42.17	1.13	
23	57		+4	51.00	+1.89m	-1.93	.94	+4	50.075			50.060	0	=			+4.57	+4.32m	n=-1.06	
22	52			50.32	.32				50.07								1.88	1.90	0.99	
																	48.68	43.06	1.13	
																			1.060	

Dec. 6

22 45

Dec. 7

$$h + .043 \quad .108$$
[illegible]

Dec. 8

22	41	+5		
0	42	12	0.37	41.55

22 45

Dec 11

$$0.42\overline{12} - 5 \quad 3.74 + 1.55 =$$

Dec 12

$$h + .0441 \quad .078$$
[illegible]

Dec. 14

 $L + .047 .090$

22 37	322	+5	5.47	+1.57m	-.63	+5	4.84	+1.15	4.99	19	1	15	+5	52.96	-0.5	-0.8	+4.3.09m
22 41	323		5.29	+1.42	-.47		.82	+1.15	4.97								
22 59	329		5.22	+1.26	-.29		.93	+1.12	5.05								
1 34	10		6.56	+1.48	-1.64		.92	-0.02	4.90		0	=		+47.84	+42.30m	n=-1.11	
0 42	12		6.83	+1.55	-1.72		5.11	-0.03	5.08								
1 3	16		5.82	+1.70	-.78		5.04	-0.06	4.98		0	=		47.88	+43.09m	n=-1.11	
1 18	20		6.82	+1.70	-1.89		4.93	-0.09	4.84								
-1 25	22		5.48	+1.26	-.29		5.19	-0.10	5.09								
-1 39	25		5.36	+1.15	-.17		.19	-0.12	5.07								
0 20	+5	5.87	+1.79m	-.58		+5	4.997		4.997								
0 11		5.34	-.27		4.99												

Dec. 16

 $L + .050 .074$

-22 41	323	+5	7.73	+1.42m	-.41	+5	7.32	+1.17	7.49	334	23	34	+5	11.48	+0.7	+.10	+4.32m
-22 59	329		7.65	+1.26	-.25		.40	+1.14	.54	19	1	15		50.13	-0.2	-0.2	+43.09
1 34	10		9.04	+1.48	-1.43	1.44	.61	+0.02	.62	31	1	53		10.65	-0.5	-0.7	+3.05
0 42	12		9.18	+1.55	-1.50		.68	+0.02	.70								
1 18	20		9.27	+1.70	-1.64	1.65	.63	-0.04	.58								
-1 39	25		7.76	+1.15	-.15		.61	-0.05	.56		0	=		+3.15	+3.46m	n=-0.97	
-1 48	30		7.96	+1.37	-.36		.60	-0.07	.53					41.71	42.23	.99	
-2 2	34		8.29	+1.68	-1.66		.63	-0.08	.55					2.20	2.19	1.00	
2 36	40		8.74	+1.14	-1.10	1.11	.64	-0.14	.51							0.967	
0 55	+5	8.40	+1.86m	-.83		+5	7.567		7.564		0	=		+4.01	+4.32m	n=-0.93	
0 38		7.88	.34		7.57		5.66							42.54	43.09	.99	
														3.01	3.05	0.99	
																0.970	

188
Nov. 13

L +093 +093

29- 75 20	21 38 22 0 22 15 22 37 22 41 0 2 - 0 7 0 34 - 1 25	309 311 317 322 323 1 3 10 22	29.44 29.32 29.31 29.26 29.86 30.09 29.53 31.19 29.91	+16 m -02 -03 +57 +42 +54 +26 +1.48 +26	-.18 +.02 +.03 -.65 -.48 -.61 -.29 -1.67 -.29	+4 29.26 .34 .34 .31 .38 .48 .54 .52 .62	29.26 .34 .34 .32 .39 .49 .54 .54 .62	+15 +12 +09 +06 +05 -07 -08 -12 +20	+29.41 .46 .43 .28 .44 .42 .46 .42 .42	308 21 27 334 23 34 19 1 15 0 =	+4 32.28 4 34.32 5 19.15 2.87 4.71 49.39 0 =	+15 -05 -20 + 2.62 m 4.19 42.89 2.75 m	32.43 34.27 18.95 n = -1.11 1.12 1.15 7.127	+2.75 m 4.32 43.02 -1.120 + 3 -1.117	
23 15 23 5	+4 29.88 29.56	440 m .13	-.45 -.15	+4 29.421 .420	29.427 - .001 - .002	+4 29.427	0 =	3.01 + 4.85 49.53	+ 2.75 m 4.32 43.02	n = -1.09 1.12 1.15 -1.120 + 3 -1.117					
139 7.8 206	+ .005 - 4 + .001	+ .0048 + 3 + .0051		+ 4 29.424											

