

ROYAL OBSERVATORY, GREENWICH.

SPECTROSCOPIC OBSERVATIONS

MADE AT THE

ROYAL OBSERVATORY, GREENWICH,

1885.

POSITION-ANGLES and HEIGHTS of SOLAR PROMINENCES, observed with the SPECTROSCOPE, and OBSERVATIONS of BRIGHT LINES in their SPECTRA, made at the ROYAL OBSERVATORY, GREENWICH, in the Year 1885.

Civil Time commencing at Greenwich Mean Midnight and reckoning from 0 to 24 hours is used throughout.

Note.—The position-angles reckoned from the north pole of the Sun's axis in the direction N., E., S., W., N., are given for the two extremities of the prominence.

The extreme height in seconds of arc is given for each prominence. Where the estimated brightness of any of the bright lines seen is given, the *average* brightness of the line has been estimated in terms of the brightness of the corresponding part of the solar spectrum. The lines are usually fainter at the extremity than at the base. Where the estimated breadth is given, the *average* breadth of the line has been estimated in terms of the breadth of the corresponding dark line in the solar spectrum, except in the case of the bright line D₃, the breadth of which is estimated in terms of the dark line C. The bright lines are usually narrower at the extremity than at the base. On each occasion the entire limb of the Sun was examined first on the C line only, and the heights and position-angles of the prominences were determined. If possible a second examination of the entire limb was then made in which the entire spectrum from B to F was examined at each prominence. The first time given for any prominence is the time when it was first seen; the second time, the time of the second examination.

The "Half-prism" Spectroscope with a train of two "half-prisms" was used throughout. For viewing the prominences and chromosphere the spectroscope is reversed end for end, the slit and eye-piece being interchanged, so that the pencil is incident on the oblique face and emerges at the perpendicular face of each "half-prism." Thus the breadth of the spectrum-lines, considered as monochromatic images of the slit, is diminished, and greater purity of spectrum is obtained. In order to view a prominence in its just proportions, the breadth can be afterwards magnified by means of a small "half-prism" (direct-vision) placed between the eye-piece and the eye.

A displacement of 1 tenth-metre corresponds to a motion in the line of sight of 28.4 miles per second for the C line, of 36.1 miles for the *b* lines, and of 38.4 miles for the F line.

Observer, M.

Greenwich Civil Time, 1885.	Position- Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₃	¹⁴⁷⁴ K	F	C	D ₃	¹⁴⁷⁴ K	F	C	D ₃	¹⁴⁷⁴ K	F	
d h m	° '	"	"	"	"									
Feb. 21. 12. 50	260. 16 } 257. 18 }	32												Very bright prominence. Considerable detail.
13. 10	62. 25 } 60. 46 }	20												Straight jet.
13. 0	55. 28 } 54. 35 }	26												Faint straight jet.
														The entire limb of the Sun was examined once with the slit radial on the C line only.
Feb. 24. 12. 36	301. 21 } 298. 36 }	46												Tall faint prominence. Sun in much haze.
12. 35	297. 51 } 295. 58 }	22												Partly detached. The Sun was in too much haze for the prominence to be examined on any other line but C.
12. 33	290. 41 }	24	19	4	14	$\frac{3}{4}$	$\frac{1}{3}$	$\frac{1}{10}$	$\frac{1}{6}$	$\frac{3}{4}$	$\frac{1}{2}$	1	1	Bright straight jet. <i>b</i> ₁ and <i>b</i> ₂ appear to be faintly reversed for a height of 5'.
13. 5	287. 56 }	19												Short bright straight jet.
12. 28	279. 16 }	17	17		12	1	1		$\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{2}$		1	
	278. 21 }													
12. 16	256. 21 }	24	36		24	$1\frac{1}{4}$	$\frac{2}{3}$		$\frac{2}{3}$	1	$\frac{1}{2}$		$\frac{2}{3}$	Very bright prominence; so bright that though the Sun was in so much haze as to render the chromosphere invisible, yet the prominence could be readily seen. At 12 ^h . 22 ^m the height of the prominence was 34", but the sky was then very much clearer.
12. 22	253. 34 }	34												Faint straight jet.
12. 46	147. 56 }	26	26			$\frac{1}{4}$	$\frac{1}{6}$			$\frac{1}{3}$	$\frac{1}{4}$			Faint straight jet.
	146. 56 }													
12. 43	136. 21 }	38												Nearly detached. Bending over towards the south.
	135. 16 }													
12. 41	76. 21 }	34												A long low faint prominence.
	73. 41 }													
12. 40	70. 56 }	26												The entire limb of the Sun was examined twice with the slit radial. In the first search only the prominence at 254° could be seen as the Sun was then in thick white haze. Later the sky became clearer, but the Sun was frequently again enveloped in the white haze, and only four of the prominences could be seen on any line but C. Even when the Sun was best seen, the limb was very unsteady. The average height of the chromosphere was 8'.
	64. 56 }													
July 22. 12. 58	319. 2 }	46	55			$\frac{1}{2}$	$\frac{1}{3}$			$\frac{3}{4}$	$\frac{1}{2}$			Fine prominence, partly detached, and showing much detail. It could not be made out on the F line.
13. 31	315. 42 }	55												Faint straight jet. The F line was displaced $\frac{2}{3}$ tenth-metre towards the red, indicating a motion of recession of about 26 miles per second.
13. 28	307. 22 }	18	17		17	$\frac{1}{2}$	$\frac{1}{4}$		$\frac{1}{6}$	$\frac{3}{4}$	$\frac{1}{2}$		1	The F line was displaced about $\frac{2}{3}$ tenth-metre towards the blue, indicating a motion of approach of about 26 miles per second.
	302. 42 }	18												
12. 55	287. 10 }	18	22		19	$\frac{3}{4}$	$\frac{1}{2}$		$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$		$\frac{1}{2}$	
13. 25	276. 20 }	22												

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Greenwich Civil Time, 1885.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₃	¹⁴⁷⁴ K	F	C	D ₃	¹⁴⁷⁴ K		C	D ₃	¹⁴⁷⁴ K	F	
d h m	° ' "	"	"	"	"									
July 22. 13. 20 —continued.	263. 18 } 254. 50 }	14 14	14		14	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{5}$		$\frac{3}{4}$	$\frac{1}{2}$		$\frac{3}{4}$	Nearly detached. Bending over towards the south. The jets at 256°. 17'—254°. 50' and 254°. 17'—250°. 34' are part of this great prominence.
13. 16	256. 17 } 254. 50 }	21 21	21	2	19	1	$\frac{1}{2}$	$\frac{1}{10}$	$\frac{2}{3}$	1	$\frac{1}{2}$	1	1	Partly detached. The F line was displaced $\frac{1}{2}$ tenth-metre towards the red, indicating a motion of recession of about 19 miles per second. <i>b</i> ₁ and <i>b</i> ₂ were also reversed, brightness $\frac{1}{10}$, breadth 1' 0, height 5".
13. 12	254. 17 } 250. 34 }	24 24	24		24	1	1	1	1	1	$\frac{3}{4}$		1 $\frac{1}{4}$	Bright straight jet.
13. 6	104. 27 } 103. 42 }	16 16	14		14	1	$1\frac{1}{2}$	$\frac{1}{5}$		1	$\frac{2}{3}$		1	<i>b</i> ₁ and <i>b</i> ₂ appeared to be faintly reversed, 5" in height.
12. 50	75. 29 }	21	19		18	1	$\frac{1}{2}$	$\frac{1}{3}$		1	$\frac{1}{2}$		1	Prominence with two jets, one 18", the other 21" high.
13. 4	70. 43 }	19												The F line was displaced $\frac{1}{4}$ tenth-metre towards the blue at upper part of prominence, corresponding to a motion of approach of about 10 miles per second. The entire limb of the Sun was examined twice with the slit radial.
13. 2	46. 18 }	14	14		12	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{5}$		$\frac{3}{4}$	$\frac{2}{3}$		1	
13. 34	43. 47 }	14												
Oct. 7. 11. 21	252. 29 }	43			43	1	$\frac{1}{2}$	$\frac{1}{10}$		$\frac{3}{4}$	$\frac{2}{3}$		1	Prominence with two jets.
11. 37	242. 29 }	43	43											A third jet further to the north had appeared since 11 ^h . 21 ^m . Straight jet.
11. 39	257. 34 }	38												
	242. 9 }													Straight jet.
11. 19	121. 49 }	22	22		19	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$		$\frac{1}{2}$	$\frac{1}{3}$		$\frac{1}{2}$	
11. 34	119. 39 }	19												Very large prominence with brilliant veins of light on a continuous but much fainter background. Though the fainter parts of the prominence could be distinctly seen on the C line, the very brightest parts could only be made out with extreme difficulty on D ₃ and not at all on F. The Sun was in considerable mist, which enfeebled the blue end of the spectrum, but did not seem materially to affect the yellow. The measures on C and D ₃ were obtained by taking the tallest and also one of the brightest jets of this prominence. On D ₃ it could only be seen faintly. On F nothing could be satisfactorily made out. Faint straight jet. It was not made out on the F line.
11. 18	118. 34 }	31	29		29	1	$\frac{1}{2}$	$\frac{1}{4}$		$\frac{3}{4}$	$\frac{3}{4}$		$\frac{1}{2}$	
11. 30	116. 49 }	29												The entire limb of the Sun was examined twice with the slit radial. No other lines were seen besides C, D ₃ , and F, but the Sun was in much haze. The dark line 1474 K of the sky spectrum was not distinctly reversed, but seemed faint or vanished entirely for about 2" in height all round the limb.
11. 13	97. 34 }	120	48			$\frac{1}{2}$	$\frac{1}{10}$			$\frac{1}{2}$	$\frac{1}{2}$			
11. 45	81. 49 }	72												
11. 24	37. 49 }	22	26			$\frac{1}{3}$	$\frac{1}{5}$			$\frac{1}{2}$	$\frac{1}{2}$			
11. 42	35. 34 }	26												
Dec. 2. 13. 7	316. 16 }	22	22	2	?	$\frac{1}{3}$	$\frac{1}{2}$	<i>f</i>	?	$\frac{1}{2}$	$\frac{1}{10}$		?	Low prominence with three jets.
	312. 53 }													Narrow straight jet. The F line merely suspected. A small displacement towards the blue was noticed on the C line of about $\frac{1}{2}$ tenth-metre, indicating a motion of approach of about 6 miles per second. The chromosphere was undulating, and varied in height from 6" to 9". Narrow straight jet.
12. 52	239. 11 }	22	22			$\frac{1}{3}$	$\frac{1}{5}$			$\frac{1}{2}$	$\frac{1}{3}$			
12. 58	237. 31 }	22												The entire limb of the Sun was examined with the slit radial.
12. 44	71. 11 }	19	19	2	19	$\frac{2}{3}$	$\frac{1}{2}$	<i>f</i>	1	$\frac{2}{3}$	$\frac{1}{2}$		$\frac{1}{5}$	
	70. 16 }	19												
Dec. 15. 13. 2	302. 59 }	22	17	5	12	$\frac{1}{4}$	$\frac{1}{5}$	<i>f</i>	<i>f</i>	$\frac{1}{2}$	$\frac{1}{3}$			Faint jet.
13. 24	300. 9 }	17												Small jet. Not satisfactorily made out on F.
13. 21	236. 29 }	17	14			$\frac{2}{3}$	$\frac{1}{2}$			$\frac{2}{3}$	$\frac{1}{3}$			
13. 35	236. 9 }	10												

OBSERVATIONS OF SOLAR PROMINENCES, MADE WITH THE SPECTROSCOPE,

Greenwich Civil Time, 1885.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₃	¹⁴⁷⁴ K	F	C	D ₃	¹⁴⁷⁴ K	F	C	D ₃	¹⁴⁷⁴ K	F	
d h m	° ' "	"	"	"	"									
Dec. 15. 13. 18	122. 39	17	17	5	17	$\frac{1}{3}$	$\frac{1}{5}$	<i>f</i>	$\frac{1}{6}$	$\frac{1}{3}$	$\frac{1}{4}$		$\frac{3}{4}$	Faint jet.
13. 30	121. 39													
13. 12	35. 9	17	22	5	22	$\frac{1}{3}$	$\frac{1}{3}$	<i>f</i>	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{2}$		1	Faint jet.
13. 28	33. 29													
13. 8	30. 19	19	19		19	$\frac{1}{3}$	$\frac{1}{4}$		$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{4}$		1	The entire limb of the Sun was examined twice with the slit radial. The sun was throughout in white haze, and the limb boiled violently. Perhaps this would partly account for the prominences being faint, and being only traced a small distance from the limb. The dark line 1474 K in the spectrum of the sky was not distinctly reversed, but was very faint for a height of 5" from the limb all the way round, and the D lines, <i>b</i> ₁ and <i>b</i> ₂ , had a similar appearance for a height of 2". The chromosphere was undulating, its average height being about 6". There were several regions of the Sun's disk that were very noticeable in the spectroscope as presenting the appearance of large diffused but faint spots. A great number of lines were evidently slightly broader and darker over these regions. The regions themselves could be made out from the finder as slightly dusky districts. The definition was not good enough to allow of any very definite observations.
13. 26	29. 19													

OBSERVATION of the SPECTRUM of a SUN SPOT made at the ROYAL OBSERVATORY, GREENWICH, in the Year 1885.

Spot-Group No. 1716.

1885 July 6.

Two spots, *f* and *d*, were examined, the slit being so arranged that both were seen at the same time. The definition was very bad, and the work of examination went on very slowly and not very satisfactorily, it being very difficult to identify the lines, or to satisfactorily determine the amount of broadening. The spectroscope was first adjusted to the part of the spectrum on the more refrangible side of *b*, and the two spots showed some slight but unmistakable differences in this region. The spot, *f*, which was circular with dark central nucleus, showed a very black spectrum, but with fewer broadened lines than the other spot, *d*, the spectrum of which was not by any means so dark. The first spot, *f*, therefore showed the greater *general* absorption, and the latter, *d*, the greater *selective* absorption.

On turning from this region, which is usually well-marked in a spot-spectrum, being the district in which the "bands" of 1880, November 27 were seen, to F a bright lozenge of flame was at once detected ($13^h 50^m$ G.C.T.). It lay on that edge of the nucleus of spot *f* which was nearest to spot *d*. Another lozenge was seen on C but of a different shape, the bright lozenge on F being more extended in the direction of the length of the spectrum than that on C, but perhaps in no greater proportion than that in which the breadth of the dark F line in the spectrum of the spot exceeded the breadth of the dark C line. The dark C line was bisected right across the spot by a very fine bright line. Nothing of the kind could be seen on the D, E, or *b* lines, nor could D_3 or 1474 K be detected as bright lines. But a faint point of light was suspected on $\lambda 4918$ and $\lambda 4919$.

No such reversal could be detected on any line in the spectrum of spot *d*. Sweeping through the length of the spectrum it became very evident that on this occasion the part of the spectrum first examined was the most barren which could have been selected, the lines broadened between D and *b* and between C and D, being both numerous and well marked. The sky clouded over before they could be recorded.

