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PARALLAX OF α LYRÆ AND 61 CYGNI.

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INTRODUCTION.

In the year 1862 a series of observations of *α Lyræ* was begun at the Naval Observatory by Prof. J. S. HUBBARD, for the purpose of determining the annual parallax of this star, and also for obtaining new values of the constants of aberration and nutation. These observations were determinations of the declination of the star with the Prime Vertical Transit Instrument according to the method followed by W. STRUVE. The work was continued by Professor HUBBARD until his death, in 1863; and afterward by Professors NEWCOMB, HARKNESS, and myself until April, 1867. An examination of these observations was made by Professor CLEVELAND ABBE in the latter part of the year 1867, when it became apparent that a negative value of the parallax would result, a fact indicating some systematic error in the work. Although the parallax of this star has been determined by several astronomers, still, considering the above failure, it seemed worth while to make an attempt by the differential method while the Naval Observatory remains on its present site. Moreover, the parallaxes of the fixed stars being very small quantities, which have a period of a year, during which the observer and his instruments undergo great changes of temperature, the determination of the parallax of any star by a new observer with a new instrument, and under different climatic conditions, is not, I think, a superfluous work. I began, therefore, a series of observations of *α Lyræ* on May 24, 1880, which was ended on July 2, 1881; observations having been made on 77 nights. As the interesting double star, 61 *Cygni* could also be observed without spending much more time, a similar series of observations of this star was begun on October 24, 1880, and ended December 7, 1881. This star was observed on 66 nights. The observations were not made on every clear night, my purpose being to obtain only data enough to give trustworthy values of the parallax; but even with this limitation these observations have taken much more time than I expected. My house is distant about one mile from the Observatory, and frequently during the winter and spring months on reaching the Observatory I would find the images so bad that no measurements for parallax could be made, or the sky would become covered with clouds. During the spring months, when the observations came at an inconvenient hour of the night, General HAZEN, of the Signal Office, very kindly sent me predictions of the weather which proved to be remarkably correct.

I am indebted to Mr. G. ANDERSON for faithful assistance during all this work.

These observations have been made with the filar micrometer of the 26-inch refractor, and an achromatic eye-piece, giving a magnifying power of 383, has been used throughout. On some of the nights the images would have borne a higher power, but, as the work was differential, the eye-piece was not changed. Since observations of the angle of position made with the circle of our micrometer are less accurate for distances that must be used in determinations of parallax, I have observed simply the difference of declination of *α Lyræ* and its companion of the 10th magnitude. In the case of 61 *Cygni* the difference of declination of the smaller of these stars and a star of the 9.5 magnitude, about 3′.3 south of the double star, was observed. This star is D. M. + 38°, No. 4345. The observations were made in the following manner: After the stellar focus of the telescope had been adjusted by examining a close double star with a high power, and the parallel of the wires had been carefully determined, the telescope was clamped in declination, the driving clock was put in, and the stars were placed so that they were equidistant from the center of the field in declination and midway in right ascension. Five bisections and readings for the difference of declination were made in the first position of the wires, then the wires were reversed and five more bisections were made. These ten readings having been made, the micrometer was reversed 180°, and a similar set was made in this position of the micrometer; the wires at the end of the work being restored to their first position. In making these bisections both screws were turned several revolutions after each reading, in order to render the single measurements independent of each other. The sidereal clock and the thermometer in the dome were read at the beginning and at the end of the bisections. After finishing the observation the driving clock was thrown out and the parallel of the wires was examined by the star observed for the purpose of detecting any erroneous setting of the position circle. This programme was strictly followed in all the observations except in the first observation of *α Lyræ*, on May 24, 1880, when only four bisections were made in each position of the wires; but as the images were unusually good on that day I have considered this as a normal observation. In the observations of *α Lyræ* two kinds of illumination were used, the bright wires being denoted by *B* and the dark wires with a bright field by *A*. For 61^2 *Cygni* only the dark wires were used.

The following are the observations of these stars that I have made during the past eighteen months. All the readings of the micrometer are given, only a few incomplete observations being omitted, where the work was interrupted by clouds and which can give no results. An examination of the observations will show that a few cases occur where it is probable that an error of a tenth of a revolution was made in reading the head of the micrometer, but I have not ventured to make any change, since in most of these cases the images were poor, and the apparently erroneous readings are within the limits of possible error. Most of the quantities in the following table will be understood from the headings of the columns, and these need no explanation. The differences of declination given in the column $\Delta\delta$ have been computed from the quantities of the preceding column by the equation

$$\tfrac{1}{2}\,\mathrm{R} = 4.''9737$$

The column $\Delta\rho$ contains the corrections for differential refraction. The principal part of this correction has been computed from the formula

$$\Delta\rho = \Delta\delta . k\,(\tan z^2 \cos q^2 + 1)$$

where z is the zenith distance, q the parallactic angle, and the factor k, expressed in parts of radius, serves for the mean condition of the thermometer and barometer. Generally this quantity is of the form

$$k = \alpha\, \beta^{A}\, \gamma^{\lambda},$$

where the factors that multiply α depend on the thermometer and barometer; and in our case these factors differ but little from unity. The first of the following tables gives the correction for differential refraction under the assumption

$$k = \alpha,$$

and the second table gives the factor by which this correction is to be multiplied in order to give the correction corresponding to the actual state of the thermometer and barometer.

TABLE I for $\Delta\rho$.

$$k = \alpha.$$

Hour Angle.	Hour Angle.	α Lyræ.	61² Cygni.
h. m.	h. m.	"	"
0 0	24 0	+ 0.012	+ 0.056
0 20	23 40	0.012	0.056
0 40	23 20	0.012	0.056
1 0	23 0	0.012	0.056
1 20	22 40	0.012	0.056
1 40	22 20	0.012	0.056
2 0	22 0	0.012	0.056
2 20	21 40	0.013	0.057
2 40	21 20	0.013	0.057
3 0	21 0	0.013	0.058
3 20	20 40	0.013	0.059
3 40	20 20	0.013	0.061
4 0	20 0	0.014	0.063
4 20	19 40	0.015	0.067
4 40	19 20	0.016	0.073
5 0	19 0	0.018	0.081
5 20	18 40	0.021	0.093
5 40	18 20	+ 0.025	+ 0.108

TABLE II for $\Delta\rho$.

Therm.	Barometer.	
	$26^{in}.6$.	$30^{in}.6$.
°		
0	1.11	1.15
10	1.08	1.12
20	1.06	1.10
30	1.04	1.07
40	1.02	1.05
50	1.00	1.03
60	0.98	1.01
70	0.96	0.99
80	0.94	0.97
90	0.92	0.95

The weights given in the next column depend only on the condition of the images, and were estimated at the time of observation. In the column of "Remarks" the kind of illumination is distinguished for the observation of *α Lyræ*, and the notes of the observer recorded at the time of the observations are also given. Then are given the mean time of the observation, the mean values of the difference of declination, the adopted correction for differential refraction, and the probable error of a single difference of declination, this value of the error being deduced from the work of each night.

Observations of α Lyræ and Companion.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	″	″		
May 24	. .	. .	73.5	59.678	68.533	8.855	44.04	. . .	4	III. A.
				.689	.539	.850	44.02			
				.688	.551	.863	44.08			$\tau = 12^h\ 26^m.5$
	16 42	22 6.3		59.681	68.559	.878	44.16	+ 0.012		$\Delta\delta = 44''.122$
				68.553	59.678	.875	44.14			$\Delta\rho = + 0''.012$
	$-2^m.8$			.539	.672	.867	44.10			$r_1 = \pm 0''.051$
				.554	.661	.893	44.23			
			73.2	.555	.667	.888	44.21			
May 25	16 27	21 51.2	77.0	59.638	68.567	8.929	44.41	+ 0.012	2	III. A.
				.641	.571	.930	44.42			
				.638	.545	.907	44.30			
				.660	.543	.883	44.18			
	$-2^m.9$			59.681	68.536	.855	44.04			$\tau = 12^h\ 19^m.9$
				68.534	59.668	.866	44.10			$\Delta\delta = 44''.199$
				.539	.662	.877	44.15			$\Delta\rho = + 0''.012$
				.532	.625	.907	44.30			$r_1 = \pm 0''.100$
				.532	.679	.853	44.03			
	16 52	22 16.2	76.6	.540	.682	.858	44.06	+ 0.012		
May 26	16 16	21 40.2	78.0	59.664	68.517	8.853	44.03	+ 0.012	2	III. A.
				.635	.543	.908	44.31			
				.660	.579	.919	44.36			
				.650	.540	.890	44.22			
	$-2^m.9$			59.676	68.550	.874	44.14			$\tau = 12^h\ 17^m.0$
				68.512	59.660	.852	44.03			$\Delta\delta = 44''.185$
				.529	.641	.888	44.21			$\Delta\rho = + 0''.012$
				.540	.637	.903	44.28			$r_1 = \pm 0''.074$
				.520	.647	.873	44.13			
	17 5	22 29.2	76.5	.528	.654	.874	44.14	+ 0.012		
May 27	15 33	20 57.1	75.0	59.700	68.580	8.880	44.17	+ 0.013	2	III. B.
				.679	.556	.877	44.15			
				.633	.535	.902	44.28			
				.670	.579	.909	44.31			
				59.688	68.579	.891	44.22			$\tau = 11^h\ 21^m.6$
	$-3^m.0$			68.494	59.609	.885	44.19			$\Delta\delta = 44''.242$
				.542	.640	.902	44.28			$\Delta\rho = + 0''.013$
				.548	.660	.888	44.21			$r_1 = \pm 0''.041$
				.552	.641	.911	44.32			
	16 5	21 29.1	74.5	.553	.648	.905	44.29	+ 0.013		
May 27	16 29	21 53.1	73.6	59.670	68.562	8.892	44.23	+ 0.012	2	III. A.
				.664	.559	.895	44.24			
				.715	.521	.806	43.80			
				.654	.535	.881	44.17			
	$-3^m.0$			59.637	68.553	.916	44.35			$\tau = 12^h\ 13^m.0$
				68.543	59.632	.911	44.32			$\Delta\delta = 44''.168$
				.539	.660	.879	44.16			$\Delta\rho = + 0''.012$
				.534	.639	.895	44.24			$r_1 = \pm 0''.118$
				.561	.665	.896	44.25			
	16 52	22 16.1	73.2	.509	.679	.830	43.92	+ 0.012		
May 31	15 23	20 57.0	72.0	59.650	68.556	8.906	44.30	+ 0.013	2	III. B.
				.671	.575	.904	44.29			
				.675	.550	.875	44.14			
				.685	.554	.869	44.11			
	$-3^m.1$			59.623	68.550	.927	44.40			$\tau = 11^h\ 5^m.8$
				68.552	59.687	.865	44.09			$\Delta\delta = 44''.212$
				.540	.669	.871	44.12			$\Delta\rho = + 0''.013$
				.561	.666	.895	44.24			$r_1 = \pm 0''.091$
				.559	.630	.929	44.41			
	16 5	21 29.0	71.5	.521	.671	.850	44.02	+ 0.013		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	″	″		
May 31	16 7	21 31.0	71.5	59.686	68.559	8.873	44.13	+ 0.013	2	III. A.
				.658	.531	.873	44.13			
				.671	.563	.892	44.23			
				.657	.553	.896	44.25			
				59.634	68.548	.914	44.34			$\tau = 11^h\ 36^m.2$
	$-3^m.1$			68.551	59.683	.868	44.11			$\Delta\delta =$ 44″.201
				.563	.666	.897	44.25			$\Delta\rho = +$ 0″.013
				.541	.653	.888	44.21			$r_1 = \pm$ 0″.047
				.550	.665	.885	44.19			
	16 32	21 56.0	71.0	.539	.659	.880	44.17	+ 0.012		
June 2	15 50	21 13.2	55.8	68.587	59.660	8.927	44.40	+ 0.013	2	III. B.
				.579	.617	.962	44.57			
				.574	.652	.922	44.38			
				.573	.660	.913	44.33			
				68.580	59.644	.936	44.44			$\tau = 11^h\ 13^m.6$
	$-3^m.9$			59.653	68.549	.896	44.25			$\Delta\delta =$ 44″.333
				.649	.551	.902	44.28			$\Delta\rho = +$ 0″.013
				.634	.570	.936	44.44			$r_1 = \pm$ 0″.098
				.663	.527	.864	44.09			
	16 21	21 44.2	55.0	.648	.525	.877	44.15	+ 0.013		
June 2	16 24	21 47.2	55.0	68.510	59.651	8.859	44.06	+ 0.013	2	III. A.
				.533	.693	.840	43.97			
				.537	.682	.855	44.04			
				.567	.657	.910	44.32			
				68.564	59.658	.906	44.30			$\tau = 11^h\ 48^m.0$
	$-3^m.9$			59.662	68.538	.876	44.15			$\Delta\delta =$ 44″.161
				.685	.549	.864	44.09			$\Delta\rho = +$ 0″.013
				.662	.526	.864	44.09			$r_1 = \pm$ 0″.088
				.668	.569	.901	44.27			
	16 56	22 19.2	54.7	.649	.560	.911	44.32	+ 0.013		
June 17	16 20	21 47.1	68.5	68.552	59.675	8.877	44.15	+ 0.012	2	III. A.
				.533	.670	.863	44.08			
				.548	.678	.870	44.12			
				.545	.701	.844	43.99			
				68.560	59.666	.894	44.24			$\tau = 10^h\ 44^m.4$
	$0^m.0$			59.698	68.505	.807	43.80			$\Delta\delta =$ 44″.060
				.671	.524	.853	44.03			$\Delta\rho = +$ 0″.012
				.669	.513	.844	43.99			$r_1 = \pm$ 0″.085
				.699	.548	.849	44.01			
	16 43	22 10.1	68.5	.646	.530	.884	44.19	+ 0.012		
June 18	16 22	21 49.1	71.0	68.540	59.663	8.877	44.15	+ 0.012	2	III. A.
				.521	.637	.884	44.19			
				.511	.669	.842	43.98			
				.555	.649	.906	44.30			
				68.545	59.623	.922	44.38			$\tau = 10^h\ 54^m.5$
	$0^m.0$			59.648	68.522	.874	44.14			$\Delta\delta =$ 44″.146
				.670	.531	.861	44.07			$\Delta\rho = +$ 0″.012
				.683	.540	.857	44.05			$r_1 = \pm$ 0″.099
				.699	.529	.830	43.92			
	17 9	22 36.1	69.8	.639	.542	.903	44.28	+ 0.012		
June 21	16 31	21 58.0	77.0	68.562	59.628	8.934	44.44	+ 0.011	2	III. A.
				.531	.654	.877	44.15			
				.539	.656	.883	44.18			
				.545	.697	.848	44.01			
				68.563	59.661	.902	44.28			$\tau = 10^h\ 41^m.1$
	$-0^m.1$			59.679	68.539	.860	44.07			$\Delta\delta =$ 44″.165
				.659	.560	.901	44.27			$\Delta\rho = +$ 0″.011
				.682	.527	.845	43.99			$r_1 = \pm$ 0″.099
				.656	.554	.898	44.26			
	16 57	22 24.0	77.0	.681	.528	.847	44.00	+ 0.011		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	"	"		
June 22	16 49	22 15.9	77.5	68.554	59.670	8.884	44.19	+ 0.011	3	Ill. B.
				.556	.660	.896	44.25			
				.531	.681	.850	44.02			
				.526	.676	.850	44.02			
	$-$ 0^m.2			68.562	59.691	.871	44.12			$\tau =$ 10^h 52^m.0
				59.647	68.557	.910	44.32			$\Delta\delta =$ 44''.191
				.659	.566	.907	44.30			$\Delta\rho = +$ 0''.011
				.667	.572	.905	44.29			$r_1 = \pm$ 0''.078
				.658	.562	.904	44.29			
	17 9	22 35.9	76.2	.680	.548	.868	44.11	+ 0.011		
June 22	17 12	22 38.9	76.2	68.569	59.642	8.927	44.40	+ 0.011	3	Ill. A.
				.543	.670	.873	44.13			
				.543	.689	.854	44.04			
				.546	.650	.896	44.25			
				68.575	59.681	.894	44.24			$\tau =$ 11^h 15^m.9
	$-$ 0^m.2			59.660	68.544	.884	44.19			$\Delta\delta =$ 44''.172
				.673	.539	.866	44.10			$\Delta\rho = +$ 0''.011
				.680	.580	.900	44.27			$r_1 = \pm$ 0''.092
				.670	.554	.884	44.19			
	17 34	23 0.9	76.0	.705	.534	.829	43.91	+ 0.011		
June 23	16 4	21 30.8	80.0	68.569	59.658	8.911	44.32	+ 0.011	2	Ill. B.
				.570	.652	.918	44.36			
				.557	.640	.917	44.35			
				.547	.665	.882	44.18			
				68.572	59.669	.903	44.28			$\tau =$ 10^h 7^m.1
	$-$ 0^m.3			59.620	68.554	.934	44.43			$\Delta\delta =$ 44''.279
				.642	.552	.910	44.32			$\Delta\rho = +$ 0''.011
				.660	.559	.899	44.26			$r_1 = \pm$ 0''.078
				.678	.580	.902	44.28			
	16 32	21 58.8	79.1	.681	.530	.849	44.01	+ 0.011		
June 23	16 35	22 1.8	79.0	68.542	59.667	8.875	44.14	+ 0.011	3	Ill. A.
				.572	.687	.885	44.19			
				.546	.654	.892	44.23			
				.553	.649	.904	44.29			
				68.518	59.688	.830	43.92			$\tau =$ 10^h 37^m.0
	$-$ 0^m.3			59.672	68.554	.882	44.18			$\Delta\delta =$ 44''.204
				.654	.565	.911	44.32			$\Delta\rho = +$ 0''.011
				.675	.556	.881	44.17			$r_1 = \pm$ 0''.090
				.635	.569	.934	44.43			
	17 1	22 27.8	78.5	.661	.541	.880	44.17	+ 0.011		
June 24	16 39	22 5.7	82.0	68.536	59.667	8.869	44.11	+ 0.011	3	Ill. B. Clouds.
				.550	.662	.888	44.21			
				.527	.650	.877	44.15			
				.549	.639	.910	44.32			
	$-$ 0^m.4			68.521	59.644	.877	44.15			$\tau =$ 10^h 35^m.0
				59.631	68.587	.956	44.54			$\Delta\delta =$ 44''.262
				.648	.563	.915	44.34			$\Delta\rho = +$ 0''.011
				.638	.554	.916	44.35			$r_1 = \pm$ 0''.089
				.651	.530	.879	44.16			
	17 1	22 27.7	81.9	.650	.554	.904	44.29	+ 0.011		
June 26	16 6	21 32.5	76.0	68.531	59.638	8.893	44.23	+ 0.012	2	Ill. B. Clouds.
				.536	.608	.928	44.40			
				.552	.597	.955	44.54			
				.530	.591	.939	44.46			
	$-$ 0^m.6			68.532	59.629	.903	44.28			$\tau =$ 9^h 59^m.6
				59.651	68.539	.888	44.21			$\Delta\delta =$ 44''.412
				.631	.562	.931	44.42			$\Delta\rho = +$ 0''.012
				.625	.590	.965	44.59			$r_1 = \pm$ 0''.094
				.654	.619	.965	44.59			
	16 39	22 5.5	76.0	.638	.565	.927	44.40	+ 0.012		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	"	"		
June 27	15 45	21 11.4	81.8	68.550	59.640	8.910	44.32	+ 0.012	3	III. A.
				.531	.666	.865	44.09			
				.546	.661	.885	44.19			
				.531	.620	.911	44.32			
	$-$ 0^m.7			68.531	59.640	.891	44.22			$\tau =$ 9^h 30^m.0
				59.657	68.528	.871	44.12			$\Delta\delta =$ 44".189
				.678	.517	.839	43.96			$\Delta\rho = +$ 0".012
				.651	.540	.889	44.21			$r_1 = \pm$ 0".074
				.654	.540	.886	44.20			
	16 9	21 35.4	81.0	.602	.501	.899	44.26	+ 0.012		
June 28	16 8	21 34.3	80.8	68.546	59.666	8.880	44.17	+ 0.012	3	III. A.
				.510	.652	.858	44.06			
				.554	.659	.895	44.24			
				.509	.640	.869	44.11			
	$-$ 0^m.8			68.513	59.665	.848	44.01			$\tau =$ 9^h 46^m.9
				59.660	68.526	.866	44.10			$\Delta\delta =$ 44".132
				.644	.564	.920	44.36			$\Delta\rho = +$ 0".012
				.675	.514	.839	43.96			$r_1 = \pm$ 0".101
				.637	.555	.918	44.36			
	16 28	21 54.3	80.5	.684	.520	.836	43.95	+ 0.012		
June 28	16 31	21 57.3	80.5	68.569	59.651	8.918	44.36	+ 0.011	3	III. B.
				.540	.678	.862	44.08			
				.530	.705	.825	43.89			
				.573	.668	.905	44.29			
	$-$ 0^m.8			68.572	.662	.910	44.32			$\tau =$ 10^h 9^m.9
				59.630	68.542	.912	44.33			$\Delta\delta =$ 44".230
				.649	.550	.901	44.27			$\Delta\rho = +$ 0".011
				.673	.531	.858	44.06			$r_1 = \pm$ 0".109
				.633	.551	.918	44.35			
	16 51	22 17.3	80.0	.639	.555	.916	44.35	+ 0.011		
June 30	16 22	21 48.1	76.8	68.519	59.660	8.859	44.06	+ 0.011	2	III. A.
				.553	.659	.894	44.24			
				.578	.636	.942	44.48			
				.555	.652	.903	44.28			
				68.552	59.660	.892	44.23			$\tau =$ 9^h 55^m.3
	$-$ 1^m.0			59.685	68.550	.865	44.09			$\Delta\delta =$ 44".209
				.670	.503	.833	43.93			$\Delta\rho = +$ 0".011
				.639	.545	.906	44.30			$r_1 = \pm$ 0".103
				.656	.562	.906	44.29			
	16 47	22 13.1	76.0	.664	.548	.884	44.19	+ 0.011		
June 30	16 52	22 18.1	76.0	68.585	59.672	8.913	44.33	+ 0.011	2	III. B.
				.586	.660	.926	44.40			
				.575	.666	.909	44.31			
				.587	.660	.927	44.40			
				68.581	59.650	.931	44.42			$\tau =$ 10^h 26^m.7
	$-$ 1^m.0			59.627	68.556	.929	44.41			$\Delta\delta =$ 44".338
				.650	.569	.919	44.36			$\Delta\rho = +$ 0".011
				.666	.565	.899	44.26			$r_1 = \pm$ 0".049
				.643	.531	.888	44.21			
	17 20	22 46.1	75.0	.651	.553	.902	44.28	+ 0.011		
July 3	16 26	21 51.9	72.5	68.558	59.640	8.918	44.35	+ 0.011	3	III. B.
				.520	.662	.858	44.06			
				.548	.668	.880	44.17			
				.531	.680	.851	44.02			
	$-$ 1^m.2			68.550	.659	.891	44.22			$\tau =$ 9^h 48^m.8
				59.647	68.576	.929	44.41			$\Delta\delta =$ 44".243
				.640	.539	.899	44.26			$\Delta\rho = +$ 0".011
				.661	.590	.929	44.41			$r_1 = \pm$ 0".089
				.668	.568	.900	44.27			
	16 54	22 19.9	71.7	.669	.568	.899	44.26	+ 0.011		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	"	"		
July 3	16 57	22 22.9	71.7	68.537	59.640	8.897	44.25	+ 0.011	3	III. A.
				.542	.678	.864	44.09			
				.540	.655	.885	44.19			
				.556	.656	.900	44.27			$\tau = 10^h\ 18^m.2$
	$-1^m.2$			68.576	59.681	.895	44.24			$\Delta\delta = 44''.145$
				59.682	68.531	.849	44.01			$\Delta\rho = +\ 0''.011$
				.642	.566	.924	44.38			$r_1 = \pm\ 0''.095$
				.680	.542	.862	44.08			
				.686	.524	.838	43.96			
	17 22	22 47.9	70.9	.686	.528	.842	43.98	+ 0.011		
July 26	16 14	21 38.0	82.5	68.551	59.656	8.895	44.24	+ 0.011	2	III. B.
				.527	.660	.867	44.10			
				.550	.664	.886	44.20			
				.548	.653	.895	44.24			
	$-3^m.1$			68.535	59.657	.878	44.16			$\tau = 8^h\ 4^m.0$
				59.660	68.524	.864	44.09			$\Delta\delta = 44''.181$
				.670	.550	.880	44.17			$\Delta\rho = +\ 0''.011$
				.649	.543	.894	44.24			$r_1 = \pm\ 0''.067$
				.659	.577	.918	44.36			
	16 41	22 5.0	81.8	.700	.548	.848	44.01	+ 0.011		
July 27	17 5	22 28.9	76.6	68.510	59.664	8.846	44.00	+ 0.011	2	III. A.
				.543	.675	.868	44.11			
				.542	.670	.872	44.13			
				.551	.680	.871	44.12			$\tau = 8^h\ 45^m.3$
	$-3^m.2$			68.530	59.643	.887	44.20			$\Delta\delta = 44''.101$
				59.640	68.509	.869	44.11			$\Delta\rho = +\ 0''.011$
				.669	.531	.862	44.08			$r_1 = \pm\ 0''.057$
				.648	.543	.895	44.24			
				.660	.520	.860	44.07			
	17 21	22 44.9	76.0	.693	.529	.836	43.95	+ 0.011		
July 28	16 33	21 56.8	74.8	59.669	68.549	8.880	44.17	+ 0.011	2	III. B.
				.661	.560	.899	44.26			
				.649	.513	.864	44.09			
				.662	.568	.906	44.30			
	$-3^m.3$			59.666	68.546	.880	44.17			$\tau = 8^h\ 13^m.4$
				68.561	59.630	.931	44.42			$\Delta\delta = 44''.225$
				.536	.671	.865	44.09			$\Delta\rho = +\ 0''.011$
				.560	.657	.903	44.28			$r_1 = \pm\ 0''.072$
				.535	.657	.878	44.16			
	16 57	22 20.8	73.7	.566	.658	.908	44.31	+ 0.011		
July 28	17 0	22 23.8	73.6	59.676	68.536	8.860	44.07	+ 0.011	2	III. A.
				.662	.532	.870	44.12			
				.661	.520	.859	44.06			
				.656	.541	.885	44.19			$\tau = 8^h\ 39^m.8$
	$-3^m.3$			59.667	68.528	.861	44.07			$\Delta\delta = 44''.133$
				68.556	59.657	.899	44.26			$\Delta\rho = +\ 0''.011$
				.549	.669	.880	44.17			$r_1 = \pm\ 0''.043$
				.550	.671	.879	44.16			
				.551	.672	.879	44.16			
	17 23	22 46.8	72.8	.530	.670	.860	44.07	+ 0.011		
July 29	16 51	22 14.8	75.0	59.624	68.576	8.952	44.52	+ 0.011	2	III. B.
				.671	.571	.900	44.27			
				.652	.578	.926	44.40			
				.642	.555	.913	44.33			$\tau = 8^h\ 32^m.4$
	$-3^m.3$			59.660	68.581	.921	44.37			$\Delta\delta = 44''.327$
				68.542	59.622	.920	44.36			$\Delta\rho = +\ 0''.011$
				.539	.653	.886	44.20			$r_1 = \pm\ 0''.069$
				.557	.639	.918	44.36			
				.546	.639	.907	44.30			
	17 25	22 48.8	73.3	.538	.659	.879	44.16	+ 0.011		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	″	″		
July 30	16 53	22 16.7	74.5	68.520	59.676	8.844	43.99	+ 0.011	3	Ill. A.
				.533	.637	.896	44.25			
				.559	.681	.878	44.16			
				.542	.656	.886	44.20			
				68.548	59.676	.872	44.13			$\tau = 8^h\ 24^m.9$
	$-\ 3^m.4$			59.681	68.545	.864	44.09			$\Delta\delta = 44''.137$
				.678	.563	.885	44.19			$\Delta\rho = +\ 0''.011$
				.653	.514	.861	44.07			$r_1 = \pm\ 0''.055$
				.657	.547	.890	44.22			
	17 12	22 35.7	73.9	.674	.535	.861	44.07	+ 0.011		
July 31	17 17	22 40.6	78.3	59.640	68.546	8.906	44.30	+ 0.011	2	Ill. A.
				.682	.548	.866	44.10			
				.626	.520	.894	44.24			
				.669	.512	.843	43.98			
	$-\ 3^m.5$			59.658	68.548	.890	44.22			$\tau = 8^h\ 43^m.8$
				68.561	59.648	.913	44.33			$\Delta\delta = 44''.178$
				.550	.660	.890	44.22			$\Delta\rho = +\ 0''.011$
				.518	.675	.843	43.98			$r_1 = \pm\ 0''.084$
				.534	.659	.875	44.14			
	17 38	23 1.6	77.8	.551	.650	.901	44.27	+ 0.011		
Aug. 12	17 16	22 38.8	76.5	59.660	68.534	8.874	44.14	+ 0.011	2	Ill. A.
				.640	.551	.911	44.32			
				.644	.549	.905	44.29			
				.672	.514	.842	43.98			
	$-\ 4^m.3$			59.660	68.550	.890	44.22			$\tau = 7^h\ 56^m.3$
				68.522	59.661	.861	44.07			$\Delta\delta = 44''.107$
				.509	.662	.847	44.00			$\Delta\rho = +\ 0''.011$
				.539	.695	.844	43.99			$r_1 = \pm\ 0''.087$
				.521	.664	.857	44.05			
	17 40	23 2.8	75.6	.509	.660	.849	44.01	+ 0.011		
Aug. 12	19 26	0 48.8	72.5	68.556	59.661	8.895	44.24	+ 0.011	2	Ill. B.
				.554	.660	.894	44.24			
				.550	.625	.925	44.39			
				.560	.663	.897	44.25			
				68.566	59.642	.924	44.38			$\tau = 10^h\ 5^m.9$
	$-\ 4^m.3$			59.668	68.558	.890	44.22			$\Delta\delta = 44''.274$
				.658	.551	.893	44.23			$\Delta\rho = +\ 0''.011$
				.669	.560	.891	44.22			$r_1 = \pm\ 0''.043$
				.644	.552	.908	44.31			
	19 50	1 12.8	71.0	.646	.545	.899	44.26	+ 0.011		
Aug. 15	18 16	23 38.5	72.0	68.548	59.635	8.913	44.33	+ 0.011	2	Ill. A.
				.572	.650	.922	44.38			
				.565	.663	.902	44.28			
				.530	.674	.856	44.05			
	$-\ 4^m.6$			68.506	59.672	.834	43.94			$\tau = 8^h\ 47^m.5$
				59.656	68.539	.883	44.18			$\Delta\delta = 44''.184$
				.659	.552	.893	44.23			$\Delta\rho = +\ 0''.011$
				.629	.530	.901	44.27			$r_1 = \pm\ 0''.101$
				.654	.542	.888	44.21			
	18 47	0 9.5	70.5	.667	.507	.840	43.97	+ 0.011		
Aug. 16	16 58	22 20.5	73.5	59.640	68.544	8.904	44.29	+ 0.011	3	Ill. A.
				.679	.567	.888	44.21			Twilight.
				.644	.530	.886	44.20			
				.658	.546	.888	44.21			
				59.662	68.537	.875	44.14			$\tau = 7^h\ 19^m.3$
	$-\ 4^m.6$			68.532	59.646	.886	44.20			$\Delta\delta = 44''.199$
				.552	.669	.883	44.18			$\Delta\rho = +\ 0''.011$
				.569	.641	.928	44.40			$r_1 = \pm\ 0''.064$
				.539	.679	.860	44.07			
	17 16	22 38.5	73.0	.552	.688	.864	44.09	+ 0.011		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	″	″		
Aug. 16	17 21	22 43.5	72.7	59.674	68.538	8.864	44.09	+ 0.012	2	Ill. B.
				.671	.539	.868	44.11			
				.680	.529	.849	44.01			
				.668	.546	.878	44.16			
	$- 4^m.6$			59.642	68.549	.907	44.30			$\tau = 7^h.\ 46^m.9$
				68.562	59.657	.905	44.29			$\Delta\delta = 44''.188$
				.545	.643	.902	44.28			$\Delta\rho = + 0''.012$
				.569	.656	.913	44.33			$r_1 = \pm 0''.076$
				.526	.663	.863	44.08			
	17 48	23 10.5	71.5	.552	.659	.893	44.23	+ 0.012		
Sept. 14	19 44	1 12.8	59.7	68.544	59.641	8.903	44.28	+ 0.012	2	Ill. A.
				.514	.616	.898	44.26			Images very blazing.
				.520	.641	.879	44.16			
				.552	.633	.919	44.36			
	$+ 1^m.7$			68.530	59.631	.899	44.26			$\tau = 8^h\ 25^m.6$
				59.593	68.496	.903	44.28			$\Delta\delta = 44''.246$
				.601	.522	.921	44.37			$\Delta\rho = + 0''.012$
				.624	.489	.865	44.09			$r_1 = \pm 0''.059$
				.615	.498	.883	44.18			
	20 19	1 47.8	58.8	.614	.504	.890	44.22	+ 0.012		
Sept. 15	19 42	1 10.9	62.0	59.630	68.528	8.898	44.26	+ 0.012	2	Ill. A.
				.635	.531	.896	44.25			
				.640	.537	.897	44.25			
				.650	.520	.870	44.12			
	$+ 1^m.8$			59.629	68.549	.920	44.36			$\tau = 8^h\ 17^m.3$
				68.486	59.631	.855	44.04			$\Delta\delta = 44''.233$
				.542	.616	.926	44.40			$\Delta\rho = + 0''.012$
				.502	.626	.876	44.15			$r_1 = \pm 0''.072$
				.520	.619	.901	44.27			
	20 12	1 40.9	60.5	.520	.628	.892	44.23	+ 0.012		
Sept. 15	20 15	1 43.9	60.5	59.644	68.527	8.883	44.18	+ 0.012	2	Ill. B.
				.635	.548	.913	44.33			
				.638	.511	.873	44.13			
				.624	.498	.874	44.14			
	$+ 1^m.8$			59.640	68.533	.893	44.23			$\tau = 8^h\ 46^m.7$
				68.515	59.639	.876	44.15			$\Delta\delta = 44''.185$
				.554	.659	.895	44.24			$\Delta\rho = + 0''.012$
				.516	.655	.861	44.07			$r_1 = \pm 0''.068$
				.517	.663	.854	44.04			
	20 38	2 6.9	59.6	.530	.616	.914	44.34	+ 0.012		
Sept. 16	20 20	1 49.1	65.0	59.623	68.485	8.862	44.08	+ 0.012	2	Ill. B.
				.653	.504	.851	44.02			
				.600	.521	.921	44.37			
				.665	.526	.861	44.07			
	$+ 2^m.0$			59.609	68.538	.929	44.41			$\tau = 8^h\ 49^m.0$
				68.506	59.658	.848	44.01			$\Delta\delta = 44''.165$
				.540	.640	.900	44.27			$\Delta\rho = + 0''.012$
				.526	.638	.888	44.21			$r_1 = \pm 0''.097$
				.503	.627	.876	44.15			
	20 45	2 14.1	64.5	.511	.653	.858	44.06	+ 0.012		
Sept. 17	20 6	1 35.3	74.6	59.610	68.515	8.905	44.29	+ 0.011	2	Ill. A.
				.646	.506	.860	44.07			
				.641	.523	.882	44.18			
				.657	.522	.865	44.09			
	$+ 2^m.2$			59.644	68.498	.854	44.04			$\tau = 8^h\ 40^m.2$
				68.520	59.630	.890	44.22			$\Delta\delta = 44''.212$
				.501	.590	.911	44.32			$\Delta\rho = + 0''.012$
				.490	.610	.880	44.17			$r_1 = \pm 0''.084$
				.521	.592	.929	44.41			
	20 49	2 18.3	73.0	.543	.631	.912	44.33	+ 0.012		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	"	"		
Sept. 17	20 54	2 23.3	73.0	59.644	68.531	8.887	44.20	+ 0.012	2	Ill. B.
				.603	.548	.945	44.49			Images very blazing
				.632	.526	.894	44.24			and unsteady.
				.613	.545	.932	44.42			
	+ 2^m.2			59.637	68.528	.891	44.22			τ = 9^h 25^m.1
				68.500	59.655	.845	43.99			$\Delta\delta$ = 44''.136
				.493	.637	.856	44.05			$\Delta\rho$ = + 0''.012
				.484	.680	.804	43.79			r_1 = ± 0''.152
				.515	.646	.869	44.11			
	21 31	3 00.3	72.0	.493	.677	.816	43.85	+ 0.012		
Sept. 18	19 8	0 37.4	78.0	68.539	59.598	8.941	44.47	+ 0.011	3	Ill. A.
				.526	.612	.914	44.34			
				.524	.628	.896	44.25			
				.559	.619	.940	44.46			τ = 7^h 26^m.1
	+ 2^m.3			68.542	59.657	.885	44.19			$\Delta\delta$ = 44''.263
				59.632	68.515	.883	44.18			$\Delta\rho$ = + 0''.011
				.632	.513	.881	44.17			r_1 = ± 0''.083
				.655	.522	.867	44.10			
				.651	.547	.896	44.25			
	19 26	0 55.4	77.6	.629	.519	.890	44.22	+ 0.011		
Sept. 18	19 29	0 58.4	77.6	68.528	59.620	8.908	44.31	+ 0.011	3	Ill. B.
				.546	.616	.930	44.42			
				.555	.620	.935	44.44			τ = 7^h 52^m.5
				.513	.634	.879	44.16			$\Delta\delta$ = 44''.342
				68.526	59.620	.906	44.30			$\Delta\rho$ = + 0''.011
	+ 2^m.3			59.620	68.554	.934	44.44			r_1 = ± 0''.060
				.631	.539	.908	44.31			
				.640	.540	.900	44.27			
				.636	.561	.925	44.39			
	19 58	1 27.4	75.6	.624	.546	.922	44.38	+ 0.011		
Sept. 22	19 25	0 54.5	66.5	59.628	68.500	8.872	44.13	+ 0.012	3	Ill. A.
				.611	.506	.895	44.24			
				.626	.497	.871	44.12			
				.650	.540	.890	44.22			τ = 7^h 30^m.4
	+ 2^m.4			59.640	68.519	.879	44.16			$\Delta\delta$ = 44''.249
				68.543	59.608	.935	44.44			$\Delta\rho$ = + 0''.012
				.521	.612	.909	44.31			r_1 = ± 0''.068
				.522	.602	.920	44.36			
				.531	.636	.895	44.24			
	19 49	1 18.5	65.8	.529	.628	.901	44.27	+ 0.012		
Sept. 22	19 52	1 21.5	65.8	59.631	68.519	8.888	44.21	+ 0.012	3	Ill. B.
				.647	.513	.866	44.10			
				.634	.537	.903	44.28			
				.678	.533	.855	44.04			
	+ 2^m.4			59.641	68.536	.895	44.24			τ = 7^h 57^m.8
				68.533	59.634	.899	44.26			$\Delta\delta$ = 44''.217
				.516	.610	.906	44.30			$\Delta\rho$ = + 0''.012
				.519	.658	.861	44.07			r_1 = ± 0''.075
				.537	.628	.909	44.31			
	20 17	1 46.5	64.9	.520	.600	.920	44.36	+ 0.012		
Oct. 20	19 39	1 9.3	56.5	59.629	68.520	8.891	44.22	+ 0.012	3	Ill. A.
				.622	.528	.906	44.30			
				.630	.529	.899	44.26			
				.618	.513	.895	44.24			τ = 5^h 53^m.1
	+ 3^m.2			59.657	68.538	.881	44.17			$\Delta\delta$ = 44''.137
				68.488	59.660	.828	43.91			$\Delta\rho$ = + 0''.012
				.518	.644	.874	44.14			r_1 = ± 0''.091
				.499	.655	.844	43.99			
				.480	.640	.840	43.97			
	19 59	1 29.3	55.8	.510	.629	.881	44.17	+ 0.012		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	"	"		
Oct. 20	20 4	1 34.3	55.8	59.640	68.526	8.886	44.20	+ 0.012	3	Ill. B.
				.625	.526	.901	44.27			
				.662	.537	.875	44.14			
				.624	.540	.916	44.35			
	$+ 3^m.2$			59.632	68.555	.923	44.38			$\tau = 6^h\ 19^m.0$
				68.539	59.640	.899	44.26			$\Delta\delta = 44''.230$
				.514	.644	.870	44.12			$\Delta\rho = +\ 0''.012$
				.547	.640	.907	44.30			$r_1 = \pm\ 0''.064$
				.524	.648	.876	44.15			
	20 26	1 56.3	54.0	.515	.642	.873	44.13	+ 0.012		
Oct. 24	19 43	1 13.4	46.5	68.509	59.629	8.880	44.17	+ 0.012	3	Ill. A.
				.518	.653	.865	44.09			Windy.
				.521	.631	.890	44.22			
				.520	.628	.892	44.23			
	$+ 3^m.3$			68.520	59.620	.900	44.27			$\tau = 5^h\ 41^m.5$
				59.639	68.535	.896	44.25			$\Delta\delta = 44''.201$
				.630	.520	.890	44.22			$\Delta\rho = +\ 0''.012$
				.638	.524	.886	44.20			$r_1 = \pm\ 0''.036$
				.625	.516	.891	44.22			
	20 3	1 33.4	45.5	.613	.488	.875	44.14	+ 0.012		
Oct. 24	20 8	1 38.4	45.5	68.502	59.656	8.846	44.00	+ 0.013	3	Ill. B.
				.539	.613	.926	44.40			
				.530	.630	.900	44.27			
				.528	.624	.904	44.29			
				68.508	59.620	.888	44.21			$\tau = 6^h\ 8^m.9$
	$+ 3^m.3$			59.658	68.539	.881	44.17			$\Delta\delta = 44''.183$
				.646	.519	.873	44.13			$\Delta\rho = +\ 0''.013$
				.630	.493	.863	44.08			$r_1 = \pm\ 0''.079$
				.620	.504	.884	44.19			
	20 33	2 3.4	45.2	.656	.521	.865	44.09	+ 0.013		
Oct. 25	19 50	1 20.4	49.5	68.511	59.641	8.870	44.12	+ 0.012	3	Ill. A.
				.541	.646	.895	44.24			
				.503	.633	.870	44.12			
				.527	.634	.893	44.23			
	$+ 3^m.3$			68.540	59.642	.898	44.26			$\tau = 5^h\ 43^m.5$
				59.632	68.509	.877	44.15			$\Delta\delta = 44''.162$
				.646	.492	.846	44.00			$\Delta\rho = +\ 0''.012$
				.656	.512	.856	44.05			$r_1 = \pm\ 0''.061$
				.630	.529	.899	44.26			
	20 8	1 38.4	49.0	.655	.539	.884	44.19	+ 0.012		
Oct. 25	20 10	1 40.4	49.0	68.515	59.651	8.864	44.09	+ 0.012	3	Ill. B.
				.504	.650	.854	44.04			
				.525	.621	.904	44.29			
				.532	.640	.892	44.23			
	$+ 3^m.3$			68.516	59.640	.876	44.15			$\tau = 6^h\ 6^m.5$
				59.639	68.515	.876	44.15			$\Delta\delta = 44''.217$
				.646	.542	.896	44.25			$\Delta\rho = +\ 0''.012$
				.628	.550	.922	44.37			$r_1 = \pm\ 0''.071$
				.640	.544	.904	44.29			
	20 34	2 4.4	48.5	.631	.539	.908	44.31	+ 0.012		
Oct. 31	20 4	1 31.8	52.0	59.634	68.529	8.895	44.24	+ 0.012	3	Ill. A.
				.633	.531	.898	44.26			
				.655	.522	.867	44.10			
				.633	.547	.914	44.34			
	$+ 0^m.7$			59.638	68.528	.890	44.22			$\tau = 5^h\ 32^m.8$
				68.511	59.639	.872	44.13			$\Delta\delta = 44''.214$
				.511	.644	.867	44.10			$\Delta\rho = +\ 0''.012$
				.542	.626	.916	44.35			$r_1 = \pm\ 0''.061$
				.519	.639	.880	44.17			
	20 25	1 52.8	51.5	.538	.646	.892	44.23	+ 0.012		