Nov. 14

L +082 +107

15m	20 37	294	31.56	+35.99 m	-1.12	+4 30.14	30.44	49	+23	+30.67	72	308	21 27	+4 33.60	+15 +19	33.75	33.79	+2.75m
20	-22 15	317	30.68	-03	+0.03	.71 .71	.71		+0.5	76	334	23 34		36.01	-03 -03	35.98	35.98	4.32
	-22 41	323	31.30	+42	-1.47	.83 .82	[.82]		+0.1	.83								
	-0 2	1	31.40	+54	-1.61	.79 .79	.79		-1.4	.65	0	=	2.60	+	2.45m	n =	-1.06	
	+0 7	3	31.22	+26	-1.29	.93 .93	.92		-1.5	.77			4.83		4.02		1.20	
	22 44	45	31.23	+44 m	-.50	+4 30.740	30.736			+4 30.796	40						1.130	
	23 16		31.15	.30	-.34	.815	.728			0	=	2.97 .98 +	2.75m		n =	-1.08	1.08	
						.812	-.006			516.17			4.32		1.19	1.20		
	144					-	.001								-1.135	1.140		
	8.8	+ .010		+ .0021											+ 3	3		
	216	- 4		+ 6		+4 30.721									-1.132	1.137		
		+ .006		+ .0027														

Nov. 23

L +086 +093

2m	-0 2	1	+4	41.42	+54m	-58	+4	40.84	40.84	+06	+40.96	19	1	15	+5	27.59	-06	-07	27.53	27.62	+43.04m
	-0 7	3		41.16	+26	-28		40.88	.88	+05	.93										
	[0 26]	5		42.92	+05+190	-2.05		40.87	[.8795]	+02	.8993	0	=		46.22	+	42.69m	m	=	-1.08	
	0 34	10		42.87	+1.48	-1.60		40.97	40.97	+01	.98										
	0 42	12		42.74	+10+155	-1.67		41.07	41.07	.00	44.07	.97	0	=	46.59	+	43.04m	m	=	-1.080	
	-1 25	22		41.34	+26	-128		41.06	41.06	-07	40.99										
	1 31	23		42.19	+1.11	-120		40.99	40.99	-08	.91										
	-44																				
	0 31		+4	42.05	+1.01m	-109	+4	40.954	40.954												
				41.31	.35	-138		.927	.952						+4	40.953					
									+ .029												
									- .001												
	23.4								+4												
	4.2		-0.12		+0.011																
	3.0		+3		+2																
			-0.09		+0.013																

Nov. 24

L +044 +044

32	-22 41 -22 59 [0 26] 0 34 0 42 1 18 -1 39 -1 48 32 0 31 0 17 244 5.2 4.0	323 329 5 10 12 30 25 30 32 42.76 42.65 44.47 44.07 44.29 44.34 42.63 42.88 43.51 42.78 - .008 + 3 - .005	+4.42m +26 +08 +190 +1.48 +1.55 +1.70 +1.15 +1.37 +1.98m .30 + .0037 + 2 + .0039	-.17 -.29 -2.13 -1.66 -1.74 -1.90 -1.17 -1.41 -1.10 -1.34 + .008 + .003 - .004	+4 42.29 .36 .34 .41 .55 .44 .46 .47 42.415 .395 + 4 42.415 42.419 .414 + .005 - .004 + 4 42.415	42.29 .36 [.35.43] .42 .56 .44 .46 .47 42.419 .414 + .005 - .004	+08 +107 +00 +01 -01 -03 -05 -06 +42.419	+42.37 .43 33.43 42 .55 .41 .41 41 0 =	325 22 45 19 1 15 0 = 0 =	+4 44.69 5 32.83 2.03 50.06 2.36 50.39	+07 -04 + 1.90m 42.74 + 2.20m 43.04	44.76 32.79 n = -1.07 1.17 1.120 n = -1.07 1.17 -1.120 + 2 -1.118	+2.20m +43.04 +2.75m 4.32 1.08 1.10 1.140 3 1.137
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1878
Dec. 7 $L + 108 + 108$