The above observations were made by Mr. Maunder with the half-prism spectroscope mounted on the South East Equatoreal. The spectroscope was used in the direct position, with a train of two half-prisms, giving under these conditions a dispersion of about 80° from A to H. A power of 14 was used on the viewing telescope. Position angle of slit $112^\circ 30'$.

The numbers of the spots are taken from the Photographic Results.

MOTIONS OF STARS IN THE LINE OF SIGHT, INFERRED FROM SPECTROSCOPIC OBSERVATIONS

MEASURES OF DISPLACEMENT OF LINES in the SPECTRA of STARS, as compared with those of TERRESTRIAL ELEMENTS, and CONCLUDED MOTIONS in the LINE of SIGHT, from OBSERVATIONS at the ROYAL OBSERVATORY, GREENWICH, in the Year 1885.

The day specified in the first column is the Civil Day, and the hours and minutes are those of Greenwich Civil Time, commencing at Greenwich Mean Midnight, and reckoning from 0 to 24 hours.

Note.—The motion corresponding to the displacement actually observed may be inferred from the Concluded Motion by adding the Earth's Motion algebraically.

The "Half-prism" Spectroscope was used throughout. Each "Half-prism" is compound, and is composed of a flint "half-prism," (*i.e.*, the half of an isosceles prism, cut by a plane perpendicular to the base,) and a crown prism, cemented on the emergent face, so as to form the half of a direct-vision prism. With one such half-prism, a dispersion of about $18\frac{1}{2}^\circ$ from A to H, equivalent to that produced by four flint prisms of 60° , is obtained; and with a train of two a dispersion of about 80° , equivalent to that produced by sixteen flint prisms of 60° . One half-prism was usually employed; when two half-prisms were used the fact is stated in the "Remarks." The dispersions have been inferred from measurements of the distance between b_1 and b_4 as compared with the wave-length measure.

1^{rev.} of the micrometer corresponds, with one "half-prism" to 10.4 tenth-metres or 37.5 miles per second for the b lines, and to 7.91 tenth-metres or 30.4 miles per second for the F line; and with two "half-prisms" to 2.1 tenth-metres or 7.7 miles per second for b , and to 1.71 tenth-metres or 6.6 miles per second for F.

1^{rev.} of the screw for opening the slit corresponds to 0.01 inch, or about $10''$.

The slit lies north and south when the reading of the Position-Circle is 5° .

The velocity of light has been taken as 186,660 miles per second, and the distance of the Sun as 92,250,000 miles.

The estimations of displacements have been made by *indirect* comparison with the comparison-line, except where the contrary is expressly stated. The displacement is estimated in terms of the breadth of the comparison-line.

The sign + denotes a displacement towards the red or a motion of recession, — a displacement towards the blue or a motion of approach.

Date, 1885, Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
Feb. 3. 21. 50	M	Aldebaran	F	0.260	+0.075	+ $\frac{1}{4}$	+ 17.3	+ 5.5	+ 10.3	Spectrum steady. Star-line faint, but well defined. Spectrum very tremulous, and star-line ill-defined. Repeated direct comparisons seemed to show a <i>slight</i> displacement towards the blue, but the two lines were evidently nearly coincident.
22. 5	M	"	F	0.260	+0.086	+ $\frac{1}{10}$	+ 17.3	+ 8.8	+ 15.8	
22. 15	M	Sirius	F	0.260	-0.023	- $\frac{1}{10}$	+ 7.9	- 14.9	- 18.9	
22. 20	M	"	F	0.260	-0.031	- $\frac{1}{10}$	+ 7.9	- 17.3	- 18.9	
22. 25	M	"	F	0.260	-0.056	- $\frac{1}{5}$	+ 7.9	- 24.9	- 29.9	
22. 30	M	"	F	0.260	+0.040	+ $\frac{1}{10}$	+ 7.9	+ 4.2	+ 3.1	
22. 35	M	"	F	0.260	-0.042	- $\frac{1}{10}$	+ 7.9	- 20.6	- 18.9	
22. 40	M	"	F	0.260	+0.003	0	+ 7.9	- 7.0	- 7.9	
22. 55	M	Procyon	F	0.260	+0.010	0	+ 6.6	- 3.6	- 6.6	
23. 0	M	"	F	0.260	-0.049	- $\frac{1}{5}$	+ 6.6	- 21.5	- 28.6	
23. 20	M	Pollux	F	0.260	-0.119	- $\frac{3}{10}$	+ 7.3	- 43.4	- 40.4	Spectrum fairly steady. Star-line very faint and difficult to see. Spectrum fairly steady. Star-line dark, but ill-defined. Position Circle, 186° .
23. 35	M	"	F	0.260	-0.065	- $\frac{1}{5}$	+ 7.3	- 27.0	- 29.3	
4. 0. 15	M	Castor	F	0.260	-0.008	- $\frac{1}{10}$	+ 8.4	- 38.2	- 41.5	
0. 30	M	"	F	0.260	+0.010	0	+ 8.4	- 5.4	- 8.4	
0. 35	M	Moon	F	0.260	-0.011	0		- 3.3		
0. 40	M	"	F	0.260	-0.011	0		- 3.3		
0. 45	M	"	F	0.260	-0.019	0		- 5.8		
0. 50	M	"	F	0.260	+0.006	0		+ 1.8		
0. 55	M	"	F	0.260	-0.017	0		- 5.1		
Feb. 5. 18. 50	M	Aldebaran	F	0.130	+0.046	+ $\frac{3}{10}$	+ 17.6	- 3.6	+ 10.3	Spectrum faint and somewhat unsteady. Star-line difficult to see. Star-line very well seen. Spectrum bright and fairly steady. Star-line fairly well seen. Spectrum bright and fairly steady. Spectrum fairly bright and steady. Star-line diffused and somewhat difficult to bisect. Star-line faint and diffused, observation very difficult.
19. 0	M	"	F	0.130	+0.048	+ $\frac{1}{10}$	+ 17.6	- 3.0	- 8.3	
19. 10	M	"	F	0.130	+0.156	+ $\frac{1}{2}$	+ 17.6	+ 29.8	+ 28.9	
19. 20	M	Rigel	F	0.130	+0.087	+ $\frac{1}{4}$	+ 14.3	+ 12.1	+ 8.9	
19. 25	M	"	F	0.130	+0.077	+ $\frac{1}{4}$	+ 14.3	+ 9.1	+ 8.9	
19. 35	M	γ Orionis	F	0.130	+0.016	0	+ 15.3	- 10.4	- 15.3	
19. 40	M	"	F	0.130	-0.029	- $\frac{1}{10}$	+ 15.3	- 24.1	- 24.6	
19. 55	M	β Tauri	F	0.130	+0.012	+ $\frac{1}{10}$	+ 15.6	- 12.0	- 6.3	
20. 0	M	"	F	0.130	-0.132	- $\frac{1}{2}$	+ 15.6	- 55.7	- 62.1	
20. 10	M	"	F	0.130	-0.069	- $\frac{1}{5}$	+ 15.6	- 36.6	- 46.6	
20. 15	M	"	F	0.130	-0.067	- $\frac{1}{5}$	+ 15.6	- 36.0	- 43.5	
20. 20	M	δ Orionis	F	0.130	-0.142	- $\frac{2}{5}$	+ 14.4	- 57.5	- 51.6	
20. 25	M	"	F	0.130	+0.035	0	+ 14.4	- 3.8	- 14.4	

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Date, 1885, Greenwich Civil Time.			Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
							Measured.	Estimated.		Measured.	Estimated.	
Feb.	d	h	m			r	r					
5.	20.	30	M	δ Orionis	F	0'130	-0'062	- $\frac{3}{10}$	+ 14'4	- 33'2	- 42'3	
	20.	35	M	"	F	0'130	+0'055	+ $\frac{1}{5}$	+ 14'4	+ 2'3	+ 4'2	
	20.	40	M	ϵ Orionis	F	0'130	-0'040	- $\frac{1}{10}$	+ 14'2	- 26'3	- 23'5	Spectrum fairly bright and steady. Star-line fairly well seen.
	20.	45	M	"	F	0'130	+0'017	+ $\frac{1}{20}$	+ 14'2	- 9'1	- 9'6	
	20.	50	M	ζ Orionis	F	0'130	-0'080	- $\frac{1}{4}$	+ 13'9	- 38'2	- 37'1	Spectrum very bright and steady. Star-line fairly well seen by glimpses.
	20.	55	M	"	F	0'130	+0'015	0	+ 13'9	- 9'3	- 13'9	
	21.	0	M	κ Orionis	F	0'130	-0'122	- $\frac{1}{2}$	+ 12'6	- 49'7	- 59'1	Spectrum faint, but fairly steady. Star-line very difficult to bisect.
	21.	3	M	"	F	0'130	+0'060	+ $\frac{1}{5}$	+ 12'6	+ 5'6	+ 6'0	
	21.	6	M	"	F	0'130	-0'117	- $\frac{1}{4}$	+ 12'6	- 48'1	- 35'8	
	21.	10	M	"	F	0'130	+0'019	+ $\frac{1}{10}$	+ 12'6	- 6'8	- 3'3	
	21.	15	M	γ Geminorum .	F	0'130	-0'140	- $\frac{1}{2}$	+ 12'0	- 54'5	- 58'5	Spectrum bright. Star-line broad and diffused at edges, but dark and fairly distinct. The star seemed to show a most remarkable displacement towards the blue.
	21.	20	M	"	F	0'130	-0'316	- $\frac{1}{5}$	+ 12'0	- 108'0	- 86'3	
	21.	25	M	"	F	0'130	-0'418	- 1	+ 12'0	- 139'0	- 104'9	
	21.	30	M	"	F	0'130	-0'201	- $\frac{3}{5}$	+ 12'0	- 73'1	- 67'8	
	21.	40	M	Sirius	F	0'130	-0'150	- $\frac{1}{2}$	+ 8'3	- 53'9	- 54'8	Spectrum bright and somewhat tremulous. Star-line very diffused and ill-defined. The displacement towards the blue was very strongly marked. Direct comparison showed a very large and well marked displacement.
	21.	45	M	"	F	0'130	-0'100	- $\frac{1}{3}$	+ 8'3	- 38'7	- 39'3	
	21.	50	M	"	F	0'130	-0'121	- $\frac{1}{2}$	+ 8'3	- 45'0	- 54'8	
	21.	55	M	"	F	0'130	-0'079	- $\frac{1}{3}$	+ 8'3	- 32'3	- 39'3	
	22.	5	M	Procyon	F	0'130	+0'033	+ $\frac{1}{10}$	+ 7'2	+ 2'8	+ 2'1	Spectrum bright and steady. Star-line faint and diffused.
	22.	10	M	"	F	0'130	+0'075	+ $\frac{1}{4}$	+ 7'2	+ 15'6	+ 16'0	
	22.	15	M	"	F	0'130	+0'005	0	+ 7'2	- 5'7	- 7'2	
	22.	20	M	"	F	0'130	-0'019	- $\frac{1}{10}$	+ 7'2	- 13'0	- 16'5	
												Position Circle, 186°.
Feb.	7.	19.	0	β Persei	F	0'120	-0'132	- $\frac{3}{5}$	+ 17'4	- 57'5	- 68'6	Spectrum faint. Star-line faint. Measures made with great difficulty and therefore rough.
		19.	10	"	F	0'120	-0'050	- $\frac{1}{3}$	+ 17'4	- 32'6	- 45'9	
		19.	15	α Persei	F	0'120	-0'227	- 1	+ 16'0	- 85'0	- 101'4	Spectrum faint. Star-line faint. Measures made with great difficulty and therefore rough.
		19.	20	"	F	0'120	-0'160	- $\frac{2}{3}$	+ 16'0	- 64'6	- 72'9	
		19.	40	Aldebaran	F	0'120	+0'226	+ $\frac{4}{5}$	+ 17'8	+ 50'9	+ 50'5	Star-line faint and only seen by glimpses, but when seen it appeared sharp and well-defined.
		19.	45	"	F	0'120	+0'130	+ $\frac{3}{5}$	+ 17'8	+ 21'7	+ 33'4	
		19.	50	Capella	F	0'120	+0'016	0	+ 14'9	- 10'0	- 14'9	Spectrum bright and steady. Star-line fairly well seen.
		19.	55	"	F	0'120	+0'086	+ $\frac{1}{5}$	+ 14'9	+ 11'2	+ 13'6	
		20.	0	"	F	0'120	+0'021	+ $\frac{1}{10}$	+ 14'9	- 8'5	- 6'4	
		20.	5	"	F	0'120	+0'109	+ $\frac{1}{2}$	+ 14'9	+ 18'2	+ 27'8	
		20.	10	Rigel	F	0'120	-0'043	- $\frac{1}{4}$	+ 14'5	- 27'6	- 35'9	Spectrum bright, but unsteady. The first two measures, although so discordant from the usual result and from the succeeding four, seemed satisfactory at the time. The star-line was however somewhat more steadily seen in the last four observations, and particularly in the last three.
		20.	12	"	F	0'120	+0'018	0	+ 14'5	- 9'0	- 14'5	
		20.	14	"	F	0'120	+0'107	+ $\frac{1}{3}$	+ 14'5	+ 18'0	+ 14'0	
		20.	16	"	F	0'120	+0'139	+ $\frac{1}{2}$	+ 14'5	+ 27'7	+ 28'2	
		20.	18	"	F	0'120	+0'166	+ $\frac{1}{2}$	+ 14'5	+ 35'9	+ 28'2	
		20.	20	"	F	0'120	+0'160	+ $\frac{1}{2}$	+ 14'5	+ 34'1	+ 28'2	
		20.	25	γ Orionis	F	0'120	-0'030	- $\frac{1}{5}$	+ 15'7	- 24'8	- 32'8	Spectrum fairly bright and steady. Star-line fairly well seen.
		20.	27	"	F	0'120	-0'050	- $\frac{1}{3}$	+ 15'7	- 30'9	- 44'2	
		20.	29	"	F	0'120	-0'028	- $\frac{1}{10}$	+ 15'7	- 24'2	- 24'2	
		20.	36	"	F	0'120	-0'026	- $\frac{1}{10}$	+ 15'7	- 23'6	- 24'2	
		20.	40	β Tauri	F	0'120	-0'059	- $\frac{2}{5}$	+ 16'0	(- 33'9)	(- 50'1)	
		20.	45	"	F	0'120	-0'116	- $\frac{1}{2}$	+ 16'0	(- 51'3)	(- 58'7)	
		20.	50	"	F	0'120	-0'060	- $\frac{1}{3}$	+ 16'0	(- 34'2)	(- 44'5)	
		21.	14	Sirius	F	0'120	-0'232	- $\frac{1}{3}$	+ 8'7	(- 79'2)	(- 65'6)	
		21.	18	"	F	0'120	-0'281	- $\frac{1}{2}$	+ 8'7	(- 94'1)	(- 51'4)	
		21.	22	"	F	0'120	-0'105	- $\frac{1}{10}$	+ 8'7	(- 40'6)	(- 34'3)	
		21.	50	β Aurigæ	F	0'120	-0'187	- $\frac{2}{3}$	+ 13'6	(- 70'4)	(- 70'5)	
		21.	58	"	F	0'120	-0'051	- $\frac{1}{5}$	+ 13'6	(- 29'1)	(- 42'1)	The sky clouded over before the measures of β Tauri were obtained. The measures of that star and of Sirius and β Aurigæ were therefore obtained under very unfavourable conditions, and should be rejected.
												Position Circle, 186°.

