

ROYAL OBSERVATORY, GREENWICH.

SPECTROSCOPIC OBSERVATIONS

MADE AT THE

ROYAL OBSERVATORY, GREENWICH,

1883.

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 1883.													
<i>Note.</i>—The position-angles reckoned from the north pole of the Sun's axis in the direction N, E, S, W, N₂, 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 height 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. The "Half-prism" Spectroscope with a train of two "half-prisms" was used throughout. For viewing the prominences and chromosphere the spectroscopie 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 solar view a prominence in its first projections, 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 56.1 miles for the <i>b</i> lines, and of 38.4 miles for the F line.													
Greenwich Mean Solar Time, 1883.	Position-Angle from Sun's Axis.	Height in Seconds of arc.			Brightness.			Breadth.			REMARKS.		
d h m	° ' "	C	D ₃	$\frac{1}{2}R$	C	D ₃	$\frac{1}{2}R$	C	D ₃	$\frac{1}{2}R$	C	D ₃	$\frac{1}{2}R$
Jan. 8. 1. 0	138.33 141.22	41	41	6	41								
1. 10	233.57 240.30	36	36	6	36								
These two prominences showed 1474 K and a faint reversal of the <i>b</i> lines. The reversal was only seen for a moment, as the Sun was generally in much white haze. The entire limb of the Sun was examined with the slit radial. Seven prominences, all of them small, were seen. The positions of two only were determined. The others were seen only on the C and D₃ lines, and showed nothing remarkable. The observations were made with difficulty, the Sun's limb being very tremulous, and the definition poor.													
Jan. 9. 0. 52	42.30 43.20	53	53	5	53								
1. 0	44. 0 44.50	19	26	5	19								
1. 3	65. 0 70.40	34	34	2	34								
1. 8	88.30 94. 0	19											
8. 23. 41	219.23 221.38	36	36	17									
23. 45	228.40 236.10	110	110	2									
23. 56	240.36 243. 0	38	38	6	38								
9. 0. 22	247.33 249. 4	17	19	17									
0. 24	251.20 255.12	55	48	4	48	1	1						
0. 34	260. 0 261.25	24	24										
0. 37	272.52 274. 0	24	26	5	24	1	1						
0. 43	358. 0 359. 0	22	22	5	22								
Bending over towards the South. Partly detached. Straight jet. Long low bank. Serrated upper edge. <i>b</i>₁, <i>b</i>₂ distinctly reversed. 1474 K bright. Low bank with serrated upper edge. Faint prominence partly detached; seen on C, D₃, and F, but on no other lines. A large, but faint prominence, much detail; partly detached. The C and D₃ lines were of equal brilliancy, their brightness varying from about $\frac{1}{2}$ to $\frac{3}{4}$ in different parts of the prominence. The prominence could not be satisfactorily made out upon the F line. Bending over towards the south. The D and <i>b</i> lines suspected to be reversed close to limb, but the uncertainty of the limb made the observation a very uncertain one. Short bright prominence. The 1474 K line not seen. Very faint at each edge, especially the northern edge, but bright in centre. Greatest height of brightest part 55". Fainter parts could not be distinctly made out except on C. <i>b</i>₁, <i>b</i>₂ were reversed, but were very faint. 1474 K was also very faint. Small faint prominence. Not seen on the F line. Short bright prominence. Faint narrow prominence. <i>Wavy</i> displaced towards the red λ tenth-metre on the F line; on the C line the amount of displacement appeared about the same. D₃, D₂, and 655 K suspected to be reversed 2" in height, and a line near F₁, λ 4895, was also suspected to be reversed.													

Greenwich Mean Solar Time, 1883.	Position-Angle from Sun's Axis.	Height in Seconds of arc.			Brightness.			Breadth.			REMARKS.		
d h m	° ' "	C	D ₃	$\frac{1}{2}R$	C	D ₃	$\frac{1}{2}R$	C	D ₃	$\frac{1}{2}R$	C	D ₃	$\frac{1}{2}R$
Jan. 9. 0. 43	—continued.												
Jan. 21. 23. 36	93.53 95. 8	19	22	4	17								
The entire limb of the Sun was examined with the slit radial. The observations were interrupted when three-quarters of the limb had been examined by the sudden stoppage of the driving clock of the equatorial. Two prominences were seen in the remaining quadrant, 95° — 185°, but their positions could not be determined. Seen on C and D₃, faintly on 1474 K and F. Faint jet. The entire limb of the Sun was examined with the slit radial, and seven prominences were seen. Of these the place of one only was determined, and that one the smallest. Each was examined on all the lines from B to F. None were seen on any metallic lines. All were seen on C and D₃ (<i>b</i>₁ being always longer than C₁ in one case as much as 5"), on F very faintly, the exact height being difficult to ascertain, and on 1474 K. On this last line the height was usually about 4". The Sun was generally in much white haze, which grew thicker and thicker until the chromospheric spectrum was wholly extinguished.													
April 1. 23. 10	24.31 26. 21												
23. 23	68. 11	34											
23. 25	76. 41 102. 11	17											
23. 27	103. 21 113. 21	17											
23. 31	126. 21 142. 21	19											
23. 33	182. 21 183. 21	17											
23. 36	246. 41 247. 21	26											
23. 38	310. 21 313. 41	49											
23. 39	321. 31 323. 31	26											
April 5. 23. 6	49. 12 65. 32	94	84	24	48								
23. 47	81.52 83. 12	22	24										
23. 49	116. 21 119. 22	89	89	2	89								
6. 0. 4	147. 32 148. 52	24	29	4									
0. 4	237. 21 244. 12	29	29	24									
0. 15	248. 52 250. 12	22	22	4	17								
5. 21. 46	288. 12 294. 47	36	24	2	36								
22. 52	297. 12 299. 22	19	24	19									
Fine bright prominence with two tall jets. Small straight jet. Bright straight jet. Straight jet. Greater part of prominence composed of faint cloud-like matter, but with brilliant veins of light running through. Bright straight jet.													

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	
April 5. 22.57	328.12 } 331.52 }	"	"	"	"									Faint jet.
		19	19											The entire limb of the Sun was examined with the slit radial.
May 20. 22.27	36.19 } 38.7 }	53												Fine prominence; much detail.
22.29	60.19 } 70.50 }	26												Short straight jet.
22.30	80.42 } 83.4 }	22												Small faint prominence.
22.22	150.44 } 156.43 }	34												Bright prominence. Partly detached.
22.25	160.51 } 162.30 }	79												Entirely detached. Lowest part of prominence 24" from the limb. At 23. 2° the prominence was found to have approached the limb slightly, but was not changing rapidly.
														The entire limb of the Sun was examined twice with the slit radial. The Sun was well defined at first, but by the time the first examination was completed was in much white haze. The prominences could then be seen only on the D ₁ and C lines, and appeared of equal height on both.
May 21. 23.30	29.27 } 35.17 }	53	46											Fine large prominence.
21. 23.47	58.7 } 59.7 }	10	22											Small faint jet partly detached.
22. 1.31	60.27 }	19	22											Small narrow jet. At 1 ^h 27 ^m , the prominence had nearly vanished, leaving only a short straight jet about 14" in height.
22. 0.27	116.57 }	22												Very bright prominence, partly detached.
22. 1.29	120.27 }	14	14	2	12	1	1							Straight jet. Very bright. No other lines noticed between B and F. At 0 ^h 55 ^m the prominence had become partly detached. At a height of about 17" from limb the prominence was much narrower.
21. 23.55	230.15 } 241.7 }	43	46	2	43	1								Faint prominence of irregular shape. At 1 ^h 41 ^m too faint to be seen on any but the C line.
21. 23.53	260.37 }	53	53	5	53	1	1							The entire limb of the Sun was examined twice with the slit radial. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined at each prominence. The times given for each prominence are those of the first and second examinations respectively.
21. 0.37	264.22 }													
21. 23.52	310.45 }	41												
22. 1.41	315.17 }													
May 22. 22.31	23.19 } 27.2 }	24	26											Straight jet. Displaced on the C line towards the red about $\frac{1}{2}$ tenth-metre. Seen only on C and D ₁ . At 23°. 30" it was displaced by about $\frac{1}{2}$ tenth-metre towards the red on the C line. Sun in much white haze.
22.33	34.5 } 35.47 }	34	34											Faint; partly detached. Slightly displaced on the C line towards the red, esp. from $\frac{1}{2}$ tenth-metre to 4 tenth-metre. Seen only on C and D ₁ . At 23°. 32" it was displaced on the C line by about $\frac{1}{2}$ tenth-metre towards the red. Sun in much white haze.
22.44	57.12 } 60.7 }	48	48	4	43									Bright jet broken on north edge. Displaced on the F line about $\frac{1}{2}$ tenth-metre towards the blue; no displacement noticed on C.
22.45	73.55 }	17	17											Short bright jet. Displaced on the F line $\frac{1}{2}$ tenth-metre towards the blue at upper edge of prominence.
22.39	74.45 }	14												
22.49	131.25 }													
22.47	133.2 } 133.57 }	17												