22 37	322	+4 57.97	+57m	-16.65	+4 57.31	57.32	+2.20	+57.52	334 23 34	+5 2.41	+08	2.49	+4.32m
22 41	323	57.86	+42	-48	58	38	+19	57	19 1 15	48.04	-10	47.94	43.07
22 59	329	57.70	+26	-30	40	40	+16	56	31 1 53	1.20	-17	1.03	3.05
[0 26]	5	59.68	+190	-218	50	[59.58]	+01	59					
0 34	10	59.24	+148	-170	54	54	-01	53	0 =	4.59	+	4.02m	n = -1.14
0 42	12	59.56	+10+1.55	-178	78	58.68	-02	56.66		50.04		42.77	1.17
✓ 1 3	16	58.30	+02+1.70	-50	50	50.52	-06	144.46		3.13		2.75	1.14
- 1 39	25	57.92	+15	-17	75	75	-12	63					1.150
- 1 48	30	58.10	+37	-43	67	67	-14	53					
- 2 36	40	59.03	+1.14	-131	72	72	-23	79	0 =	4.94	+	4.32m	n = -1.14
0 30	+4	58.54	+85m	-98	+4 57.555	57.556		+4 57.554		50.39		43.07	1.17
0 17		57.90	.30	-34	550	553				3.48		3.05	1.14
						+ 014							-1.150
						- .072							+ 1
						+4 57.565							-1.149
74													
45		- .011	+ .0022										
170		- 3	0										
		- .014	+ .0022										

Dec. 8

 $L + 081 + 048$

22 41	323	+4 58.89	+42m	-43	+4 58.46	58.46	+09	58.55	325 22 45	+5 0.43	+15	0.58	0.52	+ 2.20m
- 22 59	329	58.75	+26	-26	49	49	+08	57	31 1 53	1.83	-10	1.73	1.77	3.05
0 7	3	58.82	+26	-26	56	56	+02	58	2 26	2.06	-14	1.92	1.97	3.13
[0 26]	5	60.47	+08+1.90	-192	63	[58.63]	+01	56	19 1 15	44.68	-05	44.63	44.65	43.08
0 34	10	60.63	+1.48	-180	53	53	00	53						
0 42	12	60.37	+10+1.55	-154	80	80.70	-01	79.69	0 =	1.72	+	1.94m	n = -0.89	
- 1 39	25	58.87	+15	-15	72	72	-05	67		2.87		2.79	1.03	
- 1 48	30	59.00	+37	-137	63	63	-06	57		3.06		2.87	1.07	
- 2 2	34	59.32	+68	-64	63	63	-07	56		45.77		42.82	1.67	
0 34	+4	59.39	+79	-80	+4 58.594	58.597		58.598					-1.015	
0 38		58.86	+26	-26	58.600	590			0 =	1.92	+	2.20m	n = -.87	
						+ .010				3.17		3.05	1.04	
84						- .023				3.37		3.13	1.08	
55		- .007	+ .0043							46.05		43.08	1.067	
18.0		- 3	- 2										+ 1.013	
		- .010	+ .0041										-1.069	
Dec 11					+ 4 58.597								-.012	