Date, 1885, Greenwich Civil Time.			Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
		Measured.					Estimated.	Measured.		Estimated.		
d	h	m				r	r					
Feb.	19.	19. 25	M	Aldebaran	F	0'163	+0'086	+ $\frac{1}{4}$	+ 18'5	+ 7'5	- 1'1	Spectrum faint. Star-line very faint.
		19. 35	M	"	F	0'163	+0'217	+ $\frac{3}{4}$	+ 18'5	+ 47'3	+ 34'0	
		19. 45	M	Moon	F	0'163	-0'034			- 16'4		The coincidence of the two spectra appeared perfect.
		19. 49	M	"	F	0'163	-0'020			- 6'1		
		19. 53	M	"	F	0'163	-0'128			- 38'9		
		19. 57	M	"	F	0'163	+0'042			+ 12'7		
		20. 0	M	"	F	0'163	-0'031			- 9'4		Position Circle, 186°.
Feb.	21.	19. 11	M	Aldebaran	F	0'114	+0'164	+ $\frac{3}{8}$	+ 18'6	+ 31'2	+ 26'1	Spectrum faint. Star-line faint. Star in thin cloud. Observation rough.
		19. 15	M	"	F	0'114	+0'179	+ $\frac{3}{8}$	+ 18'6	+ 35'8	+ 26'1	
		19. 19	M	Moon	F	0'114	-0'015			- 4'6		Third and fourth measures were considered rough. So far as could be judged from the comparisons the two spectra were <i>perfectly</i> coincident, and the apparent displacement was entirely due to uncertainty of the bisection of the line in the Moon's spectrum.
		19. 21	M	"	F	0'114	+0'014			+ 4'3		
		19. 23	M	"	F	0'114	-0'095			- 28'8		
		19. 25	M	"	F	0'114	-0'068			- 20'7		
		19. 27	M	"	F	0'114	-0'006			- 1'8		
		19. 36	M	Rigel	F	0'114	+0'107	+ $\frac{2}{8}$	+ 15'7	+ 16'8	+ 14'1	Spectrum very faint. Star-line faint, but fairly well defined. Star in light cloud. Measures rough.
		19. 40	M	"	F	0'114	+0'184	+ $\frac{3}{8}$	+ 15'7	+ 40'2	+ 29'0	Position Circle, 185°.
Feb.	23.	20. 5	M	Capella	b ₁	0'175	+0'040	+ $\frac{1}{8}$	+ 16'7	- 1'7	+ 5'6	Spectrum bright, but very unsteady. Wind high. Star-line in consequence very difficult to observe.
		20. 35	M	"	b ₁	0'175	+0'152	+ $\frac{1}{8}$	+ 16'7	+ 40'4	+ 27'9	
		20. 50	M	Aldebaran	b ₁	0'175	+0'092	+ $\frac{1}{4}$	+ 18'6	+ 15'9	+ 9'3	Spectrum very unsteady. Star-line fairly well seen by glimpses.
		21. 5	M	"	b ₁	0'175	+0'118	+ $\frac{1}{3}$	+ 18'6	+ 25'7	+ 18'6	
		21. 10	M	Moon	b ₁	0'175	-0'030			- 11'3		Moon spectrum very bright, and lines very well seen at times. Wind, however, still high, and spectrum unsteady. The coincidence of the two spectra appeared perfect.
		21. 14	M	"	b ₁	0'175	-0'041			- 15'4		
		21. 18	M	"	b ₁	0'175	+0'035			+ 13'1		
		21. 21	M	"	b ₁	0'175	+0'011			+ 4'1		
		21. 25	M	"	b ₁	0'175	-0'002			- 0'8		
		21. 40	M	α Orionis	b ₁	0'175	+0'081	+ $\frac{3}{10}$	+ 16'7	+ 13'7	+ 16'8	Spectrum very bright, but unsteady. The b ₁ line could be seen faintly, but distinctly isolated from the band on which it stands.
		21. 50	M	"	b ₁	0'175	+0'122	+ $\frac{2}{5}$	+ 16'7	+ 29'1	+ 27'9	
		22. 5	M	Pollux	b ₁	0'175	+0'003	0	+ 12'7	- 11'6	- 12'7	Spectrum unsteady. Star-line exceedingly faint, but glimpsed satisfactorily at times.
		22. 20	M	"	b ₁	0'175	-0'027	- $\frac{1}{10}$	+ 12'7	- 22'8	- 23'9	
		22. 35	M	α Hydræ.....	b ₁	0'175	-0'002	0	+ 3'0	- 3'8	- 3'0	Spectrum faint and very unsteady. Star-line seen with the greatest difficulty. Measures very rough.
		22. 50	M	"	b ₁	0'175	+0'065	+ $\frac{1}{8}$	+ 3'0	+ 21'4	+ 19'3	Position Circle, 185°.
Feb.	25.	19. 27	M	Aldebaran	b ₁	0'118	+0'078	+ $\frac{1}{3}$	+ 18'6	+ 10'7	+ 8'3	Spectrum bright. Star-line well seen. Observation considered very good.
		19. 37	M	"	b ₁	0'118	+0'120	+ $\frac{2}{5}$	+ 18'6	+ 26'5	+ 13'7	
		19. 57	M	Capella.....	b ₁	0'118	+0'137	+ $\frac{1}{2}$	+ 16'8	+ 34'6	+ 23'6	Spectrum bright, but very unsteady. Star-lines exceedingly faint. Measures very rough.
		20. 12	M	"	b ₁	0'118	+0'025	+ $\frac{1}{10}$	+ 16'8	- 7'4	- 8'7	
		20. 22	M	α Orionis	b ₁	0'118	+0'027	+ $\frac{1}{10}$	+ 16'9	- 6'8	- 8'8	Spectrum exceedingly tremulous and also faint, as light cloud was forming. The bisections were difficult to obtain, and are therefore rough. The b ₁ line was seen isolated from the dark band upon which it stands, but not nearly so distinctly as on February 23.
		20. 32	M	"	b ₁	0'118	+0'130	+ $\frac{2}{7}$	+ 16'9	+ 31'9	+ 17'7	
		20. 52	M	Moon	b ₁	0'118	-0'031			- 11'6		Moon line seen very well. The coincidence of the two spectra appeared perfect.
		20. 54	M	"	b ₁	0'118	-0'029			- 10'9		
		20. 57	M	"	b ₁	0'118	-0'018			- 6'8		
		20. 59	M	"	b ₁	0'118	+0'021			+ 7'9		
		21. 2	M	"	b ₁	0'118	+0'011			+ 4'1		
		21. 22	M	Pollux	b ₁	0'118	-0'055	- $\frac{1}{3}$	+ 13'1	- 33'7	- 40'0	Spectrum unsteady, but bright. Star-line darker and more distinct than usual. Measures difficult, but considered good.
		21. 32	M	"	b ₁	0'118	-0'053	- $\frac{1}{3}$	+ 13'1	- 33'0	- 40'0	Position Circle, 185°.

Date, 1885, Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Mar. 10. 22. 32	N	Aldebaran	b_1	0'142	+0'139	+ $\frac{1}{3}$	+ 18'1	+ 34'1	+ 30'9	Spectrum unsteady. Star-lines distinct and sharp. Star-line very faint. Position Circle, 185°.
22. 41	N	,,	b_1	0'142	+0'178	+ $\frac{1}{3}$	+ 18'1	+ 48'7	+ 47'2	
23. 10	N	Capella	b_1	0'142	+0'021	0	+ 17'2	- 9'3	- 17'2	
23. 15	N	,,	b_1	0'142	+0'070	+ $\frac{1}{4}$	+ 17'2	+ 9'1	+ 7'3	
Mar. 11. 22. 50	M	Pollux	b_1	0'125	-0'042	- $\frac{1}{4}$	+ 15'9	- 31'7	- 36'3	Spectrum tremulous. Star-line fairly well seen. Spectrum faint and tremulous. Definition fair. Spectrum fairly steady. Star-line faint, but seen well by glimpses. Star spectrum and line both faint. Spectrum bright, but tremulous. Star-line faint. Position Circle, 185°.
23. 5	M	,,	b_1	0'125	-0'011	- $\frac{1}{10}$	+ 15'9	- 20'0	- 24'1	
23. 25	M	α Hydræ	b_1	0'125	+0'057	+ $\frac{1}{4}$	+ 7'5	+ 13'9	+ 12'9	
23. 40	M	,,	b_1	0'125	+0'012	+ $\frac{1}{10}$	+ 7'5	- 3'0	+ 0'7	
23. 45	M	γ Leonis	b_1	0'125	+0'114	+ $\frac{1}{2}$	+ 7'4	+ 35'4	+ 33'4	
12. 0. 10	M	,,	b_1	0'125	+0'048	+ $\frac{1}{4}$	+ 7'4	+ 10'6	+ 13'0	
0. 25	M	ϵ Virginis	b_1	0'125	+0'008	- $\frac{1}{10}$	- 5'1	+ 2'1	- 3'1	
0. 35	M	,,	b_1	0'125	+0'021	+ $\frac{1}{7}$	- 5'1	+ 13'0	+ 16'7	
0. 55	M	Arcturus	b_1	0'125	-0'065	- $\frac{1}{3}$	- 8'2	- 16'2	- 18'9	
1. 5	M	,,	b_1	0'125	-0'045	- $\frac{1}{5}$	- 8'2	- 8'7	- 8'1	
Mar. 12. 21. 17	N	Capella	b_1	0'161	+0'140	+ $\frac{1}{3}$	+ 17'1	+ 35'5	+ 35'9	Spectrum bright and steady. Star-line tolerably distinct. Slight tremor occasionally, due to wind. Spectrum faint and tremulous. A rough observation. Position Circle, 185°.
21. 22	N	,,	b_1	0'161	+0'135	+ $\frac{1}{3}$	+ 17'1	+ 33'6	+ 35'9	
21. 26	N	,,	b_1	0'161	+0'111	+ $\frac{1}{3}$	+ 17'1	+ 24'6	+ 25'2	
22. 42	N	Aldebaran	b_1	0'161	+0'087	+ $\frac{1}{3}$	+ 17'9	+ 14'8	+ 17'4	
Mar. 14. 20. 25	M	Sirius	F	0'158	-0'011	- $\frac{1}{10}$	+ 13'6	- 16'9	- 18'5	Direct comparison showed only a very slight displacement towards the blue, scarcely sufficient to be detected. Two prism train employed. Spectrum tremulous, but bright. The star-line appeared as a very broad diffused band, with no definition of the edges. Spectrum bright and steady. Star-line unusually well defined. Spectrum bright and steady. Star-line faint. Spectrum bright and steady. Star-line broad and diffused, and therefore difficult to bisect. It seemed, however, better defined than usual, and there was an unmistakable displacement towards the blue. Spectrum bright and steady. Star-line fairly well defined. Spectrum bright and steady. Star-line dark, very broad and ill-defined at edges. Displacement evidently small. Spectrum faint and very tremulous. Star-line faint and very badly defined. Measures very rough. Spectrum bright, but tremulous. Star-line faint. Definition poor. For the first four stars observed the definition was exceptionally good; after that it grew rapidly worse. Position Circle, 185°.
20. 30	M	,,	F	0'158	-0'033	- $\frac{1}{10}$	+ 13'6	- 23'6	- 23'4	
20. 35	M	,,	F	0'158	+0'008	0	+ 13'6	- 11'2	- 13'6	
20. 40	M	,,	F	0'158	-0'067	- $\frac{1}{4}$	+ 13'6	- 34'0	- 38'0	
20. 45	M	,,	F	0'158	-0'218	- $\frac{1}{4}$	+ 13'6	- 27'9	- 38'1	
20. 50	M	,,	F	0'158	-0'476	- $\frac{2}{5}$	+ 13'6	- 44'9	- 52'8	
20. 55	M	,,	F	0'158	+0'232	+ $\frac{1}{4}$	+ 13'6	+ 1'6	+ 10'9	
21. 0	M	,,	F	0'158	-0'039	- $\frac{1}{10}$	+ 13'6	- 16'2	- 23'4	
21. 4	M	Procyon	F	0'158	+0'015	0	+ 15'5	- 10'9	- 15'5	
21. 6	M	,,	F	0'158	-0'029	- $\frac{1}{10}$	+ 15'5	- 24'3	- 25'3	
21. 8	M	,,	F	0'158	-0'046	- $\frac{1}{7}$	+ 15'5	- 29'5	- 29'4	
21. 10	M	,,	F	0'158	+0'008	+ $\frac{1}{10}$	+ 15'5	- 13'1	- 10'6	
21. 15	M	Pollux	F	0'158	-0'023	- $\frac{1}{10}$	+ 16'3	- 23'3	- 21'2	Spectrum bright and steady. Star-line faint. Spectrum bright and steady. Star-line broad and diffused, and therefore difficult to bisect. It seemed, however, better defined than usual, and there was an unmistakable displacement towards the blue. Spectrum bright and steady. Star-line fairly well defined. Spectrum bright and steady. Star-line dark, very broad and ill-defined at edges. Displacement evidently small. Spectrum faint and very tremulous. Star-line faint and very badly defined. Measures very rough. Spectrum bright, but tremulous. Star-line faint. Definition poor. For the first four stars observed the definition was exceptionally good; after that it grew rapidly worse. Position Circle, 185°.
21. 20	M	,,	F	0'158	-0'030	- $\frac{1}{10}$	+ 16'3	- 25'4	- 26'1	
21. 25	M	,,	F	0'158	-0'058	- $\frac{1}{7}$	+ 16'3	- 33'9	- 30'2	
21. 30	M	,,	F	0'158	-0'011	- $\frac{1}{10}$	+ 16'3	- 19'6	- 21'2	
21. 35	M	Castor	F	0'158	-0'128	- $\frac{1}{2}$	+ 16'7	- 55'6	- 65'5	
21. 40	M	,,	F	0'158	-0'060	- $\frac{1}{5}$	+ 16'7	- 34'9	- 36'2	
21. 45	M	,,	F	0'158	+0'039	+ $\frac{1}{5}$	+ 16'7	- 4'9	+ 2'8	
21. 50	M	,,	F	0'158	-0'143	- $\frac{1}{2}$	+ 16'7	- 60'1	- 65'5	
22. 0	M	Regulus	F	0'158	-0'008	- $\frac{1}{10}$	+ 8'3	- 10'7	- 18'1	
22. 5	M	,,	F	0'158	-0'041	- $\frac{1}{7}$	+ 8'3	- 20'7	- 22'2	
22. 15	M	β Leonis	F	0'158	+0'119	+ $\frac{1}{4}$	+ 1'4	+ 34'7	+ 23'0	Spectrum bright and steady. Star-line dark, very broad and ill-defined at edges. Displacement evidently small. Spectrum faint and very tremulous. Star-line faint and very badly defined. Measures very rough. Spectrum bright, but tremulous. Star-line faint. Definition poor. For the first four stars observed the definition was exceptionally good; after that it grew rapidly worse. Position Circle, 185°.
22. 18	M	,,	F	0'158	-0'088	- $\frac{1}{5}$	+ 1'4	- 28'1	- 20'9	
22. 22	M	,,	F	0'158	-0'103	- $\frac{1}{4}$	+ 1'4	- 32'7	- 25'8	
22. 25	M	,,	F	0'158	-0'127	- $\frac{1}{3}$	+ 1'4	- 40'0	- 33'9	
22. 30	M	Spica	F	0'158	-0'138	- $\frac{1}{2}$	- 8'6	- 50'5	- 57'4	
22. 35	M	,,	F	0'158	+0'027	+ $\frac{1}{10}$	- 8'6	- 0'4	+ 1'2	
22. 40	M	Arcturus	F	0'158	-0'121	- $\frac{3}{4}$	- 7'5	- 44'2	- 49'3	
22. 50	M	,,	F	0'158	-0'137	- $\frac{1}{2}$	- 7'5	- 49'1	- 56'3	
Mar. 27. 20. 55	N	Sirius	F	0'105	+0'036	+ $\frac{1}{7}$	+ 14'1	- 3'2	- 3'6	Spectrum faint and tremulous. Measures made with difficulty.
21. 5	N	,,	F	0'105	-0'011	0	+ 14'1	- 17'4	- 14'1	