Observations of α Lyræ and Companion— Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	″	″		
Oct. 31	20 30	1 57.8	51.5	59.639	68.534	8.895	44.24	+ 0.012	3	Ill. B.
				.630	.538	.908	44.31			
				.643	.507	.864	44.09			
				.629	.512	.883	44.18			
				59.660	68.542	.882	44.18			$\tau = 6^h\ 0^m.2$
	$+ 0^m.7$			68.530	59.641	.889	44.21			$\Delta\delta = 44''.167$
				.516	.639	.877	44.15			$\Delta\rho = + 0''.012$
				.500	.644	.856	44.05			$r_1 = \pm 0''.052$
				.524	.657	.867	44.10			
	20 54	2 21.8	51.0	.527	.649	.878	44.16	+ 0.012		
Nov. 1	20 16	1 43.8	51.5	59.641	68.522	8.881	44.17	+ 0.012	3	Ill. A.
				.632	.532	.900	44.27			
				.640	.501	.861	44.07			
				.636	.524	.888	44.21			
	$+ 0^m.7$			59.615	68.524	.909	44.31			$\tau = 5^h\ 36^m.8$
				68.529	59.655	.874	44.14			$\Delta\delta = 44''.127$
				.511	.664	.847	44.00			$\Delta\rho = + 0''.012$
				.518	.677	.841	43.97			$r_1 = \pm 0''.076$
				.527	.669	.858	44.06			
	20 29	1 56.8	51.0	.525	.665	.860	44.07	+ 0.012		
Nov. 1	20 32	1 59.8	51.0	59.662	68.530	8.868	44.11	+ 0.012	3	Ill. B.
				.670	.530	.860	44.07			
				.672	.520	.848	44.01			
				.664	.517	.853	44.03			
	$+ 0^m.7$			59.653	68.511	.858	44.06			$\tau = 5^h\ 55^m.8$
				68.514	59.643	.871	44.12			$\Delta\delta = 44''.122$
				.546	.656	.890	44.22			$\Delta\rho = + 0''.012$
				.511	.634	.877	44.15			$r_1 = \pm 0''.057$
				.530	.648	.882	44.18			
	20 51	1 18.8	50.0	.551	.650	.901	44.27	+ 0.012		
Nov. 2	20 24	1 51.9	55.5	59.640	68.498	8.858	44.06	+ 0.012	2	Ill. A.
				.668	.521	.853	44.03			
				.648	.483	.835	43.94			
				.647	.529	.882	44.18			
	$+ 0^m.8$			59 631	68.531	.900	44.27			$\tau = 5^h\ 43^m.5$
				68.511	59.624	.887	44.20			$\Delta\delta = 44''.148$
				.516	.608	.908	44.31			$\Delta\rho = + 0''.012$
				.544	.640	.904	44.29			$r_1 = \pm 0''.083$
				.493	.632	.861	44.07			
	20 42	2 9.9	54.0	.511	.639	.872	44.13	+ 0.012		
Dec. 3	21 43	3 12.4	38.0	59.611	68.500	8.889	44.21	+ 0.014	3	Ill. A.
				.633	.515	.882	44.18			Twilight.
				.616	.505	.889	44.21			
				.637	.490	.853	44.03			
				59.640	68.516	876	44.15			$\tau = 5^h\ 0^m.4$
	$+ 2^m.3$			68.526	59.643	.883	44.18			$\Delta\delta = 44''.103$
				.484	.648	.836	43.95			$\Delta\rho = + 0''.014$
				.489	.640	.849	44.01			$r_1 = \pm 0''.070$
				.490	.651	839	43.96			
	21 58	3 27.4	37.6	.530	.654	.876	44.15	+ 0.014		
Dec. 3	22 0	3 29.4	37.6	59.632	68.520	8.888	44.21	+ 0.014	3	Ill. B.
				.621	.511	.890	44.22			
				.636	.505	.869	44.11			
				.634	.505	.871	44.12			
				59.644	68.491	.847	44.00			$\tau = 5^h\ 20^m.8$
	$+ 2^m.3$			68.493	59.623	.870	44.12			$\Delta\delta = 44''.114$
				.510	.625	.885	44.19			$\Delta\rho = + 0''.015$
				.477	.641	.836	43.95			$r_1 = \pm 0''.058$
				.502	.630	.872	44.13			
	22 22	3 51.4	36.7	.505	.641	.864	44.09	+ 0.015		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m	°	r.	r.	r.	"	"		
Dec. 7	21 58	3 27.8	23.0	68.519	59.667	8.852	44.03	+ 0.014	2	Ill. A.
				.549	.640	.909	44.31			Twilight.
				.536	.656	.880	44.17			
				.552	.672	.880	44.17			
	+ $2^m.7$			68.548	59.656	.892	44.23			$\tau = 5^h\ 1^m.5$
				59.658	68.521	.863	44.08			$\Delta\delta = 44''.133$
				.696	.526	.830	43.92			$\Delta\rho = +\ 0''.015$
				.642	.527	.885	44.19			$r_1 = \pm\ 0''.073$
				.652	.524	.872	44.13			
	22 16	3 45.8	22.5	.643	.509	.866	44.10	+ 0.015		
Dec. 9	22 9	3 39.0	24.0	59.628	68.493	8.865	44.09	+ 0.014	2	Ill. A
				.601	.509	.908	44.31			
				.620	.456	.836	43.95			
				.624	.495	.871	44.12			
	+ $2^m.9$			59.621	68.503	.882	44.18			$\tau = 5^h\ 5^m.3$
				68.510	59.621	.889	44.21			$\Delta\delta = 44''.125$
				.502	.632	.870	44.12			$\Delta\rho = +\ 0''.015$
				.508	.640	.868	44.11			$r_1 = \pm\ 0''.080$
				.472	.640	.832	43.93			
	22 28	3 58.0	23.5	.520	.628	.892	44.23	+ 0.015		
Dec. 9	22 30	4 0.0	23.5	59.650	68.500	8.850	44.02	+ 0.015	2	Ill. B.
				.634	.489	.855	44.04			
				.628	.503	.875	44.14			
				.630	.511	.881	44.17			
	+ $2^m.9$			59.627	68.507	.880	44.17			$\tau = 5^h\ 28^m.7$
				68.491	59.639	.852	44.03			$\Delta\delta = 44''.049$
				.508	.680	.828	43.91			$\Delta\rho = +\ 0''.016$
				.501	.664	.837	43.95			$r_1 = \pm\ 0''.059$
				.490	.640	.850	44.02			
	22 54	4 24.0	22.8	.511	.657	.854	44.04	+ 0.016		
Dec. 11	22 15	3 45.1	29.4	68.502	59.618	8.884	44.19	+ 0.014	3	Ill. A.
				.513	.620	.893	44.23			
				.513	.647	.866	44.10			
				.501	.622	.879	44.16			
	+ $3^m.0$			68.515	59.612	.903	44.28			$\tau = 5^h\ 0^m.5$
				59.660	68.481	.821	43.87			$\Delta\delta = 44''.137$
				.630	.490	.860	44.07			$\Delta\rho = +\ 0''.015$
				.618	.505	.887	44.20			$r_1 = \pm\ 0''.078$
				.638	.501	.863	44.08			
	22 28	3 58.1	28.6	.622	.507	.885	44.19	+ 0.015		
Dec. 11	22 30	4 0.1	28.6	68.493	59.666	8.827	43.90	+ 0.015	2	Ill. B.
				.510	.647	.863	44.08			
				.496	.665	.831	43.92			
				.494	.650	.844	43.99			
				68.483	59.666	.817	43.85			$\tau = 5^h\ 17^m.0$
	+ $3^m.0$			59.670	68.513	.843	43.98			$\Delta\delta = 44''.037$
				.616	.500	.884	44.19			$\Delta\rho = +\ 0''.016$
				.642	.508	.866	44.10			$r_1 = \pm\ 0''.088$
				.631	.529	.898	44.26			
	22 46	4 16.1	28.2	.620	.486	.866	44.10	+ 0.016		
Dec. 13	22 27	3 57.3	41.5	59.622	68.486	8.864	44.09	+ 0.015	2	Ill. A.
				.640	.490	.850	44.02			
				.636	.469	.833	43.93			
				.630	.497	.867	44.10			
	+ $3^m.2$			59.647	68.480	.833	43.93			$\tau = 5^h\ 8^m.3$
				68.469	59.602	.867	44.10			$\Delta\delta = 44''.005$
				.448	.613	.835	43.94			$\Delta\rho = +\ 0''.016$
				.463	.641	.822	43.88			$r_1 = \pm\ 0''.056$
				.473	.610	.863	44.08			
	22 47	4 17.3	40.0	.490	.647	.843	43.98	+ 0.016		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	2Δδ	Δδ	Δρ	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	"	"		
Dec. 13	22 49	4 19.3	40.0	59.617	68.499	8.882	44.18	+ 0.016	2	III. B.
				.584	.483	.899	44.26			
				.669	.518	.849	44.01			
				.632	.494	.862	44.08			$\tau = 5^h\ 31^m.3$
				59.610	68.469	.859	44.06			$\Delta\delta = 44''.120$
	$+ 3^m.2$			68.500	59.604	.896	44.25			$\Delta\rho = + 0''.017$
				.483	.643	.840	43.97			$r_1 = \pm 0''.069$
				.509	.621	.888	44.21			
				.511	.636	.875	44.14			
	23 11	4 41.3	39.5	.486	.632	.854	44.04	+ 0.017		
Dec. 15	22 40	4 10.4	41.5	59.628	68.459	8.831	43.92	+ 0.015	2	III. A.
				.658	.482	.824	43.89			
				.646	.488	.842	43.98			
				.632	.470	.838	43.96			$\tau = 5^h\ 12^m.0$
	$+ 3^m.3$			59.617	68.474	.857	44.05			$\Delta\delta = 44''.022$
				68.478	59.624	.854	44.04			$\Delta\rho = + 0''.016$
				.444	.644	.800	43.77			$r_1 = \pm 0''.102$
				.482	.582	.900	44.27			
				.482	.597	.885	44.19			
	22 57	4 27.4	41.0	.498	.622	.876	44.15	+ 0.016		
Dec. 16	22 40	4 10.5	40.0	68.508	59.654	8.854	44.04	+ 0.015	3	III. A.
				.516	.622	.894	44.24			
				.494	.620	.874	44.14			
				.478	.639	.839	43.96			$\tau = 5^h\ 6^m.7$
				68.482	59.601	.881	44.17			$\Delta\delta = 44''.040$
	$+ 3^m.4$			59.647	68.480	.833	43.93			$\Delta\rho = + 0''.016$
				.618	.482	.864	44.09			$r_1 = \pm 0''.077$
				.620	.458	.838	43.96			
				.628	.452	.824	43.89			
	22 54	4 24.5	39.0	.611	.454	.843	43.98	+ 0.016		
Dec. 16	22 57	4 27.5	39.0	68.495	59.597	8.898	44.26	+ 0.016	3	III. B.
				.501	.624	.877	44.15			
				.493	.616	.877	44.15			
				.504	.623	.881	44.17			$\tau = 5^h\ 25^m.2$
	$+ 3^m.4$			68.480	59.644	.836	43.95			$\Delta\delta = 44''.137$
				59.641	68.500	.859	44.06			$\Delta\rho = + 0''.017$
				.630	.502	.872	44.13			$r_1 = \pm 0''.056$
				.618	.503	.885	44.19			
				.638	.516	.878	44.16			
	23 14	4 44.5	38.5	.620	.496	.876	44.15	+ 0.017		
Dec. 18	22 53	4 19.9	35.5	59.634	68.496	8.862	44.08	+ 0.016	2	III. A.
				.620	.495	.875	44.14			
				.623	.503	.880	44.17			
				.612	.477	.865	44.09			
	$- 0^m.2$			59.654	68.497	.843	43.98			$\tau = 5^h\ 9^m.7$
				68.480	59.638	.842	43.98			$\Delta\delta = 44''.052$
				.500	.669	.831	43.92			$\Delta\rho = + 0''.016$
				.451	.582	.869	44.11			$r_1 = \pm 0''.069$
				.520	.641	.879	44.16			
	23 10	4 36.9	35.0	.448	.623	825	43.89	+ 0.017		
Dec. 18	23 12	4 38.9	35.0	59.603	68.489	8.886	44.20	+ 0.017	2	III. B.
				.631	.458	.827	43.90			
				.611	.470	.859	44.06			
				.601	.507	.906	44.30			$\tau = 5^h\ 29^m.7$
	$- 0^m.2$			59.629	68.482	.853	44.03			$\Delta\delta = 44''.016$
				68.444	59.656	.788	43.71			$\Delta\rho = + 0''.018$
				.480	.633	.847	44.00			$r_1 = \pm 0''.107$
				.461	.621	.840	43.97			
				.516	.666	.850	44.02			
	23 31	4 57.9	34.0	.503	.663	.840	43.97	+ 0.019		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
	h. m.	h. m.	°	r.	r.	r.	″	″		
1880. Dec. 22	23 11	4 38.0	32.7	68.529	59.671	8.858	44.06	+ 0.017	2	Ill. B.
				.550	.654	.896	44.25			
				.500	.664	.836	43.95			
				.511	.633	.878	44.16			$\tau = 5^h\ 13^m.0$
	$-\ 0^m.1$			68.472	59.627	.845	43.99			$\Delta\delta = 44''.053$
				59.591	68.484	.893	44.23			$\Delta\rho = +\ 0''.018$
				.630	.472	.842	43.98			$r_1 = \pm\ 0''.081$
				.614	.440	.826	43.90			
				.599	.449	.850	44.02			
	23 30	4 57.0	31.5	.618	.462	.844	43.99	+ 0.019		
1881. Feb. 6	15 22	20 50.3	8.7	59.611	68.544	8.933	44.43	+ 0.015	1	Ill. B.
				.614	.536	.922	44.38			Images very blazing
				.612	.505	8.893	44.23			and unsteady.
				.503	.535	9.032	44.92			
	$+\ 1^m.2$			59.604	68.527	8.923	44.38			$\tau = 18^h\ 23^m.8$
				68.520	59.633	.887	44.20			$\Delta\delta = 44''.342$
				.470	.568	.902	44.28			$\Delta\rho = +\ 0''.015$
				.539	.618	.921	44.37			$r_1 = \pm\ 0''.160$
				.472	.623	.849	44.01			
	15 45	21 13.3	8.0	.493	.603	.890	44.22	+ 0.015		
Feb. 10	15 23	20 51.2	34.0	59.630	68.534	8.904	44.29	+ 0.014	3	Ill. A.
				.600	.529	.929	44.41			
				.611	.520	.909	44.31			
				.589	.510	.921	44.37			$\tau = 18^h\ 12^m.0$
				59.632	68.564	.932	44.42			$\Delta\delta = 44''.307$
	$+\ 1^m.1$			68.511	59.594	.917	44.35			$\Delta\rho = +\ 0''.014$
				.480	.580	.900	44.27			$r_1 = \pm\ 0''.059$
				.511	.604	.907	44.30			
				.459	.584	.875	44.14			
	15 52	21 20.2	33.6	.484	.595	.889	44.21	+ 0.014		
Feb. 12	15 22	20 50.1	31.0	59.611	68.521	8.910	44.32	+ 0.014	2	Ill. B.
				.582	.539	.957	44.55			
				.620	.527	.907	44.30			
				.564	.558	.994	44.73			$\tau = 18^h\ 5^m.0$
	$+\ 1^m.0$			59.612	68.541	.929	44.41			$\Delta\delta = 44''.384$
				68.476	59.586	.890	44.22			$\Delta\rho = +\ 0''.014$
				.533	.600	.933	44.43			$r_1 = \pm\ 0''.105$
				.518	.621	.897	44.25			
				.536	.619	.917	44.35			
	15 55	21 23.1	30.6	.510	.608	.902	44.28	+ 0.014		
Feb. 13	15 35	21 3.0	26.8	59.622	68.482	8.860	44.07	+ 0.014	2	Ill. A.
				.586	.521	.935	44.44			
				.627	.530	.903	44.28			
				.654	.574	.920	44.36			
				59.621	68.507	.886	44.20			$\tau = 18^h\ 9^m.0$
	$+\ 0^m.9$			68.506	59.594	.912	44.33			$\Delta\delta = 44''.259$
				.494	.612	,882	44.18			$\Delta\rho = +\ 0''.014$
				.536	.637	.899	44.26			$r_1 = \pm\ 0''.073$
				.548	.640	.908	44.31			
	15 58	21 26.0	26.4	.490	.612	.878	44.16	+ 0.014		
Feb. 14	15 17	20 45.0	22.8	68.511	59.633	8.878	44.16	+ 0.014	3	Ill. B.
				.518	.632	.886	44.20			
				.530	.611	.919	44.36			
				.536	.614	.922	44.38			$\tau = {}^*17^h\ 46^m.1$
	$+\ 0^m.9$			68.524	59.607	.917	44.35			$\Delta\delta = 44''.250$
				59.642	68.506	.864	44.09			$\Delta\rho = +\ 0''.014$
				.625	.529	.904	44.29			$r_1 = \pm\ 0''.075$
				.632	.506	.874	44.14			
				.640	.518	.878	44.16			
	15 38	21 6.0	22.5	.611	.533	.922	44.37	+ 0.014		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	"	"		
Feb. 14	15 40	21 8.0	22.5	68.507	59.631	8.876	44.15	+ 0.014	3	Ill. A.
				.498	.619	.879	44.16			
				.498	.623	.875	44.14			
				.497	.656	.841	43.97			
				68.502	59.600	.902	44.28			$\tau =$ 18h 8m.0
	+ 0m.9			59.649	68.532	.883	44.18			$\Delta\delta =$ 44".168
				.653	.530	.877	44.15			$\Delta\rho = +$ 0".014
				.621	.526	.905	44.29			$r_1 = \pm$ 0".059
				.640	.522	.882	44.18			
	15 59	21 27.0	22.0	.642	.524	.882	44.18	+ 0.014		
Feb. 16	15 13	20 40.9	25.0	68.557	59.617	8.940	44.46	+ 0.014	3	Ill. B.
				.477	.613	.864	44.09			
				.546	.624	.922	44.38			
				.525	.620	.905	44.29			
				.499	.610	.889	44.21			$\tau =$ 17h 36m.1
	+ 0m.8			59.600	68.522	.922	44.37			$\Delta\delta =$ 44".286
				.622	.524	.902	44.28			$\Delta\rho = +$ 0".014
				.604	.490	.886	44.20			$r_1 = \pm$ 0".072
				.622	.518	.896	44.25			
	15 38	21 5.9	24.6	.602	.516	.914	44.33	+ 0.014		
Feb. 16	15 40	21 7.9	24.6	68.484	59.614	8.870	44.12	+ 0.014	3	Ill. A.
				.530	.619	.911	44.32			
				.512	.621	.891	44.22			
				.507	.620	.887	44.20			
				68.507	59.614	.893	44.23			$\tau =$ 18h 3m.0
	+ 0m.8			59.628	68.514	.886	44.20			$\Delta\delta =$ 44".240
				.623	.520	.897	44.25			$\Delta\rho = +$ 0".014
				.629	.517	.888	44.21			$r_1 = \pm$ 0".045
				.624	.535	.911	44.32			
	16 5	21 32.9	24.3	.624	.537	.913	44.33	+ 0.014		
Feb. 19	15 7	20 34.6	28.0	59.632	68.528	8.896	44.25	+ 0.014	3	Ill. B.
				.598	.515	.917	44.35			
				.607	.534	.927	44.40			
				.593	.536	.943	44.48			
				59.611	68.518	.907	44.30			$\tau =$ 17h 20m.5
	+ 0m.5			68.505	59.622	.883	44.18			$\Delta\delta =$ 44".295
				.508	.611	.897	44.25			$\Delta\rho = +$ 0".014
				.510	.621	.889	44.21			$r_1 = \pm$ 0".062
				.528	.630	.898	44.26			
	15 37	21 4.6	27.8	.518	.618	.900	44.27	+ 0.014		
Feb. 19	15 39	21 6.6	27.8	59.607	68.510	8.903	44.28	+ 0.014	3	Ill. A.
				.621	.526	.905	44.29			
				.607	.519	.912	44.33			
				.598	.515	.917	44.35			
				59.618	68.529	.911	44.32			$\tau =$ 17h 50m.4
	+ 0m.5			68.530	59.632	.898	44.26			$\Delta\delta =$ 44".297
				.531	.596	.935	44.44			$\Delta\rho = +$ 0".014
				.518	.636	.882	44.18			$r_1 = \pm$ 0".047
				.521	.520	.901	44.27			
	16 5	21 32.6	27.2	.528	.632	.896	44.25	+ 0.014		
Feb. 21	15 12	20 39.4	29.0	59.613	68.549	8.936	44.44	+ 0.014	3	Ill. B.
				.615	.551	.936	44.45			
				.614	.519	.905	44.29			
				.602	.535	.933	44.43			
				59.617	68.540	.923	44.38			$\tau =$ 17h 15m.0
	+ 0m.3			68.511	59.624	.887	44.20			$\Delta\delta =$ 44".289
				.508	.617	.891	44.22			$\Delta\rho = +$ 0".014
				.526	.646	.880	44.17			$r_1 = \pm$ 0".085
				.492	.624	.868	44.11			
	15 37	21 4.4	28.8	.507	.620	.887	44.20	+ 0.014		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	"	"		
Feb. 21	15 40	21 7.4	28.8	59.599	68.518	8.919	44.36	+ 0.014	3	III. A.
				.610	.522	.912	44.33			
				.607	.507	.900	44.27			
				.611	.515	.904	44.29			
	$+ 0^m.3$			59.598	68.510	.912	44.32			$\tau = 17^h\ 40^m.9$
				68.501	59.632	.869	44.11			$\Delta\delta = 44''.290$
				.522	.607	.915	44.34			$\Delta\rho = + 0''.014$
				.530	.621	.909	44.31			$r_1 = \pm 0''.051$
				.530	.614	.916	44.35			
	16 1	21 28.4	28.5	.501	.610	.891	44.22	+ 0.014		
Mar. 14	15 31	20 57.0	33.8	59.616	68.526	8.910	44.32	+ 0.014	3	III. B.
				.578	.526	.948	44.50			
				.621	.534	.913	44.33			
				.580	.534	.954	44.54			
				59.609	68.528	.919	44.36			$\tau = 16^h\ 11^m.4$
	$- 1^m.1$			68.518	59.632	.886	44.20			$\Delta\delta = 44''.387$
				.524	.579	.945	44.49			$\Delta\rho = + 0''.014$
				.518	.600	.918	44.36			$r_1 = \pm 0''.077$
				.529	.628	.901	44.27			
	15 59	21 25.0	33.5	.519	.571	.948	44.50	+ 0.014		
Mar. 14	16 2	21 28.0	33.5	59.609	68.498	8.889	44.21	+ 0.014	2	III. A.
				.639	.498	.859	44.06			
				.609	.538	.929	44.41			
				.634	.493	.859	44.06			
	$- 1^m.1$			59.598	68.505	.907	44.30			$\tau = 16^h\ 40^m.9$
				68.534	59.611	.923	44.38			$\Delta\delta = 44''.193$
				.518	.646	.872	44.13			$\Delta\rho = + 0''.014$
				.527	.637	.890	44.22			$r_1 = \pm 0''.090$
				.500	.644	.856	44.05			
	16 27	21 53.0	33.0	.504	.635	.869	44.11	+ 0.014		
Mar. 15	15 26	20 51.9	38.8	59.618	68.536	8.918	44.36	+ 0.014	3	III. B.
				.597	.538	.941	44.47			
				.650	.558	.908	44.31			
				.590	.520	.930	44.41			
				59.599	68.524	.925	44.39			$\tau = 16^h\ 0^m.4$
	$- 1^m.2$			68.530	59.590	.940	44.46			$\Delta\delta = 44''.360$
				.525	.614	.911	44.32			$\Delta\rho = + 0''.014$
				.523	.613	.910	44.32			$r_1 = \pm 0''.047$
				.514	.610	.904	44.29			
	15 50	21 15.9	38.5	.520	.619	.901	44.27	+ 0.014		
Mar. 15	15 52	21 17.9	38.5	59.608	68.497	8.889	44.21	+ 0.014	2	III. A. Images blurred.
				.611	.508	.897	44.25			
				.609	.518	.909	44.31			
				.628	.520	.892	44.23			
				59.611	68.527	.916	44.35			$\tau = 16^h\ 25^m.9$
	$- 1^m.2$			68.548	59.575	.973	44.63			$\Delta\delta = 44''.324$
				.513	.637	.876	44.15			$\Delta\rho = + 0''.014$
				.532	.618	.914	44.34			$r_1 = \pm 0''.090$
				.550	.622	.928	44.40			
	16 15	21 40.9	38.5	.528	.607	.921	44.37	+ 0.014		
Mar. 21	15 31	20 56.4	34.0	68.535	59.592	8.943	44.48	+ 0.014	2	III. B.
				.536	.582	.954	44.54			
				.490	.578	.912	44.33			
				.569	.581	.988	44.70			
	$- 1^m.7$			68.548	59.612	.936	44.44			$\tau = 15^h\ 42^m.8$
				59.599	68.517	.913	44.36			$\Delta\delta = 44''.442$
				.591	.521	.930	44.41			$\Delta\rho = + 0''.014$
				.600	.512	.912	44.33			$r_1 = \pm 0''.078$
				.606	.522	.916	44.35			
	15 58	21 23.4	34.0	.602	.546	.944	44.48	+ 0.014		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
Mar. 21	16 2	21 27.4	34.0	68.537	59.612	8.925	44.39	+ 0.014	2	Ill. A.
				.514	.582	.932	44.42			
				.560	.610	.950	44.51			
				.512	.629	.883	44.18			$\tau = 16^h\ 12^m.2$
				68.482	59.607	.875	44.14			$\Delta\delta = 44''.335$
	$-1^m.7$			59.620	68.530	.910	44.32			$\Delta\rho = + 0''.014$
				.629	.530	.901	44.27			$r_1 = \pm\ 0''.076$
				.603	.520	.917	44.35			
				.610	.540	.930	44.42			
	16 26	21 51.4	34.3	.610	.527	.917	44.35	+ 0.014		
Mar. 23	16 7	21 32.3	33.5	68.521	59.623	8.898	44.26	+ 0.014	2	Ill. B.
				.571	.608	.963	44.58			
				.528	.638	.890	44.22			
				.536	.615	.921	44.37			$\tau = 16^h\ 7^m.3$
	$-1^m.8$			68.530	59.619	.911	44.32			$\Delta\delta = 44''.341$
				59.589	68.523	.934	44.44			$\Delta\rho = + 0''.014$
				.592	.530	.938	44.46			$r_1 = \pm\ 0''.089$
				.616	.502	.886	44.20			
				.630	.511	.881	44.17			
	16 27	21 52.3	33.0	.605	.531	.926	44.39	+ 0.013		
Mar. 23	16 30	21 55.3	33.0	68.497	59.634	8.863	44.08	+ 0.013	2	Ill. A.
				.538	.623	.915	44.34			
				.513	.615	.898	44.26			
				.503	.627	.876	44.15			$\tau = 16^h\ 28^m.7$
				68.528	59.628	.900	44.27			$\Delta\delta = 44''.300$
	$-1^m.8$			59.612	68.525	.913	44.33			$\Delta\delta = + 0''.013$
				.607	.553	.946	44.49			$r_1 = \pm\ 0''.079$
				.600	.520	.920	44.36			
				.600	.514	.914	44.34			
	16 47	22 12.3	32.7	.607	.531	.924	44.38	+ 0.013		
Mar. 26	16 10	21 35.1	31.8	59.599	68.530	8.931	44.42	+ 0.014	2	Ill. B.
				.574	.548	.974	44.63			
				.597	.527	.930	44.42			
				.599	.566	.967	44.60			$\tau = 16^h\ 0^m.8$
	$-2^m.0$			59.600	68.547	.947	44.50			$\Delta\delta = 44''.462$
				68.538	59.621	.917	44.35			$\Delta\rho = + 0''.014$
				.549	.600	.949	44.51			$r_1 = \pm\ 0''.073$
				.552	.603	.949	44.51			
				.539	.614	.925	44.39			
	16 35	22 0.1	31.5	.530	.626	.904	44.29	+ 0.014		
Mar. 26	16 38	22 3.1	31.5	59.614	68.500	8.886	44.20	+ 0.013	2	Ill. A.
				.614	.532	.918	44.36			
				.600	.523	.923	44.38			
				.614	.519	.905	44.29			$\tau = 16^h\ 27^m.7$
				59.603	68.518	.915	44.34			$\Delta\delta = 44''.327$
	$-2^m.0$			68.511	59.610	.901	44.27			$\Delta\rho = + 0''.013$
				.536	.613	.923	44.38			$r_1 = \pm\ 0''.053$
				.531	.587	.944	44.48			
				.524	.620	.904	44.29			
	17 1	22 26.1	31.0	.520	.617	.903	44.28	+ 0.013		
Mar. 27	16 10	21 35.0	33.0	68.536	59.610	8.926	44.40	+ 0.014	3	Ill. B.
				.533	.600	.933	44.43			
				.544	.614	.930	44.42			
				.546	.601	.945	44.49			$\tau = 15^h\ 57^m.2$
	$-2^m.1$			68.512	59.596	.916	44.35			$\Delta\delta = 44''.385$
				59.599	68.498	.899	44.26			$\Delta\rho = + 0''.014$
				.632	.523	.891	44.22			$r_1 = \pm\ 0''.062$
				.603	.532	.929	44.41			
				.600	.520	.920	44.36			
	16 36	22 1.0	32.7	.590	.539	.949	44.51	+ 0.013		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	2Δδ	Δδ	Δρ	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
Mar. 27	16 38	22 3.0	32.7	68.550	59.579	8.971	44.62	+ 0.013	3	III. A.
				.500	.588	.912	44.33			
				.531	.594	.937	44.45			
				.530	.584	.946	44.50			
				68.510	59.590	.920	44.36			$\tau = 16^h\ 23^m.6$
	$-\ 2^m.1$			59.623	68.544	.921	44.37			$\Delta\delta = 44''.414$
				.590	.546	.956	44.54			$\Delta\rho = +\ 0''.013$
				.631	.528	.897	44.25			$r_1 = \pm\ 0''.082$
				.618	.516	.898	44.26			
	17 1	22 26.0	32.7	.599	.539	.940	44.46	+ 0.013		
Apr. 27	17 39	23 5.7	56.0	68.564	59.583	8.981	44.67	+ 0.012	3	III. B.
				.569	.584	.985	44.69			
				.560	.614	.946	44.50			
				.570	.598	.972	44.62			
	$-\ 0^m.4$			68.592	59.621	.971	44.62			$\tau = 15^h\ 28^m.8$
				59.577	68.514	.937	44.45			$\Delta\delta = 44''.498$
				.587	.525	.938	44.46			$\Delta\rho = +\ 0''.012$
				.637	.520	.883	44.18			$r_1 = \pm\ 0''.118$
				.586	.545	.959	44.56			
	18 11	23 37.7	55.8	.620	.513	.893	44.23	+ 0.012		
Apr. 27	18 15	23 41.7	55.8	68.529	59.601	8.928	44.40	+ 0.012	2	III. A.
				.528	.604	.924	44.38			
				.535	.621	.914	44.34			
				.512	.623	.889	44.21			
	$-\ 0^m.4$			68.510	59.602	.908	44.31			$\tau = 16^h\ 1^m.2$
				59.620	68.520	.900	44.27			$\Delta\delta = 44''.314$
				.600	.482	.882	44.18			$\Delta\rho = +\ 0''.012$
				.602	.530	.928	44.40			$r_1 = \pm\ 0''.051$
				.604	.520	.916	44.35			
	18 40	0 6.7	55.5	.618	.524	.906	44.30	+ 0.012		
Apr. 29	16 49	22 15.6	52.7	59.610	68.560	8.950	44.52	+ 0.012	2	III. B.
				.608	.550	.942	44.47			
				.577	.543	.966	44.59			
				.608	.560	.952	44.52			
	$-\ 0^m.5$			59.620	68.550	.930	44.42			$\tau = 14^h\ 30^m.0$
				68.549	59.587	.962	44.57			$\Delta\delta = 44''.527$
				.533	.588	.945	44.49			$\Delta\rho = +\ 0''.012$
				.559	.615	.944	44.48			$r_1 = \pm\ 0''.061$
				.552	.610	.942	44.47			
	17 19	22 45.6	52.0	.564	.569	.995	44.74	+ 0.012		
Apr. 29	17 25	22 51.6	52.0	59.551	68.541	8.990	44.71	+ 0.012	2	III. A.
				.611	.550	.939	44.46			
				.617	.554	.937	44.45			
				.588	.560	.972	44.62			
	$-\ 0^m.5$			59.613	68.537	.924	44.38			$\tau = 15^h\ 6^m.9$
				68.568	59.620	.948	44.50			$\Delta\delta = 44''.511$
				.549	.582	.967	44.60			$\Delta\rho = +\ 0''.012$
				.551	.578	.973	44.63			$r_1 = \pm\ 0''.082$
				.550	.628	.922	44.38			
	17 57	23 23.6	51.0	.563	.639	.924	44.38	+ 0.012		
Apr. 30	17 46	23 12.8	49.0	68.556	59.584	8.972	44.62	+ 0.012	2	III. B.
				.536	.554	.982	44.67			
				.560	.580	.980	44.66			
				.572	.598	.974	44.63			
	$-\ 0^m.3$			68.570	59.586	.984	44.68			$\tau = 15^h\ 21^m.6$
				59.585	68.542	.957	44.55			$\Delta\delta = 44''.520$
				.629	.557	.928	44.41			$\Delta\rho = +\ 0''.012$
				.633	.524	.891	44.22			$r_1 = \pm\ 0''.108$
				.613	.541	.928	44.40			
	18 13	23 39.8	48.2	.604	.522	.918	44.36	+ 0.012		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	2Δδ	Δδ	Δρ	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	"	"		
Apr. 30	18 14	23 40.8	48.2	68.554	59.628	8.926	44.40	+ 0.012	2	Ill. A.
				.561	.593	.968	44.60			
				.540	.579	.961	44.57			
				.551	.588	.963	44.58			
				68.564	59.610	.954	44.54			$\tau = 15^h\ 49^m.5$
	− 0m.3			59.596	68.550	.954	44.53			$\Delta\delta = 44''.473$
				.614	.505	.891	44.22			$\Delta\rho = +\ 0''.012$
				.606	.517	.911	44.32			$r_1 = \pm\ 0''.086$
				.596	.528	.932	44.42			
	18 41	0 7.8	47.4	.585	.542	.957	44.55	+ 0.012		
May 6	17 56	23 23.2	56.2	68.578	59.600	8.978	44.65	+ 0.012	2	Ill. A. Cloudy.
				.538	.612	.926	44.40			
				.552	.591	.961	44.57			
				.523	.620	.903	44.28			
	+ 0m.1			68.549	59.580	.969	44.61			$\tau = 15^h\ 10^m.3$
				59.642	68.533	.891	44.22			$\Delta\delta = 44''.442$
				.575	.530	.955	44.54			$\Delta\rho = +\ 0''.012$
				.612	.540	.928	44.40			$r_1 = \pm\ 0''.101$
				.629	.534	.905	44.29			
	18 27	23 54.2	55.8	.606	.546	.940	44.46	+ 0.012		
May 7	17 7	22 34.1	56.0	68.530	59.597	8.933	44.43	+ 0.012	3	Ill. A.
				.562	.586	.976	44.64			
				.545	.618	.927	44.40			
				.541	.602	.939	44.46			
				68.539	59.617	.922	44.38			$\tau = 14^h\ 10^m.5$
	0m.0			39.579	68.544	.965	44.59			$\Delta\delta = 44''.481$
				.593	.520	.927	44.40			$\Delta\rho = +\ 0''.012$
				.601	.550	.949	44.51			$r_1 = \pm\ 0''.071$
				.613	.535	.922	44.37			
	17 24	23 51.1	56.0	.598	.572	.974	44.63	+ 0.012		
May 7	17 28	22 55.1	56.0	68.556	59.600	8.956	44.54	+ 0.012	3	Ill. B.
				.515	.620	.895	44.24			
				.558	.607	.951	44.52			
				.534	.598	.936	44.44			
	0m.0			68.553	59.619	.934	44.44			$\tau = 14^h\ 37^m.4$
				59.606	68.561	.955	44.54			$\Delta\delta = 44''.464$
				.616	.542	.926	44.40			$\Delta\rho = +\ 0''.012$
				.602	.554	.952	44.52			$r_1 = \pm\ 0''.063$
				.609	.565	.956	44.54			
	17 57	. .	55.2	.601	.541	.940	44.46	+ 0.012		
May 8	16 58	22 25.0	59.5	68.554	59.600	8.954	44.54	+ 0.012	3	Ill. A.
				.521	.630	.891	44.22			
				.527	.598	.929	44.41			
				.561	.614	.947	44.50			
				68.542	59.629	.913	44.33			$\tau = 13^h\ 59^m.5$
	− 0m.1			59.611	68.549	.938	44.46			$\Delta\delta = 44''.448$
				.608	.539	.931	44.42			$\Delta\rho = +\ 0''.012$
				.589	.570	.981	44.67			$r_1 = \pm\ 0''.083$
				.627	.556	.929	44.41			
	17 19	22 46.0	59.0	.578	.528	.950	44.52	+ 0.012		
May 8	17 22	22 49.0	59.0	68.549	59.594	8.955	44.54	+ 0.012	3	Ill. B.
				.516	.619	.897	44.25			
				.574	.619	.955	44.54			
				.547	.618	.929	44.41			
	− 0m.1			68.509	59.590	.919	44.36			$\tau = 14^h\ 26^m.4$
				59.607	68.552	.945	44.49			$\Delta\delta = 44''.509$
				.592	.570	.978	44.65			$\Delta\rho = +\ 0''.012$
				.590	.572	.982	44.67			$r_1 = \pm\ 0''.091$
				.592	.550	.958	44.55			
	17 49	23 16.0	58 5	.585	.558	.973	44.63	+ 0.012		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	2Δδ	Δδ	Δρ	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
May 25	16 16	21 42.3	64.5	68.562	59.583	8.979	44.66	+ 0.012	3	Ill. B.
				.549	.599	.950	44.52			
				.569	.604	.965	44.59			
				.544	.584	.960	44.56			$\tau = 12^h\ 11^m.5$
	− 0m.8			68.562	59.600	.962	44.57			$\Delta\delta = 44''.506$
				59.612	68.542	.930	44.42			$\Delta\rho = +\ 0''.012$
				.614	.540	.926	44.39			$r_1 = \pm\ 0''.064$
				.609	.550	.941	44.47			
				.609	.561	.952	44.52			
	16 40	22 6.3	64.0	.620	.539	.919	44.36	+ 0.012		
May 25	16 43	22 9.3	64.0	68.544	59.614	8.930	44.42	+ 0.012	3	Ill. A.
				.554	.623	.931	44.42			
				.534	.592	.942	44.48			
				.541	.620	.921	44.37			$\tau = 12^h\ 38^m.0$
	− 0m.8			68.532	59.614	.918	44.36			$\Delta\delta = 44''.434$
				59.616	68.570	.954	44.53			$\Delta\rho = +\ 0''.012$
				.614	.564	.950	44.52			$r_1 = \pm\ 0''.048$
				.610	.542	.932	44.42			
				.616	.564	.948	44.50			
	17 6	22 32.3	63.5	.612	.522	.910	44.32	+ 0.012		
May 26	16 25	21 51.3	62.8	68.558	59.600	8.958	44.55	+ 0.012	4	Ill. B.
				.570	.581	.989	44.71			
				.559	.608	.951	44.52			
				.554	.600	.954	44.54			$\tau = 12^h\ 14^m.6$
	− 0m.8			68.566	59.601	.965	44.59			$\Delta\delta = 44''.530$
				59.615	68.539	.924	44.38			$\Delta\rho = +\ 0''.012$
				.610	.559	.949	44.51			$r_1 = \pm\ 0''.069$
				.590	.559	.969	44.61			
				.599	.552	.953	44.53			
	16 45	22 11.3	62.8	.628	.548	.920	44.36	+ 0.012		
May 26	16 48	22 14.3	62.8	68.559	59.618	8.921	44.37	+ 0.012	3	Ill. A.
				.538	.609	.929	44.41			
				.527	.620	.907	44.30			
				.561	.610	.951	44.52			$\tau = 12^h\ 37^m.0$
	− 0m.8			68.552	59.623	.929	44.41			$\Delta\delta = 44''.440$
				59.607	68.535	.928	44.40			$\Delta\rho = +\ 0''.012$
				.576	.542	.966	44.59			$r_1 = \pm\ 0''.058$
				.606	.532	.926	44.40			
				.607	.561	.954	44.53			
	17 7	22 33.3	62.5	.605	.546	.941	44.47	+ 0.012		
May 27	16 34	22 0.2	67.0	68.560	59.610	8.950	44.52	+ 0.012	3	Ill. A.
				.540	.598	.942	44.47			
				.554	.599	.955	44.54			
				.548	.621	.927	44.40			$\tau = 12^h\ 20^m.0$
	− 0m.9			68.544	59.572	.972	44.62			$\Delta\delta = 44''.466$
				59.598	68.539	.941	44.47			$\Delta\rho = +\ 0''.012$
				.590	.531	.941	44.47			$r_1 = \pm\ 0''.055$
				.608	.527	.919	44.36			
				.600	.519	.919	44.36			
	16 55	22 21.2	66.9	.586	.523	.937	44.45	+ 0.012		
May 27	16 58	22 24.2	66.9	68.562	59.581	8.981	44.67	+ 0.012	3	Ill. B.
				.564	.577	.987	44.70			
				.562	.599	.963	44.58			
				.530	.586	.944	44.48			$\tau = 12^h\ 45^m.0$
	− 0m.9			68.552	59.585	.967	44.60			$\Delta\delta = 44''.598$
				59.617	68.563	.946	44.49			$\Delta\rho = +\ 0''.012$
				.600	.582	.982	44.67			$r_1 = \pm\ 0''.055$
				.571	.550	.979	44.66			
				.607	.556	.949	44.51			
	17 21	22 47.2	66.0	.586	.558	.972	44.62	+ 0.012		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	2Δδ	Δδ	Δρ	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	"	"		
May 28	16 32	21 58.2	70.2	59.620	68.552	8.932	44.42	+ 0.012	3	Ill. A.
				.599	.551	.952	44.53			
				596	.533	.937	44.45			
				.623	.569	.946	44.50			$\tau = 12^h\ 12^m.1$
				59.623	68.540	.917	44.35			$\Delta\delta = 44''.537$
	$-0^m.9$			68.569	59.600	.969	44.61			$\Delta\rho = +0''.012$
				.560	.596	.964	44.58			$r_1 = \pm 0''.070$
				.581	.608	.973	44.63			
				.551	.574	.977	44.65			
	16 49	22 15.2	70.0	.578	.600	.978	44.65	+ 0.012		
May 28	16 52	22 18.2	70.0	59.610	68.562	8.952	44.52	+ 0.012	3	Ill. B.
				.590	.549	.959	44.56			
				.593	.571	.978	44.65			
				.609	.542	.933	44.43			$\tau = 12^h\ 33^m.0$
	$-0^m.9$			59.613	68.570	.957	44.55			$\Delta\delta = 44''.536$
				68.559	59.571	.988	44.70			$\Delta\rho = +0''.012$
				.556	.604	.952	44.52			$r_1 = \pm 0''.061$
				.554	.618	.936	44.45			
				.559	.600	.959	44.56			
	17 11	22 37.2	69.9	.551	.621	.930	44.42	+ 0.012		
May 30	16 29	21 55.0	73.2	59.594	68.560	8.966	44.59	+ 0.012	4	Ill. B.
				.595	.576	.981	44.67			
				.605	.570	.965	44.59			
				.569	.543	.974	44.63			$\tau = 12^h\ 4^m.0$
	$-1^m.1$			59.578	68.571	.993	44.73			$\Delta\delta = 44''.578$
				68.548	59.595	.953	44.53			$\Delta\rho = +0''.012$
				.570	.583	.987	44.70			$r_1 = \pm 0''.077$
				.543	.622	.921	44.37			
				.532	.596	.936	44.44			
	16 52	22 18.0	73.0	.544	.592	.952	44.53	+ 0.012		
May 30	16 55	22 21.0	73.0	59.623	68.550	8.927	44.40	+ 0.011	3	Ill. A.
				.610	.557	.947	44.50			
				.600	.532	.932	44.42			
				.615	.547	.932	44.43			$\tau = 12^h\ 27^m.0$
	$-1^m.1$			59.592	68.564	.972	44.62			$\Delta\delta = 44''.432$
				68.555	59.634	.921	44.37			$\Delta\rho = +0''.011$
				.550	.622	.928	44.40			$r_1 = \pm 0''.055$
				.538	.616	.922	44.38			
				.512	.599	.913	44.33			
	17 12	22 38.0	73.0	.556	.615	.941	44.47	+ 0.011		
June 22	16 36	22 3.9	64.0	68.577	59.608	8.969	44.61	+ 0.012	2	Ill. B.
				.570	.625	.945	44.49			
				.542	.600	.942	44.48			
				.580	.622	.978	44.65			
				68.537	59.604	.933	44.43			$\tau = 10^h\ 41^m.0$
	$-2^m.2$			59.588	68.560	.972	44.62			$\Delta\delta = 44''.574$
				.596	.539	.943	44.48			$\Delta\rho = +0''.012$
				.596	.558	.962	44.57			$r_1 = \pm 0''.067$
				.566	.557	.991	44.72			
	17 2	22 26.9	63.5	.590	.575	.985	44.69	+ 0.012		
June 22	17 5	22 29.9	63.5	68.559	59.600	8.959	44.56	+ 0.012	2	Ill. A.
				.561	.623	.938	44.46			
				.567	.595	.972	44.62			
				.560	.580	.980	44.66			$\tau = 11^h\ 7^m.4$
				68.564	59.616	8.948	44.50			$\Delta\delta = 44''.572$
	$-2^m.2$			59.600	68.602	9.002	44.77			$\Delta\rho = +0''.012$
				.631	.574	8.943	44.48			$r_1 = \pm 0''.063$
				.604	.561	.957	44.55			
				.623	.591	.968	44.60			
	17 26	22 50.9	62.8	.615	.567	.952	44.52	+ 0.012		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	"	"		
June 26	15 49	21 13.7	75.4	68.571	59.599	8.972	44.62	+ 0.012	3	III. B.
				.579	.626	.953	44.53			
				.582	.634	.948	44.50			
				.570	.596	.984	44.68			
				68.573	59.579	.994	44.73			$\tau = 9^h\ 38^m.2$
	$-2^m.4$			59.596	68.565	.969	44.61			$\Delta\delta = 44''.639$
				.584	.560	.976	44.64			$\Delta\rho = +0''.012$
				.591	.564	8.973	44.63			$r_1 = \pm 0''.056$
				.583	.586	9.003	44.78			
	16 15	21 39.7	74.8	.571	.553	8.982	44.67	+ 0.012		
June 26	16 20	21 44.7	74.8	68.533	59.568	8.965	44.59	+ 0.012	3	III. A.
				.550	.586	.964	44.58			
				.560	.613	.947	44.50			
				.527	.594	.933	44.43			
	$-2^m.4$			68.561	59.611	.950	44.52			$\tau = 10^h\ 7^m.1$
				59.605	68.549	.944	44.48			$\Delta\delta = 44''.491$
				.609	.555	.946	44.50			$\Delta\rho = +0''.012$
				.596	.514	.918	44.36			$r_1 = \pm 0''.050$
				.586	.540	.954	44.54			
	16 42	22 6.7	74.0	.618	.548	.930	44.41	+ 0.012		
June 28	16 30	21 54.6	81.5	68.590	59.593	8.997	44.75	+ 0.012	3	III. B.
				.559	.578	.981	44.67			
				.563	.596	.967	44.60			
				.560	.590	.970	44.61			
	$-2^m.5$			68.543	59.586	.957	44.55			$\tau = 10^h\ 9^m.1$
				59.612	68.554	.942	44.48			$\Delta\delta = 44''.603$
				.603	.587	.984	44.68			$\Delta\rho = +0''.012$
				.616	.562	.946	44.49			$r_1 = \pm 0''.060$
				.610	.564	.954	44.54			
	16 52	22 16.6	80.8	.599	.578	.979	44.66	+ 0.012		
June 28	16 56	22 20.6	80.8	68.552	59.610	8.942	44.48	+ 0.011	2	III. A. Images blurred.
				.534	.606	.928	44.40			
				.522	.597	.925	44.39			
				.578	.614	.964	44.58			
				68.554	59.590	.964	44.58			$\tau = 10^h\ 38^m.0$
	$-2^m.5$			59.585	68.556	.971	44.62			$\Delta\delta = 44''.473$
				.584	.534	.950	44.52			$\Delta\rho = +0''.011$
				.639	.539	.900	44.27			$r_1 = \pm 0''.077$
				.607	.525	.918	44.36			
	17 24	22 48.6	79.2	.620	.574	.954	44.53	+ 0.011		
July 1	16 25	21 49.4	70.8	68.551	59.610	8.941	44.47	+ 0.012	2	III. A. Images blazing.
				.546	.631	.915	44.34			
				.561	.610	.951	44.52			
				.534	.612	.922	44.38			
	$-2^m.7$			68.552	59.612	.940	44.46			$\tau = 9^h\ 52^m.1$
				59.600	68.518	.918	44.36			$\Delta\delta = 44''.465$
				.592	.591	.999	44.76			$\Delta\rho = +0''.012$
				.631	.565	.934	44.43			$r_1 = \pm 0''.079$
				.620	.566	.946	44.50			
	16 47	22 11.4	69.7	.619	.552	.933	44.43	+ 0.012		
July 1	17 0	22 24.4	69.0	59.604	68.560	8.956	44.54	+ 0.012	2	III B. Images blazing.
				.614	.579	.965	44.59			
				.628	.567	.939	44.46			
				.606	.580	.974	44.63			
				59.616	68.579	.963	44.58			$\tau = 10^h\ 28^m.5$
	$-2^m.7$			68.591	59.626	.965	44.59			$\Delta\delta = 44''.651$
				.591	.608	8.983	44.68			$\Delta\rho = +0''.012$
				.628	.580	9.048	45.00			$r_1 = \pm 0''.100$
				.579	.595	8.984	44.68			
	17 25	22 49.4	68.0	.594	.594	9.000	44.76	+ 0.012		