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	
May 22. 22.48	172.32 } 172.57 }	17	"	"	"	"	"	"	"	"	"	"	"	Faint small jet.
22.51	201.45 }	24	24			$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			Very faint. Sun in much haze. Straight jet. Seen only on C and D ₁ .
23.30	204.57 }	24	24											
23.13	227.7 } 228.7 }	17												
23.14	239.49 }	46	46	36		$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			Displaced about $\frac{1}{2}$ tenth-metre towards the blue on the F line. No displacement noticed on the C line.
23.44	239.25 }													Seen only on C and D ₁ . A large but faint and broken prominence was seen on the C line, rising above and beyond this prominence. Its dimensions were as follows:—
23.17	305.7 }	17	17			$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			
23.47	305.32 }													
23.18	317.2 }	19	22			$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			
23.50	319.27 }													
22.57	315.57 }	72				$\frac{1}{2}$								The entire limb of the Sun was examined twice with the slit radial. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined for each prominence. The times given for each prominence are those of the first and second examinations respectively.
23.49	319.52 }													
May 24. 0.53	31.6 } 32.16 }	24	26	5		$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			Prominence displaced at its upper extremity $\frac{1}{2}$ tenth-metre towards the red on the C line.
1.0	55.26 }	48	48	43		$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			Fine bright prominence, partly detached.
1.2	58.46 }	34	34	34		$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			Straight jet.
1.4	78.26 }	34	34	34		$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			Straight jet. Upper part of prominence displaced $\frac{1}{2}$ tenth-metre on the F line. No displacement detected on C.
1.4	82.16 }	29	34	29	1	1				$\frac{1}{2}$	$\frac{1}{2}$			Very faint prominence. Bending over towards the south. Seen only on C and D ₁ .
1.7	120.46 }	34	34			$\frac{1}{2}$	$\frac{1}{2}$							Partly detached.
1.12	133.26 }	43	43			$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			The upper part of prominence displaced $\frac{1}{2}$ tenth-metre towards the red on the C line.
1.13	135.46 }	36	41	2 34		$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			Short bright jet.
1.18	138.6 }	50	55			$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			Fine bright prominence, bending over towards the south. Slightly displaced towards the blue on the F line ($\frac{1}{2}$ tenth-metre).
1.18	205.6 }	29	29	29	1	1				$\frac{1}{2}$	$\frac{1}{2}$			Short straight jet.
1.21	207.6 }	29	29	29	1	1				$\frac{1}{2}$	$\frac{1}{2}$			
1.21	225.26 }	29	29	29	1	1				$\frac{1}{2}$	$\frac{1}{2}$			
1.24	227.6 }	53	53	53	1	1				$\frac{1}{2}$	$\frac{1}{2}$			
1.24	228.46 }	53	53	53	1	1				$\frac{1}{2}$	$\frac{1}{2}$			
1.24	231.46 }													
1.28	277.6 }	29	31	24		$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			Faint prominence. Partly detached. Seen only on the C and D ₁ lines.
1.32	279.6 }	38	38			$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			The entire limb of the Sun was examined once with the slit radial.
1.32	316.56 }	38	38			$\frac{1}{2}$	$\frac{1}{2}$			$\frac{1}{2}$	$\frac{1}{2}$			
	320.6 }													
May 28. 0.20	26.30 }	41	43	41	$\frac{1}{2}$	$\frac{1}{2}$				$\frac{1}{2}$	$\frac{1}{2}$			Bright prominence.
27. 22.21	31.6 }	17												Narrow jet. Not seen in the second search.
28. 0.24	57.41 }	17												
0.28	63.25 }	46	50	46	1	1				$\frac{1}{2}$	$\frac{1}{2}$			Very large prominence with two tall jets in the middle.
0.34	73.27 }	41	43	34	$\frac{1}{2}$	$\frac{1}{2}$				$\frac{1}{2}$	$\frac{1}{2}$			Bright prominence.
0.37	74.22 }	14	14	14	1	1				$\frac{1}{2}$	$\frac{1}{2}$			Small straight jet.
	106.45 }													
	121.25 }													
	126.43 }													
	281.59 }													
	286.52 }													
	297.7 }													
	299.12 }													The entire limb of the Sun was examined twice with the slit radial. The chromosphere appeared low, averaging about 6" in height, being seldom as high as 7" and sometimes as low as 5".