Dec. 11

 $L + 078 + 079$

0 7	3	+5 2.15	+26m	-28	+5 1.87	1.87	+05	1.92	19 1 15	+5 47.72	-03	47.69	+43.08m
[0 26]	5	3.93	+08+1.90	-200	1.93	[1.92.00]	+02	1.92	202				
0 42	12	3.74	+10+1.55	-164	2.10	2.09.199	00	2.09.199	0 =	45.85	+	42.67m	n = -1.06
✓ 1 3	16	2.58	+02+1.70	-74	1.84	1.84.86	-02	1.82.84					
- 1 25	22	2.28	+26	-28	2.00	2.00	-05	1.95	0 =	45.79	+	43.08m	n = -1.068
0 48	+5	2.94	+93m	-99	+5 1.948	1.944		1.944					
0 52		2.84	+41	-43	1.903	930							
						- .005							
114						- .584							
8.5		+ .009	+ .0049										
21.0		- 4	- 4										
		+ .005	+ .0045										

Dec. 12

 $L + 078 + 078$

22 37	322	+5 3.53	+57m	-59	+5 2.94	2.94	+09	+ 3.03	19 1 15	+5 47.35	-11	47.24	+43.08m
- 22 41	323	3.38	+42	-43	2.95	95	+08	.03					
- 22 59	329	3.22	+26	-27	2.95	2.95	+06	.01	0 =	43.89	+	42.78m	n = -1.03
0 7	3	3.33	+26	-27	3.06	3.06	-03	.03					
0 34	10	4.59	+1.48	-152	3.07	.07	-06	.01	0 =	44.20	+	43.08m	n = -1.03
- 1 25	22	3.46	+26	-27	3.19	.19	-13	.06					
23 44	+5	3.58	+54m	-56	+5 3.027	3.027		+5 3.028					
23 48		3.35	.80	-31	.038								
						- .008							
						- .001							
12.4													
9.5		+ .012	+ .0016										
22.0		- 4	+ 1										
		+ .008	+ .0017										

1878phae-proj-1681

47

1878
Dec. 19

L +0.72 +0.41

22 59	10 38	+5	10.48	+1.05 m	10.05	+5 10.43	10.43	+0.09	10.52	31 1 53	+5 13.39	-0.4	-0.02	13.35	13.37	+3.05 m
0 34	10	11.88	+1.48	11.40	48	48	48	+0.04	52	19 1 15	51.99	+0.1	+0.01	52.00	52.00	+43.10
0 42	12	11.94	+1.55	11.46	48	48	48.38	+0.03	51.41	0 =	2.67	+	2.89 m	n = -93		
1 3	16	11.14	+0.70	10.66	48	48	48.50	+0.02	50.52		41.32		42.94		96	
1 18	20	12.18	+1.70	11.62	56	56	56	+0.01	57						94.5	
1 39	25	10.68	+1.5	10.14	54	54	54	-0.01	53							
1 48	30	10.86	+1.37	10.35	51	51	51	-0.01	50	0 =	2.84	+	3.05 m	n = -93		
2 36	40	11.63	+1.94	11.18	55	55	55	-0.05	50		41.47		43.10		96	
2 42	43	11.90	+1.45	11.37	53	53	53	-0.05	48						-94.5	
2 56	47	10.69	+0.06	10.66	63	63	63	-0.06	57						-2	
1 27	+5	11.34	+0.86	10.81	+5 10.519	10.519			10.520						-94.7	
1 24	10.68	+1.16	10.15	10.528	511											