MOTIONS OF STARS IN THE LINE OF SIGHT, INFERRED FROM SPECTROSCOPIC OBSERVATIONS

Date, 1885, Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Mar. 27. 21. 20	N	Procyon	F	0'105	-0'057	- $\frac{1}{4}$	+ 17'0	- 34'3	- 35'5	Spectrum much brighter than that of Sirius. Star-line fairly distinct. Star-line broad and diffused.
21. 25	N	, ,	F	0'105	-0'054	- $\frac{1}{5}$	+ 17'0	- 33'4	- 31'7	
21. 45	N	Castor	F	0'105	+0'006	0	+ 17'8	- 16'0	- 17'8	
21. 50	N	, ,	F	0'105	+0'069	+ $\frac{1}{4}$	+ 17'8	+ 3'2	+ 0'7	
21. 55	N	, ,	F	0'105	+0'003	0	+ 17'8	- 16'9	- 17'8	
22. 8	N	Moon	F	0'105	+0'011			+ 3'3		
22. 10	N	, ,	F	0'105	-0'004			- 1'2		
22. 13	N	, ,	F	0'105	-0'012			- 3'6		
22. 17	N	, ,	F	0'105	-0'010			- 3'0		
										Position Circle, 185°.
Apr. 18. 21. 20	M	Regulus	F	0'162	+0'145	+ $\frac{3}{8}$	+ 15'9	+ 28'1	+ 21'8	Definition exceedingly bad.
21. 28	M	, ,	F	0'162	+0'005	0	+ 15'9	- 14'4	- 15'9	Position Circle, 185°.
Apr. 21. 21. 50	M	Pollux	δ_1	0'230	-0'013	- $\frac{1}{10}$	+ 17'8	- 22'7	- 27'5	Spectrum bright, but very tremulous.
22. 5	M	, ,	δ_1	0'230	-0'016	- $\frac{1}{10}$	+ 17'8	- 23'8	- 27'5	The coincidence of the two spectra appeared perfect.
22. 10	M	Moon	δ_1	0'230	+0'016			+ 6'0		
22. 13	M	, ,	δ_1	0'230	+0'013			+ 4'9		
22. 15	M	, ,	δ_1	0'230	-0'028			- 10'5		
22. 17	M	, ,	δ_1	0'230	-0'024			- 9'0		
22. 20	M	, ,	δ_1	0'230	+0'001			+ 0'4		
										Position Circle, 180°.
Apr. 29. 22. 0	M	ϵ Virginis	δ_1	0'088	-0'034	- $\frac{1}{4}$	+ 9'1	- 21'9	- 28'2	Spectrum faint and tremulous. Star-line faint and difficult to see. Spectrum exceedingly tremulous. Definition bad. The coincidence of the two spectra appeared perfect.
22. 10	M	, ,	δ_1	0'088	-0'013	- $\frac{1}{10}$	+ 9'1	- 14'0	- 16'7	
22. 20	M	Arcturus	δ_1	0'088	-0'131	- $\frac{3}{5}$	+ 4'6	- 53'8	- 50'3	
22. 25	M	, ,	δ_1	0'088	-0'015	- $\frac{1}{8}$	+ 4'6	- 17'7	- 30'0	
22. 30	M	Moon	δ_1	0'088	+0'010			+ 3'8		
22. 34	M	, ,	δ_1	0'088	-0'006			- 2'2		
22. 36	M	, ,	δ_1	0'088	-0'010			- 3'8		
22. 38	M	, ,	δ_1	0'088	-0'017			- 6'4		
22. 40	M	, ,	δ_1	0'088	+0'001			+ 0'4		
										Position Circle, 185°.
May 7. 22. 48	N	Arcturus	δ_1	0'158	-0'143	- $\frac{1}{2}$	+ 6'6	- 60'3	- 64'4	Spectrum faint. Passing cloud troublesome. Sky misty.
22. 53	N	, ,	δ_1	0'158	-0'196	- $\frac{3}{8}$	+ 6'6	- 80'2	- 83'7	
										Position Circle, 186°.
May 29. 22. 28	N	Arcturus	δ_1	0'170	-0'099	- $\frac{3}{10}$	+ 11'1	- 48'3	- 49'8	Measures made with difficulty. Star-line faint and indistinct.
22. 35	N	, ,	δ_1	0'170	-0'159	- $\frac{1}{10}$	+ 11'1	- 70'8	- 75'7	
22. 40	N	, ,	δ_1	0'170	-0'039	- $\frac{1}{6}$	+ 11'1	- 25'8	- 27'2	The coincidence of the two spectra appeared perfect.
23. 35	N	Moon	δ_1	0'170	+0'015			+ 5'6		
23. 38	N	, ,	δ_1	0'170	+0'001			+ 0'4		
23. 42	N	, ,	δ_1	0'170	-0'016			- 6'0		
23. 45	N	, ,	δ_1	0'170	-0'021			- 7'9		
3c. 1. 10	N	α Lyrae	F	0'130	-0'020	- $\frac{1}{10}$	- 4'8	(- 1'3)	(- 0'5)	
1. 20	N	, ,	F	0'130	-0'060	- $\frac{1}{3}$	- 4'8	(- 13'4)	(- 13'0)	
										Measures difficult and probably of little value on account of the awkward position of the spectroscope. Position Circle, 186°.
June 2. 22. 50	N	Arcturus	F	0'164	-0'086	- $\frac{1}{10}$	+ 11'8	- 37'9	- 35'2	Star-line very faint.
22. 55	N	, ,	F	0'164	-0'078	- $\frac{1}{10}$	+ 11'8	- 35'5	- 35'2	
23. 20	N	, ,	F	0'205	-0'128	- $\frac{1}{10}$	+ 11'8	- 50'7	- 51'4	Much better definition than for first two measures.
23. 25	N	, ,	F	0'205	-0'064	- $\frac{1}{6}$	+ 11'8	- 31'2	- 35'6	
										Position Circle, 186°.
June 18. 22. 41	N	Arcturus	F	0'157	-0'108	- $\frac{3}{10}$	+ 13'9	- 46'7	- 46'0	Measures considered good.
22. 46	N	, ,	F	0'157	-0'113	- $\frac{1}{10}$	+ 13'9	- 48'2	- 46'0	
23. 31	N	α Ophiuchi	F	0'157	-0'132	- $\frac{1}{10}$	+ 1'8	- 41'9	- 41'9	Star-line broad and diffused. The displacement towards the blue was unmistakable.
23. 36	N	, ,	F	0'157	-0'109	- $\frac{1}{10}$	+ 1'8	- 34'9	- 33'9	
										Position Circle, 186°.
July 9. 22. 58	M	Arcturus	F	0'116	-0'178	- $\frac{2}{3}$	+ 15'2	- 69'3	- 52'4	Spectrum tremulous. Definition bad.
23. 13	M	, ,	F	0'116	-0'065	- $\frac{1}{3}$	+ 15'2	- 34'9	- 33'8	

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Date, 1885, Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
July 9. 23. 28	M	α Coronæ Bor..	F	0'116	+0'053	+ $\frac{1}{3}$	+ 11'7	+ 4'4	- 0'5	Spectrum faint. Definition bad.
23. 38	M	,,	F	0'116	+0'056	+ $\frac{1}{3}$	+ 11'7	+ 5'3	- 0'5	
23. 48	M	α Ophiuchi....	F	0'116	-0'102	- $\frac{1}{3}$	+ 6'6	- 37'6	- 34'6	Spectrum faint. Definition poor.
23. 58	M	,,	F	0'116	-0'117	- $\frac{1}{3}$	+ 6'6	- 42'1	- 34'6	
10. 0. 13	M	α Lyræ	F	0'116	-0'124	- $\frac{1}{3}$	+ 0'6	- 38'3	- 34'1	Spectrum bright, but tremulous.
0. 23	M	,,	F	0'116	-0'083	- $\frac{1}{3}$	+ 0'6	- 25'8	- 22'9	
0. 33	M	α Aquilæ	F	0'116	-0'158	- $\frac{1}{3}$	- 3'3	- 44'7	- 38'6	Spectrum fairly steady.
0. 43	M	,,	F	0'116	-0'160	- $\frac{1}{3}$	- 3'3	- 45'3	- 38'6	
0. 58	M	α Cygni	F	0'116	-0'134	- $\frac{1}{3}$	- 6'4	- 34'3	- 27'1	Spectrum steady. Definition good.
1. 8	M	,,	F	0'116	-0'141	- $\frac{1}{3}$	- 6'4	- 36'4	- 30'8	Position Circle, 186°.
July 23. 22. 8	N	α Ophiuchi....	F	0'110	-0'069	- $\frac{1}{4}$	+ 9'4	- 30'4	- 32'2	Star-line faint. Moon close to star. Measures doubtful.
22. 12	N	,,	F	0'110	-0'070	- $\frac{1}{4}$	+ 9'4	- 30'6	- 32'2	
22. 23	N	Moon	F	0'110	+0'028			+ 8'5		The coincidence of the two spectra appeared perfect.
22. 26	N	,,	F	0'110	+0'007			+ 2'1		
22. 30	N	,,	F	0'110	0'000			0'0		
22. 33	N	,,	F	0'110	-0'001			- 0'3		
22. 53	N	α Aquilæ	F	0'110	-0'019	- $\frac{1}{10}$	+ 0'3	- 6'1	- 9'4	Star-line broad.
22. 58	N	,,	F	0'110	-0'010	0	+ 0'3	- 3'3	- 0'3	
23. 28	N	α Pegasi	F	0'110	-0'124	- $\frac{2}{5}$	- 13'0	- 24'7	- 23'4	Spectrum faint. Star-line very indistinct.
23. 36	N	,,	F	0'110	-0'083	- $\frac{1}{3}$	- 13'0	- 12'2	- 17'4	Measures uncertain. Position Circle, 186°.
Aug. 3. 22. 10	M	α Lyræ	F	0'125	-0'078	- $\frac{1}{3}$	+ 4'0	- 27'7	- 28'7	Definition good for first observation; fairly satisfactory for second.
22. 40	M	,,	F	0'125	-0'119	- $\frac{1}{3}$	+ 4'0	- 40'1	- 41'1	
23. 5	M	α Aquilæ	F	0'125	-0'106	- $\frac{1}{3}$	+ 3'2	- 35'4	- 27'9	Definition poor. Spectrum faint. Observation very difficult, but there was unmistakably a large displacement towards the blue.
23. 40	M	,,	F	0'125	-0'206	- $\frac{1}{3}$	+ 3'2	- 65'8	- 52'6	Position Circle, 185°.
Aug. 5. 22. 56	M	α Lyræ	F	0'125	-0'166	- $\frac{2}{3}$	+ 4'2	- 54'6	- 53'6	Spectrum faint. Definition fair.
23. 21	M	,,	F	0'125	-0'089	- $\frac{1}{3}$	+ 4'2	- 31'2	- 28'9	Position Circle, 185°.
Aug. 10. 21. 7	M	α Lyræ	F	0'125	-0'199	- $\frac{4}{5}$	+ 4'8	- 65'2	- 64'1	Spectrum bright and steady. The star-line, however, seemed more than usually broad and diffused.
21. 22	M	,,	F	0'125	-0'129	- $\frac{1}{2}$	+ 4'8	- 44'0	- 41'9	Spectrum faint, but steady. Definition fair.
21. 42	M	ζ Draconis	F	0'125	-0'126	- $\frac{1}{2}$	+ 1'1	- 39'4	- 38'2	
21. 52	M	,,	F	0'125	-0'170	- $\frac{1}{2}$	+ 1'1	- 52'7	- 50'5	
22. 12	M	α Draconis	F	0'125	+0'182	+	+ 2'1	+ 53'2	+ 47'3	Spectrum faint, but steady. Star-line broad and diffused at edges as usual in the type. Definition fair.
22. 22	M	,,	F	0'125	+0'106	+	+ 2'1	+ 30'1	+ 35'0	
22. 32	M	,,	F	0'125	+0'111	+	+ 2'1	+ 31'6	+ 35'0	
22. 42	M	,,	F	0'125	+0'088	+	+ 2'1	+ 24'6	+ 22'6	
22. 52	M	η Ursæ Majoris	F	0'125	+0'072	+	+ 6'2	+ 15'7	+ 18'5	Spectrum fairly bright, but rather tremulous.
23. 2	M	,,	F	0'125	+0'067	+	+ 6'2	+ 14'1	+ 12'3	Definition not quite so good as for foregoing stars. Direct comparison showed the lines in the two spectra to be very nearly coincident; if there was any displacement it was towards the red.
23. 7	M	,,	F	0'125	+0'045	+	+ 6'2	+ 7'5	+ 8'6	
23. 12	M	,,	F	0'125	+0'090	+	+ 6'2	+ 21'1	+ 23'4	
23. 22	M	ξ Ursæ Majoris	F	0'125	+0'163	+	+ 4'2	+ 45'3	+ 45'2	Both stars observed as one. Displacement towards the red more marked than in η Ursæ Majoris.
23. 32	M	,,	F	0'125	+0'092	+	+ 4'2	+ 23'8	+ 20'5	
23. 42	M	ϵ Ursæ Majoris	F	0'125	-0'152	- $\frac{2}{3}$	+ 3'4	- 49'6	- 52'8	Spectrum fairly bright, but a little unsteady.
23. 52	M	,,	F	0'125	-0'178	- $\frac{2}{3}$	+ 3'4	- 57'5	- 52'8	Definition fair. Star-line, a difficult example of the type, broad and diffused at the edges.
11. 0. 2	M	,,	F	0'125	-0'137	- $\frac{1}{2}$	+ 3'4	- 45'0	- 40'5	
0. 7	M	,,	F	0'125	-0'037	- $\frac{1}{2}$	+ 3'4	- 14'6	- 18'2	
0. 22	M	δ Ursæ Majoris	F	0'125	+0'067	+	+ 2'1	+ 18'2	+ 16'4	Spectrum exceedingly faint. Star-line broad and ill-defined. Observations very difficult.
0. 32	M	,,	F	0'125	+0'145	+	+ 2'1	+ 41'9	+ 42'4	Position Circle, 185°.
Aug. 14. 21. 36	M	α Ursæ Majoris	F	0'125	-0'017	- $\frac{1}{10}$	- 1'7	- 3'4	- 5'7	Spectrum faint. Definition poor. Position Circle, 185°.