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₂	$\frac{1}{2}$ R	F	C	D ₂	$\frac{1}{2}$ R	F	C	D ₂	$\frac{1}{2}$ R	F	
May 30. 12. 19	51. 19	48				1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Fine large prominence.			
31. 0. 58	62. 47	50				1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Forked prominence. Upper part of prominence displaced $\frac{1}{2}$ tenth-metre towards the blue on the F line. Displacement not noticed on the C line.			
30. 22. 20	65. 42	36	26	26		1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Completely detached cloud. Lower surface 38" from the limb; upper surface 72". Not seen on D ₂ . Displaced $\frac{1}{2}$ tenth-metre towards the blue on the C line; displacement suspected on the F line corresponding to that on the C line. At 1 ^h 17 ^m the cloud was very much smaller than when seen before, but it was about the same height above the limb.			
30. 22. 21	73. 53	72				1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Straight jet. Very much broken.			
31. 0. 55	78. 25										Partly detached. Displaced towards the red on the C line by an amount varying from about $\frac{1}{2}$ to 1 tenth-metre. The largest displacement took place about the middle of the height of the prominence towards the north edge. Sun in much white haze, consequently the F line appeared very faint and no displacement could be detected upon it.			
30. 22. 23	92. 22	46	41	41		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Bright straight jet bending over towards the south. Displaced $\frac{1}{2}$ tenth-metre towards the blue on the F line. No displacement detected on the C line.			
31. 0. 53	96. 44	41									Bright straight jet. No displacements detected on any lines.			
30. 21. 59	99. 58	41	29	22	1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Bright jet, bending over towards the south. Displaced by about $\frac{1}{2}$ tenth-metre towards the blue on the C line. D ₂ and F too faint to show any displacement.			
22. 4. 119. 22		26	24			19	1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Small straight jet. Seen only on C and D ₂ .			
22. 28. 121. 13		24									Straight jet. No displacements detected on any line.			
22. 5. 122. 10		24	24			19	1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Faint, very narrow jet. The position-angle given is for the centre of the prominence.			
22. 31. 123. 38		24									Fine prominence. Irregular shape. Displaced from $\frac{1}{2}$ to 1 tenth-metre towards the red on the C line. This prominence was afterwards observed to break up into two parts (A and B) as below.			
22. 6. 123. 45		43	38	29	1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	A. A small detached portion seen with great difficulty, and displaced about $\frac{1}{2}$ tenth-metre towards the red on the C line, rising above the rest of the prominence and reaching the height of 60".			
22. 35. 125. 58		36									B. D lines faint. No displacement detected on any line.			
22. 11. 198. 25		14	17			$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Straight jet.			
22. 39. 199. 50		17									The entire limb of the Sun was examined with the slit radial. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined at each prominence. The times given for each prominence are those of the first and second examinations respectively. Sun often in much white haze, so that it was not possible to detect the reversal of short lines.			
22. 12. 259. 52		17									Faint; much broken.			
22. 43. 241. 8		22	14			$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Small straight jet.			
22. 13. 244. 27		26	17	12	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Small forked prominence.			
22. 47. 248. 36		17									Displaced by about $\frac{1}{2}$ tenth-metre towards the blue on the C line. Bending over towards the north. Could not be satisfactorily made out on any line except C, the Sun being in much white haze, and the limb ill-defined and			
22. 14. 252. 12		19												
22. 51. 252. 12		19												
22. 15. 281. 43		19	17			$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Displaced by about $\frac{1}{2}$ tenth-metre towards the blue on the C line. Bending over towards the north. Could not be satisfactorily made out on any line except C, the Sun being in much white haze, and the limb ill-defined and			
22. 52. 287. 23		17												
22. 56. 282. 36		60												
22. 58. 284. 41														
22. 57. 285. 12														
23. 9. 287. 31		19	19	4	17	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$				
22. 17. 317. 4		31	24	4	22	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$				
23. 11. 318. 21		22												
June 3. 23. 20	57. 23	36	34	4	22	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Faint; much broken.			
3. 24. 1	62. 18	34									Small straight jet.			
3. 23. 63. 38	34	19	4	19	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Small forked prominence.			
3. 24. 66. 32	19										Displaced by about $\frac{1}{2}$ tenth-metre towards the blue on the C line. Bending over towards the north. Could not be satisfactorily made out on any line except C, the Sun being in much white haze, and the limb ill-defined and			
3. 25. 103. 43	14	14				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$				
3. 27. 108. 58	14													
3. 29. 109. 37	43													
112. 9														

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₂	$\frac{1}{2}$ R	F	C	D ₂	$\frac{1}{2}$ R	F	C	D ₂	$\frac{1}{2}$ R	F	
June 3. 23. 49 —continued.	a b m o " <td>"</td> <td>"</td> <td>"</td> <td>"</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>tremulous. The prominence, which was very bright when first caught sight of, rapidly diminished in brightness and in height. At 2^h 4^m its greatest height was 34". There was then a small but distinct displacement towards the red of about $\frac{1}{2}$ tenth-metre. At 2^h 3^m height 29". By 2^h 13^m the prominence had entirely vanished, leaving not the slightest trace.</td>	"	"	"	"									tremulous. The prominence, which was very bright when first caught sight of, rapidly diminished in brightness and in height. At 2 ^h 4 ^m its greatest height was 34". There was then a small but distinct displacement towards the red of about $\frac{1}{2}$ tenth-metre. At 2 ^h 3 ^m height 29". By 2 ^h 13 ^m the prominence had entirely vanished, leaving not the slightest trace.
3. 23. 26	116. 21	77	58	2	58	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Large prominence. Much detail. Irregular in shape. The greater part of the prominence is very faint. Partly detached.
3. 23. 31	150. 43	77												Short bright jet.
3. 23. 31	264. 1	58	55	48	3	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Short straight jet.
3. 23. 32	282. 38	19	19	19	3	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Straight jet.
3. 23. 32	282. 38	19	19	19	3	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
3. 23. 34	289. 49	19	19	19	3	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
3. 23. 34	291. 13	19												
3. 23. 35	293. 17	26	26	26	3	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
3. 23. 35	295. 28	26												
3. 23. 36	313. 30	67	38	2	38	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	The entire limb of the Sun was examined twice with the slit radial. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined at each prominence. The times given for each prominence are those of the first and second examinations respectively.
3. 23. 36	313. 30	67												
3. 23. 37	319. 27	50												
June 5. 1. 17	47. 18	38	38			$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Narrow faint jet nearly detached. Seen only on C and D ₂ .
1. 18	48. 3	38				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Straight jet.
1. 19	48. 10	26	22	17		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Straight jet. Position-angle for the centre of the prominence.
1. 20	58. 48	22				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Very broken. Not seen in the second search.
1. 21	63. 10	14	12	2	10	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Very broken. Not seen in the second search.
1. 22	87. 24	19												
1. 23	88. 53	12												
4. 23. 59	100. 40	24												
5. 0. 3	109. 46	67												
1. 35	108. 26	14	14	5	14	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Bright prominence. Broken. Before the second search this prominence had greatly altered its shape, and was measured as follows:—
1. 36	112. 18	14												b lines very distinctly reversed. 1474 K and D lines also for about 5" at 1 ^h 38 ^m . Limb very tremulous. Much white haze.
0. 11	131. 6	144				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Very tall prominence. Very much broken. At 1 ^h 41 ^m it was much fainter than at 1 ^h 38 ^m , but taller, being traceable for at least 156". At 1 ^h 50 ^m it could not be detected on any line but C. At 1 ^h 57 ^m it was entirely detached, the lower surface being 46" from the limb, the upper surface 173".
1. 41	124. 30	156				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Seen only on C and D ₂ .
1. 57		173												Straight jet. Position-angle for the centre of the prominence. Not seen in the second search.
0. 16	145. 53	20	19			$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Very faint, bending over towards the north. Seen only on the C line.
2. 1	148. 12	19												Detached cloud. Lower surface 14" from the limb.
0. 17	155. 1	14												At 2 ^h 7 ^m not detached, but bending over towards the south.
0. 19	131. 48	20				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
2. 9	234. 6	29				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
0. 20	259. 46	46	43			$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
2. 7	264. 25	43				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
0. 21	281. 33	22	17			$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
2. 9	286. 38	26				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
0. 22	298. 20	26				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
2. 11	300. 8	17	17	12		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
0. 23	311. 10	54	53			$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	
2. 13	325. 53	53				$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	The entire limb of the Sun was examined with the slit radial. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined for each prominence. The times given for each prominence are those of the first and second examinations respectively.