Observations of α Lyræ and Companion—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	2Δδ	Δδ	Δρ	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
July 2	16 35	21 59.3	72.0	68.544	59.619	8.925	44.39	+ 0.012	3	Ill. A.
				.561	.595	.966	44.59			
				.560	.612	.948	44.50			
				.572	.613	.959	44.56			
	− 2ᵐ.8			68.554	59.610	.944	44.48			$\tau =$ 9ʰ 55ᵐ.5
				59.593	68.565	.972	44.62			$\Delta\delta =$ 44″.500
				.637	.571	.934	44.44			$\Delta\rho = +$ 0″.012
				.602	.568	.966	44.59			$r_1 = \pm$ 0″.063
				.628	.541	.913	44.33			
	16 51	22 15.3	71.0	.606	.553	.947	44.50	+ 0.012		
July 2	16 54	22 18.3	71.0	68.560	59.615	8.945	44.49	+ 0.012	3	Ill. B.
				.568	.596	.972	44.62			
				.550	.627	.923	44.38			
				.567	.647	.920	44.36			
	− 2ᵐ.8			68.566	59.601	.965	44.59			$\tau =$ 10ʰ 16ᵐ.5
				59.590	68.551	8.961	44.57			$\Delta\delta =$ 44″.560
				.567	.568	9.001	44.77			$\Delta\rho = +$ 0″.012
				.598	.580	8.982	44.67			$r_1 = \pm$ 0″.091
				.580	.565	.985	44.69			
	17 15	22 39.3	70.0	.600	.539	.939	44.46	+ 0.012		