19.4
2.8
1.5
Dec 23 -0.11
-0.12
+1
-0.035
+1
-0.034

+0.11
+0.03
+5 10.525

L +0.52 +0.64

0 7 3	+5	12.50	+1.26 m	12.27	+5 12.23	12.23	+1.17	12.40	31 1 53	+5 15.58	-0.4			15.54		+3.05 m
0 34	16	13.00	+1.48	12.52	28	28	28.30	+1.11	39.41	19 1 15	56.01	.00		56.01		+43.11
1 39	25	12.55	+1.05	12.15	44	44	44	+0.07	51	0 =	2.91	+	2.79 m	n = -1.04		
1 48	30	12.81	+1.37	12.38	43	43	43	+0.06	49		43.38		42.85		1.01	
3 50	64	13.28	+1.83	12.85	43	43	43	-0.07	36						-1.025	
4 16	71	12.75	+1.31	12.32	43	43	43	-0.10	33							
4 29	73	12.89	+1.29	12.30	59	59	59	-0.11	48	0 =	3.17	+	3.05 m	n = -1.04		
4 49	79	13.12	+1.65	12.69	45	45	45	-0.13	32		43.64		43.11		-1.01	
2 45	+5	12.87	+1.44 m	12.45	+5 12.410	12.410			12.410						-1.025	
1 11	12.63	+1.26	12.27	12.367	409										+3	
					-0.024										-1.022	
					-0.02											
23.4																
6.8	0.00		+0.045													
5.5	+4		+10													
	+0.04		+0.055													
					+5 12.403											

Dec. 24

L +0.47 +0.46

0 7 3	+5	12.93	+1.26 m	12.24	+5 12.69	12.69	+0.04	12.73	19 1 15	+5 53.24	-0.2			53.22		+43.11 m
1 18	20	14.30	+1.70	14.00	70	70	70	-0.02	68							
1 25	22	12.92	+1.26	12.24	68	68	68	-0.02	66	0 =	40.30	+	42.85 m	n = -94		
0 57	+5	13.38	+1.74 m	12.70	+5 12.690	12.690			12.690	0 =	40.54	+	43.11 m	n = -940		
0 46	12.92	+1.26	12.24	12.685												
					-0.009											
					-0.005											
24.4																
7.8	+0.05		+0.058													
6.5	+4		+5													
	+0.09		+0.063													
					+5 12.676											

Dec. 25

L +0.43 +0.43

0 34	10	14.33	+1.48	13.55	12.98	12.99	+0.01	13.00								
0 7 3	+5	13.17	+1.26 m	12.24	+5 12.93	12.93	+0.03	12.96	19 1 15	+5 52.08	-0.2			52.06		+43.11 m
0 26	5	14.67	+1.90	13.73	12.94	12.94	+0.02	12.97								
0 42	12	14.55	+1.55	13.11	13.14	13.14	.02	13.14	0 =	38.72	+	42.70 m	n = -91			
1 3	16	13.56	+1.70	12.86	12.92	12.92	-0.01	12.91	19 1 15	39.10	+	43.11 m	n = -907			
1 18	20	14.57	+1.70	13.55	13.02	13.02	-0.02	13.00	0 =							
1 25	22	13.28	+1.26	12.24	13.04	13.04	-0.03	13.01								
0 52	+5	14.02	+1.42 m	13.02	+5 12.996	12.999			12.999							
0 48	13.34	+1.41	12.97	12.963	993											
					-0.014											
					-0.005											
25.4																
8.8	+0.10		+0.044													
7.5	+4		+4													
	+0.14		+0.048													
					+5 12.974											

1878
Dec. 26 $L + 0.43 + 0.10$

34	+5	14.38	+1.48m	-129	+5 13.09	13.09	+0.7	13.16	19	1	15	+5 50.70	+0.7	50.77	+43.11m	-1
42	12	14.71	+1.55	-135	.36	[.34.26]	+0.7	.43.33								-2
3	16	13.73	+1.70	-160	.13	.43.15	+0.5	.18.20	0	=	37.15	+	42.63m	n = -.87		-3
25	22	13.43	+1.26	-23	.20	.20	+0.4	.24								-3
31	23	14.15	+1.11	-97	.20	.20	+0.4	.24	0	=	37.57	+	43.11m	n = -.871		-3
16	71	13.48	+1.31	-27	.21	.21	-0.7	.14								-5
49	79	13.84	+1.65	-57	.27	.27	-1.0	.17								-3
54	82	13.99	+1.57	-76	.23	.23	-1.0	.13								-2
24	+5	13.97	+1.87m	-76	+5 13.211	13.211		13.211								
54		13.62	+1.48	-42	13.202	.193										
						.016										
						.004										
264																
98	+0.121	+0.041														
85	+4	+10														
	+0.16	+0.051														
						+5 13.173										