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	
June 5. 23. 12	47.54	29	"	"	"	"	"	"	"	?	"	"	"	Very faint. Seen only on the C line.
23. 14	49. 51	29	"	"	"	"	"	"	"	"	"	"	"	Faint, bending over towards the south. Seen only on C and D.
23. 5	84. 29	26	"	"	"	"	"	"	"	"	"	"	"	No trace of this prominence could be detected at 23°. 47".
23. 38	85. 36	26	"	"	"	"	"	"	"	"	"	"	"	Small faint straight jet. Seen only on C and D ₁ .
23. 8	107. 32	17	"	"	"	"	"	"	"	"	"	"	"	Partly detached. Broken prominence.
22. 12	152. 58	19	"	"	"	"	"	"	"	"	"	"	"	Straight jet. Seen only on C and D ₁ .
22. 42	155. 6	17	"	"	"	"	"	"	"	"	"	"	"	Straight jet.
22. 13	156. 33	46	46	29	"	"	"	"	"	"	"	"	"	Straight jet.
22. 44	156. 15	19	"	"	"	"	"	"	"	"	"	"	"	Straight jet.
22. 14	156. 10	18	"	"	"	"	"	"	"	"	"	"	"	Straight jet.
22. 49	151. 44	17	"	"	"	"	"	"	"	"	"	"	"	Broken. Fine prominence nearly detached. Bending over towards the north.
22. 18	235. 16	23	22	14	"	"	"	"	"	"	"	"	"	Bright prominence partly detached. Bending over towards both the north and south.
22. 55	235. 24	19	"	"	"	"	"	"	"	"	"	"	"	The entire limb of the Sun was examined twice with the slit radial. In the first search the position angles were determined, the prominence being examined on the C line only; in the second search the entire spectrum from B to F was examined for each prominence. The times given for each prominence are those of the first and second examinations respectively. The Sun was in much white haze, and in only a few cases could the F line be seen. No lines other than C, D ₁ , and F were perceived.
22. 19	327. 49	18	26	22	"	"	"	"	"	"	"	"	"	
22. 55	238. 36	26	"	"	"	"	"	"	"	"	"	"	"	
22. 21	286. 40	24	"	"	"	"	"	"	"	"	"	"	"	
22. 59	291. 51	22	12	13	"	"	"	"	"	"	"	"	"	
23. 23	297. 6	46	43	22	"	"	"	"	"	"	"	"	"	
23. 0	298. 54	43	"	"	"	"	"	"	"	"	"	"	"	
22. 54	301. 0	53	53	31	"	"	"	"	"	"	"	"	"	
23. 5	305. 50	53	"	"	"	"	"	"	"	"	"	"	"	
22. 25	322. 24	48	46	34	"	"	"	"	"	"	"	"	"	
23. 8	327. 24	46	"	"	"	"	"	"	"	"	"	"	"	
June 9. 0. 48	61. 10	41	"	"	"	"	"	"	"	"	"	"	"	
0. 20	107. 41	24	"	"	"	"	"	"	"	"	"	"	"	
0. 24	115. 34	19	"	"	"	"	"	"	"	"	"	"	"	
0. 30	124. 43	17	"	"	"	"	"	"	"	"	"	"	"	
0. 32	127. 6	24	"	"	"	"	"	"	"	"	"	"	"	
0. 34	151. 31	24	"	"	"	"	"	"	"	"	"	"	"	
0. 37	153. 44	34	34	34	"	"	"	"	"	"	"	"	"	
0. 40	260. 36	17	"	"	"	"	"	"	"	"	"	"	"	
0. 43	263. 43	17	"	"	"	"	"	"	"	"	"	"	"	
0. 45	284. 8	17	"	"	"	"	"	"	"	"	"	"	"	
0. 43	286. 26	50	"	"	"	"	"	"	"	"	"	"	"	
0. 54	294. 44	41	41	41	"	"	"	"	"	"	"	"	"	
1. 0	298. 11	41	"	"	"	"	"	"	"	"	"	"	"	
0. 46	355. 6	26	"	"	"	"	"	"	"	"	"	"	"	
	328. 38	26	"	"	"	"	"	"	"	"	"	"	"	

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	
Aug. 12. 22. 50	6. 26 9. 11	17	14	"	"	"	"	"	"	"	"	"	"	Partly detached. A very small cloud floating above the prominence was seen on the C line. The prominence was 17" in height; the lower surface of the cloud 33", the upper surface 34" from the limb. The C line in the prominence was displaced $\frac{1}{2}$ tenth-metre towards the blue at the upper northern edge. At 23°. 52" the C line was about 14" in height; brightness and breadth each about 1.
22. 2	63. 1	19	14	?	10	"	"	"	"	"	"	"	"	D ₁ , D ₂ , and δ lines not seen.
22. 26	65. 6	19	"	"	"	"	"	"	"	"	"	"	"	
22. 3	76. 20	19	"	"	"	"	"	"	"	"	"	"	"	
22. 30	79. 53	19	14	12	"	"	"	"	"	"	"	"	"	
22. 4	103. 45	14	14	12	"	"	"	"	"	"	"	"	"	
22. 34	105. 2	14	"	"	"	"	"	"	"	"	"	"	"	
22. 6	109. 33	79	70	67	"	"	"	"	"	"	"	"	"	Fine bright prominence. Much broken.
22. 37	112. 51	67	"	"	"	"	"	"	"	"	"	"	"	
22. 8	212. 49	62	29	"	"	"	"	"	"	"	"	"	"	Very faint prominence. Not seen on the F line.
22. 40	216. 28	36	"	"	"	"	"	"	"	"	"	"	"	Not seen on the F line.
22. 45	244. 41	19	19	"	"	"	"	"	"	"	"	"	"	The entire limb of the Sun was examined with the slit radial twice. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined, at each prominence. The times given for each prominence are those of the first and second examinations respectively. Average height of the chromosphere 6".
Aug. 18. 1. 6	34. 54	29	"	"	"	"	"	"	"	"	"	"	"	
1. 7	35. 56	14	"	"	"	"	"	"	"	"	"	"	"	
1. 8	64. 55	14	"	"	"	"	"	"	"	"	"	"	"	
1. 10	113. 37	34	"	"	"	"	"	"	"	"	"	"	"	
1. 16	207. 16	29	"	"	"	"	"	"	"	"	"	"	"	
1. 15	224. 4	55	"	"	"	"	"	"	"	"	"	"	"	
1. 14	233. 37	29	"	"	"	"	"	"	"	"	"	"	"	
1. 13	252. 24	43	"	"	"	"	"	"	"	"	"	"	"	
0. 18	261. 8	24	"	"	"	"	"	"	"	"	"	"	"	
0. 19	267. 36	19	"	"	"	"	"	"	"	"	"	"	"	
0. 19	268. 22	19	"	"	"	"	"	"	"	"	"	"	"	
0. 20	280. 1	53	"	"	"	"	"	"	"	"	"	"	"	
0. 24	302. 36	43	"	"	"	"	"	"	"	"	"	"	"	
0. 26	303. 14	24	"	"	"	"	"	"	"	"	"	"	"	
0. 27	308. 28	43	"	"	"	"	"	"	"	"	"	"	"	
0. 27	310. 11	22	"	"	"	"	"	"	"	"	"	"	"	
0. 27	314. 32	22	"	"	"	"	"	"	"	"	"	"	"	
0. 27	316. 52	22	"	"	"	"	"	"	"	"	"	"	"	

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	
Aug. 19. 23. 46	45. 10	31			"									Faint. No other lines.
20. 0. 8	44. 44	41			"									Partly detached. Not seen on the F line.
19. 23. 48	46. 37	41			"									Faint. Displaced $\frac{1}{2}$ tenth-metre towards the blue on the C line.
	58. 44	41			"									Bright straight jet, partly detached. The detached part displaced $\frac{1}{2}$ tenth-metre towards the blue on the C line.
23. 23	169. 40	19			"									Immediately above this jet was a detached cloud, of which the under side was 17" and the upper side 26" from the limb. The C line was wholly displaced towards the red $\frac{1}{2}$ tenth-metre. In spite of the very tremulous limb and the haze round the Sun, 1474 K was distinctly reversed to a height of 5". D ₁ , D ₂ a little less distinctly but to a greater height, 7". b ₁ , b ₂ less distinctly still, to a height of 6". One or two other lines were suspected to be reversed, but were not distinctly seen.
23. 52	172. 8	14			"									
23. 57	250. 27	10			"									
23. 56	255. 4	17			"									
23. 59	258. 8	14			"									
20. 0. 5	259. 16	12			"									
19. 23. 44	265. 40	14			"									Fine prominence, much detail. Could not be distinctly made out on F. Sun in too much haze.
20. 0. 5	267. 57	12			"									The entire limb of the Sun was examined twice. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined at each prominence. The times given for each prominence are those of the first and second examinations respectively. Sun in much white haze. Limb very tremulous.
19. 23. 45	302. 58	60			"									
20. 0. 7	310. 20	43			"									
Aug. 25. 0. 55	29. 31	19			"									Narrow. The upper part of the prominence was detached, and was displaced $\frac{1}{2}$ tenth-metre towards the red on the C line.
1. 43		14			"									
0. 51	51. 34	43			"									
1. 40	50. 8	43			"									
0. 50	61. 52	29			"									
1. 38	62. 57	31			"									
1. 32	245. 10	29			"									
1. 50	248. 43	29			"									
1. 0	292. 11	43			"									
1. 47	296. 30	58			"									Partly detached. Boulding over towards the south. The prominence was much altered in shape when it was examined the second time.
					"									The entire limb of the Sun was examined twice with the slit radial. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined at each prominence. The times given for each prominence are those of the first and second examinations respectively.
Aug. 27. 23. 52	105. 9	34			"									Bright jet.
28. 0. 37	108. 7	29			"									Bright straight jet.
27. 23. 47	109. 20	19			"									Bright broken prominence. No metallic lines visible.
28. 0. 40	111. 18	19			"									
27. 23. 45	122. 27	43			"									Bright broken prominence.
28. 0. 32	125. 53	41			"									
27. 23. 47	226. 18	43			"									The chromosphere was very undulating, varying from 6" to 12" in height at about this point.
	229. 39	41			"									1474 K seen, but no metallic lines.
	253. 0				"									Not seen in the second search.
27. 23. 30	267. 59	17			"									
28. 0. 33	270. 53	14			"									
27. 23. 57	272. 32	14			"									
	272. 55				"									