Observations of 61^2 *Cygni and D. M.* $+ 38°$, 4345.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1880.	h. m.	h. m.	°	r.	r.	r.	$''$	$''$		
Oct. 24	22 0	1 1.7	43.0	44.213	84.004	39.791	197.91	+ 0.058	3	
				.158	84.010	.852	198.21			
				.135	83.971	.836	198.13			
				.151	84.003	.852	198.21			$\tau = 7^h\,59^m.6$
	$+ 3^m.3$			44.143	83.963	.820	198.05			$\Delta\delta = 198''.142$
				84.016	44.153	.863	198.27			$\Delta\rho = +\ 0''.058$
				.005	.198	.807	197.99			$r_1 = \pm\ 0''.082$
				.007	.144	.863	198.27			
				83.989	.140	.849	198.20			
	22 23	1 24.7	41.2	84.021	.176	.845	198.18	+ 0.058		
Oct. 25	21 28	0 29.7	46.5	83 990	44.196	39.794	197.92	+ 0.058	3	
				.996	.198	.798	197 94			
				.998	.211	.787	197.89			
				.971	.202	.769	197.80			$\tau = 7^h\,23^m.7$
	$+ 3^m.3$			83.999	44.215	.784	197.87			$\Delta\delta = 197''.870$
				44.200	83.961	.761	197.76			$\Delta\rho = +\ 0''.058$
				.188	83.956	.768	197.79			$r_1 = \pm\ 0''.046$
				.209	84.012	.803	197.97			
				.208	83.994	.786	197.88			
	21 51	0 52.7	45.5	.196	.982	.786	197.88	+ 0.058		
Oct. 31	21 41	0 40.1	49.5	44.198	83.961	39.763	197.77	+ 0.057	3	
				.194	.984	.790	197.90			
				.201	.972	.771	197.81			
				.200	.995	.795	197.93			$\tau = 7^h\,11^m.0$
				44.194	83.972	.778	197.84			$\Delta\delta = 197''.961$
	$+ 0^m.7$			83.994	44.176	.818	198.04			$\Delta\rho = +\ 0''.057$
				.991	.176	.815	198.03			$r_1 = \pm\ 0''.088$
				83.990	.165	.825	198.08			
				84.029	.186	.843	198.17			
	22 5	1 4.1	48.5	83.997	.180	.817	198.04	+ 0.057		
Nov. 1	21 48	0 47.1	48.5	44.162	84.002	39.840	198.15	+ 0.057	2	
				.183	83.988	.805	197.98			
				.196	.978	.782	197.86			
				.183	.989	.806	197.98			$\tau = 7^h\,15^m.1$
				44.182	83.986	.804	197.97			$\Delta\delta = 197''.950$
	$+ 0^m.7$			83.985	44.194	.791	197.91			$\Delta\rho = +\ 0''.057$
				.986	.215	.771	197.81			$r_1 = \pm\ 0''.069$
				83.988	.198	.790	197.90			
				84.026	.203	.823	198.07			
	22 14	1 13.1	47.5	83.980	.196	.784	197.87	+ 0.057		
Nov. 2	22 3	1 2.2	51.0	44.230	83.994	39.764	197.77	+ 0.056	2	
				.174	83.992	.818	198.04			
				.193	84.006	.813	198.02			
				.201	84.032	.831	198.11			$\tau = 7^h\,26^m.2$
	$+ 0^m.8$			44.181	83.994	.813	198.02			$\Delta\delta = 198''.015$
				83.977	44.176	.801	197.96			$\Delta\rho = +\ 0''.056$
				84.005	.139	.866	198.28			$r_1 = \pm\ 0''.092$
				.973	.183	.790	197.90			
				.007	.178	.829	198.10			
	22 29	1 28.2	50.5	83.991	.191	.800	197.95	+ 0.056		
Dec. 3	22 29	1 29.7	36.2	44.172	83.996	39.824	198.07	+ 0.059	3	
				.191	83.983	.792	197.91			
				.149	84.001	.852	198.21			
				.143	83.977	.834	198.12			$\tau = 5^h\,48^m.7$
	$+ 2^m.3$			44.182	.992	.810	198.00			$\Delta\delta = 198''.043$
				83.993	44.160	.833	198.12			$\Delta\rho = +\ 0''.059$
				.956	.160	.796	197.93			$r_1 = \pm\ 0''.080$
				.984	.133	.851	198.21			
				.957	.161	.796	197.93			
	22 49	1 49.7	35.5	.961	.166	.795	197.93	+ 0.059		

Observations of 61^2 *Cygni and D. M.* + 38°, 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	2Δδ	Δδ	Δρ	Wt.	Remarks.
	h. m.	h. m.	°	r.	r.	r.	″	″		
1880. Dec. 7	22 27	1 28.1	22.0	44.174	83.987	39.813	198.02	+ 0.060	3	
				.142	84.029	.887	198.39			
				.182	.034	.852	198.21			
				.208	.035	.827	198.09			τ = 5h 30m.4
				44.207	84.010	.803	197.97			Δδ = 198″.106
	+ 2m.7			83.997	44.171	.826	198.08			Δρ = + 0″.060
				84.004	.192	.812	198.01			r_1 = ± 0″.083
				83.996	.179	.817	198.04			
				84.020	.179	.841	198.16			
	22 45	1 46.1	21.5	83.999	.172	.827	198.09	+ 0.060		
Dec. 9	23 4	2 5.3	22.7	44.158	84.007	39.849	198.20	+ 0.061	2	
				.124	83.971	.847	198.19			
				.133	84.006	.873	198.32			
				.136	.012	.876	198.33			τ = 6h 0m.7
	+ 2m.9			44.173	84.000	.827	198.09			Δδ = 198″.120
				83.983	44.189	.794	197.92			Δρ = + 0″.061
				.994	.182	.812	198.01			r_1 = ± 0″.092
				.970	.156	.814	198.02			
				.981	.155	.826	198.08			
	23 24	2 25.3	22.2	.979	.162	.817	198.04	+ 0.061		
Dec. 11	22 25	1 26.4	28.1	84.022	44.169	39.853	198.22	+ 0.059	3	
				83.994	.171	.823	198.07			
				.994	.168	.826	198.08			
				.996	.169	.827	198.09			τ = 5h 7m.0
				83.998	44.156	.842	198.16			Δδ = 198″.132
	+ 3m.0			44.162	83.994	.832	198.11			Δρ = + 0″.059
				.160	84.003	.843	198.17			r_1 = ± 0″.032
				.178	84.016	.838	198.14			
				.149	83.982	.833	198.12			
	23 31	1 32.4	27.2	.166	84.008	.842	198.16	+ 0.059		
Dec. 13	23 16	2 17.6	39.5	44.194	83.980	39.786	197.88	+ 0.060	2	
				.125	84.001	.876	198.33			
				.127	83.980	.853	198.22			
				.169	84.017	.848	198.19			τ = 5h 56m.7
				44.150	83.974	.824	198.07			Δδ = 198″.114
	+ 3m.2			83.975	44.162	.813	198.02			Δρ = + 0″.060
				83.980	.144	.836	198.13			r_1 = ± 0″.085
				84.009	.161	.848	198.19			
				83.980	.160	.820	198.05			
	23 35	2 36.6	39.0	.984	.162	.822	198.06	+ 0.060		
Dec. 15	23 3	2 4.7	41.0	44.142	83.984	39.842	198.16	+ 0.057	2	
				.124	.990	.866	198.28			
				.140	.971	.831	198.11			
				.140	.981	.841	198.16			τ = 5h 37m.5
				44.148	83.983	.836	198.13			Δδ = 198″.128
	+ 3m.3			83.988	44.179	.809	198.00			Δρ = + 0″.058
				.989	.170	.819	198.05			r_1 = ± 0″.061
				.980	.170	.810	198.00			
				83.998	.150	.848	198.19			
	23 25	2 26.7	40.3	84.000	.151	.849	198.20	+ 0.058		
1881. Jan. 12	1 17	4 15.4	28.5	44.124	84.016	39.892	198.41	+ 0.070	3	Images very good at times, but became poor.
				.120	3.993	.873	198.32			
				.160	.963	.803	197.97			
				.134	3.993	.859	198.25			τ = 5h 59m.2
	+ 0m.0			44.121	84.002	.881	198.36			Δδ = 198″.322
				83.993	44.124	.869	198.30			Δρ = + 0″.074
				84.014	.117	.897	198.44			r_1 = ± 0″.094
				84.006	.131	.875	198.33			
				83.984	.099	.885	198.38			
	1 42	4 40.4	28.0	84.000	.098	.902	198.46	+ 0.077		