MOTIONS OF STARS IN THE LINE OF SIGHT, INFERRED FROM SPECTROSCOPIC OBSERVATIONS

Date, 1885, Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
Aug. 17. 21. 15	M	α Coronæ Bor..	F	r	0'125	+0'048	+ $\frac{1}{5}$	+ 12'4	+ 2'2	Spectrum faint. Star-line very broad. Definition fair. Definition good. Position Circle, 185°.
21. 30	M	,,	F	r	0'125	-0'044	- $\frac{1}{5}$	+ 12'4	- 25'8	
22. 55	M	α Lyræ	F	r	0'125	-0'075	- $\frac{1}{4}$	+ 5'6	- 28'4	
23. 5	M	,,	F	r	0'125	-0'065	- $\frac{1}{4}$	+ 5'6	- 25'3	
Aug. 25. 22. 43	M	α Lyræ	F	r	0'125	-0'137	- $\frac{1}{2}$	+ 6'5	- 48'1	Spectrum bright and fairly steady. Definition fair. Definition fair. Definition fair. Spectrum steady.
23. 3	M	,,	F	r	0'125	-0'054	- $\frac{1}{4}$	+ 6'5	- 22'9	
23. 18	M	α Aquilæ	F	r	0'125	-0'142	- $\frac{1}{2}$	+ 8'5	- 51'6	
23. 28	M	,,	F	r	0'125	-0'132	- $\frac{1}{2}$	+ 8'5	- 48'6	
23. 38	M	α Cygni	F	r	0'125	-0'102	- $\frac{2}{5}$	- 0'1	- 30'9	Spectrum faint, but steady. Definition fair. The awkward position of the star made the measures difficult and rough. The coincidence of the two spectra appeared perfect.
23. 48	M	,,	F	r	0'125	-0'099	- $\frac{2}{5}$	- 0'1	- 30'0	
26. 0. 3	M	α Cephei	F	r	0'125	-0'099	- $\frac{2}{5}$	- 4'0	- 26'1	
0. 13	M	,,	F	r	0'125	-0'041	- $\frac{1}{5}$	- 4'0	- 8'5	
0. 23	M	Moon	F	r	0'125	-0'028			- 8'5	Spectrum faint, but steady. Definition fair. The spectra throughout the evening were steady, and the definition better than usual. The moonlight, however, made the spectra appear faint, and there was a good deal of light cloud. Position Circle, 185°.
0. 26	M	,,	F	r	0'125	-0'034			- 10'3	
0. 28	M	,,	F	r	0'125	+0'012			+ 3'6	
0. 30	M	,,	F	r	0'125	-0'008			- 2'4	
0. 33	M	,,	F	r	0'125	-0'009			- 2'7	
0. 48	M	α Pegasi	F	r	0'125	-0'020	- $\frac{1}{10}$	- 5'5	- 0'6	
0. 53	M	,,	F	r	0'125	+0'042	+ $\frac{1}{7}$	- 5'5	+ 18'2	
									+ 17'3	
Aug. 27. 22. 10	M	α Lyræ	F	r	0'125	-0'062	- $\frac{1}{4}$	+ 6'6	- 25'4	Spectrum tremulous. Position Circle, 185°.
22. 25	M	,,	F	r	0'125	-0'023	- $\frac{1}{10}$	+ 6'6	- 13'6	
Aug. 29. 21. 32	M	α Lyræ	F	r	0'125	-0'138	- $\frac{1}{2}$	+ 6'8	- 48'7	Spectrum bright and steady. Definition good. Cloud constantly passing. Spectrum steady and definition good in the clear intervals. Position Circle, 185°.
21. 47	M	,,	F	r	0'125	-0'068	- $\frac{1}{4}$	+ 6'8	- 27'5	
22. 2	M	α Aquilæ	F	r	0'125	-0'052	- $\frac{1}{5}$	+ 9'4	- 25'2	
22. 12	M	,,	F	r	0'125	-0'123	- $\frac{1}{2}$	+ 9'4	- 46'8	
Sept. 26. 20. 7	M	α Cygni	b_1	r	0'144	-0'186	- $\frac{4}{7}$	+ 4'6	- 74'4	Spectrum very tremulous. Definition bad. Position Circle, 185°.
20. 37	M	,,	b_1	r	0'144	-0'150	- $\frac{3}{5}$	+ 4'6	- 60'9	
Oct. 5. 21. 46	M	β Pegasi	b_4	r	0'108	-0'064	- $\frac{1}{2}$	+ 4'1	- 28'1	Spectrum bright, but tremulous. Definition bad. The b lines could not be isolated from the shaded band on which they stand.
22. 16	M	,,	b_4	r	0'108	-0'084	- $\frac{1}{2}$	+ 4'1	- 35'7	
22. 36	M	α Cassiopeiæ ..	b_1	r	0'108	+0'125	+ $\frac{1}{2}$	- 5'0	+ 51'9	Spectrum very tremulous. Definition bad. Position Circle, 5°.
23. 1	M	,,	b_1	r	0'108	+0'146	+ $\frac{1}{2}$	- 5'0	+ 59'8	
Oct. 16. 13. 38	M	Venus	b_1	r	0'140	-0'013	- $\frac{1}{7}$		- 4'9	The estimated displacement as compared with the sky lines was about $\frac{1}{4}$ of the breadth of the bright magnesium line towards the blue. Calculated motion -7'4 miles per second,
13. 39	M	,,	b_1	r	0'140	-0'056			- 21'0	
13. 40	M	,,	b_1	r	0'140	-0'109			- 40'9	
13. 40	M	,,	b_1	r	0'140	-0'033			- 12'4	
13. 41	M	,,	b_1	r	0'140	-0'047			- 17'7	
13. 41	M	,,	b_1	r	0'140	-0'055			- 20'6	
13. 42	M	,,	b_1	r	0'140	-0'038			- 14'3	
13. 42	M	,,	b_1	r	0'140	-0'035			- 13'1	
13. 43	M	,,	b_1	r	0'140	-0'020			- 7'5	
13. 44	M	,,	b_1	r	0'140	-0'067			- 25'2	
13. 44	M	,,	b_1	r	0'140	-0'009			- 3'4	
13. 45	M	,,	b_1	r	0'140	-0'057			- 21'4	
13. 45	M	,,	b_1	r	0'140	+0'013			+ 4'9	

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Date, 1885, Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
Oct. 16. 13. 46 13. 46	M M	Venus..... ,,	b ₁ b ₁	0'140 0'140	-0'009 -0'024			- 3'4 - 9'0		Position Circle, 185°.
Nov. 5. 18. 50 18. 55 19. 5 19. 10 6. 0. 5 0. 15 0. 25 0. 35 0. 50 1. 5 1. 15 1. 20 1. 30 1. 40 1. 50 2. 0 2. 10 2. 20 2. 25 2. 30 2. 35 2. 40 2. 45	M M	α Lyrae ,, ,, ,, α Andromedæ . ,, Aldebaran ,, Capella ,, β Tauri ,, γ Orionis ,, Rigel ,, ,, Sirius ,, ,, ,, ,, ,, ,,	F F	0'214 0'214	-0'027 -0'190 -0'032 -0'100 -0'056 -0'040 +0'082 +0'074 +0'045 +0'076 -0'104 -0'146 -0'011 -0'034 -0'046 -0'077 -0'227 -0'078 -0'167 -0'108 -0'086 -0'081 -0'124	- 1/10 - 1/10	+ 7'7 + 7'7 + 7'7 + 7'7 + 8'7 + 8'7 - 7'7 - 7'7 - 10'3 - 10'3 - 11'2 - 11'2 - 10'4 - 10'4 - 8'3 - 8'3 - 8'3 - 12'3 - 12'3 - 12'3 - 12'3 - 12'3 - 12'3 - 12'3	- 15'9 - 65'4 - 17'4 - 38'1 - 25'7 - 20'8 + 32'6 + 30'2 + 23'9 + 33'3 - 20'4 - 33'2 + 13'7 + 0'1 (- 5'7) (- 15'1) (- 60'7) - 11'4 - 38'4 - 20'5 - 13'8 - 12'3 - 25'4	- 26'2 - 53'9 - 17'0 - 53'9 - 27'2 - 31'8 + 38'5 + 38'5 + 28'7 + 33'3 - 19'6 - 35'0 + 10'4 + 1'1 (- 4'9) (- 14'8) (- 61'0) - 18'5 - 33'9 - 33'9 - 18'5 - 10'8 - 33'9	Observations difficult. Star observed some- times through cloud. Definition poor. Definition somewhat poor. Definition fair. Measures considered good. Spectrum bright and steady. Star-line clearly seen. Definition very good. Definition fair. Displacement evidently large. Measures considered good. Star-line faint and difficult to see steadily. Spectrum very tremulous. Star-line exceed- ingly difficult to see. Decided displace- ment towards the blue. Spectrum very bright, but tremulous. Star- line very broad and ill-defined. The star- line did not seem to be quite symmetrical, but to have a broader fringe towards the blue than towards the red; the most con- densed portion of the line being slightly on the red side of the centre. Position Circle, 185°.
Nov. 6. 12. 26 12. 30 12. 35 12. 40 12. 46	M M M M M	Sun. ,, ,, ,, ,,	F F F F F	0'214 0'214 0'214 0'214 0'214	+0'031 -0'016 +0'008 -0'013 +0'016			+ 9'4 - 4'9 + 2'4 - 4'0 - 4'9		Position Circle, 185°.
Nov. 17. 18. 15 18. 20 18. 40 18. 45 18. 50 18. 55 19. 0 19. 5 19. 10 19. 15 19. 20 19. 25 19. 30 19. 34 19. 37 19. 41 19. 45 19. 55 20. 0 20. 5 20. 10 20. 15 20. 18 20. 20 20. 23 20. 25	M M	α Lyrae ,, α Aquilæ ,, ζ Aquilæ ,, ,, ,, γ Cygni ,, α Cygni ,, ε Cygni ,, ,, ,, ,, α Cephei ,, α Pegasi ,, Moon ,, ,, ,, ,, ,, ,,	F F	0'138 0'138	-0'145 -0'067 -0'258 -0'129 +0'001 -0'083 +0'050 -0'138 -0'039 +0'029 -0'102 -0'106 +0'120 +0'034 +0'011 +0'023 +0'130 -0'088 -0'098 -0'023 -0'028 -0'009 -0'010 -0'042 +0'010 +0'005	- 3/10 - 1/10 - 2/10 - 1/10 0 - 1/10 + 1/10 - 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10	+ 6'6 + 6'6 + 14'8 + 14'8 + 12'0 + 12'0 + 12'0 + 12'0 + 10'2 + 10'2 + 9'3 + 9'3 + 12'2 + 12'2 + 12'2 + 12'2 + 4'7 + 4'7 + 15'9 + 15'9 - 2'7 - 3'0 - 12'7 + 3'0 + 1'5	- 50'6 - 27'0 - 93'2 - 54'0 - 12'0 - 37'2 + 3'2 - 53'9 - 22'0 - 1'4 - 40'3 - 41'5 + 24'2 - 1'9 - 8'9 - 5'2 + 27'3 - 31'4 - 34'5 - 22'9 - 24'4 - 32'8	- 57'4 - 49'0 - 71'3 - 57'2 - 12'0 - 33'2 + 4'9 - 54'4 - 22'3 - 1'7 - 37'6 - 43'2 + 13'2 - 3'7 - 12'2 + 16'1 + 30'2 - 33'0 - 47'1 - 24'4 - 32'8	Spectrum bright, but very unsteady. Spectrum very tremulous. Spectrum tremulous and extremely faint. Measures very difficult. Spectrum fairly steady. Definition good. Spectrum steady. Definition good. Spectrum steady. Star-line faint. Defini- tion fair. Spectrum steady. Definition fair. Definition fair. The coincidence of the two spectra appeared perfect.