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₁	¹⁴⁷⁴ K	F	C	D ₁	¹⁴⁷⁴ K	F	C	D ₁	¹⁴⁷⁴ K	F	
Aug. 27. 23. 36 28. 0. 21	289. 25 } 290. 41 }	24 19	22 19	2 1	14 1	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{10}$ $\frac{1}{10}$	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	1 1				The southern side of the prominence displaced $\frac{1}{2}$ tenth-metre towards the blue on the C line. At 23. 21" the northern edge of this prominence was displaced towards the red and the southern towards the blue, each about $\frac{1}{2}$ tenth-metre.
27. 23. 35 28. 0. 8	298. 18 } 300. 44 }	19 19	19 19	14 1	1 1	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	1 1				Entire limb of Sun examined twice. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined at each prominence. The times given for each prominence are those of the first and second examinations respectively. All the prominences, except the one at 275", were examined with the slit tangential as well as with the slit radial, but no metallic lines were seen, though 1474 K was always more or less distinctly visible.
Nov. 5. 12. 54 23. 0 23. 3 23. 10 23. 15	59. 28 } 61. 25 } 83. 34 } 87. 16 } 118. 12 } 127. 43 } 151. 9 } 158. 11 } 259. 19 } 261. 37 }	22 26 29 29 29 29 115 26	22 26 29 29 29 29 115 26	17 17 22 29 29 29 ?	17 17 22 29 29 29 ?	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	1 1 1 1 1 1 1 1 1				Straight jet. Limb very tremulous. No reversal detected except on the usual three lines, C, D ₁ , and F. Bright prominence. A very large but very faint prominence. F line displaced $\frac{1}{2}$ tenth-metre towards the blue. At 23. 30", a part of the prominence was separated from the limb (the part on the southern side). The C line too showed a displacement of about $\frac{1}{2}$ tenth-metre. At 23. 31" the F line was very brilliant. Breadth at base of the prominence, 5; at tip, $\frac{1}{2}$. b ₁ and b ₂ reversed to a height of 5". 1474 K, reversed to a height of 4". D ₁ and D ₂ were suspected to be reversed.
23. 35 23. 42	270. 56 } 281. 29 }	19 19	19 19	?	?	$\frac{1}{2}$ $\frac{1}{2}$	?	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	?				Entire limb of Sun examined once with the slit radial. Chromosphere averaged 7" in height. Limb very tremulous. Sun often in much haze. Each prominence examined from B to F, but the Sun's limb hidden so much that no short lines could possibly be seen.
Nov. 27. 0. 20 0. 49 0. 41 1. 3 0. 43 1. 7 0. 18 0. 45 0. 22 0. 51 0. 26 0. 55	11. 27 } 19. 31 } 41. 58 } 47. 30 } 61. 8 } 62. 58 } 83. 17 } 94. 18 } 121. 58 } 124. 6 } 268. 50 } 270. 25 }	77 60 24 24 17 17 62 46 17 22 22 19	60 60 24 24 17 17 46 46 17 22 22 19	48 48 12 12 ?	48 48 12 12 ?	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ 1 1 1 1 1 1 1 1 1			Fine bright arched prominence. Small faint prominence. Small faint prominence. 1 Fine prominence. Much broken. Small straight jet. Small faint jet. Chromosphere very undulating between these two prominences. Small brilliant prominence. The F and C lines displaced each $\frac{1}{2}$ tenth-metre towards the blue. Limb boiling and much mist, so that short and faint lines could not be easily made out, but 1474 K seemed reversed to a height of 2", and b ₁ and b ₂ were suspected to be reversed. On D ₁ and D ₂ nothing was clearly made out. At 0. 57" the bright prominence which had been seen here in the first search had entirely disappeared, the only trace of it being the very slightest elevation of the chromosphere and a peculiar vividness in the three chromospheric lines C, D ₁ , and F.	
0. 27	284. 2 } 285. 11 }	26 26	26 26	26 26	1 1	$\frac{1}{2}$ $\frac{1}{2}$	1 1	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	1 1				

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	
Nov. 27. 0.38 1. 1	288.55 293.46	41 41	" 41	" 41	" 41	1 1	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	1 1	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	Small triple forked jet.	
The entire limb of the Sun was examined twice with the slit radial. In the first search the position angles were determined, the prominences being examined on the C line only; in the second search the entire spectrum from B to F was examined at each prominence. The times given for each prominence are those of the first and second examinations respectively. The general height of the chromosphere was about 6" to 7". Near the north pole it was very undulating, and varied from 2" to 8" or even 10". The Sun was in much white haze, and the limb was boiling throughout the observation. It was therefore scarcely possible that short or faint lines should have been seen. 1474 K was, however, suspected to be reversed to a height of about 2" all round the limb. The <i>h</i> lines were not distinctly seen to be reversed anywhere, but the dark lines of the sky spectrum seemed slightly fainter close to the limb over each prominence. The same remark in a lesser degree applies to the D lines. The image of the Sun was brighter in the first search than in the second.														
Nov. 28. 0.50 0.46 0.57 1. 1 1. 4 1. 5 1. 9 1. 9 1. 11 0.35 0.37 0.40 0.41 0.43	44. 1 45.54 53.13 78. 4 87.36 92.51 93.24 109.58 111. 3 117.44 121. 5 124.56 125.54 126. 1 127.41 132. 4 213.29 252.29 252.43 265.17 267.57 269. 9 274.18 277.35 279.53 298.14 300. 0	19 29 36 29 12 43 17 17 17 19 19 26 29 26 19	" "	" "	" "	" "	" "	" "	" "	Small faint jet.				
Partly detached. Bending over towards the south. Displaced $\frac{1}{2}$ tenth-metre towards the blue on the southern side on the C and F lines. Very bright, F metallic eruption. Bending over towards the north. These two prominences make as it were the two sides of an arch which has no keyholes, but the first is very bright and the second very faint. At 1.15 this second prominence was only 12" in height. Small straight jet.														
Height not measured.														
Narrow jet. Upper north edge displaced $\frac{1}{2}$ tenth-metre towards the blue.														
The chromosphere between these two prominences is undulating and is higher than usual, being 10" in height.														
Straight jet.														
Forked prominence.														
Small jet.														
Entire limb of Sun examined with the slit radial on the C line only.														
Dec. 6. 0.25 0.27 1. 9 1.43	39. 2 41.36 100.23 105. 1 112.20 114. 3 227.57 229.30	26 26 24 24 48 48 36 36	26 26 24 24 48 48 36 36	? $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	Detached cloud. Greatest height, 48". Nearest point to limb 17". Not certainly made out on the F line.		