Observations of 61² *Cygni and D. M.* + 38°, 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	2Δδ	Δδ	Δρ	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
Jan. 14	1 23	4 21.5	27.0	44.117	84.037	39.920	198.55	+ 0.071	2	
				.090	.008	.918	198.54			Very windy and tele-
				.160	.000	.840	198.15			scope much shaken.
				.102	84.030	.928	198.59			
				44.140	83.980	.840	198.15			
	+ 0m.1			83.981	44.073	.908	198.49			τ = 5h 57m.4
				84.020	.088	.932	198.61			Δδ = 198″.413
				83.982	.124	.858	198.24			Δρ = + 0″.074
				83.974	.138	.836	198.13			r_1 = ± 0″.149
	1 48	4 46.5	25.0	84.023	.078	.945	198.68	+ 0.077		
Jan. 17	1 25	4 23.7	34.6	44.100	84.004	39.904	198.47	+ 0.073	3	
				.137	83.977	.840	198.15			
				.111	84.019	.908	198.49			
				.144	.021	.877	198.34			
				44.114	84.041	.927	198.58			τ = 5h 45m.8
	+ 0m.3			83.974	44.070	.904	198.47			Δδ = 198″.389
				83.980	.101	.879	198.35			Δρ = + 0″.076
				84.000	.118	.882	198.36			r_1 = ± 0″.082
				83.979	.111	.868	198.29			
	1 46	4 44.7	33.8	83.980	.092	.888	198.39	+ 0.079		
Jan. 19	2 11	5 9.7	31.0	84.045	44.122	39.923	198.56	+ 0.091	2	Comp. faint after re-
				.035	.123	.912	198.51			versal; cloudy.
				.035	.142	.893	198.42			
				83.992	.101	.891	198 41			
	+ 0m.3			84.031	44.122	.909	198.50			τ = 6h 26m.3
				44.156	83.961	.805	197.98			Δδ = 198″.358
				.131	.960	.829	198.10			Δρ = + 0″.100
				.057	.910	.853	198.22			r_1 = ± 0″.139
				.046	.974	.928	198.59			
	2 37	5 35.7	30.2	.122	.989	.867	198.29	+ 0.110		
Jan. 22	1 48	4 46.8	35.8	83.997	44.060	39.937	198.64	+ 0.080	2	
				84.023	.117	.906	198.48			
				83.998	.140	.858	198.24			
				84.050	.129	.921	198.55			
				83.977	44.086	.891	198.41			τ = 5h 50m.2
	+ 0m.4			44.090	84.025	.935	198.62			Δδ = 198″.431
				.092	83.985	.893	198.42			Δρ = + 0″.085
				.092	.950	.858	198.24			r_1 = ± 0″.096
				.103	.978	.875	198.33			
	2 11	5 9.8	35.0	.110	.995	.885	198.38	+ 0.090		
Jan. 26	2 4	5 3.0	34.5	44.104	84.041	39.937	198.64	+ 0.085	3	
				.113	83.976	.863	198.27			
				.146	84.009	.863	198.27			
				.136	84.023	.887	198.39			
				44.128	84.013	.885	198.38			τ = 5h 49m.6
	+ 0m.6			83.981	44.095	.886	198.38			Δδ = 198″.362
				.980	.106	.874	198.32			Δρ = + 0″.092
				.984	.138	.846	198.18			r_1 = ± 0″.084
				83.972	.094	.878	198.34			
	2 25	5 24.0	34.4	84.010	.110	.900	198.45	+ 0.100		
Jan. 28	2 11	5 10.1	26.5	44.070	83.963	39.893	198.42	+ 0.094	3	
				.095	84.008	.913	198.52			
				.135	84.003	.868	198.29			
				.078	83.999	.921	198.55			τ = 5h 47m.4
	+ 0m.7			44.110	84.014	.904	198.47			Δδ = 198″.421
				84.017	44.110	.907	198.49			Δρ = + 0″.101
				83.979	.107	.872	198.31			r_1 = ± 0″.066
				.990	.110	.880	198.35			
				.993	.122	.871	198.31			
	2 29	5 28.1	25.2	.990	.081	.909	198.50	+ 0.108		

Observations of 61^2 *Cygni and D. M.* + 38°, 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
Mar. 14	16 36	19 33.3	32.8	84.104	44.097	40.007	198.98	+ 0.073	2	
				.060	.118	39.942	198.66			
				.112	.090	40.022	199.06			
				.041	.091	39.950	198.70			
	− 1^m.1			84.087	44.077	40.010	199.00			τ = 17^h. 19^m.2
				44.080	84.083	40.003	198.96			$\Delta\delta$ = 198″.829
				.080	.037	39.957	198.73			$\Delta\rho$ = + 0″.069
				.096	.049	.953	198.71			r_1 = ± 0″.107
				.073	.054	.981	198.85			
	17 10	20 7.3	32.2	.110	.049	.939	198.64	+ 0.065		
Mar. 15	16 26	19 23.2	38.0	84.126	44.072	40.054	199.22	+ 0.073	2	
				.129	.067	40.062	199.26			Images blurred.
				.070	.082	39.988	198.89			
				.134	.047	40.087	199.38			
	− 1^m.2			84.150	44.059	40.091	199.40			τ = 17^h 3^m.2
				44.040	84.041	40.001	198.95			$\Delta\delta$ = 199″.097
				.018	.063	40.045	199.17			$\Delta\rho$ = + 0″.070
				.074	.051	39.977	198.83			r_1 = ± 0″.156
				.033	.069	40.036	199.13			
	16 56	19 53.2	38.0	.102	.061	39.959	198.74	+ 0.067		
Mar. 21	16 54	19 50.7	34.2	84.095	44.061	40.034	199.12	+ 0.067	2	
				.053	.075	39.978	198.84			
				.072	.095	.977	198.83			
				.079	.090	.989	198.89			
				84.052	44.114	39.938	198.64			τ = 17^h 5^m.1
	− 1^m.7			44.063	84.066	40.003	198.96			$\Delta\delta$ = 198″.980
				.028	.063	.035	199.12			$\Delta\rho$ = + 0″.065
				.040	.077	.037	199.13			r_1 = ± 0″.119
				.044	.089	.045	199.17			
	17 20	20 16.7	33.8	.041	.072	.031	199.10	+ 0.063		
Mar. 23	16 53	19 49.6	32.6	84.101	44.052	40.049	199.19	+ 0.067	2	
				.080	.035	.045	199.17			Very unsteady.
				.064	.029	.035	199.12			
				.114	.087	.027	199.08			
				84.092	44.040	.052	199.21			τ = 16^h 57^m.1
	− 1^m.8			44.040	84.104	.064	199.27			$\Delta\delta$ = 199″.256
				.030	.130	.100	199.44			$\Delta\rho$ = + 0″.065
				.049	.120	.071	199.30			r_1 = ± 0″.092
				.028	.090	.062	199.26			
	17 21	20 17.6	32.2	.004	.118	.114	199.52	+ 0.063		
Mar. 26	17 12	20 8.4	31.0	84.056	44.070	39.986	198.88	+ 0.064	2	
				.010	.082	.928	198.59			
				.042	.051	.991	198.90			
				.064	.084	39.980	198.85			
	− 2^m.0			84.080	44.039	40.041	199.15			τ = 17^h 4^m.1
				44.080	84.083	40.003	198.96			$\Delta\delta$ = 198″.908
				.076	.069	39.993	198.91			$\Delta\rho$ = + 0″.063
				.044	.049	40.005	198.97			r_1 = ± 0″.099
				.058	.076	40.018	199.04			
	17 40	20 36.4	30.8	.062	.039	39.977	198.83	+ 0.062		
Mar. 27	17 9	20 5.3	32.7	84.150	44.050	40.100	199.44	+ 0.064	2	
				.099	.060	.039	199.14			
				.156	.085	.071	199.30			
				.142	.048	.094	199.42			
	− 2^m.1			84.098	44.088	.010	199.00			τ = 16^h 56^m.1
				44.059	84.081	.022	199.06			$\Delta\delta$ = 199″.174
				.036	.056	.020	199.05			$\Delta\rho$ = + 0″.063
				.046	.050	.004	198.97			r_1 = ± 0″.113
				.042	.099	.057	199.23			
	17 35	20 31.3	32.6	.019	.056	.037	199.13	+ 0.062		

Observations of 61^2 *Cygni and D. M.* + 38°, 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.		″		
Apr. 27	18 45	21 43.0	55.5	84.138	44.039	40.099	199.44	+ 0.057	3	
				.126	.046	.080	199.35			
				.133	.052	.081	199.35			$\tau =$ $16^h\ 27^m.1$
				.128	.060	.068	199.29			$\Delta\delta =$ 199″.373
				84.113	44.043	.070	199.30			$\Delta\rho = +$ 0″.057
	− $0^m.4$			44.034	84.135	.101	199.45			$r_1 = \pm$ 0″.056
				.070	.164	.094	199.42			
				054	.120	.066	199.28			
				.054	.129	.075	199.32			
	19 2	22 0.0	55.3	.031	.149	.118	199.53	+ 0.056		
Apr. 29	18 15	21 12.9	50.8	84.113	44.020	40.093	199.41	+ 0.057	2	
				.114	.058	.056	199.23			
				.121	.001	.120	199.54			
				.069	.037	.032	199.11			$\tau =$ $15^h\ 53^m.2$
	− $0^m.5$			84.145	44.041	.104	199.46			$\Delta\delta =$ 199″.335
				44.056	84.099	.043	199.16			$\Delta\rho = +$ 0″.057
				.081	.136	.055	199.22			$r_1 = \pm$ 0″.100
				.019	.131	.112	199.50			
				.031	.120	.089	199.39			
	18 40	21 37.9	50.2	.060	.136	.076	199.33	+ 0.057		
Apr. 30	18 46	21 44.1	47.0	84.154	44.045	40.109	199.49	+ 0.058	2	
				.159	.038	.121	199.55			
				.148	.029	.119	199.54			$\tau =$ $16^h\ 17^m.9$
				.152	.025	.127	199.58			$\Delta\delta =$ 199″.466
				84.114	44.056	.058	199.24			$\Delta\rho = +$ 0″.058
	− $0^m.3$			44.062	84.174	.112	199.50			$r_1 = \pm$ 0″.072
				.041	.149	.108	199.49			
				.040	.117	.077	199.33			
				.024	.140	.116	199.52			
	19 6	22 4.1	46.5	.034	.129	.095	199.42	+ 0.057		
May 6	18 35	21 33.5	55.8	84.137	44.009	40.128	199.58	+ 0.057	3	
				.119	.030	.089	199.39			
				.144	.021	.123	199.56			
				.120	.015	.105	199.47			$\tau =$ $15^h\ 45^m.3$
				84.167	44.020	.147	199.68			$\Delta\delta =$ 199″.554
	+ $0^m.1$			44.019	84.165	.146	199.67			$\Delta\rho = +$ 0″.057
				.019	.139	.120	199.54			$r_1 = \pm$ 0″.061
				.012	.150	.138	199.63			
				.023	.133	.110	199.49			
	18 58	21 56.5	55.0	.032	.149	.117	199.53	+ 0.057		
May 7	18 4	21 2.4	55.1	84.155	44.007	40.148	199.68	+ 0.058	3	
				.169	43.978	.191	199.90			
				.148	44.017	.131	199.60			
				.160	.014	.146	199.67			$\tau =$ $15^h\ 8^m.8$
	− $0^m.0$			84.145	44.025	.120	199.54			$\Delta\delta =$ 199″.627
				44.021	84.132	.111	199.50			$\Delta\rho = +$ 0″.058
				.029	.139	.110	199.49			$r_1 = \pm$ 0″.081
				44.005	.129	.124	199.56			
				43.998	.133	.135	199.62			
	18 24	21 22.4	54.8	.999	.152	.153	199.71	+ 0.058		
May 8	17 57	20 55.3	58.2	84.126	44.006	40.120	199.54	+ 0.058	3	
				.120	.019	.101	199.45			
				.130	.040	.090	199.40			$\tau =$ $14^h\ 57^m.8$
				.144	.008	.136	199.62			$\Delta\delta =$ 199″.490
	− $0^m.1$			84.144	44.018	.126	199.58			$\Delta\rho = +$ 0″.058
				44.042	84.138	.096	199.43			$r_1 = \pm$ 0″.058
				.036	.153	.117	199.53			
				.037	.138	.101	199.45			
				.030	.151	.121	199.55			
	18 17	21 15.3	58.0	.040	.121	081	199.35	+ 0.057		

Observations of 61^2 *Cygni and D. M.* + 38° 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	2Δδ	Δδ	Δρ	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
May 25	17 14	20 11.6	63.0	84.193	44.046	40.147	199.68	+ 0.062	3	
				.192	.046	.146	199.67			
				.186	.026	.160	199.74			
				.205	.047	.158	199.73			$\tau = 13^h\ 7^m.9$
	− $0^m.8$			84.179	44.012	.167	199.78			$\Delta\delta = 199''.735$
				43.982	84.180	.198	199.93			$\Delta\rho = +\ 0''.060$
				44.002	.140	.138	199.63			$r_1 = \pm\ 0''.079$
				43.961	.141	.180	199.84			
				44.014	.192	.178	199.83			
	17 35	20 32.6	62.6	44.043	.159	.116	199.52	+ 0.060		
May 26	17 15	20 12.6	62.3	84.200	43.990	40.210	199.99	+ 0.062	2	
				.181	43.960	.221	200.05			
				.188	44.037	.151	199.70			
				.238	44.006	.232	200.10			$\tau = 13^h\ 6^m.1$
				84.210	43.957	.253	200.21			$\Delta\delta = 199''.951$
	− $0^m.8$			43.982	84.175	.193	199.91			$\Delta\rho = +\ 0''.060$
				.988	.176	.188	199.88			$r_1 = \pm\ 0''.099$
				43.996	.203	.207	199.98			
				44.019	.199	.180	199.84			
	17 38	20 35.6	61.7	43.966	.147	.181	199.85	+ 0.059		
May 27	17 28	20 25.5	65.9	84.187	43.989	40.198	199.93	+ 0.060	3	
				.181	44.003	.178	199.83			
				.195	43.990	.205	199.97			
				.167	44.015	.152	199.70			$\tau = 13^h\ 15^m.9$
				84.192	44.001	.191	199.90			$\Delta\delta = 199''.794$
	− $0^m.9$			43.996	84.139	.143	199.66			$\Delta\rho = +\ 0''.059$
				44.016	.167	.151	199.70			$r_1 = \pm\ 0''.091$
				44.021	.153	.132	199.60			
				43.972	.172	.200	199.94			
	17 53	20 50.5	65.0	44.011	.165	.154	199.71	+ 0.058		
May 28	17 17	20 14.5	69.9	44.008	84.154	40.146	199.67	+ 0.060	3	
				44.001	.183	.182	199.85			
				43.982	.196	.214	200.01			
				43.981	.176	.195	199.92			$\tau = 12^h\ 58^m.0$
				44.022	84.177	.155	199.72			$\Delta\delta = 199''.852$
	− $0^m.9$			84.181	43.982	.199	199.94			$\Delta\rho = +\ 0''.059$
				.205	44.010	.195	199.92			$r_1 = \pm\ 0''.075$
				.159	44.002	.157	199.73			
				.173	43.977	.196	199.92			
	17 36	20 33.5	69.5	.164	43.984	.180	199.84	+ 0.058		
May 30	17 18	20 15.3	73.0	43.990	84.180	40.190	199.89	+ 0.060	2	
				.978	.192	.214	200.01			
				.999	.210	.211	200.00			
				.987	.188	.201	199.95			$\tau = 12^h\ 52^m.4$
	− $1^m.1$			43.979	84.189	.210	199.99			$\Delta\delta = 199''.955$
				84.169	43.960	.209	199.99			$\Delta\rho = +\ 0''.059$
				.160	.998	.162	199.75			$r_1 = \pm\ 0''.105$
				.198	43.930	.268	200.28			
				.156	44.003	.153	199.71			
	17 40	20 37.3	72.9	.178	43.970	.208	199.98	+ 0.058		
June 26	18 15	21 11.0	72.0	84.238	43.973	40.265	200.27	+ 0.057	3	
				.180	44.015	.165	199.77			
				.220	43.978	.242	200.15			$\tau = 11^h\ 59^m.8$
				.211	.992	.219	200.04			$\Delta\delta = 200''.130$
				84.183	43.949	.234	200.11			$\Delta\rho = +\ 0''.057$
	− $2^m.4$			43.969	84.225	.256	200.22			$r_1 = \pm\ 0''.101$
				.966	.228	.262	200.25			
				.995	.220	.225	200.07			
				.954	.199	.245	200.17			
	18 33	21 29.0	72.0	.978	.240	.262	200.25	+ 0.056		

Observations of 61^2 *Cygni and D. M.* $+ 38°$, 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
June 28	18 15	21 10.9	79.0	84.191	43.959	40.232	200.00	+ 0.055	2	Images blazing and unsteady.
				.270	44.050	.220	200.04			
				.211	43.923	.288	200.38			
				.171	43.980	.191	199.90			
	− 2m.5			84.228	44.005	.223	200.06			
				43.920	84.210	.290	200.39			$\tau =$ 11h 55m.3
				.979	.250	.271	200.30			$\Delta\delta =$ 200″.231
				.920	.229	.309	200.49			$\Delta\rho = +$ 0″.054
				.958	.223	.265	200.27			$r_1 = \pm$ 0″.130
	18 40	21 39.9	78.8	.928	.217	.289	200.38	+ 0.054		
July 1	18 7	21 2.7	67.2	84.254	43.951	40.303	200.46	+ 0.056	2	
				.250	.950	.300	200.44			
				.184	.950	.234	200.11			
				.206	.970	.236	200.12			
	− 2m.7			84.251	43.961	.290	200.39			$\tau =$ 11h 33m.4
				43.958	84.229	.271	200.30			$\Delta\delta =$ 200″.259
				43.960	.210	.250	200.19			$\Delta\rho = +$ 0″.055
				44.000	.235	.235	200.12			$r_1 = \pm$ 0″.103
				43.960	.250	.290	200.39			
	18 28	21 23.7	66.9	.963	.189	.226	200.07	+ 0.055		
July 2	18 4	20 59.6	69.3	84.233	43.946	40.287	200.38	+ 0.056	3	
				.234	.951	.283	200.36			
				.210	.960	.250	200.19			
				.205	.965	.240	200.14			
				84.224	43.968	.256	200.22			$\tau =$ 11h 26m.3
	− 2m.8			43.969	84.203	.234	200.11			$\Delta\delta =$ 200″.209
				.966	.186	.220	200.04			$\Delta\rho = +$ 0″.055
				.983	.216	.233	200.11			$r_1 = \pm$ 0″.077
				.956	.230	.274	200.31			
	18 25	21 20.6	68.2	.943	.201	.258	200.23	+ 0.055		
July 19	21 33	0 31.0	68.6	43.960	84.251	40.291	200.39	+ 0.054	2	Clouds after first set; the second set commenced at 21h 55m.
				.933	.275	.342	200.65			
				.941	.262	.321	200.55			
				.928	.280	.352	200.70			
	— 0m.4			43.944	84.269	.325	200.56			
				84 218	43.914	.304	200.46			$\tau =$ 13h 59m.3
				.248	.910	.338	200.63			$\Delta\delta =$ 200″.595
				.221	.897	.324	200.56			$\Delta\rho = +$ 0″.054
				.298	.910	.388	200.88			$r_1 = \pm$ 0″.090
	22 12	1 9.0	68.2	.225	.899	.326	200.57	+ 0.054		
July 21	21 35	0 33.0	72.2	84.225	43.942	40.283	200.36	+ 0.054	2	
				.268	.953	.315	200.52			
				.227	.961	.266	200.27			
				.212	.946	.266	200.27			
	− 0m.4			84.218	43.944	.274	200.31			$\tau =$ 13h 46m.9
				43.946	84.243	.297	200.42			$\Delta\delta =$ 200″.386
				.922	.223	.301	200.44			$\Delta\rho = +$ 0″.054
				.946	.201	.255	200.22			$r_1 = \pm$ 0″.079
				.917	.237	.320	200.54			
	22 1	0 59.0	71.9	.933	.248	.315	200.51	+ 0.054		
July 23	21 20	0 17.9	69.0	43.916	84.219	40.303	200.46	+ 0.054	2	
				.969	.207	.238	200.13			
				.919	.233	.314	200.51			
				.928	.234	.306	200.47			$\tau =$ 13h 24m.0
	− 0m.5			43.958	84.232	.274	200.31			$\Delta\delta =$ 200″.373
				84.243	43.957	.286	200.37			$\Delta\rho = +$ 0″.054
				.257	.946	.311	200.49			$r_1 = \pm$ 0″.103
				.222	.969	.253	200.21			
				.249	.921	.328	200.58			
	21 46	0 43.9	68.7	.220	.969	.251	200.20	+ 0.054		

Observations of 61² *Cygni and D. M.* + 38°, 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
July 24	21 21	0 18.9	71.3	84.233	43.923	40.310	200.49	+ 0.054	3	
				.243	.957	.286	200.37			
				.224	.920	.304	200.46			
				.234	.926	.308	200.48			
				84.253	43.915	.338	200.63			$\tau = 13^{h}\ 19^{m}.1$
	$-\ 0^{m}.5$			43.934	84.237	.303	200.45			$\Delta\delta = 200''.450$
				.940	.230	.290	200.39			$\Delta\rho = +\ 0''.054$
				.946	.230	.284	200.36			$r_1 = \pm\ 0''.052$
				.934	.232	.298	200.43			
	21 43	0 40.9	71.0	.925	.225	.300	200.44	+ 0.054		
July 25	21 20	0 17.8	75.0	84.249	43.922	40.327	200.57	+ 0.054	3	
				.238	.942	.296	200.42			
				.251	.938	.313	200.50			
				.250	.935	.315	200.52			
				84.266	43.953	.313	200.50			$\tau = 13^{h}\ 14^{m}.1$
	$-\ 0^{m}.6$			43.928	84.197	.269	200.29			$\Delta\delta = 200''.465$
				.930	.232	.302	200.45			$\Delta\rho = +\ 0''.054$
				.934	.238	.304	200.46			$r_1 = \pm\ 0''.051$
				.955	.261	.306	200.47			
	21 42	0 39.8	74.8	.927	.232	.305	200.47	+ 0.054		
July 28	21 40	0 37.7	66.0	43.906	84.258	40.352	200.70	+ 0.054	2	
				.890	.226	.336	200.62			
				.917	.273	.356	200.72			
				.902	.227	.325	200.56			
				43.907	84.240	.335	200.61			$\tau = 13^{h}\ 24^{m}.6$
	$-\ 0^{m}.7$			84.242	43.972	.270	200.29			$\Delta\delta = 200''.530$
				.230	.925	.305	200.47			$\Delta\rho = +\ 0''.054$
				.233	.943	.290	200.39			$r_1 = \pm\ 0''.092$
				.241	.939	.302	200.45			
	22 7	1 4.7	65.8	.253	.943	.310	200.49	+ 0.054		
Aug. 22	21 14	0 10.8	71.5	84.267	43.895	40.372	200.80	+ 0.054	2	
				.230	.908	.322	200.55			
				.275	.873	.402	200.95			
				.247	.878	.369	200.78			
	$-\ 1^{m}.6$			84.246	43.905	.341	200.64			$\tau = 11^{h}\ 18^{m}.0$
				43.896	84.238	.342	200.65			$\Delta\delta = 200''.722$
				.890	.229	.339	200.63			$\Delta\rho = +\ 0''.054$
				.864	.225	.361	200.74			$r_1 = \pm\ 0''.076$
				.872	.241	.369	200.78			
	21 38	0 34.8	71.0	.901	.253	.352	200.70	+ 0.054		
Aug. 23	19 24	22 20.8	73.6	43.911	84.265	40.354	200.71	+ 0.054	2	
				.927	.272	.345	200.66			
				.900	.277	.377	200.82			
				.908	.261	.353	200.70			
	$-\ 1^{m}.6$			43.887	84.272	.385	200.86			$\tau = 9^{h}\ 22^{m}.4$
				84.250	43.863	.387	200.87			$\Delta\delta = 200''.720$
				.195	.894	.301	200.45			$\Delta\rho = +\ 0''.054$
				.261	.913	.348	200.68			$r_1 = \pm\ 0''.082$
				.249	.885	.364	200.76			
	19 44	22 40.8	72.0	.277	.926	.351	200.69	+ 0.054		
Aug. 24	19 32	22 28.8	75.5	84.272	43.910	40.362	200.75	+ 0.054	2	
				.256	.924	.332	200.60			
				.284	.899	.385	200.86			
				.263	.919	.344	200.66			
				84.241	43.878	.363	200.75			$\tau = 9^{h}\ 27^{m}.4$
	$-\ 1^{m}.6$			43.923	84.240	.317	200.52			$\Delta\delta = 200''.687$
				.900	.236	.336	200.62			$\Delta\rho = +\ 0''.054$
				.904	.262	.358	200.73			$r_1 = \pm\ 0''.071$
				.899	.230	.331	200.59			
	19 54	22 50.8	74.0	.902	.272	.370	200.79	+ 0.054		