MOTIONS OF STARS IN THE LINE OF SIGHT, INFERRED FROM SPECTROSCOPIC OBSERVATIONS

Date, 1885, Greenwich Civil Time.	Observer.	Objects.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Nov. 17. 20. 35	M	γ Pegasi	F	0'138	-0'063	- $\frac{1}{10}$	+ 13'7	- 32'8	- 42'0	Spectrum faint and tremulous. Measures rather rough.
20. 40	M	, ,	F	0'138	-0'042	- $\frac{1}{4}$	+ 13'7	- 26'4	- 34'9	
20. 45	M	α Andromedæ .	F	0'138	-0'103	- $\frac{1}{2}$	+ 11'6	- 42'9	- 54'0	Spectrum steady. Definition good.
20. 50	M	, ,	F	0'138	-0'075	- $\frac{2}{5}$	+ 11'6	- 34'4	- 45'5	
20. 55	M	β Arietis	F	0'138	-0'104	- $\frac{2}{5}$	+ 7'4	- 39'0	- 41'3	Spectrum fairly bright and steady. Star-line very broad and diffused. Definition fair.
21. 0	M	, ,	F	0'138	-0'153	- $\frac{3}{5}$	+ 7'4	- 53'9	- 58'2	
21. 5	M	α Arietis	F	0'138	+0'002	0	+ 6'3	- 5'7	- 6'3	Spectrum steady. Star-line very faint and only seen with great difficulty by glimpses.
21. 10	M	, ,	F	0'138	-0'019	- $\frac{1}{5}$	+ 6'3	- 12'1	- 23'2	
21. 15	M	γ Persei	F	0'138	+0'265	+ $\frac{3}{2}$	- 0'7	+ 81'2	+ 64'3	Spectrum faint. Star-line faint and diffused. Bisections very difficult.
21. 25	M	, ,	F	0'138	+0'172	+ $\frac{2}{3}$	- 0'7	+ 53'0	+ 57'2	
21. 30	M	β Persei	F	0'138	-0'107	- $\frac{1}{2}$	- 0'4	- 32'9	- 42'8	Spectrum fairly bright and steady. Definition good.
21. 35	M	, ,	F	0'138	-0'150	- $\frac{3}{5}$	- 0'4	- 46'0	- 56'9	
Nov. 18. 19. 8	N	α Lyra	F	0'210	-0'118	- $\frac{2}{5}$	+ 6'5	- 42'3	- 39'3	Star-line diffused. Measures difficult and doubtful.
19. 13	N	, ,	F	0'210	-0'131	- $\frac{1}{2}$	+ 6'5	- 46'3	- 47'5	
19. 48	N	α Aquilæ	F	0'210	-0'032	- $\frac{1}{2}$	+ 14'7	- 24'4	- 25'0	
19. 55	N	, ,	F	0'210	-0'105	- $\frac{1}{2}$	+ 14'7	- 46'6	- 45'5	
20. 15	N	α Cygni	F	0'210	-0'107	- $\frac{1}{2}$	+ 9'4	- 41'9	- 40'2	
20. 20	N	, ,	F	0'210	-0'098	- $\frac{1}{2}$	+ 9'4	- 39'2	- 40'2	
21. 28	N	Moon	F	0'210	-0'007			- 2'1		The coincidence of the two spectra appeared perfect.
21. 30	N	, ,	F	0'210	-0'025			- 7'6		
21. 32	N	, ,	F	0'210	+0'008			+ 2'4		Position Circle, 185°.
21. 34	N	, ,	F	0'210	+0'020			+ 6'1		
Nov. 28. 21. 30	M	α Andromedæ .	F	0'095	-0'076	- $\frac{3}{10}$	+ 13'8	- 36'9	- 25'7	
21. 55	M	, ,	F	0'095	-0'064	- $\frac{1}{10}$	+ 13'8	- 33'2	- 25'7	
22. 25	M	Aldebaran . . .	F	0'095	+0'064	+ $\frac{3}{10}$	- 0'4	+ 19'8	+ 12'3	
22. 40	M	, ,	F	0'095	+0'122	+ $\frac{3}{5}$	- 0'4	+ 37'5	+ 26'9	
23. 0	M	Rigel	F	0'095	+0'060	+ $\frac{1}{10}$	- 2'3	+ 20'5	+ 14'2	
23. 10	M	, ,	F	0'095	+0'102	+ $\frac{1}{5}$	- 2'3	+ 33'3	+ 28'8	
23. 25	M	Sirius	F	0'095	-0'068	- $\frac{1}{2}$	- 8'5	- 12'2	- 11'4	Displacement seemed to be small and towards the blue.
23. 35	M	, ,	F	0'095	-0'022	- $\frac{1}{5}$	- 8'5	+ 1'8	+ 0'6	
23. 40	M	, ,	F	0'095	-0'106	- $\frac{3}{4}$	- 8'5	- 23'7	- 18'0	
23. 50	M	, ,	F	0'095	-0'027	- $\frac{1}{4}$	- 8'5	+ 0'3	- 1'4	
23. 55	M	, ,	F	0'095	-0'121	- $\frac{3}{4}$	- 8'5	- 28'2	- 21'3	
29. 0. 5	M	, ,	F	0'095	+0'004	0	- 8'5	+ 9'7	+ 8'5	
Dec. 1. 20. 32	N	α Andromedæ .	F	0'140	-0'028	- $\frac{1}{10}$	+ 14'3	- 22'8	- 23'9	Slit too narrow for satisfactory work.
20. 41	N	, ,	F	0'140	-0'074	- $\frac{2}{5}$	+ 14'3	- 36'8	- 37'4	Spectrum faint. Measures difficult.
21. 36	N	β Arietis	F	0'265	-0'096	- $\frac{1}{3}$	+ 11'4	- 40'5	- 48'0	
21. 47	N	, ,	F	0'265	-0'159	- $\frac{2}{3}$	+ 11'4	- 59'7	- 66'4	Measures difficult.
22. 26	N	α Arietis	F	0'265	-0'100	- $\frac{1}{3}$	+ 10'4	- 40'8	- 47'0	
22. 34	N	, ,	F	0'265	-0'065	- $\frac{1}{4}$	+ 10'4	- 30'1	- 37'9	Star-line very faint and indistinct.
23. 31	N	Aldebaran	F	0'265	-0'083	- $\frac{1}{4}$	+ 0'6	(- 25'8)	(- 28'1)	
23. 41	N	, ,	F	0'265	-0'048	- $\frac{1}{8}$	+ 0'6	(- 15'2)	(- 14'3)	Position Circle, 186°.
Dec. 8. 19. 43	N	α Andromedæ .	F	0'192	-0'116	- $\frac{2}{5}$	+ 15'4	- 50'7	- 47'8	Spectrum bright and steady. Star-line distinct.
19. 47	N	, ,	F	0'192	-0'107	- $\frac{2}{5}$	+ 15'4	- 47'9	- 47'8	
20. 9	N	γ Pegasi	F	0'192	-0'072	- $\frac{1}{4}$	+ 17'3	- 39'2	- 37'6	
20. 14	N	, ,	F	0'192	-0'050	- $\frac{1}{5}$	+ 17'3	- 32'5	- 33'5	
20. 34	N	β Arietis	F	0'192	-0'032	- $\frac{1}{8}$	+ 13'2	- 22'9	- 23'3	
20. 44	N	, ,	F	0'192	-0'086	- $\frac{1}{3}$	+ 13'2	- 39'3	- 40'2	
20. 59	N	α Arietis	F	0'192	-0'115	- $\frac{3}{10}$	+ 12'2	- 47'1	- 44'6	
21. 4	N	, ,	F	0'192	-0'056	- $\frac{1}{4}$	+ 12'2	- 29'2	- 32'5	

Date, 1885, Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Stars in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Dec. 8. 21. 1	N	β Persei	F	0'192	-0'037	- $\frac{1}{7}$	+ 6'7	- 18'0	- 18'3	Spectrum tremulous. Wind high.
21. 49	N	"	F	0'192	-0'048	- $\frac{1}{5}$	+ 6'7	- 21'3	- 22'9	
22. 24	N	Aldebaran	F	0'192	+0'087	+ $\frac{1}{3}$	+ 2'9	+ 23'5	+ 24'1	
22. 29	N	"	F	0'192	+0'107	+ $\frac{2}{5}$	+ 2'9	+ 29'6	+ 29'5	Wind very troublesome.
23. 4	N	Rigel	F	0'192	+0'110	+ $\frac{2}{5}$	+ 0'5	+ 32'9	+ 31'9	
23. 9	N	"	F	0'192	+0'048	+ $\frac{1}{5}$	+ 0'5	+ 14'1	+ 15'7	
23. 34	N	β Tauri	F	0'192	-0'123	- $\frac{1}{2}$	- 1'2	- 36'2	- 39'4	Position Circle, 186°.
23. 39	N	"	F	0'192	-0'128	- $\frac{1}{2}$	- 1'2	- 37'7	- 39'4	
Dec. 15. 19. 35	N	α Pegasi	F	0'199	+0'015	0	+ 17'9	- 13'3	- 17'9	Star-line broad and dark.
19. 40	N	"	F	0'199	+0'079	+ $\frac{1}{3}$	+ 17'9	+ 6'1	+ 6'5	
19. 55	N	γ Pegasi	F	0'199	-0'035	- $\frac{1}{5}$	+ 18'0	- 28'7	- 30'2	
20. 0	N	"	F	0'199	-0'038	- $\frac{1}{5}$	+ 18'0	- 29'6	- 30'2	Spectrum bright and steady. Star-line faint.
20. 15	N	α Andromedæ .	F	0'199	+0'007	0	+ 16'2	- 14'1	- 16'2	
20. 20	N	"	F	0'199	-0'013	0	+ 16'2	- 20'2	- 16'2	
20. 35	N	Moon	F	0'199	+0'009			+ 2'7		The coincidence of the two spectra appeared perfect.
20. 37	N	"	F	0'199	+0'005			+ 1'5		
20. 40	N	"	F	0'199	-0'002			- 0'6		
20. 42	N	"	F	0'199	+0'006			+ 1'8		Star-line faint. Measures difficult.
21. 10	N	β Arietis	F	0'199	-0'064	- $\frac{1}{4}$	+ 14'7	- 34'1	- 33'0	
21. 15	N	"	F	0'199	-0'037	- $\frac{1}{5}$	+ 14'7	- 25'9	- 26'9	
21. 50	N	α Arietis	F	0'199	+0'033	+ $\frac{1}{5}$	+ 13'9	- 3'9	- 4'8	
22. 0	N	"	F	0'199	+0'015	0	+ 13'9	- 9'3	- 13'9	
22. 15	N	Aldebaran	F	0'199	+0'142	+ $\frac{1}{2}$	+ 5'2	+ 37'9	+ 31'4	
22. 20	N	"	F	0'199	+0'096	+ $\frac{2}{5}$	+ 5'2	+ 23'9	+ 24'1	
22. 35	N	Rigel	F	0'199	+0'111	+ $\frac{1}{2}$	+ 2'5	+ 31'2	+ 34'1	
22. 40	N	"	F	0'199	+0'060	+ $\frac{1}{4}$	+ 2'5	+ 15'7	+ 15'8	
22. 52	N	γ Orionis	F	0'199	+0'030	+ $\frac{1}{7}$	+ 1'6	+ 7'5	+ 8'8	
22. 57	N	"	F	0'199	+0'007	0	+ 1'6	- 3'7	- 1'6	
23. 20	N	Sirius	F	0'199	-0'083	- $\frac{1}{3}$	- 4'6	- 20'6	- 19'8	
23. 25	N	"	F	0'199	-0'068	- $\frac{1}{4}$	- 4'6	- 16'1	- 13'7	
23. 35	N	Procyon	F	0'199	-0'133	- $\frac{1}{2}$	- 9'1	- 31'3	- 27'5	
23. 40	N	"	F	0'199	-0'071	- $\frac{1}{4}$	- 9'1	- 12'5	- 9'2	
23. 44	N	"	F	0'199	-0'060	- $\frac{1}{4}$	- 9'1	- 9'1	- 9'2	Position Circle, 186°.
23. 48	N	"	F	0'199	-0'077	- $\frac{1}{3}$	- 9'1	- 14'3	- 15'3	

ROTATION OF JUPITER deduced from the Relative Displacement of Lines in the Spectrum at the East and West Limbs respectively.

Date, 1885, Greenwich Civil Time.	Observer.	W. Limb.	E. Limb.	Line.	Width of Slit.	Displace- ment Measured.	Concluded Motion in Miles per Second. W - E.	Position Circle.	REMARKS.
Apr. 21. 22. 25	M	0'553	0'745	δ_1	0'230	+0'002	+34'5	207 30	Cylindrical lens before slit. Slit tangential to limb. The limb of the planet was brought as accurately as possible up to the outer edge of the slit.
22. 29	M	0'708	0'751	δ_1	0'230	+0'043	+10'1		
22. 32	M	0'685	0'812	δ_1	0'230	+0'127	+47'7		
22. 37	M	0'709	0'780	δ_1	0'230	+0'071	+16'6		
22. 41	M	0'710	0'798	δ_1	0'230	+0'088	+33'0		
Mean							+31'6		
22. 45	M	0'168	0'190	δ_1	0'230	+0'022	+8'3	117 30	No cylindrical lens before slit. Slit radial, parallel to planet's equator. The upper and lower edge of the spectrum represented the W. and E. limbs of the planet. The spectrum was bright and the definition fair, but it was found much more difficult to measure the line at the actual limb than with the former arrangement.
22. 48	M	0'071	0'205	δ_1	0'230	+0'134	+50'3		
22. 51	M	0'058	0'094	δ_1	0'230	+0'034	+12'8		
22. 55	M	0'058	0'091	δ_1	0'230	+0'033	+12'4		
23. 0	M	0'041	0'090	δ_1	0'230	+0'049	+18'4		
Mean							+20'4		
Apr. 27. 21. 6	M	0'267	0'386	δ_1	0'125	+0'119	+44'7	207 30	Cylindrical lens. Slit tangential. The limb of the planet was brought as accurately as possible up to the outer edge of the slit. Misty. The lines in the spectrum of Jupiter were very faint and difficult to see.
21. 16	M	0'379	0'413	δ_1	0'125	+0'034	+12'8		
Mean							+28'8		
Apr. 29. 20. 45	M	0'940	0'960	δ_1	0'088	+0'020	+7'5	207 30	Cylindrical lens. Slit tangential. The limb of the planet was brought as accurately as possible up to the outer edge of the slit. The lines in the spectrum of Jupiter were very faint and difficult to see.
20. 50	M	0'854	0'938	δ_1	0'088	+0'034	+31'6		
20. 55	M	0'889	0'922	δ_1	0'088	+0'033	+12'4		
Mean							+17'2		
21. 18	M	0'307	0'372	δ_1	0'088	+0'065	+24'4	27 30	
21. 21	M	0'248	0'255	δ_1	0'088	+0'045	+16'9		
21. 25	M	0'227	0'432	δ_1	0'088	+0'135	+50'7		
Mean							+30'7		

Calculated Relative Motion of the limbs, +32 miles per second.

The following Measures of the Relative Displacement of the Lines in the Spectrum of JUPITER at the North and South Limbs were made as a check upon the preceding Measures —

Date, 1885, Greenwich Civil Time.	Observer.	N. Limb.	S. Limb.	Line.	Width of Slit.	Displace- ment Measured.	Concluded Motion in Miles per Second. N - S.	Position Circle.	REMARKS.
Apr. 29. 21. 2	M	0'103	0'161	δ_1	0'088	-0'032	-12'0	117 30	Cylindrical lens. Slit tangential. The limb of the planet was brought as accurately as possible up to the outer edge of the slit. The lines in the spectrum of Jupiter were very faint and difficult to see. It was found more difficult to measure the lines with the slit horizontal than with the slit vertical.
21. 6	M	0'093	0'101	δ_1	0'088	+0'008	+3'0		
21. 11	M	0'048	0'075	δ_1	0'088	+0'027	+10'1		
Mean							+0'4		
21. 32	M	0'461	0'513	δ_1	0'088	+0'052	+19'5	297 30	
21. 36	M	0'567	0'533	δ_1	0'088	-0'034	-12'8		
21. 40	M	0'563	0'561	δ_1	0'088	-0'002	-0'8		
Mean							+2'0		

The "half-prism" spectroscope in the direct position with a dispersion of one "half-prism" was used in all the above observations of Jupiter.

ROTATION OF SATURN'S RINGS deduced from the Relative Displacement of Lines in the Spectrum at the East and West Anses respectively.

Date, 1885, Greenwich Civil Time.	Observer.	W. Ansa.	E. Ansa.	Line.	Width of Slit.	Displace- ment Measured.	Concluded Motion in Miles per Second. W - E.	Position Circle.	REMARKS.
Apr. 21. 20. 50	M	0'556	0'741	δ_1	0'230	+0'085	+31'9	180 0	Cylindrical lens before slit. Slit parallel to minor axis of ring. So far as could be ascertained the Cassinian division was on the inner edge of the slit at each observation. The lines in the spectrum of the ring were exceedingly faint and difficult to see. It was not found possible to make observations for determining the velocity of rotation of the ball.
20. 55	M	0'371	0'410	δ_1	0'230	+0'030	+14'7		
21. 0	M	0'386	0'410	δ_1	0'230	+0'024	+9'0		
21. 4	M	0'578	0'565	δ_1	0'230	-0'013	-4'9		
21. 9	M	0'413	0'542	δ_1	0'230	+0'127	+47'7		
21. 13	M	0'477	0'499	δ_1	0'230	+0'022	+8'3		
21. 17	M	0'435	0'550	δ_1	0'230	+0'115	+43'2		
21. 21	M	0'597	0'703	δ_1	0'230	+0'106	+39'8		
21. 25	M	0'721	0'823	δ_1	0'230	+0'102	+38'3		
21. 30	M	0'538	0'643	δ_1	0'230	+0'105	+39'4		
Mean							+26'7		

Assuming that the particles of the ring revolve as Satellites round Saturn, and taking the distance of the points of the Ansa observed from centre of Saturn, as $18''.4$ at mean distance ($9^h 58^m$), the mass of Saturn as 97.28 , and the Sun's mean distance at $91,250,000$ miles, the Calculated Relative Motion of the Ansa in the line of sight (for the points observed) would be $+18'6$ miles per second. The "half-prism" spectroscope in the direct position with a dispersion of one "half-prism" was employed throughout.