Greenwich Mean Solar Time, 1883.	Position Angle from Sun's Axis.	Height in Seconds of arc.				Brightness.				Breadth.				REMARKS.
		C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	C	D ₁	$\frac{1}{2}R$	F	
d h m	o ' "	"	"	"	"									
Dec. 6. 1. 1	243.43 } 245.22 }	34	34		34	$\frac{3}{4}$	$\frac{1}{2}$		$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{2}$		1	Partly detached.
0.21	281.20 } 282.20 }	19	19			$\frac{1}{2}$	$\frac{1}{2}$		?	$\frac{1}{2}$	$\frac{1}{2}$		?	Small jet. Leaning over towards the north.
0. 6	296.10 } 299.18 }	22	22	4	22	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{2}$	1	1	Very faint ill-defined prominence. Not seen on the F line.
1. 4	325.16 } 325.47 }	29	29			$\frac{3}{4}$	$\frac{1}{2}$			$\frac{1}{10}$				The entire limb of the Sun examined with the slit radial. Each prominence examined on all lines from B to F. Work constantly interrupted by cloud. No metallic lines seen. 1474 K glimpsed once.
Dec. 7. 1. 28	32.49 } 38.13 }	24												Very faint.
1. 11	42.13 } 43.32 }	19												Very faint.
1. 13	61.55 } 63. 4 }	17												Very faint.
1. 14	80.12 } 83.25 }	29												C line displaced $\frac{1}{2}$ tenth-metre towards the blue.
1. 15	115.39 } 119.36 }	34												
1. 18	242.21 } 246.28 }	24												
1. 20	251.46 } 253.46 }	14												Small but very brilliant jet. ? Metallic eruption.
1. 21	263.42 } 266.13 }	22												Partly detached.
1. 22	276.11 } 277.58 }	14												Small faint jet.
1. 23	289.50 } 304.12 }	43												Five brilliant jets on a fainter background.
1. 26	324.45 } 329. 4 }	36												Entire limb of the Sun examined with the slit radial on the C line only. Sun in much white haze. Chromo- sphere only appeared 5" in height. Prominences nearly all exceedingly faint.

OBSERVATIONS OF SPECTRA OF SUN SPOTS made at the ROYAL OBSERVATORY, GREENWICH, in the Year 1883.

The numeration of the spots is taken from the Photographic Results.

The observations were made by Mr. Maunder with the Half-prism Spectroscope mounted on the South-East Equatorial. With the spectroscopie in the direct position, one "half-prism" gives a dispersion of about $18\frac{1}{2}''$ from A to H, and two "half-prisms" a dispersion of about $80''$. On some occasions the spectroscopie was reversed end for end, the slit and eye-piece being interchanged. The spectroscopie in this position gives great purity of spectrum. The wave-lengths of the lines observed and the corresponding elements are taken from Ångström's *Spectre Normal du Soleil*. The wave-lengths of lines not given in Ångström's map are inferred from the wave-lengths of the neighbouring lines. Lines not given by Ångström are distinguished by an asterisk. The amount of broadening is expressed in terms of the normal breadth of the line.

SPOT No. 987.

1883 April 6.

The general absorption over the nucleus was very considerable, and from about midway between C and B to the limit of the spectrum at the red end it was very strongly marked. The selective absorption on the other hand was on the whole mainly confined to the fainter lines of the spectrum, often lines not recorded by Ångström. The spectrum from *b* to *F* was charted with the spectroscopie in the direct position, one-prism train; the spectrum below D to the red was examined with the spectroscopie reversed, two-prism train. With neither dispersion were any reversals or displacements noticed; the spot seemed to be deep but quiescent.

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
6867.0	..	1	B. Much broadened.	5141.4	..	$\frac{1}{2}$	
6603.9	Iron	..		5138.8	Iron	..	
6573.9	Iron	..		5138.3*	..	..	Line about 0.3 tenth-metre in breadth, seen only over the spot.
6562.1	Hydrogen	..	C.	5136.9	Iron and nickel	Slight	
6492.3	Calcium	..		5136.4*	..	..	Line about 0.3 tenth-metre in breadth, seen only over the spot.
6461.9	Calcium	..		5133.7*	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.
6449.2	Calcium	..		5133.1	Iron	Slight	
6438.3	Calcium	..		5131.0	Iron	Slight	
6161.4	Calcium	..		5129.4*	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.
6140.8	Barium	..		5128.7	Titanium	Slight	
6121.3	Calcium	..		5126.8	Iron	..	
6101.9	Lithium and calcium.	..		5125.6	..	..	
5885.1	Sodium	..	The D lines. Very nebulous.	5123.3	..	..	
5889.1	Magnesium	..	<i>b</i> ₁ . Nebulous.	5120.1	Titanium	..	
5183.1	Nickel	..					
5176.2	Magnesium	..	<i>b</i> ₂ . Nebulous.				
5175.7	Iron and nickel	..	<i>b</i> ₃ .				
5168.5	Iron and nickel	..					
5166.9	Iron and magnesium.	..					
5164.7	Iron	..					
5164.2	Iron	..					
5162.3*	..	..	Two of the "bands" seen first on 1880 November 27. Breadth 1.0 tenth-metre. Seen only over the spot.				
5159.6*	..	..	Two fine lines, seen only over the spot.				
5156.4*	..	..	About 0.3 tenth-metre in breadth over the spot.				
5156.0*	Nickel	..					
5155.2	Sodium	..					
5154.7	Sodium and copper	..					
5153.2	Iron	..					
5151.7	Iron	..					
5151.4	Iron	..					
5150.3	Iron	..					
5147.6	Iron and nickel	..					
5146.9	..	..					
5144.6	..	..					
5143.0*	..	..	A fine line, seen only over the spot.				

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
5110.9*	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.	5044.3*	..	..	
5109.9	Iron	Slight		5043.5*	Iron	..	
5107.2	Iron	..		5042.8	Iron and calcium	..	
5105.1	Copper	..		5041.3	Iron	..	
5103.8	..	..		5038.8	Titanium	..	
5102.5	..	..		5038.3	Iron	..	
5101.0*	..	..	Line about 0.3 tenth-metre in breadth, seen only over the spot.	5037.8	Titanium	..	
5096.0*	..	..	A broad "band," seen only over the spot. It could not be resolved into lines.	5035.5	Titanium	..	
5093.2*	..	..	A "band," 0.6 tenth-metre in breadth, seen only over the spot.	5035.0	..	..	A "band," 1.0 tenth-metre in breadth, seen only over the spot.
5091.9*	..	..		5030.3	..	..	
5090.5	Iron	..		5029.1	..	..	
5089.5	..	..	Three "bands," each 0.5 tenth-metre in breadth, seen only over the spot.	5017.8	..	..	
5087.5	..	..		5016.8	Nickel	..	
5086.0	..	..		5015.6*	..	..	
5084.9	..	..	Line about 0.3 tenth-metre in breadth, seen only over the spot.	5014.4	Iron	..	
5083.7	..	Slight		5013.3	Titanium	..	
5082.6	Iron	..		5011.6	Iron	..	
5081.9	..	Slight		5009.5*	..	..	
5079.0	Iron	..		5007.7	Iron and titanium	Slight	
5078.0	Iron	..		5005.7	..	..	Double line.
5076.4*	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.	5005.6	Iron	..	
5076.0	Iron	..		5003.2	Iron	..	
5074.2	Iron	..		5002.1	Iron	..	
5074.8	Iron	..		5001.2	..	..	
5070.3	..	..	Much broadened. 0.3 tenth-metre in breadth, over the spot.	4997.5	..	Slight	
5068.3	Iron	Slight		4996.1	..	Slight	
5066.5	Iron	..		4993.4	..	..	
5064.5	Iron and titanium	Slight		4990.5	Iron and titanium	..	
5063.2*	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.	4988.5	Iron	..	
5061.4*	..	..	Double line. The two components were not separated with the dispersion employed.	4984.8	Iron, nickel, and sodium.	..	
5059.9	Iron	..		4983.5	..	..	
5058.3*	..	..	Line about 0.3 tenth-metre in breadth, seen only over the spot.	4982.7	Iron	..	
5057.7*	..	..	A "band," 0.7 tenth-metre in breadth, seen only over the spot.	4981.0	Iron and sodium	..	
5055.7*	..	..	A "band," 1.0 tenth-metre in breadth, seen only over the spot.	4979.8	Nickel	..	
5053.8*	..	..		4977.9	Iron	..	
5052.7*	..	..		4975.9	..	..	
5046.2*	..	..		4973.2	..	..	
				4972.4	Iron	..	
				4970.1	..	..	
				4969.1	Iron	..	
				4967.6	Iron	..	
				4967.2	..	..	
				4965.5	Iron	..	
				4964.8	..	..	
				4961.8	Iron	..	
				4961.4*	..	..	Two lines, each about 0.2 tenth-metre in breadth, seen only over the spot.
				4960.9*	..	..	
				4956.9	Iron	..	
				4954.4	Iron	..	
				4950.2	Iron	..	
				4949.5	..	Slight	
				4947.5	..	..	
				4944.0	Iron	Slight	
				4938.4	Iron	..	
				4938.0	..	..	
				4937.4	..	..	
				4936.5	..	..	
				4935.2	Nickel	..	
				4933.6	Barium	..	
				4932.9	Iron	..	
				4931.3	..	Slight	