Observations of 61^2 *Cygni and D. M.* + 38°, 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	"	"		
Aug. 25	19 11	22 7.8	74.0	43.879	84.260	40.381	200.84	+ 0.054	2	
				.928	.264	.336	200.62			
				.903	.287	.384	200.86			
				.920	.255	.335	200.61			τ = 9h 1m.5
				43.920	84.260	.340	200.64			$\Delta\delta$ = 200''.691
	− 1m.6			84 43	43.888	.355	200.71			$\Delta\rho$ = + 0''.054
				.257	.918	.339	200.63			r_1 = ± 0''.073
				.251	.921	.330	200.59			
				.241	.911	.330	200.59			
	19 31	22 27.8	73.5	.267	.891	.376	200.82	+ 0.054		
Aug. 26	19 33	22 29.8	73.0	84.297	43.910	40.387	200.87	+ 0.054	2	
				.253	.907	.346	200.67			
				.284	.902	.382	200.85			
				.255	.932	.323	200.56			τ = 9h 20m.5
				84.290	43.926	.364	200.76			$\Delta\delta$ = 200''.707
	− 1m.6			43.906	84.260	.354	200.71			$\Delta\rho$ = + 0''.054
				.910	.264	.354	200.71			r_1 = ± 0''.082
				.891	.238	.347	200.67			
				.948	.255	.307	200.48			
	19 55	22 51.8	71.9	.889	.259	.370	200.79	+ 0.054		
Sept. 5	22 0	0 56.5	84.7	84.275	43.920	40.355	200.71	+ 0.053	3	
				.266	.909	.357	200.72			
				.272	.901	.371	200.79			τ = 11h 7m.5
				.271	.894	.377	200.82			$\Delta\delta$ = 200''.735
				84.280	43.916	.364	200.76			$\Delta\rho$ = + 0''.053
	− 1m.9			43.898	84.251	.353	200.70			r_1 = ± 0''.035
				.906	.262	.356	200.72			
				.900	.241	.341	200.64			
				.887	.253	.366	200.77			
	22 22	1 18.5	84.2	.894	.250	.356	200.72	+ 0.053		
Sept. 6	19 51	22 47.4	81.8	84.251	43.881	40.370	200.79	+ 0.053	3	
				.252	.901	.351	200.69			
				.278	.921	.357	200.72			
				.243	.908	.335	200.61			τ = 8h 54m.3
	− 2m.0			84.268	43.909	.359	200.73			$\Delta\delta$ = 200''.712
				43.911	84.250	.339	200.63			$\Delta\rho$ = + 0''.053
				.908	.257	.349	200.68			r_1 = ± 0''.042
				.892	.262	.370	200.79			
				.897	.263	.366	200.77			
	20 12	23 8.4	81.2	.911	.265	.354	200.71	+ 0.053		
Sept. 24	19 22	22 17.8	81.0	84.280	43.907	40.373	200.80	+ 0.053	2	
				.278	.923	.355	200.71			
				.260	.893	.367	200.77			
				.291	.910	.381	200.84			τ = 7h 12m.0
	− 2m.6			84.308	43.918	.390	200.89			$\Delta\delta$ = 200''.788
				43.926	84.280	.354	200.71			$\Delta\rho$ = + 0''.053
				.934	.296	.362	200.75			r_1 = ± 0''.039
				.920	.293	.373	200.80			
				.921	.302	.381	200.84			
	19 39	22 34.8	80.0	.919	.286	.367	200.77	+ 0.053		
Sept. 26	19 22	22 17.7	84.7	84.262	43.915	40.347	200.67	+ 0.053	2	
				.310	.909	.401	200.94			
				.279	.924	.355	200.71			τ = 7h 4m.1
				.299	.908	.391	200.89			$\Delta\delta$ = 200''.881
				84.294	43.912	.382	200.85			$\Delta\rho$ = + 0''.053
	− 2m.7			43.892	84.306	.414	201.01			r_1 = ± 0''.088
				.889	.291	.402	200.95			
				.882	.313	.431	201.09			
				.911	.281	.370	200.79			
	19 39	22 34.7	83.8	.898	.292	.394	200.91	+ 0.053		

Observations of 61^2 *Cygni and D. M.* $+ 38°$, 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	″	″		
Sept. 27	21 59	0 54.7	80.0	84.273	43.909	40.364	200.76	+ 0.053	2	
				.262	.918	.344	200.66			
				.265	.925	.340	200.64			
				.264	.904	.360	200.74			
				84.288	43.898	.390	200.89			$\tau = 9^h\ 40^m.2$
	$-\ 2^m.7$			43.927	84.292	.365	200.76			$\Delta\delta = 200''.826$
				.893	.308	.415	201.01			$\Delta\rho = +\ 0''.053$
				.893	.276	.383	200.85			$r_1 = \pm\ 0''.090$
				.893	.300	.407	200.97			
	22 23	1 28.7	80.0	.891	.300	.409	200.98	+ 0.053		
Sept. 29	22 10	1 5.6	78.8	43.922	84.315	40.393	200.90	+ 0.053	2	
				.908	.302	.394	200.91			
				.905	.294	.389	200.88			
				.915	.303	.388	200.88			
				43.918	84.297	.379	200.83			$\tau = 9^h\ 42^m.2$
	$-\ 2^m.8$			84.307	43.905	.402	200.95			$\Delta\delta = 200''.884$
				.296	.908	.388	200.88			$\Delta\rho = +\ 0''.053$
				.307	.930	.377	200.82			$r_1 = \pm\ 0''.031$
				.306	.904	.402	200.95			
	22 32	1 27.6	78.5	.305	.925	.380	200.84	+ 0.053		
Oct. 22	22 11	1 9.2	58.2	43.885	84.272	40.387	200.87	+ 0.055	3	
				.880	.274	.394	200.91			
				.900	.290	.390	200.89			
				.882	.282	.400	200.94			
	$-\ 0^m.2$			43.884	84.269	.385	200.86			$\tau = 8^h\ 15^m.9$
				84.275	43.870	.405	200.96			$\Delta\delta = 200''.943$
				.298	.875	.423	201.05			$\Delta\rho = +\ 0''.055$
				.293	.862	.431	201.09			$r_1 = \pm\ 0''.053$
				.271	.863	.408	200.98			
	22 34	1 32.2	57.7	.266	.877	.389	200.88	+ 0.055		
Oct. 26	22 29	1 27.2	53.2	43.923	84.305	40.382	200.85	+ 0.056	2	Images blazing.
				.900	.315	.415	201.01			
				.902	.307	.405	200.96			
				.884	.314	.430	201.09			
				43.904	84.292	.388	200.88			$\tau = 8^h\ 17^m.1$
	$-\ 0^m.2$			84.291	43.887	.404	200.96			$\Delta\delta = 200''.996$
				.318	.890	.428	201.08			$\Delta\rho = +\ 0''.056$
				.294	.884	.410	200.99			$r_1 = \pm\ 0''.072$
				.289	.891	.398	200.93			
	22 50	1 48.2	53.0	.315	.861	.454	201.21	+ 0.056		
Oct. 27	22 33	1 31.2	55.9	43.879	84.271	40.392	200.90	+ 0.056	2	Images blazing.
				.909	.313	.404	200.96			
				.899	.305	.406	200.97			
				.900	.266	.366	200.77			
				43.901	84.301	.400	200.94			$\tau = 8^h\ 16^m.7$
	$-\ 0^m.2$			84.292	43.853	.439	201.13			$\Delta\delta = 201''.013$
				.304	.878	.426	201.07			$\Delta\rho = +\ 0''.056$
				.333	.887	.446	201.17			$r_1 = \pm\ 0''.094$
				.332	.872	.460	201.24			
	22 53	1 51.2	55.2	.289	.881	.408	200.98	+ 0.056		
Nov. 4	22 34	1 32.1	41.5	84.311	43.885	40.426	201.07	+ 0.058	2	Images blurred.
				.291	.859	.432	201.10			
				.296	.847	.449	201.18			
				.315	.878	.437	201.12			
				84.286	43.848	.438	201.13			$\tau = 7^h\ 47^m.6$
	$-\ 0^m.3$			43.861	84.254	.393	200.90			$\Delta\delta = 201''.035$
				.898	.287	.389	200.88			$\Delta\rho = +\ 0''.058$
				.869	.294	.425	201.06			$r_1 = \pm\ 0''.073$
				.895	.285	.390	200.89			
	22 57	1 55.1	41.0	.865	.281	.416	201.02	+ 0.058		

Observations of 61^2 *Cygni and D. M.* $+38°$, 4345—Continued.

Date.	Clock Time and Corr.	Hour Angle.	Temp.	Micr.	Micr.	$2\Delta\delta$	$\Delta\delta$	$\Delta\rho$	Wt.	Remarks.
1881.	h. m.	h. m.	°	r.	r.	r.	"	"		
Nov. 5	22 50	1 48.1	53.5	43.853	84.298	40.445	201.16	+ 0.056	3	
				.844	.296	.452	201.20			
				.869	.297	.428	201.08			
				.840	.292	.452	201.20			
				43.866	84.315	.449	201.18			$\tau = 7^h\ 57^m.1$
	$-0^m.3$			84.317	43.863	.454	201.21			$\Delta\delta = 201''.137$
				.291	.865	.426	201.07			$\Delta\rho = +0''.056$
				.298	.849	.449	201.18			$r_1 = \pm 0''.048$
				.289	.875	.414	201.01			
	23 8	2 6.1	53.0	.291	.863	.428	201.08	+ 0.056		
Nov. 29	22 27	1 24.8	43.8	43.862	84.301	40.439	201.13	+ 0.058	3	Very faint during last
				.863	.291	.428	201.08			set; moisture on ob-
				.848	.301	.453	201.20			jective.
				.888	.289	.401	200.94			
				43.864	84.302	.438	201.13			$\tau = 6^h\ 2^m.5$
	$-0^m.6$			84.286	43.858	.428	201.08			$\Delta\delta = 201''.087$
				.272	.838	.434	201.11			$\Delta\rho = +0''.058$
				.313	.891	.422	201.05			$r_1 = \pm 0''.054$
				.300	.853	.447	201.17			
	22 51	1 48.8	43.6	.309	.900	.409	200.98	+ 0.058		
Dec. 1	22 33	1 30.8	53.8	43.834	84.287	40.453	201.20	+ 0.056	2	Clouds, and windy.
				.815	.308	.493	201.40			
				.851	.262	.411	200.99			
				.850	.275	.425	201.06			
				43.818	84.311	.493	201.40			$\tau = 6^h\ 3^m.1$
	$-0^m.6$			84.291	43.818	.473	201.30			$\Delta\delta = 201''.200$
				.281	.839	.442	201.15			$\Delta\rho = +0''.056$
				.267	.811	.456	201.22			$r_1 = \pm 0''.103$
				.282	.872	.410	200.99			
	23 2	1 59.8	53.0	.291	.821	.470	201.29	+ 0.056		
Dec. 4	22 10	1 7.8	46.0	43.844	84.308	40.464	201.26	+ 0.058	3	
				.852	.297	.445	201.16			
				.850	.300	.450	201.19			
				.868	.319	.451	201.19			
	$-0^m.6$			43.871	84.282	.411	200.99			$\tau = 5^h\ 23^m.4$
				84.280	43.850	.430	201.09			$\Delta\delta = 201''.110$
				.269	.859	.410	200.99			$\Delta\rho = +0''.058$
				.290	.848	.442	201.15			$r_1 = \pm 0''.069$
				.273	870	.403	200.95			
	22 29	1 26.8	44.5	84.290	43.852	.438	201.13	+ 0.058		
Dec. 5	22 41	1 38.8	42.0	43.842	84.298	40.456	201.22	+ 0.058	3	
				.864	.314	.450	201.19			
				.840	.277	.437	201.12			
				.858	.271	.413	201.00			
	$-0^m.6$			43.845	84.303	.458	201.23			$\tau = 5^h\ 50^m.4$
				84.280	43.828	.452	201.20			$\Delta\delta = 201''.157$
				.267	.848	.419	201.03			$\Delta\rho = +0''.058$
				.300	.841	.459	201.23			$r_1 = \pm 0''.055$
				.284	.837	.447	201.17			
	23 0	1 57.8	41.5	84.277	43.829	.448	201.18	+ 0.058		
Dec. 7	22 36	1 33.8	41.5	84.302	43.825	40.477	201.32	+ 0.058	2	Very windy.
				.310	.830	.480	201.34			
				.304	.853	.451	201.19			
				.289	.835	.454	201.21			
	$-0^m.6$			84.281	43.825	.456	201.22			$\tau = 5^h\ 40^m.0$
				43.827	84.318	.491	201.39			$\Delta\delta = 201''.296$
				.814	.296	.482	201.34			$\Delta\rho = +0''.058$
				.829	.338	.509	201.48			$r_1 = \pm 0''.064$
				.836	.302	.466	201.27			
	23 0	1 57.8	41.2	43.828	84.280	.452	201.20	+ 0.058		

From these observations we have for the mean values of the probable errors of a single measurement in the case of *α Lyræ*,

Illumination A, $r_1 = \pm 0''.07365$, 688 measurements
Illumination B, $r_1 = \pm 0''.07732$, 590 measurements

These values of the probable errors are practically equal, and show that but little has been gained by illuminating the field. Still I am inclined to think that with a good field illumination under proper control, one is less liable to constant errors in any given position of the micrometer. The companion of *α Lyræ* is too faint for a strongly illuminated field; but, on the other hand, the image of the large star was generally better than I expected to find it, and the bisections could be made in a satisfactory manner. The color of this star seems well suited to our 26-inch objective.

The observations of 61^2 *Cygni* give

Illumination A, $r_1 = \pm 0''.08114$, 660 measurements

This probable error is a little greater than for the measurements of *α yræ*, while from the magnitude of the stars one would expect a different result; 61^2 *Cygni* being smaller than *α Lyræ* and the star D. M. + 38°, 4345, brighter than the companion of *α Lyræ*. But the color of 61^2 *Cygni* is such that the image of this star is generally not well defined by our glass; and, again, the difference of declination is so great that the stars were too far apart to be observed with the best results.

The observed differences of declination need three more corrections before they are ready to be introduced into the equations of condition for determining the differential annual parallax. These are

(α) The reductions for nutation, aberration, and for precession to 1881.0;

(β) The reduction to the same epoch for the proper motion of the principal stars;

(γ) A reduction for the influence of changes of temperature on the screw of the micrometer.

(α) Since the differences of right ascension and declination are small we may consider them as differentials, and by differentiating the Besselian formula for the reduction of a star to mean place we shall have for the reduction under this head,

$$d.\,\Delta\delta = \{A\,n \sin\alpha + B\cos\alpha + C\cos\alpha\sin\delta + D\sin\alpha\sin\delta\}\,.\,d\alpha$$
$$+\,\{C\tan\omega\sin\delta + C\sin\alpha\cos\delta - D\cos\alpha\cos\delta\}\,.\,d\delta$$

or

$$d.\,\Delta\delta = \{g\sin(G+\alpha) + h\sin(H+\alpha)\sin\delta\}\,.\,d\alpha$$
$$+\,\{i\sin\delta - h\cos(H+\alpha)\cos\delta\}\,.\,d\delta$$

The symbols in these formulæ are those of the American Ephemeris, 1880, p. 258; and the formulæ will give the reduction to the beginning of the year by using the auxiliary quantities of that Ephemeris. As we wish to reduce all the observations to 1881.0, those made in 1880 need the further reduction, on account of precession, given by the term,

$$-\,n\sin\alpha,\ d\alpha$$

For α *Lyræ* this term is $+0''.002$; and for 61^2 *Cygni* it is $+0''.0004$. The values used for $d\alpha$ and $d\delta$ are for α *Lyræ*,

$$d\alpha = + \frac{20''.21}{206265}; \quad d\delta = - \frac{44''.24}{206265}$$

and for 61^2 *Cygni*,

$$d\alpha = + \frac{6''.40}{206265}; \quad d\delta = - \frac{198''.40}{206265}$$

The reductions of the differences of declination to 1881.0 are given in the following tables. The dates are for Washington midnight.

α *Lyræ.*

Date.	Red.	Date.	Red.	Date.	Red.
	"		"		"
1880, May 20	0.000	1880, Oct. 7	+ 0.002	1881, Feb. 24	− 0.003
30	0.000	17	0.001	Mar. 6	0.003
June 9	+ 0.001	27	0.001	16	0.003
19	0.001	Nov. 6	+ 0.001	26	0.003
29	0.001	16	0.000	April 5	0.003
July 9	0.001	26	0.000	15	0.003
19	0.002	Dec. 6	− 0.001	25	0.003
29	0.002	16	0.001	May 5	0.002
Aug. 8	0.002	26	0.002	15	0.002
18	0.002	1881, Jan. 5	0.002	25	0.002
28	0.002	15	0.003	June 4	0.001
Sept. 7	0.002	25	0.003	14	0.001
17	0.002	Feb. 4	0.003	24	0.001
27	0.002	14	0.003	July 4	− 0.001
Oct. 7	+ 0.002	24	− 0.003	14	0.000

16^2 *Cygni.*

Date.	Red.	Date.	Red.	Date.	Red.
	"		"		"
1880, Oct. 20	+ 0.010	1881, Mar. 9	− 0.004	1881, July 27	− 0.006
30	0.011	19	0.006	Aug. 6	0.004
Nov. 9	0.012	29	0.007	16	− 0.002
19	0.012	April 8	0.009	26	0.000
29	0.012	18	0.010	Sept. 5	+ 0.002
Dec. 9	0.011	28	0.011	15	0.004
19	0.011	May 8	0.012	25	0.006
29	0.010	18	0.012	Oct. 5	0.007
1881, Jan. 8	0.009	28	0.012	15	0.009
18	0.007	June 7	0.012	25	0.010
28	0.005	17	0.011	Nov. 4	0.011
Feb. 7	0.003	27	0.010	14	0.011
17	+ 0.001	July 7	0.009	24	0.012
27	− 0.001	17	0.008	Dec. 4	0.011
Mar 9	− 0.004	27	− 0.006	14	+ 0.011

(β) For the annual proper motion of *α Lyræ* I adopt the value given by Professor Boss:

$$\mu = + 0''.2724$$

On account of the orbital motion of 61^2 *Cygni* I adopt the value of the proper motion which results from Boss's investigation, combined with O. STRUVE's value of the relative motion in declination. We have, therefore, for 1881.0,

$$\mu = + 3''.2276 - 0''.1838 = + 3''.0438$$

(γ) Our 26-inch refractor was not provided with an apparatus for adjusting the stellar focus, but at first this was done by holding the micrometer with the hands and pushing in or drawing out the tube of the micrometer until the right position was found, when the tube was clamped by an assistant. This method was troublesome, and the observer was tempted to put up with an adjustment that was not quite satisfactory. To assist in this adjustment, and to enable one to find the focus easily after the micrometer had been removed, a scale reading to $\frac{1}{20}$ of an inch was engraved on the tube in 1876. In the spring of 1880, before beginning the observations for parallax, a new arrangement for adjusting the stellar focus was attached to this telescope by Mr. Gardner. This consists of three light brass rings fitting closely on the tube of the micrometer, the middle ring moving in a dovetail between the others. From the middle ring a knob of the metal projects, and through this is passed a screw which works into a fixed part of the telescope. When the tube is unclamped a slight motion can be given to it by means of this screw, and the focus can be adjusted deliberately; and at the same time the zero of the position circle can be changed as one pleases. I have found that the change of the focal adjustment from summer to winter is $\frac{1}{20}$ of an inch, and, contrary to what might be expected, the tube has to be pushed in during cold weather, and drawn out in summer. If this were simply a change of focal distance it would produce a change of $0''.0038$ in the difference of declination of *α Lyræ* and its companion, and a change of $0''.0177$ in the case of 61^2 *Cygni*. But as the total effect of changes of temperature on the tube of the telescope and the screw and on the objective cannot well be separated, it seemed better to test the effect of changes of temperature on the whole apparatus, at the same time that the observations for parallax were being made; I have therefore measured the difference of declination of the two stars No. 5 and No. 12 of Professor KRUEGER's catalogue of the stars in the cluster *h Persei*. This difference of declination is $18' \ 38''$; and by means of the stars situated between, one can pass easily from one of these stars to the other, using the same eyepiece that has been used in the observations for parallax. These observations were made in pairs on successive days, the movable wire being placed on different sides of the fixed wire on these days for the purpose of eliminating any error in the coincidence of the wires, although this was observed on each night, and also to render the observations like those made for parallax. I have assumed that these stars have no relative proper motion, which is indicated by the meridian observations, and by my own measurements made after the interval of a year. In the following table are given the results of the observations made on sixteen nights :

Date.		R.	Temp.
		″	°
1880. Dec.	15–16	9.9013	37.1 F.
	18–20	9.9066	30.9
1881, Jan.	14–17	9.9240	27.7
July	19–21	9.9017	69.4
	23–24	9.8952	69.3
	25–28	9.8970	70.0
Dec.	10–15	9.9067	33.4
	16–17	9.9117	34.2

The values of R have been found by bringing forward the positions of KRUEGER's catalogue, which give for 1880.0.

$$\Delta\delta = 1117''.84$$

The mean value of R differs from the value adopted in the reductions, but my purpose being to find the coefficient of temperature, and not the absolute value of the revolution, I have not endeavored to correct KRUEGER's $\Delta\delta$ by means of meridian observations. The mean value is

$$R = 9''.9055$$

Subtracting each value from the mean value, the equation of condition for the residuals will be of the form

$$x + (\theta - 50^{\circ})\, y + n = o$$

x being the correction to the mean value of R, y the temperature coefficient, and θ the reading of the Fahrenheit thermometer. The observations give the following equations of condition:

Equations.	Residuals.
	″
$x - 12.9y + 42 = 0$	+ 0.0087
$x - 19.1y - 11 = 0$	+ 0 0057
$x - 22.3y - 185 = 0$	− 0.0106
$x + 19.4y + 38 = 0$	− 0.0031
$x + 19.3y + 103 = 0$	+ 0.0032
$x + 20.0y + 85 = 0$	+ 0.0012
$x - 16.6y - 12 = 0$	+ 0.0047
$x - 15.8y - 62 = 0$	− 0.0006

Giving to these equations equal weight, we have, by the method of least squares,

$$x = -0''.000101 \pm 0''.001648$$
$$y = -0''.00036054 \pm 0''.00008976$$

Denoting by R_0 the value of a revolution for the temperature 50° F. and by R_θ the value for the temperature θ we have therefore,

$$R_\theta = R_0 - 0''.00036054\ (\theta - 50^\circ)$$

These observations were not reduced until January, 1882, and the coefficient for temperature is much greater than I expected to find, since in all our previous reductions it has been assumed that this coefficient is zero. According to my plan of observing the determination of this coefficient was to be made while the observations for parallax were going on, and I think that I must accept this result, although unexpected. At the same time I regret that more observations were not made for the determination of this coefficient. Indeed it was my intention to make a set during the warm weather in the early part of September, 1881, but by some oversight they were omitted, and perhaps the assurance that this coefficient was zero made me too negligent. It is not probable that this coefficient has been produced by a change of declination of one of the stars, caused by its annual parallax, since the observations were made at a time when the coefficient of parallax in declination was small. As the coefficient of temperature needs further investigation, and as the stars No. 5 and No. 12, of KRUEGER'S catalogue are convenient for this purpose, I give the formula which I have computed for the reduction of the difference of declination. This difference is assumed to be positive, and the formula gives the correction to be added to the difference of the mean declinations to get the apparent difference. The notation is that of BESSEL, which has been used in the American Ephemeris since 1864.

1880. $\Delta\delta = A.\,(8.8513_n) + B.\,(7.7416_n) + C.\,(7.9127_n) + D.\,(6.6467_n)$
1885. $\Delta\delta = A.\,(8.8525_n) + B.\,(7.7417_n) + C.\,(7.9130_n) + D.\,(6.6635_n)$
1890. $\Delta\delta = A.\,(8.8543_n) + B.\,(7.7418_n) + C.\,(7.9132_n) + D.\,(6.6797_n)$
1895. $\Delta\delta = A.\,(8.8555_n) + B.\,(7.7420_n) + C.\,(7.9134_n) + D.\,(6.6938_n)$
1900. $\Delta\delta = A.\,(8.8567_n) + B.\,(7.7421_n) + C.\,(7.9137_n) + D.\,(6.7061_n)$
1905. $\Delta\delta = A.\,(8.8585_n) + B.\,(7.7423_n) + C.\,(7.9140_n) + D.\,(6.7220_n)$
1910. $\Delta\delta = A.\,(8.8603_n) + B.\,(7.7425_n) + C.\,(7.9143_n) + D.\,(6.7360_n)$

The quantities in parentheses are logarithms, and the letter n after the logarithms denotes that the factor is negative.

The following tables give the observed differences of declination corrected for refraction; the reduction of this apparent difference to 1880; then $\Delta\mu$ the reduction for proper motion to the same epoch; the reduction to the temperature of 50° F.; the sum of the reductions denoted by Σ, and finally the mean values of $\Delta\delta$. The reductions have been given separately, so that if any change in the temperature coefficient of the micrometer screw is indicated by future observations the proper correction may be made easily.

α Lyræ. Illumination A.

Date.	$\Delta\delta$	$d\delta$	$\Delta\mu$	$\Delta\theta$	Σ	$\Delta\delta_0$
1880.	"	"	"	"	"	"
May 24	44.134	0.000	+ 0.164	+ 0.037	+ 0.201	44.335
25	44.211	0.000	0.163	0.043	0.206	44.417
26	44.197	0.000	0.163	0.044	0.207	44.404
27	44.180	0.000	0.162	0.038	0.200	44.380
31	44.214	0.000	0.159	0.034	0.193	44.407
June 2	44.174	0.000	0.157	0.008	0.165	44.339
17	44.072	+ 0.001	0.146	0.030	0.177	44.249
18	44.158	0.001	0.145	0.033	0.179	44.337
21	44.176	0.001	0.143	0.043	c.187	44.363
22	44.183	0.001	0.142	0.042	0.185	44.368
23	44.215	0.001	0.142	0.046	0.189	44.404
27	44.201	0.001	0.139	0.050	0.190	44.391
28	44.144	0.001	0.138	0.049	0.188	44.332
30	44.220	0.001	0.137	0.042	0.180	44.400
July 3	44.156	0.001	0.134	0.034	0.169	44.325
27	44.112	0.002	0.116	0.042	0.160	44.272
28	44.144	0.002	0.116	0.037	0.155	44.299
30	44.148	0.002	0.114	0.039	0.155	44.303
31	44.189	0.002	0.113	0.045	0.160	44.349
Aug. 12	44.118	0.002	0.105	0.042	0.149	44.267
15	44.195	0.002	0.102	0.034	0.138	44.333
16	44.210	0.002	0.102	0.037	0.141	44.351
Sept. 14	44.258	0.002	0.080	0.015	0.097	44.355
15	44.245	0.002	0.079	0.018	0.099	44.344
17	44.224	0.002	0.078	0.038	0.118	44.342
18	44.274	0.002	0.077	0.045	0.124	44.398
22	44.261	0.002	0.074	0.026	0.102	44.363
Oct. 20	44.149	0.001	0.053	+ 0.010	0.064	44.213
24	44.213	0.001	0.050	− 0.006	0.045	44.258
25	44.174	0.001	0.049	− 0.001	0.049	44.223
31	44.226	0.001	0.045	+ 0.003	0.049	44.275
Nov. 1	44.139	0.001	0.044	0.002	0.047	44.186
2	44.160	+ 0.001	0.043	+ 0.008	+ 0.052	44.212
Dec. 3	44.117	− 0.001	0.020	− 0.020	− 0.001	44.116
7	44.148	0.001	0.017	0.044	0.028	44.120
9	44.140	0.001	0.016	0.042	0.027	44.113
11	44.152	0.001	0.014	0.034	0.021	44.131
13	44.021	0.001	0.013	0.015	0.003	44.018
15	44.038	0.001	0.011	0.014	0.004	44.034
16	44.056	0.001	0.011	0.017	0.007	44.049
18	44.068	0.001	+ 0.009	0.024	0.016	44.052
1881.						
Feb. 10	44.321	0.003	− 0.032	0.026	0.061	44.260
13	44.273	0.003	0.034	0.038	0.075	44.198
14	44.182	0.003	0.035	0.045	0.083	44.099
16	44.254	0.003	0.036	0.041	0.080	44.174
19	44.311	0.003	0.038	0.036	0.077	44.234
21	44.304	− 0.003	− 0.040	− 0.034	− 0.077	44.227

α Lyræ. Illumination A—Continued.