Dec. 30

 $L + 0.33 + 0.08$

1	3128	+5 13.87	+1.11m	-98.97	+5 12.89	12.900	.00	12.900	19	1	14	+5 50.65	+0.1	.00	50.66	50.65	+43.12m	-1
304																		-2
0.2	.0001	-0.0057																-3
12.5	+2	+2																-2
	+0.002	-0.0055																-3
						+5 12.904												-2

Dec. 31

 $L + 0.33 + 0.10$

1	3	¹⁶ +5	12.31	+1.70m	-62	+5	11.69	11.69.71	+0.2	11.7+.73	19	1	14	+5	50.03	+0.1	.00	50.04	50.03	+43.12-
1	31	23	12.68	+1.11	-99		.69	.69	+0.1	.70										
1	148	30	12.08	+1.37	-33		.75	.75	+0.1	.76	0	=	37.90	+	42.54m	n = -.89				
2	2	34	12.32	+1.68	-61	¹⁶⁰	.71	.72	+0.1	.73										
3	34	57	12.66	+1.09	-97		.69	.69	-0.1	.68	0	=	38.31	+	43.12m	n = -.888				
3	50	64	12.41	+1.83	-74		.67	.67	-0.1	.66										
5	19	90	12.28	+1.54	-48		.77	.77	-0.3	.74										
2	44	⁰ +5	12.48	+1.76m	-68	+5	11.712	11.711		11.711										
1	38	12.24	+1.58	-52			11.717	.714												
								+ .004												
								+ .004												
31.4																				
1.2	-0.008			-0.0056																
13.5	+1			+1																
	-0.004			-0.0055				+5 11.722												

1878

Jan 23

3	0	54	5	1556	+ .85m	- .70
3	16	52	15.72 ³	+ .85	- .96	
3	34	57	15.74	+ .89	- .89	
3	40	64	15.49	+ .83	- .68	
5	81	86	15.14 ⁸	+ .103	- .84	
3	44	+5	15.24 ⁶⁶	+ .99m		

+5	14.86	.00
	.767	.00
	.85	.00
	.81	.00
	.94	.00
+5	14.846	

360	3	5	+5	18.48	+ .00	18.48	+ 4.44m
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$$h = +.029 - .004$$

$$0 = + \frac{2.94}{2.82} + 3.45m \quad n = \frac{-8.52}{-8.17}$$

Jan 25

2	56	47	5	1638	+ .06m	- .05
3	0	50	17.03	+ .85	- .70	
3	16	52	17.22	+ .117	- .96	
3	32	64	16.97	+ .83	- .68	
3	34	57	17.08	+ .109	- .89	
3	19	+5	16.94	+ .80m		

+5	16.33	.00
	.33	.00
	.26	.00
	.29	.00
	.14	.00
+5	16.280	

360	3	5	+5	19.88	+ .00	19.88	+ 4.44m
68	3	59	5	26.22	+ .00	26.22	+ 11.97

$$h = +.036 + .003$$

$$0 = + \frac{2.94}{9.28} + \frac{3.64m}{11.17} \quad n = \frac{-81}{-83} = -820$$

Jan 26

2	56	47	5	1727	+ .06m	- .05
3	0	50	17.08	+ .85	- .71	
3	16	52	18.06	+ .117	- .98	
3	34	57	18.04	+ .109	- .92	
3	30	64	17.97	+ .83	- .70	
3	19	+5	17.82	+ .80m		

+5	17.22	.00
	17.07	16.94
	17.08	.00
	.12	.00
	.27	.00
+5	17.152	

360	3	5	+5	20.62	+ .00	20.62	+ 4.44m
68	3	59		28.04	+ .00	28.04	+ 11.97

$$h = +.036 + .003$$

$$0 = + \frac{2.82}{10.282} + \frac{3.64m}{11.17} \quad n = \frac{-77}{-91} = -840$$

1878phae.proj. 1881.