18 COLLECTED RESULTS FOR MOTIONS OF STARS IN THE LINE OF SIGHT, FROM SPECTROSCOPIC OBSERVATIONS

COLLECTED RESULTS for MOTIONS of STARS in the line of Sight, from SPECTROSCOPIC OBSERVATIONS made at the ROYAL OBSERVATORY, GREENWICH, in the Year 1885.

(F for the Star or Moon is compared with H_{β} of Hydrogen, and b_1, b_2, b_4 with Mg_1, Mg_2, Mg_3 of Magnesium.)

(+ denotes Recession ; — Approach.)

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		
								Measured.	Estimated.	
α ANDROMEDÆ.										
November	6	M	2	1	185	0'214	F	+ 8'7	— 23'3	— 29'5
	17	M	2	1	185	0'138	F	+ 11'6	— 38'7	— 49'8
	28	M	2	1	185	0'095	F	+ 13'8	— 35'1	— 25'7
December	1	N	2	1	186	0'140	F	+ 14'3	— 29'8	— 30'7
	8	N	2	1	186	0'192	F	+ 15'4	— 49'3	— 47'8
	15	N	2	1	186	0'199	F	+ 16'2	— 17'2	— 16'2
γ PEGASI.										
November	17	M	2	1	185	0'138	F	+ 13'7	— 29'6	— 38'5
December	8	N	2	1	186	0'192	F	+ 17'3	— 35'9	— 35'6
	15	N	2	1	186	0'199	F	+ 18'0	— 29'2	— 30'2
α CASSIOPEIÆ.										
October	5	M	2	1	5	0'108	b_1	— 5'0	+ 55'9	+ 54'4
β ARIETIS.										
November	17	M	2	1	185	0'138	F	+ 7'4	— 46'5	— 49'8
December	1	N	2	1	186	0'265	F	+ 11'4	— 50'1	— 57'2
	8	N	2	1	186	0'192	F	+ 13'2	— 31'1	— 31'8
	15	N	2	1	186	0'199	F	+ 14'7	— 30'0	— 30'0
α ARIETIS.										
November	17	M	2	1	185	0'138	F	+ 6'3	— 8'9	— 14'8
December	1	N	2	1	186	0'265	F	+ 10'4	— 35'5	— 42'5
	8	N	2	1	186	0'192	F	+ 12'2	— 38'2	— 38'6
	15	N	2	1	186	0'199	F	+ 13'9	— 6'6	— 9'4

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
γ PERSEI.									
November 17	M	2	1	° 185	r 0.138	F	— 0.7	+ 67.1	+ 60.8
β PERSEI.									
February 7	M	2	1	186	0.120	F	+ 17.4	— 45.1	— 57.3
November 17	M	2	1	185	0.138	F	+ 0.4	— 39.5	— 49.9
December 8	N	2	1	186	0.192	F	+ 6.7	— 19.7	— 20.6
α PERSEI.									
February 7	M	2	1	186	0.120	F	+ 16.0	— 74.8	— 87.2
α TAURI (<i>Aldebaran</i>).									
February 3	M	2	1	186	0.260	F	+ 17.3	+ 7.2	+ 13.1
5	M	3	1	186	0.130	F	+ 17.6	+ 7.7	+ 10.3
7	M	2	1	186	0.120	F	+ 17.8	+ 36.3	+ 42.0
19	M	2	1	186	0.163	F	+ 18.5	+ 27.4	+ 16.5
21	M	2	1	185	0.114	F	+ 18.6	+ 33.5	+ 26.1
23	M	2	1	185	0.175	b ₁	+ 18.6	+ 20.8	+ 14.0
25	M	2	1	185	0.118	b ₁	+ 18.6	+ 18.6	+ 11.0
March 10	N	2	1	° 185	0.142	b ₁	+ 18.1	+ 41.4	+ 39.1
12	N	1	1	185	0.161	b ₁	+ 17.9	+ 14.8	+ 17.4
November 6	M	2	1	° 185	0.214	F	— 7.7	+ 31.9	+ 38.5
28	M	2	1	185	0.095	F	— 0.4	+ 28.7	+ 19.6
December 1	N	2	1	186	0.265	F	+ 0.6	(— 20.5)	(— 21.2)
8	N	2	1	186	0.192	F	+ 2.9	+ 26.6	+ 26.8
15	N	2	1	186	0.199	F	+ 5.2	+ 30.9	+ 27.8
α AURIGÆ (<i>Capella</i>).									
February 7	M	4	1	186	0.120	F	+ 14.9	+ 2.7	+ 5.0
23	M	2	1	185	0.175	b ₁	+ 16.7	+ 19.4	+ 16.8
25	M	2	1	185	0.118	b ₁	+ 16.8	+ 13.6	+ 7.5
March 10	N	2	1	° 185	0.142	b ₁	+ 17.2	— 0.1	— 5.0
12	N	3	1	185	0.161	b ₁	+ 17.1	+ 31.2	+ 32.3
November 6	M	2	1	° 185	0.214	F	— 10.3	+ 28.6	+ 31.0

20 COLLECTED RESULTS FOR MOTIONS OF STARS IN THE LINE OF SIGHT, FROM SPECTROSCOPIC OBSERVATIONS

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		
								Measured.	Estimated.	
β ORIONIS (<i>Rigel</i>).										
February	5	M	2	1	186	0.130	F	+ 14.3	+ 10.6	+ 8.9
	7	M	6	1	186	0.120	F	+ 14.5	+ 13.2	+ 8.0
	21	M	2	1	185	0.114	F	+ 15.7	+ 28.5	+ 21.6
November	6	M	3	1	185	0.214	F	— 8.3	(— 27.2)	(— 26.9)
	28	M	2	1	185	0.095	F	— 2.3	+ 26.9	+ 21.5
December	8	N	2	1	186	0.192	F	+ 0.5	+ 23.5	+ 25.8
	15	N	2	1	186	0.199	F	+ 2.5	+ 23.5	+ 25.0
γ ORIONIS.										
February	5	M	2	1	186	0.130	F	+ 15.3	— 17.3	— 20.0
	7	M	4	1	186	0.120	F	+ 15.7	— 25.9	— 31.4
November	6	M	2	1	185	0.214	F	— 10.4	+ 6.9	+ 5.8
December	15	N	2	1	186	0.199	F	+ 1.6	+ 1.9	+ 3.6
β TAURI.										
February	5	M	4	1	186	0.130	F	+ 15.6	— 35.9	— 39.6
	7	M	3	1	186	0.120	F	+ 16.0	(— 39.8)	(— 51.1)
November	6	M	2	1	185	0.214	F	— 11.2	— 26.8	— 27.3
December	8	N	2	1	186	0.192	F	— 1.2	— 37.0	— 39.4
δ ORIONIS.										
February	5	M	4	1	186	0.130	F	+ 14.4	— 23.1	— 26.0
ϵ ORIONIS.										
February	5	M	2	1	186	0.130	F	+ 14.2	— 17.7	— 16.6
ζ ORIONIS.										
February	5	M	2	1	186	0.130	F	+ 13.9	— 23.8	— 25.5

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		
								Measured.	Estimated.	
κ ORIONIS.										
February	5	M	4	1	^o 186	^r 0'130	F	+ 12'6	— 24'8	— 23'1
α ORIONIS.										
February	23 25	M M	2 2	1 1	185 185	0'175 0'118	b ₁ b ₁	+ 16'7 + 16'9	+ 21'4 + 12'6	+ 22'4 + 4'5
β AURIGÆ.										
February	7	M	2	1	186	0'120	F	+ 13'6	(— 49'8)	(— 56'3)
γ GEMINORUM.										
February	5	M	4	1	186	0'130	F	+ 12'0	— 93'7	— 79'4
α CANIS MAJORIS (<i>Sirius</i>).										
February	3 5 7	M M M	6 4 3	1 1 1	186 186 186	0'260 0'130 0'120	F F F	+ 7'9 + 8'3 + 8'7	— 13'4 — 42'5 (— 71'3)	— 15'2 — 47'1 (— 50'4)
March	14 14 27	M M N	4 4 2	1 2 1	185 185 185	0'158 0'158 0'105	F F F	+ 13'6 + 13'6 + 14'1	— 21'4 — 21'9 — 10'3	— 23'4 — 25'9 — 8'9
November	6 28	M M	6 6	1 1	185 185	0'214 0'095	F F	— 12'3 — 8'5	— 20'3 — 8'7	— 24'9 — 7'2
December	15	N	2	1	186	0'199	F	— 4'6	— 18'4	— 16'8
α GEMINORUM (<i>Castor</i>).										
February	4	M	2	1	186	0'260	F	+ 8'4	— 21'8	— 25'0
March	14 27	M N	4 3	1 1	185 185	0'158 0'105	F F	+ 16'7 + 17'8	— 38'9 — 9'9	— 41'1 — 11'6

22 COLLECTED RESULTS FOR MOTIONS OF STARS IN THE LINE OF SIGHT, FROM SPECTROSCOPIC OBSERVATIONS

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		
								Measured.	Estimated.	
α CANIS MINORIS (<i>Procyon</i>).										
February	3	M	2	1	186	0.260	F	+ 6.6	- 12.6	- 17.6
	5	M	4	1	186	0.130	F	+ 7.2	- 0.1	- 1.4
March	14	M	4	1	185	0.158	F	+ 15.5	- 19.5	- 20.2
	27	N	2	1	185	0.105	F	+ 17.0	- 33.9	- 33.6
December	15	N	4	1	186	0.199	F	- 9.1	- 16.8	- 15.3
β GEMINORUM (<i>Pollux</i>).										
February	3	M	2	1	186	0.260	F	+ 7.3	- 35.2	- 34.9
	23	M	2	1	185	0.175	b_1	+ 12.7	- 17.2	- 18.3
	25	M	2	1	185	0.118	b_1	+ 13.1	- 33.4	- 40.0
March	11	M	2	1	185	0.125	b_1	+ 15.9	- 25.9	- 30.2
	14	M	4	1	185	0.158	F	+ 16.3	- 25.6	- 24.7
April	21	M	2	1	180	0.230	b_1	+ 17.8	- 23.3	- 27.5
α HYDRÆ.										
February	23	M	2	1	185	0.175	b_1	+ 3.0	+ 8.8	+ 8.2
March	11	M	2	1	185	0.125	b_1	+ 7.5	+ 5.5	+ 6.8
α LEONIS (<i>Regulus</i>).										
March	14	M	2	1	185	0.158	F	+ 8.3	- 15.7	- 20.2
April	18	M	2	1	185	0.162	F	+ 15.9	+ 6.9	+ 3.0
γ^1 LEONIS.										
March	11	M	2	1	185	0.125	b_1	+ 7.4	+ 23.0	+ 23.2
α URÆ MAJORIS.										
August	14	M	1	1	185	0.125	F	- 1.7	- 3.4	- 5.7

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		
								Measured.	Estimated.	
β LEONIS.										
March 14	M	4	1	$\circ$ 185	r 0'158	F	+ 1'4	— 16'5	— 14'4	
δ URSÆ MAJORIS.										
August 11	M	2	1	185	ϵ 0'125	F	+ 2'1	+ 30'1	+ 29'4	
ϵ URSÆ MAJORIS.										
August 10	M	4	1	185	0'125	F	+ 3'4	— 41'7	— 41'1	
ϵ VIRGINIS.										
March 12	M	2	1	185	0'125	b_1	— 5'1	+ 7'6	+ 6'8	
April 29	M	2	1	185	0'088	b_1	+ 9'1	— 18'0	— 22'5	
α VIRGINIS (<i>Spica</i>).										
March 14	M	2	1	185	0'158	F	— 8'6	— 25'5	— 28'1	
ζ URSÆ MAJORIS.										
August 10	M	2	1	185	0'125	F	+ 4'2	+ 34'6	+ 32'9	
η URSÆ MAJORIS.										
August 10	M	4	1	185	0'125	F	+ 6'2	+ 14'6	+ 15'7	

24 COLLECTED RESULTS FOR MOTIONS OF STARS IN THE LINE OF SIGHT, FROM SPECTROSCOPIC OBSERVATIONS

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		
								Measured.	Estimated.	
α DRACONIS.										
August	10	M	4	1	^o 185	^r 0'125	F	+ 2'1	+ 34'9	+ 35'0
α BOÖTIS (<i>Arcturus</i>).										
March	11	M	2	1	185	0'125	<i>b</i> ₁	— 8'2	— 12'5	— 13'5
	14	M	2	1	185	0'158	F	— 7'5	— 46'7	— 52'8
April	29	M	2	1	185	0'088	<i>b</i> ₁	+ 4'6	— 35'8	— 40'2
May	7	N	2	1	186	0'158	<i>b</i> ₁	+ 6'6	— 70'3	— 74'1
	29	N	3	1	186	0'170	<i>b</i> ₁	+ 11'1	— 48'3	— 50'9
June	2	N	2	1	186	0'164	F	+ 11'8	— 36'7	— 35'2
	2	N	2	1	186	0'205	F	+ 11'8	— 42'0	— 43'5
	18	N	2	1	186	0'157	F	+ 13'9	— 47'5	— 46'0
July	9	M	2	1	186	0'116	F	+ 15'2	— 52'1	— 43'1
α CORONÆ BOREALIS.										
July	9	M	2	1	186	0'116	F	+ 11'7	+ 4'9	— 0'5
August	17	M	2	1	185	0'125	F	+ 12'4	— 11'8	— 12'4
ζ DRACONIS.										
August	10	M	2	1	185	0'125	F	+ 1'1	— 46'1	— 44'4
α OPHIUCHI.										
June	18	N	2	1	186	0'157	F	+ 1'8	— 38'4	— 37'9
July	9	M	2	1	186	0'116	F	+ 6'6	— 39'9	— 34'6
	23	N	2	1	186	0'110	F	+ 9'4	— 30'5	— 32'2
α LYRÆ (<i>Vega</i>).										
May	30	N	2	1	186	0'130	F	— 4'8	(— 7'4)	(— 6'8)
July	10	M	2	1	186	0'116	F	+ 0'6	— 32'1	— 28'5

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		
								Measured.	Estimated.	
α LYRÆ (Vega)—cont.										
August	3	M	2	1	185	0'125	F	+ 4'0	— 33'9	— 34'9
	5	M	2	1	185	0'125	F	+ 4'2	— 42'9	— 41'3
	10	M	2	1	185	0'125	F	+ 4'8	— 54'6	— 53'0
	17	M	2	1	185	0'125	F	+ 5'6	— 26'9	— 27'2
	25	M	2	1	185	0'125	F	+ 6'5	— 35'5	— 37'5
	27	M	2	1	185	0'125	F	+ 6'6	— 19'5	— 21'1
	29	M	2	1	185	0'125	F	+ 6'8	— 38'1	— 37'8
November	5	M	4	1	185	0'214	F	+ 7'7	— 34'2	— 37'8
	17	M	2	1	185	0'138	F	+ 6'6	— 38'8	— 53'2
	18	N	2	1	185	0'210	F	+ 6'5	— 44'3	— 43'4
ζ AQUILÆ.										
November	17	M	4	1	185	0'138	F	+ 12'0	— 25'0	— 23'7
α AQUILÆ (Altair.)										
July	10	M	2	1	186	0'116	F	— 3'3	— 45'0	— 38'6
	23	N	2	1	186	0'110	F	+ 0'3	— 4'7	— 4'9
August	3	M	2	1	185	0'125	F	+ 3'2	— 50'6	— 40'3
	25	M	2	1	185	0'125	F	+ 8'5	— 50'1	— 49'8
	29	M	2	1	185	0'125	F	+ 9'4	— 36'0	— 38'3
November	17	M	2	1	185	0'138	F	+ 14'8	— 73'6	— 64'3
	18	N	2	1	185	0'210	F	+ 14'7	— 35'5	— 35'3
γ CYGNI.										
November	17	M	2	1	185	0'138	F	+ 10'2	— 11'7	— 12'0
α CYGNI.										
July	10	M	2	1	186	0'116	F	— 6'4	— 35'4	— 29'0
August	25	M	2	1	185	0'125	F	— 0'1	— 30'5	— 33'0
September	26	M	2	1	185	0'144	b ₁	+ 4'6	— 67'7	— 68'2
November	17	M	2	1	185	0'138	F	+ 9'3	— 40'9	— 40'4
	18	N	2	1	185	0'210	F	+ 9'4	— 40'6	— 40'2

GREENWICH OBSERVATIONS, 1885.