Date.	Δδ	dδ	Δμ	Δθ	Σ	$\Delta\delta_0$
1881.	"	"	"	"	"	"
Mar. 14	44.207	− 0.003	− 0.055	− 0.027	− 0.085	44.122
15	44.338	0.003	0.056	0.018	0.077	44.261
21	44.349	0.003	0.061	0.025	0.089	44.260
23	44.313	0.003	0.062	0.028	0.093	44.220
26	44.340	0.003	0.064	0.030	0.097	44.243
27	44.427	0.003	0.065	− 0.028	0.096	44.331
27	44.326	0.003	0.088	+ 0.009	0.082	44.244
29	44.523	0.003	0.090	+ 0.002	0.091	44.432
30	44.485	0.003	0.090	− 0.004	0.097	44.388
May 6	44.454	0.002	0.095	+ 0.010	0.087	44.367
7	44.493	0.002	0.096	0.010	0.088	44.405
8	44.460	0.002	0.096	0.015	0.083	44.377
25	44.446	0.002	0.109	0.022	0.089	44.357
26	44.452	0.002	0.110	0.020	0.092	44.360
27	44.478	0.002	0.110	0.027	0.085	44.393
28	44.549	0.002	0.111	0.032	0.081	44.468
30	44.443	0.002	0.113	0.037	0.078	44.365
June 22	44.584	0.001	0.130	0.021	0.110	44.474
26	44.503	0.001	0.133	0.039	0.095	44.408
28	44.484	0.001	0.134	0.048	0.087	44.397
July 1	44.477	0.001	0.136	0.032	0.105	44.372
2	44.512	− 0.001	− 0.137	+ 0.034	− 0.104	44.408

α Lyræ. Illumination B.

Date.	Δδ	dδ	Δμ	Δθ	Σ	$\Delta\delta_0$
1880.						
May 27	44.255	0.000	+ 0.162	+ 0.040	+ 0.202	44.457
31	44.225	0.000	0.159	0.035	0.194	44.419
June 2	44.346	0.000	0.157	0.009	0.166	44.512
22	44.202	+ 0.001	0.142	0.043	0.186	44.388
23	44.290	0.001	0.142	0.048	0.191	44.481
24	44.273	0.001	0.141	0.052	0.194	44.467
26	44.424	0.001	0.140	0.042	0.183	44.607
28	44.241	0.001	0.138	0.049	0.188	44.429
30	44.349	0.001	0.137	0.041	0.179	44.528
July 3	44.254	0.001	0.134	0.036	0.171	44.425
26	44.192	0.002	0.117	0.052	0.171	44.363
28	44.236	0.002	0.116	0.039	0.157	44.393
29	44.338	0.002	0.115	0.039	0.156	44.494
Aug. 12	44.285	0.002	0.105	0.035	0.142	44.427
16	44.200	0.002	0.102	0.036	0.140	44.340
Sept. 15	44.197	0.002	0.079	0.016	0.097	44.294
16	44.177	0.002	0.078	0.024	0.104	44.281
17	44.148	0.002	0.078	0.036	0.116	44.264
18	44.353	0.002	0.077	0.043	0.122	44.475
22	44.229	0.002	0.074	0.025	0.101	44.330
Oct. 20	44.242	+ 0.001	+ 0.053	+ 0.008	+ 0.062	44.304

α Lyræ. Illumination B—Continued.

Date.	$\Delta\delta$	$d\delta$	$\Delta\mu$	$\Delta\theta$	Σ	$\Delta\delta_0$
	"	"	"	"	"	"
1880.						
Oct. 24	44.196	+ 0.001	+ 0.050	− 0.007	+ 0.044	44.240
25	44.229	0.001	0.049	− 0.002	0.048	44.277
31	44.179	0.001	0.045	+ 0.002	0.048	44.227
Nov. 1	44.134	+ 0.001	0.044	+ 0.001	+ 0.046	44.180
Dec. 3	44.129	− 0.001	0.020	− 0.021	− 0.002	44.127
9	44.065	0.001	0.016	0.043	0.028	44.037
11	44.053	0.001	0.014	0.035	0.022	44.031
13	44.137	0.001	0.013	0.016	0.004	44.133
16	44.154	0.001	0.011	0.018	0.008	44.146
18	44.034	0.001	0.009	0.025	0.017	44.017
22	44.071	0.002	+ 0.006	0.029	0.025	44.046
1881.						
Feb. 6	44.357	0.003	− 0.029	0.067	0.099	44.258
12	44.398	0.003	0.033	0.031	0.067	44.331
14	44.264	0.003	0.035	0.044	0.082	44.182
16	44.300	0.003	0.036	0.041	0.080	44.220
19	44.309	0.003	0.038	0.036	0.077	44.232
21	44.303	0.003	0.040	0.034	0.077	44.226
Mar. 14	44.401	0.003	0.055	0.026	0.084	44.317
15	44.374	0.003	0.056	0.018	0.077	44.297
21	44.456	0.003	0.061	0.026	0.090	44.366
23	44.355	0.003	0.062	0.027	0.092	44.263
26	44.476	0.003	0.064	0.030	0.097	44.379
27	44.399	0.003	0.065	− 0.028	0.096	44.303
Apr. 27	44.510	0.003	0.088	+ 0.009	0.082	44.428
29	44.539	0.003	0.090	+ 0.004	0.089	44.450
30	44.532	0.003	0.090	− 0.002	0.095	44.437
May 7	44.476	0.002	0.096	+ 0.009	0.089	44.387
8	44.521	0.002	0.096	0.014	0.084	44.437
25	44.518	0.002	0.109	0.023	0.088	44.430
26	44.542	0.002	0.110	0.021	0.091	44.451
27	44.610	0.002	0.110	0.026	0.086	44.524
28	44.548	0.002	0.111	0.032	0.081	44.467
30	44.590	0.002	0.113	0.037	0.078	44.512
June 22	44.586	0.001	0.130	0.022	0.109	44.477
26	44.651	0.001	0.133	0.040	0.094	44.557
28	44.615	0.001	0.134	0.050	0.085	44.530
July 1	44.663	0.001	0.136	0.030	0.107	44.556
2	44.572	− 0.001	− 0.137	+ 0.033	− 0.105	44.467

61^2 *Cygni.*

Date.	$\Delta\delta$	$d\delta$	$\Delta\mu$	$\Delta\theta$	Σ	$\Delta\delta$
1880.	"	"	"	"	"	"
Oct. 24	198.200	+ 0.010	+ 0.560	− 0.057	+ 0.513	198.713
25	197.928	0.010	0.552	0.029	0.533	198.461
31	198.018	0.011	0.502	0.007	0.506	198.524
Nov. 1	198.007	0.011	0.493	− 0.014	0.490	198.497
2	198.071	0.011	0.485	+ 0.006	0.502	198.573
Dec. 3	198.102	0.012	0.227	− 0.102	0.137	198.239
7	198.166	0.011	0.194	0.204	+ 0.001	198.167
9	198.181	0.011	0.177	0.199	− 0.011	198.170
11	198.191	0.011	0.161	0.161	+ 0.011	198.202
13	198.174	0.011	0.144	0.078	0.077	198.251
15	198.186	0.011	+ 0.127	0.068	+ 0.070	198.256
1881.						
Jan. 12	198.396	0.008	− 0.106	0.157	− 0.255	198.141
14	198.487	0.008	0.123	0.173	0.288	198.199
17	198.465	0.007	0.148	0.114	0.255	198.210
19	198.458	0.007	0.165	0.140	0.298	198.160
22	198.516	0.006	0.190	0.105	0.289	198.227
26	198.454	0.005	0.223	0.114	0.332	198.122
28	198.522	+ 0.005	0.240	0.174	0.409	198.113
Mar. 14	198.898	− 0.005	0.618	0.126	0.749	198.149
15	199.167	0.005	0.627	0.087	0.719	198.448
21	199.045	0.006	0.677	0.115	0.798	198.247
23	199.321	0.006	0.694	0.127	0.827	198.494
26	198.971	0.007	0.719	0.138	0.864	198.107
27	199.237	0.007	0.727	− 0.125	0.859	198.378
Apr. 27	199.430	0.011	0.985	+ 0.039	0.957	198.473
29	199.392	0.011	1.001	+ 0.004	1.008	198.384
30	199.524	0.011	1.010	− 0.023	1.044	198.480
May 6	199.611	0.012	1.060	+ 0.039	1.033	198.578
7	199.685	0.012	1.068	0.036	1.044	198.641
8	199.548	0.012	1.076	0.058	1.030	198.518
25	199.795	0.012	1.217	0.092	1.137	198.658
26	200.011	0.012	1.225	0.087	1.150	198.861
27	199.853	0.012	1.234	0.111	1.135	198.718
28	199.911	0.012	1.242	0.142	1.112	198.799
30	200.014	0.012	1.259	0.166	1.105	198.909
June 26	200.187	0.010	1.484	0.159	1.335	198.852
28	200.285	0.010	1.500	0.208	1.302	198.983
July 1	200.314	0.010	1.525	0.123	1.412	198.902
2	200.264	0.009	1.533	0.135	1.407	198.857
19	200.649	0.008	1.676	0.133	1.551	199.098
21	200.440	0.007	1.692	0.159	1.540	198.900
23	200.427	0.007	1.709	0.136	1.580	198.847
24	200.504	0.006	1.717	0.152	1.571	198.933
25	200.519	0.006	1.725	0.180	1.551	198.968
28	200.584	− 0.006	− 1.751	+ 0.115	− 1.642	198.942

61^2 *Cygni*—Continued.

Date.	$\Delta\delta$	$d\delta$	$\Delta\mu$	$\Delta\theta$	Σ	$\Delta\delta$
1881.	"	"	"	"	"	"
Aug. 22	200.776	− 0.001	− 1.958	+ 0.154	− 1.805	198.971
23	200.774	− 0.001	1.966	0.164	1.803	198.971
24	200.741	0.000	1.974	0.179	1.795	198.946
25	200.745	0.000	1.982	0.171	1.811	198.934
26	200.761	0.000	1.991	0.162	1.829	198.932
Sept. 5	200.788	+ 0.002	2.075	0.248	1.825	198.963
6	200.765	0.002	2.082	0.227	1.853	198.912
24	200.841	0.006	2.232	0.220	2.006	198.835
26	200.934	0.006	2.248	0.247	1.995	198.939
27	200.879	0.006	2.258	0.216	2.036	198.843
29	200.937	0.006	2.274	0.206	2.062	198.875
Oct. 22	200.998	0.010	2.465	0.058	2.397	198.601
26	201.052	0.010	2.499	0.022	2.467	198.585
27	201.069	0.010	2.507	+ 0.040	2.457	198.612
Nov. 4	201.093	0.011	2.573	− 0.063	2.625	198.468
5	201.193	0.011	2.582	+ 0.023	2.548	198.645
29	201.145	0.012	2.781	− 0.045	2.814	198.331
Dec. 1	201.256	0.011	2.798	+ 0.025	2.762	198.496
4	201.168	0.011	2.822	− 0.035	2.846	198.322
5	201.215	0.011	2.831	0.060	2.880	198.335
7	201.354	+ 0.011	− 2.854	− 0.062	− 2.905	198.449

In the case of α *Lyræ* the reduced values of $\Delta\delta$ show that the adopted annual proper motion of this star represents the measurements very well. On the other hand, the observations of 61^2 *Cygni* indicate a small correction to the value of this proper motion, but this will be cared for by the equations of condition. These equations are of the form,

$$x + by + cz + du + n = 0$$

In this equation x is the correction to an assumed value of $\Delta\delta$; y is the correction to the value of the annual proper motion which has been used in reducing the $\Delta\delta$ of the two stars to the epoch 1881.0; z is the difference of the constants of aberration, which have been assumed to be the same for both stars; and u is the annual relative parallax of the stars. The coefficients have the following values:

$$b = 1881.0 - \tau$$

$$c = (9.94578) \sin (\odot + 264^\circ\ 11'.1); \qquad \alpha\ Lyræ$$
$$c = (9.92225) \sin (\odot + 238^\circ\ 15'.2); \qquad 61^2\ Cygni$$
$$d = (9.94578)\ R \cos (\odot + 264^\circ\ 11'.1); \qquad \alpha\ Lyræ$$
$$d = (9.92225)\ R \cos (\odot + 238^\circ\ 15'.2); \qquad 61^2\ Cygni$$

where $\odot$ is the longitude of the sun, and R its radius vector. The independent term n is the difference between an assumed value of $\Delta\delta$ and the observed value. These values have been assumed as follows:

for α *Lyræ*; $\Delta\delta_0 = 44''.200$: and $\Delta\delta_0 = 44''.300$

for 61^2 *Cygni*; $\Delta\delta_0 = 198''.560$

In nearly every case the weight unity has been assigned to the observation, but for a few nights, where the notes indicate unusual disturbance of the images, the weight has been reduced to one-half. The following are the equations of condition:

α Lyræ. Illumination A.

No.	Date.	Equations.				Residuals.	Wt.
	1880.				″	″	
1	May 24	x + 0.6023y	− 0.4608z	+ 0.7628u	− 0.135 = 0	+ 0.005	1
2	25	+ 0.5996	− 0.4481	+ 0.7707	− 0.217	− 0.075	.
3	26	+ 0.5969	− 0.4354	+ 0.7783	− 0.204	− 0.060	.
4	27	+ 0.5941	− 0.4225	+ 0.7857	− 0.180	− 0.035	.
5	31	+ 0.5832	− 0.3703	+ 0.8128	− 0.207	− 0.056	.
6	June 2	+ 0.5777	− 0.3430	+ 0.8253	− 0.139	+ 0.014	.
7	17	+ 0.5367	− 0.1316	+ 0.8870	− 0.049	+ 0.120	.
8	18	+ 0.5340	− 0.1170	+ 0.8891	− 0.137	+ 0.032	.
9	21	+ 0.5258	− 0.0733	+ 0.8941	− 0.163	+ 0.008	.
10	22	+ 0.5230	− 0.0583	+ 0.8953	− 0.168	+ 0.004	.
11	23	+ 0.5204	− 0.0441	+ 0.8961	− 0.204	− 0.031	.
12	27	+ 0.5096	+ 0.0135	+ 0.8973	− 0.191	− 0.017	.
13	28	+ 0.5068	+ 0.0288	+ 0.8969	− 0.132	+ 0.043	.
14	30	+ 0.5012	+ 0.0582	+ 0.8955	− 0.200	− 0.025	.
15	July 3	+ 0.4930	+ 0.1024	+ 0.8914	− 0.125	+ 0.051	.
16	27	+ 0.4275	+ 0.4346	+ 0.7799	− 0.072	+ 0.095	.
17	28	+ 0.4248	+ 0.4473	+ 0.7724	− 0.099	+ 0.067	.
18	30	+ 0.4193	+ 0.4723	+ 0.7567	− 0.103	+ 0.062	.
19	31	+ 0.4166	+ 0.4849	+ 0.7484	− 0.149	+ 0.015	.
20	Aug. 12	+ 0.3838	+ 0.6220	+ 0.6343	− 0.067	+ 0.083	.
21	15	+ 0.3755	+ 0.6530	+ 0.6010	− 0.133	+ 0.013	.
22	16	+ 0.3729	+ 0.6623	+ 0.5904	− 0.151	− 0.007	.
23	Sept. 14	+ 0.2934	+ 0.8592	+ 0.2032	− 0.155	− 0.063	.
24	15	+ 0.2906	+ 0.8625	+ 0.1885	− 0.144	− 0.055	.
25	17	+ 0.2851	+ 0.8684	+ 0.1586	− 0.142	− 0.057	.
26	18	+ 0.2825	+ 0.8708	+ 0.1444	− 0.198	− 0.115	.
27	22	+ 0.2715	+ 0.8786	+ 0.0842	− 0.163	− 0.089	.
28	Oct. 20	+ 0.1951	+ 0.8176	− 0.3308	− 0.013	0.000	.
29	24	+ 0.1841	+ 0.7926	− 0.3860	− 0.058	− 0.054	.
30	25	+ 0.1814	+ 0.7856	− 0.3996	− 0.023	− 0.021	.
31	31	+ 0.1650	+ 0.7394	− 0.4782	− 0.075	− 0.085	.
32	Nov. 1	+ 0.1622	+ 0.7308	− 0.4909	+ 0.014	+ 0.002	.
33	2	+ 0.1595	+ 0.7219	− 0.5034	− 0.012	− 0.028	.
34	Dec. 3	+ 0.0747	+ 0.3536	− 0.7968	+ 0.084	+ 0.022	.
35	7	+ 0.0638	+ 0.2954	− 0.8191	+ 0.080	+ 0.014	.
36	9	+ 0.0583	+ 0.2656	− 0.8286	+ 0.087	+ 0.019	.
37	11	+ 0.0528	+ 0.2356	− 0.8372	+ 0.069	0.000	.
38	13	+ 0.0474	+ 0.2052	− 0.8448	+ 0.182	+ 0.111	.
39	15	+ 0.0419	+ 0.1746	− 0.8513	+ 0.166	+ 0.094	.
40	16	+ 0.0391	+ 0.1592	− 0.8541	+ 0.151	+ 0.078	.
41	18	+ 0.0337	+ 0.1283	− 0.8590	+ 0.148	+ 0.074	.
	1881.						
42	Feb. 10	− 0.1157	− 0.6468	− 0.5930	− 0.060	− 0.099	.
43	13	− 0.1239	− 0.6776	− 0.5588	+ 0.002	− 0.031	.

α Lyræ. Illumination A—Continued.

No.	Date.	Equations.					Residuals.	Wt.
	1881.					″	″	
44	Feb. 14	$x - 0.1267y$	$- 0.6875z$	$- 0.5469u$	$+ 0.101 = 0$		+ 0.069	1
45	16	− 0.1321	− 0.7065	− 0.5231	+ 0.026		− 0.003	.
46	19	− 0.1403	− 0.7333	− 0.4860	− 0.034		− 0.056	.
47	21	− 0.1457	− 0.7501	− 0.4605	− 0.027		− 0.045	.
48	Mar. 14	− 0.2031	− 0.8669	− 0.1651	+ 0.078		+ 0.106	.
49	15	− 0.2059	− 0.8696	− 0.1503	− 0.061		− 0.030	.
50	21	− 0.2223	− 0.8806	− 0.0599	− 0.060		− 0.015	.
51	23	− 0.2278	− 0.8821	− 0.0294	− 0.020		+ 0.028	.
52	26	− 0.2360	− 0.8825	+ 0.0163	− 0.043		+ 0.015	.
53	27	− 0.2387	− 0.8821	+ 0.0314	− 0.131		− 0.071	.
54	Apr. 27	− 0.3236	− 0.7454	+ 0.4763	− 0.044		+ 0.092	.
55	29	− 0.3290	− 0.7291	+ 0.5014	− 0.232		− 0.091	.
56	30	− 0.3317	− 0.7205	+ 0.5141	− 0.188		− 0.045	.
57	May 6	− 0.3481	− 0.6654	+ 0.5855	− 0.167		− 0.011	.
58	7	− 0.3507	− 0.6560	+ 0.5964	− 0.205		− 0.047	.
59	8	− 0.3534	− 0.6015	+ 0.6525	− 0.177		− 0.009	.
60	25	− 0.3998	− 0.4511	+ 0.7689	− 0.157		+ 0.034	.
61	26	− 0.4026	− 0.4384	+ 0.7765	− 0.160		+ 0.032	.
62	27	− 0.4052	− 0.4257	+ 0.7839	− 0.193		+ 0.001	.
63	28	− 0.4080	− 0.4127	+ 0.7911	− 0.268		− 0.073	.
64	30	− 0.4135	− 0.3862	+ 0.8050	− 0.165		+ 0.033	.
65	June 22	− 0.4763	− 0.0620	+ 0.8950	− 0.274		− 0.053	.
66	26	− 0.4872	− 0.0039	+ 0.8974	− 0.208		+ 0.015	.
67	28	− 0.4926	+ 0.0258	+ 0.8970	− 0.197		+ 0.027	.
68	July 1	− 0.5008	+ 0.0693	+ 0.8947	− 0.172		+ 0.052	.
69	2	− 0.5036	+ 0.0840	+ 0.8933	− 0.208		+ 0.016	.
				α Lyræ. Illumination B.				
	1880.					″	″	
1	May 27	$x + 0.5942y$	$- 0.4229z$	$+ 0.7854u$	$- 0.157 = 0$		− 0.006	1
2	31	+ 0.5833	− 0.3704	+ 0.8127	− 0.119		+ 0.038	.
3	June 2	+ 0.5778	− 0.3434	+ 0.8251	− 0.212		− 0.053	.
4	22	+ 0.5230	− 0.0586	+ 0.8953	− 0.088		+ 0.091	.
5	23	+ 0.5204	− 0.0443	+ 0.8961	− 0.181		− 0.008	.
6	24	+ 0.5177	− 0.0294	+ 0.8968	− 0.167		+ 0.006	.
7	26	+ 0.5122	− 0.0004	+ 0.8974	− 0.307		− 0.134	.
8	28	+ 0.5067	+ 0.0291	+ 0.8969	− 0.129		+ 0.044	.
9	30	+ 0.5012	+ 0.0586	+ 0.8955	− 0.228		− 0.056	.
10	July 3	+ 0.4931	+ 0.1021	+ 0.8915	− 0.125		+ 0.046	.
11	26	+ 0.4303	+ 0.4214	+ 0.7874	− 0.063		+ 0.086	.
12	28	+ 0.4248	+ 0.4471	+ 0.7725	− 0.093		+ 0.052	.
13	29	+ 0.4220	+ 0.4599	+ 0.7646	− 0.194		− 0.050	.
14	Aug. 12	+ 0.3838	+ 0.6230	+ 0.6333	− 0.127		− 0.011	.
15	16	+ 0.3729	+ 0.6625	+ 0.5902	− 0.040		− 0.067	.
16	Sept. 15	+ 0.2906	+ 0.8625	+ 0.1882	+ 0.006		+ 0.030	.
17	16	+ 0.2879	+ 0.8656	+ 0.1733	+ 0.019		+ 0.040	.

α Lyræ. Illumination B—Continued.

No.	Date.	Equations.				Residuals.	Wt.
	1880.				″	″	
18	Sept. 17	x + 0.2850y	+ 0.8685z	+ 0.1581u	+ 0.036 = 0	+ 0.038	½
19	18	+ 0.2825	+ 0.8709	+ 0.1441	− 0.175	− 0.160	.
20	22	+ 0.2715	+ 0.8787	+ 0.0839	− 0.030	− 0.027	.
21	Oct. 20	+ 0.1950	+ 0.8175	− 0.3311	− 0.004	− 0.084	.
22	24	+ 0.1841	+ 0.7924	− 0.3863	+ 0.060	− 0.030	.
23	25	+ 0.1814	+ 0.7855	− 0.3998	+ 0.023	− 0.070	.
24	31	+ 0.1650	+ 0.7392	− 0.4784	+ 0.073	− 0.035	.
25	Nov. 1	+ 0.1622	+ 0.7307	− 0.4910	+ 0.120	+ 0.009	.
26	Dec. 3	+ 0.0747	+ 0.3534	− 0.7969	+ 0.173	+ 0.006	.
27	9	+ 0.0582	+ 0.2654	− 0.8287	+ 0.263	+ 0.091	.
28	11	+ 0.0528	+ 0.2355	− 0.8373	+ 0.269	+ 0.096	.
29	13	+ 0.0473	+ 0.2051	− 0.8448	+ 0.167	− 0.007	.
30	16	+ 0.0390	+ 0.1590	− 0.8541	+ 0.154	− 0.021	.
31	18	+ 0.0336	+ 0.1280	− 0.8590	+ 0.283	+ 0.107	.
32	22	+ 0.0227	+ 0.0659	− 0.8656	+ 0.254	+ 0.078	.
	1881.						
33	Feb. 6	− 0.1047	− 0.6029	− 0.6361	+ 0.042	− 0.052	½
34	12	− 0.1212	− 0.6675	− 0.5704	− 0.031	− 0.132	.
35	14	− 0.1267	− 0.6873	− 0.5472	+ 0.118	+ 0.022	.
36	16	− 0.1320	− 0.7063	− 0.5233	+ 0.080	− 0.010	.
37	19	− 0.1402	− 0.7331	− 0.4862	+ 0.068	− 0.014	.
38	21	− 0.1457	− 0.7496	− 0.4611	+ 0.074	− 0.003	.
39	Mar. 14	− 0.2031	− 0.8668	− 0.1654	− 0.017	− 0.029	.
40	15	− 0.2059	− 0.8696	− 0.1505	+ 0.003	− 0.005	.
41	21	− 0.2222	− 0.8806	− 0.0602	− 0.066	− 0.055	.
42	23	− 0.2278	− 0.8821	− 0.0296	+ 0.037	+ 0.055	.
43	26	− 0.2360	− 0.8825	+ 0.0160	− 0.079	− 0.051	.
44	27	− 0.2386	− 0.8821	+ 0.0311	− 0.003	+ 0.028	.
45	April 27	− 0.3235	− 0.7455	+ 0.4760	− 0.128	− 0.003	.
46	29	− 0.3289	− 0.7295	+ 0.5009	− 0.150	− 0.020	.
47	30	− 0.3317	− 0.7206	+ 0.5139	− 0.137	− 0.004	.
48	May 7	− 0.3508	− 0.6558	+ 0.5966	− 0.087	+ 0.063	.
49	8	− 0.3535	− 0.6456	+ 0.6077	− 0.137	+ 0.015	.
50	25	− 0.3997	− 0.4514	+ 0.7687	− 0.130	+ 0.055	.
51	26	− 0.4025	− 0.4386	+ 0.7764	− 0.151	+ 0.036	.
52	27	− 0.4053	− 0.4254	+ 0.7841	− 0.224	− 0.035	.
53	28	− 0.4081	− 0.4125	+ 0.7912	− 0.167	+ 0.023	.
54	30	− 0.4134	− 0.3864	+ 0.8049	− 0.212	− 0.019	.
55	June 22	− 0.4763	− 0.0623	+ 0.8950	− 0.177	+ 0.033	.
56	26	− 0.4871	− 0.0048	+ 0.8973	− 0.257	− 0.046	.
57	28	− 0.4926	+ 0.0255	+ 0.8970	− 0.230	− 0.020	.
58	July 1	− 0.5008	+ 0.0697	+ 0.8946	− 0.256	− 0.046	.
59	2	− 0.5036	+ 0.0842	+ 0.8933	− 0.167	+ 0.042	.