4m

4m
7

4m
7

2

Stars showing a constant disagreement with mean $(\Delta I+m)$

$-(\Delta I+m)$ of star — Mean $-(\Delta I+m)$ for each date. = corr. to R.A.

η Cass. $h^h 42^m$	β Androm. $h^h 3^m$	ν Ursa Maj. $h^h 42^m$	ϕ Herc. $h^h 5^m$
Jan. 1 ^{s} +.08	Nov. 26 ^{s} -.05	Apr. 2 ^{s} -.13	June 25 ^{s} +.16
Nov. 6 +.11	Dec. 7 -.11	3 -.06	July 2 +.07
23 +.12	11 -.12	8 -.06	7 +.12
24 +.13	14 -.03	13 -.08	16 +.06
26 +.13	19 -.02	14 -.07	22 +.06
30 +.01	23 -.02		23 +.09
Dec. 1 +.12	25 -.09		24 +.08
7 +.21	26 -.03		
8 +.19	31 .00		
11 +.16	Jan 5 -.05		
14 +.09			
16 +.12			
19 -.01			
25 +.14			
26 +.22			
Mean +.121	-.052	-.080	+0.099
P. Corr. +.091	-.005	+0.35	+0.05
Total Corr. +.212 15	-.057 10	-.045 5	+0.204 7
Corr. by ϕ M.C.B. +.184 22	-.019 53	-.024 23	+0.177 14
Mean by weights +.195 Adopted	-.025	-.028	+0.186
P. Corr. +.091	-.005	+0.35	+0.05
Corr. to Corr. used +.104	-.020	-.063	+0.081

τ Herculis $h^h 16^m 16^s$	α Cygni $h^h 20^m 37^s$	ν Lyrae $h^h 19^m 3^s$	The values of I.R.A. or of $-(\Delta I+m)$ for the above stars are therefore corrected by the amounts given, viz
June 25 ^{s} +.05	Sept. 2 ^{s} -.02	Aug. 25 ^{s} +.04	η Cass. ^{s} -.104
26 +.06	9 -.01	26 -.02	β Andr. +0.20
July 1 +.05	14 -.03	27 -.02	ν Ursa Maj. +0.63
2 +.01	23 .00	29 +.02	ϕ Herc. -.081
9 +.01	30 -.12	Sept. 1 -.06	τ " -.054
22 +.04	Oct. 1 -.04	2 -.06	ν Lyrae +0.32
24 -.04	2 .00	9 -.07	α Cygni +0.46
	3 -.04	10 -.09	
	8 .00	17 -.02	
	10 +.01	18 .00	
	14 +.01	19 -.03	
	16 -.09	22 -.08	
	21 -.04	23 -.09	
	[22 -.12]	28 -.02	
	Nov. 4 -.04		
	16 -.07		
Mean +.026	-.033	-.033	
P. Corr. +.040	+0.055	+0.019	
Total Corr. +.066 7	+0.022 15	-.014 14	
Corr. by ϕ M.C.B. +.099 39	+0.007 88	-.012 19	
Mean by weights +.094	+0.009	-.013	
P. Corr. +.040	+0.055	+0.019	
Corr. to Corr. used +.054	-.046	-.032	

Observations bracketed with reason.

R.A. & Date	Reason for rejection.
0 26 all dates - $\tan \delta = 1.90$	
8 20 " " " 1.81	
16 22 " " " 1.86	
0 42 Dec. 26	Discordant.
1 18 Nov. 26	Broken wires.
1 18 Dec. 14	Discordant, $\tan \delta = 1.70$
1 39 Dec. 23	Discordant.
10 54 May 14	" , broken wires.
17 54 Aug. 22	" , observation poor.
19 26 Sept. 2	Broken wires.
20 32 Sept. 28	Discordant.
21 38 Nov. 3	"
22 41 Nov. 14	Broken wires.

Summary of the Number of Observations of Fundamental
Stars observed during the years 1870-1879

1870	130
1871	2262
1872	2014
1873	2114
1874	1834
1875	1655
1876	1829
1877	2017
1878	1314
1879	44
	15,216

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