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
4929.6	Iron	Slight	Much broadened. Each line about 0.6 tenth-metre in breadth, over the spot.	4892.3	..		
4927.0	Iron	..		4891.0	Iron		
4924.6	..	..		4890.2	Iron		
4921.4	..	..		4877.5	Iron and calcium		
4919.9	Iron	..		4875.5	Iron		
4918.3	Iron	..		4872.7*	Nickel		
4916.6	..	..		4871.4	Iron		
4915.4	..	..		4870.6	Iron		
4899.5	Barium	..		4869.7	Cobalt		
4896.0	..	..		4865.4	Nickel		
				4863.7	Iron		
				4860.7	Hydrogen		F. Slightly diffused.

SPOT No. 1027.

1883 May 15.

The spot, which was not a large one and which had two nuclei divided by a narrow bridge, showed very strong general absorption over both nuclei. The selective absorption was not remarkable. The "bands" were not seen. No twisting, bending, or reversal was noticed on any line in the neighbourhood of the δ group. The δ lines themselves were slightly broadened by about one-fourth, and were at once ill-defined at their edges and much darker over the spot than on the general disk. Many of the lines in their immediate neighbourhood were similarly affected. The definition was very bad, and observation was constantly interrupted by passing cloud. Two-prism train direct. Magnifying power 14. Position angle of slit 27.5°.

1883 May 16.

The general absorption over the two small nuclei was strongly marked, as it had been on the previous day. No twisting or reversal was detected. The definition was fair at the time of the commencement of the observations, but deteriorated as the morning advanced. The observations of the less refrangible lines were therefore made under better conditions than those of the more refrangible. Two-prism train direct. Magnifying power 14. Position angle of slit, 91°.

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
6562.1	Hydrogen	..	C. Scarcely affected. The edges of the line were a little fuzzy over the spot.	5150.3	Iron		
5895.1	Sodium } Iron and calcium } Iron } Magnesium } Iron }	}	The D lines.	5147.6	Iron		
5889.1				5145.9	Iron and nickel		
5869.1				5144.6	..		
5185.1				5142.2	..		
5175.2				5141.8	Iron		
5173.2	Iron and nickel } Iron and magnesium. }	}	E. Double line.	5138.8	Iron		
5171.2				5136.9	Iron and nickel		
5168.5				5135.2*	..		
5166.9				5133.8*	..		
5165.9				5133.1	Iron	Slight	
5164.7	Iron			5131.0	Iron	Slight	
5164.2	Iron			5129.7	..		
5161.8	Iron			5128.7	Titanium		
5158.6	Iron			5126.8	Iron		
5155.2	Nickel			5119.0*	..		Three lines, each about 0.5 tenth-metre in breadth, seen only over the spot.
5154.7	Sodium			5117.9*	..		
5153.2	..			5116.3*	..		
5152.7	Sodium and copper.			5113.5	..		
5151.4	Iron			5111.9*	..		Line about 0.3 tenth-metre in breadth, seen only over the spot.
				5110.9*	..		

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
5109.9	Iron			5035.0	Nickel		
5109.0	..			5030.3	..		
5107.2	..			5027.4	..		
5105.1	Iron	Slight		5026.3	Iron		
5103.8	..			5025.0*	..		
5102.3	..			5023.0*	..		
5101.0*	..			5021.9	..		
			Line about 0.2 tenth-metre in breadth, seen only over the spot.	5021.3	Iron		
5098.7	Nickel			5019.5	Iron and titanium		
5098.3	Iron			5017.8	..		
5096.4*	..			5016.8	..		
5095.3*	..			5015.6*	Nickel	Slight	
5094.2*	..			5014.4	Iron		
5092.4	..			5013.3	Titanium		
			Three ill-defined lines, each about 0.4 tenth-metre in breadth, seen only over the spot.	5012.5*	..		
5090.5	Iron			5011.6	..		
5089.5	..			5010.8*	..		
5085.5	..			5009.2*	..		
5083.7	..	Slight		5008.3*	..		
5082.6	Iron			5006.7	Iron and titanium		
5082.0	..			5005.6	Iron		
5079.0	Iron	Slight		5005.3	..		
5078.0	Iron			5003.2	Iron		
5076.4*	..			5002.1	..		
			Line about 0.2 tenth-metre in breadth, seen only over the spot.	5001.2	..		
5076.0	Iron			4998.9	Titanium		
5074.3	..			4996.1	..		
5072.6*	..			4995.4	..		
			Line about 0.2 tenth-metre in breadth, seen only over the spot.	4992.4*	..		
5071.8*	Iron			4991.7*	..		
5070.1*	..			4990.5	Iron and titanium		
5068.3	Iron	Slight		4989.6*	..		
5066.5	..			4988.5	..		
5065.3*	..			4986.2*	..		
5064.5	Iron and titanium			4984.8	..		
			Double line. The two components were not separated with the dispersion employed.	4983.5	Iron, nickel, and sodium.		
5063.2*	..			4982.7	Iron		Very slight.
5061.4*	..			4982.0	Iron and sodium		
			Two "bands," each about 0.8 tenth-metre in breadth, seen only over the spot.	4981.1	Titanium		
5059.9	Iron	Slight		4979.8	Nickel		
5058.2*	..			4977.9	Iron		
5055.5*	..			4972.4	..		
5053.1*	..			4969.1	Iron		
			Three "bands," each about 0.8 tenth-metre in breadth, seen only over the spot.	4965.5	..		
5051.1	Iron			4964.8	..		
5049.5	Iron			4961.8	Iron		
5048.3	..			4959.9*	..		
5047.9	..			4959.4	..		
5044.3*	..			4949.5	..		
5043.5	Iron			4945.8	..		
5042.3*	..			4945.4	..		
5041.3	Iron and calcium			4942.3	..		
5040.3	..			4940.6	Barium		
5038.8	Iron			4938.6	..		
5038.3	Titanium			4932.9	..		
5037.8	..			4931.3	..		
5035.9	Titanium			4929.6	..		
5035.5	..			4927.0	..		
				4926.7	..		
				4917.8*	..		
				4914.8*	..		
				4913.4	..		
				4907.1	..		
				4902.6	..		
				4899.5	..		
				4891.0	..		