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26 COLLECTED RESULTS FOR MOTIONS OF STARS IN THE LINE OF SIGHT, FROM SPECTROSCOPIC OBSERVATIONS

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
ε CYGNI.									
November 17	M	5	1	185	0.138	F	+ 12.2	+ 7.1	+ 2.3
α CEPHEI.									
August 26	M	2	1	185	0.125	F	- 4.0	- 17.3	- 20.8
November 17	M	2	1	185	0.138	F	+ 4.7	- 33.0	- 40.1
β PEGASI.									
October 5	M	2	1	5	0.108	b ₄	+ 4.1	- 31.9	- 30.6
α PEGASI.									
July 23	N	2	1	186	0.110	F	- 13.0	- 18.5	- 20.4
August 26	M	2	1	185	0.125	F	- 5.5	+ 8.8	+ 7.3
November 17	M	2	1	185	0.138	F	+ 15.9	- 23.7	- 28.6
December 15	N	2	1	186	0.199	F	+ 17.9	- 3.6	- 5.7
MOON.									
February 4	M	5	1	186	0.260	F	..	- 3.1	..
19	M	5	1	186	0.163	F	..	- 11.6	..
21	M	5	1	185	0.114	F	..	- 10.3	..
23	M	5	1	185	0.175	b ₁	..	- 2.1	..
February 25	M	5	1	185	0.118	b ₁	..	- 3.5	..
March 27	N	4	1	185	0.105	F	..	- 1.1	..
April 21	M	5	1	180	0.230	b ₁	..	- 1.6	..
29	M	5	1	185	0.088	b ₁	..	- 1.6	..
May 29	N	4	1	186	0.170	b ₁	..	- 2.0	..

Date, 1885.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		
								Measured.	Estimated.	
MOON— <i>cont.</i>										
July	23	N	4	1	186	0°110	F	..	+ 2.6	..
August	26	M	5	1	185	0°125	F	..	— 4.1	..
November	17	M	5	1	185	0°138	F	..	— 2.8	..
	18	N	4	1	185	0°210	F	..	— 1.2	..
December	15	N	4	1	186	0°199	F	..	+ 1.4	..
SUN.										
November	6	M	5	1	185	0°214	F	..	— 0.4	..
VENUS.										
October	16	M	15	1	185	0°140	b ₁	..	— 14.0	— 7.8
Calculated relative motion of Venus — 7.4 miles per second.										
ROTATION OF JUPITER. Displacement between the <i>p</i> and <i>f</i> Limbs.										
April	21	M	5	1	207. 30	0°230	b ₁	..	+ 31.6	..
	21	M	5	1	117. 30	0°230	b ₁	..	+ 20.4	..
	27	M	2	1	207. 30	0°125	b ₁	..	+ 28.8	..
	29	M	3	1	207. 30	0°088	b ₁	..	+ 17.2	..
	29	M	3	1	27. 30	0°088	b ₁	..	+ 30.7	..
Calculated relative motion, <i>p</i> — <i>f</i> limb, + 32 miles per second.										
DISPLACEMENT BETWEEN THE N. AND S. LIMBS.										
April	29	M	3	1	117. 30	0°088	b ₁	..	+ 0.4	..
	29	M	3	1	297. 30	0°088	b ₁	..	+ 2.0	..
ROTATION OF SATURN'S RINGS. Displacement between the <i>p</i> and <i>f</i> Ansæ.										
April	21	M	10	1	180. 0	0°230	b ₁	..	+ 26.7	..

OBSERVATIONS of the SPECTRA of NOVA ANDROMEDÆ and NOVA ORIONIS, made at the ROYAL OBSERVATORY,
GREENWICH, in the YEAR 1885.

NOVA ANDROMEDÆ.

1885, September 4.

Half-prism Spectroscope. One prism train both direct and reversed.

Observer, M.

The Nova was very bright and was judged to be quite equal in brightness to a star of the 8th magnitude.

The spectrum appeared to be simply a plain continuous spectrum without bright or dark lines. The red, orange, and violet portions were very faint or altogether wanting, the spectrum being traceable from about D to F, but being scarcely, if at all, discernible beyond those limits. The spectrum of the star resembled that of the nebula precisely, except that it was, of course, brighter, and probably in consequence of this greater brightness, was traceable a little further in either direction.

With the spectroscope in the direct position magnifying powers of 7 and 14 were used on the viewing telescope; with the spectroscope reversed, powers of 14 and 28 were employed. A cylindrical lens was used in front of the slit, which was about $0''.4 = 0''.004$, in width corresponding to about $4''$ of arc.

1885, September 11.

Single-prism Spectroscope.

No cylindrical lens.

Observer, M.

The spectrum of the *Nova* was compared with those of Arg. Z. + 38° No. 90, Arg. Z. + 38° No. 88, and of the Nebula as to the distance to which it could be traced in either direction, with a view to ascertaining whether the faintness of the extreme portions of the spectra of the star and nebula was due to the spectroscope, the observer's eye, or the general feebleness of the light to be examined, or whether it indicated a real deficiency in the objects themselves. The following rough settings were obtained for the limits of visibility towards the red and towards the violet. The positions obtained were but very rough, as there was no definite point to be measured in any case; the micrometer indeed was only read to the nearest integral revolution.

Object.	Magnitude.	Limit towards the Red.		Limit towards the Violet.	
		Reading.	Wave-length.	Reading.	Wave-length.
Arg. Z. + 38° No. 90	5.5	5.0	tenth-metres. 7380	85.0	tenth-metres. 3948
Arg. Z. + 38° No. 88	8.0	10.0	6808	76.0	4095
Nova - - -	8.3	12.0	6615	64.0	4319
Nebula - - -		17.0	6196	62.0	4363

The spectrum of the *Nova* was traceable a little further in both directions than that of the nebula. Towards the violet this would seem to be entirely due to its greater brightness, but towards the red the difference seemed greater than could be fairly explained on this ground. The spectrum of the *Nova* seemed slightly brighter than that of No. 88 in the central district from D to F, but was decidedly feebler in the red and violet regions. The *Nova* was estimated as being three-tenths of a magnitude fainter than No. 88.

The spectrum of the *Nova* was very faint in the red and orange, and began to brighten at a definite point, either at D or close to it. Then followed a space, relatively very bright, the centre of which was not far from E, the brightest part being however at λ 5457, where at times the brightening appeared so definite as to suggest a bright line. The same general region was also much the brightest in the spectrum of the Nebula. The spectrum rapidly declined in brightness beyond F; practically it only extended from D to F; nothing like a bright line was seen either at F, *b*, or D. From time to time the presence of bright lines in the region of the green was suspected, and two other estimations of the places of bright points were made; viz., λ 5508 for the bright point observed before, and λ 5327 for a second but less distinct bright point. The mean of the two estimations for the first bright point gives λ 5482 for its wave length.

1885, September 15.

Observer, M.

The spectrum of the *Nova* was observed with a small direct-vision half-prism held behind the eye-piece. The centre of the green was relatively very bright. There seemed to be two *maxima* in this portion of the spectrum; the more refrangible was estimated from the colour to be near E. It was not easy to decide whether these were, strictly speaking, bright lines.

1885, September 18.

Single-prism Spectroscope.

No cylindrical lens.

Observer, M.

The spectrum of the *Nova* being too faint for satisfactory work on account of the fog, the telescope was turned first to γ Cassiopeiæ, and next to β Andromedæ. With the former star, when the spectrum was faint from the combined effect of fog, diminished aperture, and narrow slit, the red end of the spectrum was quite as difficult to see as with the *Nova*, and the bright F line was not more conspicuous than the supposed bright line at λ 5482 in the spectrum of the *Nova*, perhaps scarcely so conspicuous. On the other hand, the spectrum of β Andromedæ appeared full of bright lines. It seems clear, therefore, that with a very faint spectrum, and when no cylindrical lens is used, it is exceedingly difficult to be sure of the presence of bright lines in a star spectrum unless they are remarkably distinct.

The *Nova* was compared for magnitude with the stars Arg. Z. + 38° No. 85 and 87 early in the evening and later with Arg. Z. + 39° Nos. 159 and 163, and + 40° No. 144; the estimated magnitude being 9.2 in both cases.

The *Nova* seemed perfectly sharp and well-defined with a magnifying power of 220, but there was the faintest suspicion of a larger disk than a star would show. The fog often all but concealed the nebula, but did not alter the sharp definition of the *Nova*. The colour was still about that of the D lines, perhaps a little paler than on previous occasions.

1885, September 21.

Observer, M.

The only observation which could be made, the Moon being bright and there being much mist, was to notice that the *Nova* bore every power up to and including 500 quite as well as did the neighbouring stars. It was distinctly and sharply stellar in appearance, there was no fuzziness, nor could anything be detected which might reasonably be called a disk. The fog all but extinguished M. 31, but M. 32 was quite distinct, and was therefore clearly the brighter of the two. A comparison with Arg. Z. + 40° Nos. 144 and 145 gave the magnitude of the *Nova* as about 9.6 or 9.7. The colour was still markedly an orange yellow, not unlike that of the D lines, but paler than on September 18.

1885, September 30.

Half-prism Spectroscope reversed.

One prism train.

No cylindrical lens. Magnifying power 15.

Observer, M.

The spectrum of the *Nova* was not much brighter than that of the nucleus of the nebula, and was traceable but little further in either direction. The two bright lines seen before were recognised fairly easily, and a third suspected further towards the red. It was not found possible to obtain any measures of the positions of the lines, but their places were estimated as follows :—

The brightest line was not far from the bright line of magnesium at λ 5527, but a little nearer the blue. The second in brightness was about midway between the first and *b*. The faintest was about as far to the red of the magnesium line λ 5527, as the first was to the blue. Adopting λ 5482 as the wave-length of the first line the second would have its wave-length as λ 5321, and the third λ 5575.

A narrow slit was used, and it was found very difficult, almost impossible, to keep the star on the slit, the spectrum being so exceedingly faint that it was frequently lost.

It could not be decided whether the lines were brighter than on September 11. It was believed that the brightest could be traced over or near the nucleus of the nebula, but the spectrum was so faint, and it was so difficult to see it steadily, that no certain conclusion on the point could be arrived at.

With a magnifying power of 220 the *Nova* appeared sharply stellar, the colour, though a decided yellow, was less marked than before, the light now seeming to have only just a tinge of orange about the colour of the D lines. The part of the nebula immediately preceding the *Nova* was faint, so that in the spectroscope the spectrum of the nebula seemed on the preceding edge to terminate sharply with that of the star. This had been noticed on every evening on which the spectrum of the *Nova* had been examined.

NOVA ORIONIS.

1885, December 29.

Half-prism Spectroscope reversed.

One prism train.

Width of slit $0^{\text{in}}.0069 = \text{about } 7''$.

Observer, M.

A cylindrical lens was employed before the slit, which was not quite sufficiently narrow to separate the bright lines of the magnesium spectrum which correspond to *b*₂ and *b*₄.

The spectrum was an exceedingly pronounced example of Secchi's third type. The dark bands were *very* dark; the bright zones or interspaces *very* bright, and with a low dispersion would undoubtedly have presented the appearance of bright lines. With the dispersion employed, however, no bright lines could be detected, nor was any local irregularity of brightness, which could reasonably be suspected to be a bright line, seen anywhere; notwithstanding that as just stated, the brilliance of the bright zones, especially close to the sharp edges of the dark bands, was very striking.

Four dark bands were very conspicuous. Adopting the numeration employed in the observations of β Pegasi made on 1876 October 18, and published in the volume of Greenwich Observations for 1876, these were Bands IV., V., VI., and VII. The following three measures were obtained of the sharp and more refrangible edge of Band VI. (Band 7 in Dunér's nomenclature):—

	Wave-length.
	Tenth-metres.
	5167·76
	5170·29
	5170·57
Mean	- 5169·54

Bands IV. and V. were identified beyond any doubt by their proximity to the line of the magnesium spectrum λ 5527, and Band VII. (Dunér's Band 8) by its neighbourhood to the double line of air λ 5002, and it was clear that they occupied their usual places. These were measured in the spectrum of β Pegasi on the occasion above referred to as λ 5610, λ 5450, and λ 4953. The dark line on Band VI., the wave-length of which was measured in the spectrum of β Pegasi as λ 5272 (Dunér's Band 6) was not identified, but Band VI. was so broad that it evidently embraced this line or sub-band within its limits. A band was also seen at D, without doubt Band II., λ 5869 (Dunér's Band 3) and another beyond F, probably Band VIII., λ 4761 (Dunér's Band 9). Band I. λ 6169 (Dunér's Band 2) was only just suspected. The spectrum was not traced far enough for bands to be detected beyond these, either towards the red or the violet. Some feeble bands or lines were suspected between Bands V. and VI., but none of the great bands were resolved into lines. The *breadth* of the great bands seemed to be about the same as usually observed in stars of this type. Band VI. is often confused with the dark line or narrow band at λ 5272, and its breadth was not greater than would result from this cause.