61^2 *Cygni.*

No.	Date.	Equations.				Residuals.	Wt.
	1880.				″	″	
1	Oct. 24	$x + 0.1839y$	$+ 0.8361z$	$- 0.0040u$	$- 0.153 = 0$	− 0.149	1
2	25	+ 0.1812	+ 0.8359	− 0.0181	+ 0.099	+ 0.097	.
3	31	+ 0.1648	+ 0.8294	− 0.1045	+ 0.036	− 0.007	.
4	Nov. 1	+ 0.1621	+ 0.8274	− 0.1189	+ 0.063	+ 0.013	.
5	2	+ 0.1593	+ 0.8252	− 0.1333	− 0.013	− 0.069	.
6	Dec. 3	+ 0.0746	+ 0.6359	− 0.5349	+ 0.321	+ 0.064	.
7	7	+ 0.0638	+ 0.5960	− 0.5774	+ 0.393	+ 0.114	.
8	9	+ 0.0582	+ 0.5746	− 0.5980	+ 0.390	+ 0.099	.
9	11	+ 0.0528	+ 0.5530	− 0.6172	+ 0.358	+ 0.057	.
10	13	+ 0.0473	+ 0.5300	− 0.6363	+ 0.309	− 0.003	.
11	15	+ 0.0418	+ 0.5069	− 0.6542	+ 0.304	− 0.017	.
	1881.						
12	Jan. 12	− 0.0349	+ 0.1275	− 0.8127	+ 0.419	− 0.003	.
13	14	− 0.0404	+ 0.0981	− 0.8168	+ 0.361	− 0.046	½
14	17	− 0.0486	+ 0.0539	− 0.8209	+ 0.350	− 0.081	.
15	19	− 0.0542	+ 0.0237	− 0.8225	+ 0.390	− 0.031	½
16	22	− 0.0623	− 0.0204	− 0.8229	+ 0.333	− 0.104	.
17	26	− 0.0732	− 0.0796	− 0.8197	+ 0.438	− 0.002	.
18	28	− 0.0787	− 0.1090	− 0.8167	+ 0.447	+ 0.002	.
19	Mar. 14	− 0.2032	− 0.6700	− 0.4977	+ 0.411	+ 0.088	.
20	15	− 0.2060	− 0.6785	− 0.4863	+ 0.112	− 0.146	½
21	21	− 0.2224	− 0.7255	− 0.4143	+ 0.313	+ 0.027	.
22	23	− 0.2279	− 0.7394	− 0.3893	+ 0.066	− 0.209	.
23	26	− 0.2361	− 0.7586	− 0.3509	+ 0.453	+ 0.195	.
24	27	− 0.2388	− 0.7646	− 0.3379	+ 0.182	− 0.070	.
25	April 27	− 0.3236	− 0.8308	+ 0.0949	+ 0.087	+ 0.043	.
26	29	− 0.3290	− 0.8271	+ 0.1229	+ 0.176	+ 0.151	.
27	30	− 0.3318	− 0.8249	+ 0.1373	+ 0.070	+ 0.048	.
28	May 6	− 0.3481	− 0.8070	+ 0.2208	− 0.018	+ 0.003	.
29	7	− 0.3509	− 0.8033	+ 0.2342	− 0.081	− 0.053	.
30	8	− 0.3535	− 0.7993	+ 0.2478	+ 0.042	+ 0.077	.
31	25	− 0.3998	− 0.6984	+ 0.4659	− 0.098	+ 0.054	.
32	26	− 0.4026	− 0.6906	+ 0.4777	− 0.301	− 0.143	.
33	27	− 0.4053	− 0.6826	+ 0.4895	− 0.158	+ 0.007	.
34	28	− 0.4081	− 0.6745	+ 0.5010	− 0.239	− 0.067	.
35	30	− 0.4135	− 0.6576	+ 0.5237	− 0.249	− 0.065	.
36	June 26	− 0.4874	− 0.3680	+ 0.7633	− 0.292	+ 0.037	.
37	28	− 0.4928	− 0.3428	+ 0.7753	− 0.423	− 0.061	½
38	July 1	− 0.5010	− 0.3045	+ 0.7917	− 0.342	+ 0.006	.
39	2	− 0.5037	− 0.2916	+ 0.7967	− 0.297	+ 0.054	.
40	19	− 0.5505	− 0.0598	+ 0.8473	− 0.538	− 0.139	.
41	21	− 0.5560	− 0.0320	+ 0.8487	− 0.340	+ 0.063	.
42	23	− 0.5615	− 0.0044	+ 0.8492	− 0.287	+ 0.119	.
43	24	− 0.5641	+ 0.0095	+ 0.8491	− 0.373	+ 0.034	.
44	25	− 0.5668	+ 0.0234	+ 0.8487	− 0.408	0.000	.
45	28	− 0.5752	+ 0.0653	+ 0.8461	− 0.382	+ 0.029	.
46	Aug. 22	− 0.6433	+ 0.3976	+ 0.7434	− 0.411	− 0.016	.
47	23	− 0.6459	+ 0.4090	+ 0.7370	− 0.411	− 0.017	.

61[2] *Cygni*—Continued.

No.	Date.	Equations.				Residuals.	Wt.
	1881.				″	″	
48	Aug. 24	$x - 0.6486y$	$+ 0.4213z$	$+ 0.7297u$	$- 0.386 = 0$	+ 0.005	1
49	25	− 0.6513	+ 0.4332	+ 0.7224	− 0.378	+ 0.015	.
50	26	− 0.6541	+ 0.4453	+ 0.7147	− 0.372	+ 0.014	.
51	Sept. 5	− 0.6816	+ 0.5588	+ 0.6265	− 0.403	− 0.048	.
52	6	− 0.6841	+ 0.5683	+ 0.6176	− 0.352	0.000	.
53	24	− 0.7332	+ 0.7264	+ 0.4149	− 0.275	− 0.003	.
54	26	− 0.7386	+ 0.7401	+ 0.3896	− 0.379	− 0.118	.
55	27	− 0.7417	+ 0.7474	+ 0.3753	− 0.283	− 0.027	.
56	29	− 0.7471	+ 0.7598	+ 0.3492	− 0.315	− 0.070	.
57	Oct. 22	− 0.8100	+ 0.8356	+ 0.0282	− 0.041	+ 0.062	.
58	26	− 0.8210	+ 0.8355	− 0.0297	− 0.025	+ 0.051	.
59	27	− 0.8237	+ 0.8349	− 0.0442	− 0.052	+ 0.017	.
60	Nov. 4	− 0.8455	+ 0.8206	− 0.1587	+ 0.092	+ 0.107	.
61	5	− 0.8483	+ 0.8177	− 0.1729	− 0.085	− 0.077	.
62	29	− 0.9138	+ 0.6747	− 0.4868	+ 0.229	+ 0.080	.
63	Dec. 1	− 0.9192	+ 0.6568	− 0.5098	+ 0.064	− 0.096	.
64	4	− 0.9273	+ 0.6287	− 0.5430	+ 0.238	+ 0.060	.
65	5	− 0.9302	+ 0.6186	− 0.5540	+ 0.225	+ 0.041	.
66	7	− 0.9377	+ 0.5984	− 0.5750	+ 0.111	− 0.084	.

Reducing these equations by the method of least squares, we have the following systems of normal equations:

α Lyræ, A.

$$
\begin{aligned}
+69.0000\,x + 5.2625\,y - 3.7646\,z + 17.3642\,u - 6.4710'' &= 0\\
+9.3897\,y + 5.9664\,z + 3.9279\,u - 0.5670 &= 0\\
+22.2484\,z - 3.6682\,u + 0.6975 &= 0\\
+31.9473\,u - 5.7437 &= 0
\end{aligned}
$$

The sums of the coefficients of the four unknown quantities were used as a check in this part of the work, and denoting the sum of the coefficients in the normal equations by Σ, the reduction gave,

$[as] = +87.8621:$ $\qquad$ $[bs] = +24.5462:$

$\Sigma a = +87.8621:$ $\qquad$ $\Sigma b = +24.5465:$

$[cs] = +20.7826:$ $\qquad$ $[ds] = +49.5721:$

$\Sigma c = +20.7820:$ $\qquad$ $\Sigma d = +49.5712:$

$[ns] = -12.0834:$

$\Sigma n = -12.0842:$

The values of Σ were used in the elimination. From the solution of the normal equations we have

$$x = +0''.0593 \pm 0''.00510 \qquad \text{weight} = 57.5209$$
$$y = -0.0491 \pm 0.01484 \qquad \text{"} = 6.7960$$
$$z = +0.0175 \pm 0.00940 \qquad \text{"} = 16.9264$$
$$u = +0.1556 \pm 0.00764 \qquad \text{"} = 25.6622$$

The residuals found by substituting these values of the unknown quantities in the equations of condition are given in the fourth column of the equations. The sum of the squares of these residuals is

$$0''.21300$$

By elimination we have

$$[nn.4] = 0''.21386$$

The probable error of an equation of weight unity is therefore

$$r_1 = \pm 0''.03869$$

The value of this quantity, found from the discordances of the single nights, is

$$\pm \frac{0''.07365}{\sqrt{10}} = \pm 0''.02329$$

The probable error found from the equations of condition depends on a greater variety of circumstances, and generally it will be the greater of the two. In the present case, however, the difference is not great, and we may infer from this that the observer's manner of bisecting these stars did not change much during the period of observation.

α Lyræ, B.

$$+58.0000x + 1.6248y - 3.8841z + 12.7690u - 2''.9620 = 0$$
$$+7.2177y + 5.9363z + 1.3608u + 0.0436 = 0$$
$$+19.2877z - 2.3489u + 0.9463 = 0$$
$$+26.2358u - 5.5042 = 0$$

$$[as] = +68.5097 \qquad [bs] = +16.1409$$
$$\Sigma a = +68.5097 \qquad \Sigma b = +16.1396$$

$$[cs] = +18.9918 \qquad [ds] = +38.0171$$
$$\Sigma c = +18.9910 \qquad \Sigma d = +38.0167$$

$$[ns] = -7.4760$$
$$\Sigma n = -7.4763$$

The values of the unknown quantities are—

$$x = +0''.0056 \pm 0''.00556 \qquad \text{weight} = 50.7511$$
$$y = -0.0374 \pm 0.01741 \qquad \text{"} = 5.1589$$
$$z = -0.0111 \pm 0.01069 \qquad \text{"} = 13.6974$$
$$u = +0.2080 \pm 0.00827 \qquad \text{"} = 22.8916$$

The sum of the squares of the residuals is

$$0''.18490$$

From the elimination

$$[nn.4] = 0''.18556.$$

Hence the probable error of an equation of weight unity is

$$r_1 = \pm 0''.03955$$

The value found from the single nights is

$$\pm \frac{0''.07732}{\sqrt{10}} = \pm 0''.02445$$

The values of the annual parallax of *α Lyræ* found from the two series of observations are therefore—

$$\text{Illumination A, } \pi = 0''.1556 \pm 0''.00764$$
$$\text{" B, } \pi = 0.2080 \pm 0.00827$$

In such a case as this it is generally better to take the simple arithmetical mean of the two values, but as the weights do not differ much I have taken the mean by weight, and we have as the final result:

$$\pi = 0''.1797 \pm 0''.005612$$

The time required for light to pass from this star to our sun is 18.11 Julian years.

If we apply the corrections to the assumed values of $\varDelta\delta$, we have for 1881.0:

$$\text{Ill. A, } \varDelta\delta = -44''.259 \pm 0''.0051$$
$$\text{Ill. B, } \varDelta\delta = -44.306 \pm 0.0056$$

These results indicate that the difference of declination was measured a little greater with the bright wires than with the dark ones.

The values of y, the correction to the assumed value of the proper motion have the same sign, but they have small weights, the interval of time being too small for an accurate correction of this constant. The values of z have opposite signs, and are of no importance.

61[2] *Cygni.*

The 66 equations of condition of this star give the following normal equations:

$$+ 64.0000x - 25.9116y + 7.6854z + 3.5760u - 1.3940'' = 0$$
$$+ 17.6961y - 5.3082z - 6.6255u + 3.8300 = 0$$
$$+ 24.2231z - 2.8108u - 0.8082 = 0$$
$$+ 20.5718u - 9.9808 = 0$$

$$[as] = +49.3498 \qquad [bs] = -20.1500$$
$$\Sigma a = +49.3498 \qquad \Sigma b = -20.1492$$

$$[cs] = +23.7889 \qquad [ds] = +14.7109$$
$$\Sigma c = +23.7895 \qquad \Sigma d = +14.7115$$

$$[ns] = +\ 8.3529$$
$$\Sigma n = -\ 8.3530$$

The values of the unknown quantities are:

$$x = -0''.0470 \pm 0''.01121 \qquad \text{weight} = 23.7093$$
$$y = -0.0835 \pm 0.02330 \qquad \text{"} = 5.4890$$
$$z = +0.0821 \pm 0.01184 \qquad \text{"} = 21.2360$$
$$u = +0.4783 \pm 0.01381 \qquad \text{"} = 15.6253$$

The sum of the squares of the residuals is

$$0''.39331$$

and from the elimination,

$$[nn.4] = 0''.39287$$

The probable error of an equation of weight unity is

$$r_1 = \pm 0''.05458$$

The value found from the measurements of the single nights is

$$\pm \frac{0''.08114}{\sqrt{10}} = \pm 0''.2566$$

The discordance between the two values of the probable error is greater than for *α Lyræ;* and this might have been expected, I think, for the reason mentioned before. For the parallax of this star we have,

$$\pi = 0''.4783 \pm 0''.01381$$

The time required for light to pass from this star to our sun is 6.803 Julian years.

The value of x gives for 1881.0

$$\Delta\delta = -198''.513 \pm 0''.0112$$

The unequal distribution of the observations with respect to the epoch has diminished the weight of this determination of x. The values of y and z are greater than those found from the observations of *α Lyræ*, but it is doubtful if these corrections have any real significance.

An examination of the columns of residuals shows that the observations of *α Lyræ* are represented in a satisfactory manner. For the field illumination the greatest residual is 0″.120; and for the illuminated wires it is 0″.160. The image of this star in our telescope is always surrounded with a mass of blue light, but in good seeing the central image is a small, round disk, that can be bisected with certainty. The observations of 61^2 *Cygni* show larger residuals, the greatest being 0″.209. It is very rarely that this star is well defined in our telescope; and generally it has a hazy, indistinct appearance, that varies from night to night, and gives rise to some uncertainty in the bisections. If the objective and eye-piece be accurately focused on a star, and then a spectroscope be placed at the eye-piece, the image of the star will be reduced to a fine line between the lines *D* and *E* of the spectrum. Towards the blue end of the spectrum the image of the star soon widens and flares out into a broad, fan-like shape; while towards the red end of the spectrum the image widens slowly for some distance, and gradually loses its fine sharp form. It is on account of this, I think, that stars of the color of 61^2 *Cygni* are not well defined by our glass. Still the error in the parallax arising from the bisections is not very great even in this case. It may be objected that the coefficient of temperature of the micrometer screw depends on too few observations, and this must be acknowledged. However, observations made since the close of the first series confirm the value of this coefficient already found, and I cannot doubt the reality of the result. Even if the value of this coefficient should be a little changed by future observations it may well be doubted whether the new coefficient should be applied to the preceding observations.

The parallaxes of stars found by the differential method, which has been used here, are relative, or they are the differences of the parallaxes of the two stars. In order to get the absolute parallax of the bright star, we must add to the parallax found by observation the parallax of the small star. This might be done by means of the table of parallaxes for stars of different magnitudes given by W. Struve in his "Astronomie Stellaire," p. 106. Although the assumptions made by Struve on the distribution of the stars in space seem plausible, yet this whole matter is so vague that I omit this reduction.

I am indebted to Prof. Edgar Frisby for assistance in all the preceding reductions. The important calculations have been made by us in duplicate, and independent checks have been employed when possible. I hope, therefore, that no important errors remain in the work.

OBSERVATIONS OF α LYRÆ

WITH

THE PRIME VERTICAL TRANSIT INSTRUMENT.

1862–1867.

These observations form the most accurate determinations of declination ever made at the Naval Observatory, and having been undertaken for the purpose of finding the annual parallax of the star, as well as the correction of certain astronomical constants, I have examined the observations and their reduction in the hope that some valuable result might be deduced from this laborious work. Before beginning the observations special precautions were taken that this instrument should be in perfect order; its pivots were reground, and a new striding level was made by Mr. WÜRDEMANN. The methods of observing and reducing seem to have been chosen by Prof. J. S. HUBBARD, all the formulæ for the reductions having been written out by him, and the early reductions being in his handwriting. The method followed in the observations was the same as that employed by W. STRUVE with such success at Pulkova. Two systems of wires, seven in each set, were placed on each side the center of the field, and the instrument was reversed in each vertical, so that after a complete observation it was restored to its first position. The four transits observed over each wire gave a determination of the declination of the star, and in the reductions the observations of each wire were reduced separately. The reduction of the star's declination, from apparent to mean place, was computed directly from the formulæ for every tenth day, and then interpolated for the time of its culmination.

The following is an outline of this work:

The instrument was in charge of Professor HUBBARD from March 25, 1862, until his death, August 12, 1863. From that time until the end of the observations, April 2, 1867, it was in charge of Prof. S. NEWCOMB. Professor HUBBARD was assisted by Professors NEWCOMB and HARKNESS, and Professor NEWCOMB by Professor HARKNESS until November 8, 1865. After that time I was his assistant. The observations are distributed among these observers as follows:

J. S. HUBBARD, March 25, 1862–July 8, 1863, 93 observations.

S. NEWCOMB, May 6, 1862–February 26, 1867, 180 observations.

W. HARKNESS, August 12, 1862–August 16, 1865, 74 observations.

A. HALL, November 8, 1865–April 2, 1867, 82 observations.

The reductions of the transits from which the apparent declination of the star was found were made by the following computers:

J. S. HUBBARD reduced 119 observations.

S. NEWCOMB reduced 118 observations.

M. H. DOOLITTLE reduced 66 observations.

A. HALL reduced 108 observations.

The computations for the reduction of the star from its apparent to its mean declination were made as follows:

J. S. HUBBARD, March 10, 1862–January 27, 1864.

S. NEWCOMB, January 27, 1864–September 30, 1865.

A. HALL, September 30, 1865–January 2, 1869.

In my examination of these observations I first made a careful comparison of the formulæ used for the reduction to mean place, thinking that possibly some small error had been made in some of the periodical terms. No such error could be found. This examination was repeated by Professor FRISBY, who could detect no error in these formulæ. An independent check on these reductions was found by comparing with the Nautical Almanac. The reduction of the separate wires was made after the manner of STRUVE, and this is so simple and so easily revised that it is hardly possible for a systematic error to remain in this part of the work. It appears then impossible to change the results of these observations, and they must stand as they are printed.

The observations were then divided according to the observers, but it was apparent that such a division would not help the matter. Indeed, if equations of condition should be formed in accordance with such a division, these equations in some cases would not be suitable for a good solution. I then divided the observations into groups according to the time, and the means of these groups were taken by Professor FRISBY. As these means show briefly and clearly the character of these observations they are given here. The columns give the Washington mean time of the mean of the observations, and the seconds of the mean declination of the star. This declination is referred to 1860.0 for the years 1862, 1863, and 1864, and for the other years to 1870.0.

The probable error of a declination from a single complete transit is $\pm 0''.141$ For his own work STRUVE found this error to be $\pm 0''.117$. Judging, therefore, from the accidental errors, these observations ought to give trustworthy results.

Washington Mean Time.	δ	Washington Mean Time.	δ	Washington Mean Time.	δ	Washington Mean Time.	δ
1862.	"	1863.	"	1864.	"	1866.	"
Apr. 1, 7432	20.206	June 14, 2569	20.281	Oct. 21, 5200	20.270	Feb. 19, 4692	51.413
Apr. 20, 4918	20.420	Sept. 12, 1299	20.397	Nov. 8, 3378	20.492	Mar. 10, 6370	51.407
May 9, 4732	20.228	Sept. 24, 6622	20.334	Nov. 27, 8843	20.484	Mar. 25, 5130	51.342
May 23, 2688	20.345	Oct. 12, 8859	20.270	Dec. 22, 3507	20.373	Apr. 12, 0497	51.333
June 11, 2169	20.128	Nov. 9, 6363	20.290	1865.		May 13, 3792	51.102
June 19, 3280	20.358	Nov. 20, 3570	20.288	Jan. 11, 5335	51.391	May 24, 5985	51.295
June 29, 5002	20.336	Dec. 3, 9006	20.443	Feb. 12, 8735	51.350	June 20, 3586	51.193
July 18, 9469	20.168	Dec. 20, 8236	20.330	Mar. 7, 0129	51.214	July 3, 9879	51.348
Aug. 3, 4046	20.397	1864.		Mar. 23, 5177	50.932	July 13, 6614	51.346
Aug. 17, 8650	20.395	Jan. 15, 9520	20.320	May 15, 8717	51.230	July 27, 1675	51.350
Sept. 17, 2817	19.980	Jan. 31, 7061	20.188	June 5, 2326	51.262	Aug. 13, 1779	51.102
Oct. 6, 8282	20.082	Feb. 26, 8367	19.908	June 27, 0063	51.268	Aug. 24, 0980	51.155
Oct. 19, 2359	20.070	Mar. 9, 0566	19.980	July 13, 4613	51.193	Sept. 24, 5950	50.953
Oct. 26, 9731	20.168	May 22, 4370	20.225	July 26, 7582	50.917	Oct. 5, 4320	51.016
Nov. 16, 9150	20 186	June 12, 4021	20.300	Aug. 10, 8834	50.792	Oct. 18, 1971	51.148
Dec. 7, 8584	20.300	June 25, 1084	20.140	Sept. 8, 0563	50.880	Nov. 12, 9266	51.104
Dec. 20, 5237	20.160	July 6, 8786	20.080	Oct. 27, 6705	51.042	Dec. 5, 4632	51.192
1863.		July 16, 4524	20.140	Nov. 10, 9619	51.423	Dec. 22, 3520	51.273
Jan. 6, 7265	20.258	July 27, 0235	20.244	Nov. 23, 6965	51.458	1867.	
Feb. 9, 0520	20.365	Aug. 8, 3897	20.238	Dec. 16, 6337	51.566	Jan. 13, 1590	51.504
Mar. 8, 4105	20.288	Aug. 26, 7394	20.262	1866.		Feb. 2, 0711	51.443
Apr. 3, 2379	19.791	Sept. 15, 2858	20.180	Jan. 10, 7150	51.800	Mar. 10, 4054	51.180
May 10, 2565	19.932	Oct. 8, 8879	20.273	Feb. 3, 4002	51.620		

The maximum effect of the parallax in declination will occur about June 27, and the minimum effect December 27. The values of δ show that a positive value of the parallax will result from the observations of 1862, but those of 1863, 1864, 1865, and 1866 will give a negative parallax; on the whole, therefore, a negative parallax would result. A curious diminution of the declination is shown in all the years during the first three or four months, and the different observers agree in this. Such a variation taken by itself would indicate a correction to the constant of aberration, but the fact of a negative parallax renders uncertain all deductions from these observations. Probably some annual disturbance in the observations or in the instrument occurred which will never be explained. A possible source of disturbance may be mentioned. At the time these observations were made the library of the Observatory was in a room adjoining the prime vertical room, and a stove, with pipe and chimney directly above it, was placed 20 feet south of the prime vertical pier. A fire was started in this stove in November, and kept going until April. It was assumed that the reversal of the instrument would eliminate the effects of the heat and smoke on the instrument and observations. But it would appear to be a doubtful policy to undertake a series of observations for the determination of the absolute parallax of a star, and for the correction of constants determined with the utmost care by STRUVE, under any other than the most favorable conditions. In view of the recent discussions on the constant of aberration, it would be an interesting and a valuable astronomical investigation to determine the value of this constant in the latitude of our Observatory, and I hope our Prime Vertical Instrument may be refitted, and another and more successful attempt may be made.

MARCH 9, 1882.

P. S.—Having made some more observations of the stars in *h Persei* for testing the value of the temperature coefficient of the screw of the micrometer, the equations of condition resulting from these observations are given below. In the case of the observations made during the present summer double distances were measured on each night, so that the equations from these observations are of equal weight with those given before. The value of one revolution of the screw at the temperature of 50° is assumed to be 9″.9054. The fourth decimal is the unit of the independent term.

Date.	Equations of Condition.	Residuals.
1880.		
Dec. 15–16	$x - 12.9y + 41 = 0$	+ 88.1
Dec. 18–20	− 19.1 − 12	+ 59.4
1881.		
Jan. 14–17	− 22.3 − 186	− 102.1
July 19–21	+ 19.4 + 37	− 42.6
July 23–24	+ 19.3 + 102	+ 22.8
July 25–28	+ 20.0 + 84	+ 2.1
Dec. 10–15	− 16.6 − 13	+ 48.6
Dec. 16–17	− 15.8 − 63	− 4.6
1882.		
Jan. 23–24	− 31.6 − 182	− 61.6
July 28	+ 21.2 + 92	+ 5.4
July 29	+ 23.7 + 82	− 14.4
Aug. 14	+ 23.7 + 21	− 75.4
Aug. 19	+ 15.3 + 138	+ 74.5

The solution of these 13 equations by the method of least squares gives

$$y = -0''.00039205 \pm 0''.00005619$$

and the probable error of a single equation is $\pm 0''.004153$. The value of the revolution of the screw is therefore

$$R_\theta = R_0 - 0''.00039205\ (\theta - 50^\circ)$$

where θ is the temperature according to the Fahrenheit thermometer. This result differs but little from that found before, p. 46.

AUGUST 24, 1882.