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
4850.2	Iron	$\frac{1}{2}$		4857.7	Colalt	$\frac{1}{2}$	
4856.8	Iron	$\frac{1}{2}$		4857.0*	Nickel	$\frac{1}{2}$	
4884.7	Iron and titanium	$\frac{1}{2}$		4865.4	..	$\frac{1}{2}$	
4883.0	..	$\frac{1}{2}$		4864.9	..	$\frac{1}{2}$	
4884.1	Iron	$\frac{1}{2}$		4865.7	Iron	Slight	
4877.6	Iron and calcium	Slight		4860.7	Hydrogen	..	F. Scarcely affected. The edges of the line were a little fuzzy over the spot.
4872.7*	..	$\frac{1}{2}$					
4871.4	Iron	$\frac{1}{2}$		4859.3	Iron	$\frac{1}{2}$	
4870.6	Iron	$\frac{1}{2}$		4854.9	Iron and nickel	$\frac{1}{2}$	
4869.7*	..	$\frac{1}{2}$					
4869.0*	..	$\frac{1}{2}$					

Spot No. 1056.

1883 June 23.

The spot showed very considerable general absorption; the selective absorption was much more marked than usual. The great majority of the lines between *b* and *F* were much broadened, but the sky clouded over before many of them could be recorded. The "hands," however, were not noticed. Definition bad, limb boiling. Two-prism train direct. Magnifying power 14. Position angle of slit 10°.

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
5183.1	Magnesium	$\frac{1}{2}$	b_{12}	5142.2	..	$\frac{1}{2}$	
5172.2	Magnesium	$\frac{1}{2}$	b_{12}	5144.8	Iron	$\frac{1}{2}$	
5168.5	Iron and nickel	$\frac{1}{2}$	b_{12}	5141.4	..	$\frac{1}{2}$	
5166.9	Iron and magnesium.	$\frac{1}{2}$	b_{12}	5138.8	Iron	$\frac{1}{2}$	
5161.8	Iron	$\frac{1}{2}$		5136.8	Iron and nickel	$\frac{1}{2}$	
5158.6	Iron	$\frac{1}{2}$		5133.1	Iron	$\frac{1}{2}$	
5151.4	Iron	$\frac{1}{2}$		5131.0	Iron	$\frac{1}{2}$	
5150.3	Iron	$\frac{1}{2}$		5128.7	Titanium	$\frac{1}{2}$	
5147.6	Iron	$\frac{1}{2}$		5126.8	Iron	$\frac{1}{2}$	
5145.9	Iron and nickel	Slight		5125.6	..	$\frac{1}{2}$	
5144.6	..	Slight		5124.5	Iron	$\frac{1}{2}$	
5143.9*	..	..	0.1 tenth-metre in breadth, seen only over the spot.	5123.3	Iron	$\frac{1}{2}$	
				5121.2	Iron	$\frac{1}{2}$	
				5120.1	Titanium	$\frac{1}{2}$	

Spot No. 1062.

1883 June 30.

The definition was very bad and the spectrum could not be satisfactorily examined. C and F disappeared over the spot though they could not be distinctly seen to be reversed. Several other lines seemed at times to disappear in like manner, but the spot spectrum was so dark and the definition so bad that it was not possible to make sure of it. The D lines were greatly broadened, particularly D_{12} , which was quite 6 tenth-metres in breadth, the chief extension taking place towards the blue. The *b* lines seemed only slightly broadened, but were very ill-defined over the spot. Two-prism train reversed.

1883 July 2.

The spectrum showed much selective absorption, the number of new lines which appeared and of old lines broadened being much greater than usual. The "hands" evidently consisted of groups of fine lines. The definition in the early part of the morning was exceedingly bad, and nothing could be done on the spot although the sun was bright. Towards noon the definition improved, and the spectrum from *b* to *F* was examined with the two-prism train direct. Magnifying power 14. The definition whilst the part from *b* to *c* was examined was fair and often good, but the part from *c* to *F* was mapped under much less favourable circumstances, the sun getting into haze again. The portion of the spectrum below D towards the red was examined with the two-prism train reversed. Magnifying power 28. Position angle of slit 113° 5'.

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
6573.9	Iron	$\frac{1}{2}$		5142.2	..	$\frac{1}{2}$	
6562.1	Hydrogen	..	C. No distinct reversal was perceived, but the line disappeared in one or two places over the spot.	5141.8	Iron	Slight	
				5141.4	..	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.
				5139.8*	..	..	
6515.7	..	$\frac{1}{2}$		5138.8	Iron	$\frac{1}{2}$	
6492.3	Calcium	$\frac{1}{2}$		5138.3*	..	..	Line about 0.3 tenth-metre in breadth, seen only over the spot.
6168.1	Calcium	$\frac{1}{2}$					
6161.4	Calcium	2		5136.9	Iron and nickel	$\frac{1}{2}$	
6140.8	Barium	$\frac{1}{2}$		5136.4*	..	..	Line about 0.3 tenth-metre in breadth, seen only over the spot.
6135.7	Iron	$\frac{1}{2}$					
6121.3	Calcium	$\frac{1}{2}$		5134.2	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.
6101.9	Lithium and calcium.	1					
5895.1	Sodium	..	D_1 considerably broadened.				
5889.1	Sodium	..	D_2 about 3.0 tenth-metres broader than usual.	5133.1	Iron	Very slight.	
			2.0 tenth-metres of this additional breadth was on the side of the line towards the blue.	5131.0	..	Very slight.	
5315.9	..	..	The coronal line 1474 K. No change was detected in this line.	5129.9*	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.
5269.1	Iron	$\frac{1}{2}$	The E lines. Very little affected.	5128.7	Titanium	Very slight.	
5183.1	Magnesium	$\frac{1}{2}$		5126.8	Iron	Very slight.	
5172.2	Magnesium	$\frac{1}{2}$		5122.2*	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.
5171.2	Iron	$\frac{1}{2}$					
			Very much broadened. 0.3 tenth-metre over the spot.	5118.0*	..	..	Two "hands," each 1.0 tenth-metre in breadth, seen only over the spot.
5170.3*	..	..	Two lines each about 0.2 tenth-metre in breadth, seen only over the spot.	5116.0*	..	..	A "hand," 0.8 tenth-metre in breadth, seen only over the spot.
5169.6*	..	..		5113.5*	..	..	Line about 0.3 tenth-metre in breadth, seen only over the spot.
5168.5	Iron and nickel	$\frac{1}{2}$		5111.0*	..	..	
5166.9	Iron and magnesium.	$\frac{1}{2}$					
5165.6	Iron	$\frac{1}{2}$		5109.9	Iron	$\frac{1}{2}$	
5164.7	Iron	$\frac{1}{2}$		5108.3*	..	..	
5162.8*	..	$\frac{1}{2}$	A "hand," 1.2 tenth-metre in breadth, seen only over the spot.	5105.9*	Copper	Slight	
			0.3 tenth-metre in breadth over the spot.	5100.0*	..	..	A "hand," about 1.0 tenth-metre in breadth, seen only over the spot.
5159.8*	..	..	A "hand," 1.2 tenth-metre in breadth, seen only over the spot.				
5158.6	Iron	$\frac{1}{2}$		5095.3*	..	..	
5156.0	..	..	A line about 0.2 tenth-metre in breadth, seen only over the spot.	5094.8*	..	..	
				5094.0*	..	..	
5155.2	Nickel	$\frac{1}{2}$		5093.5*	..	..	
5151.4	Iron	$\frac{1}{2}$		5092.1*	..	..	
5150.3	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.	5091.7*	..	..	
5149.2*	..	..		5090.1*	..	..	
				5089.9	..	..	
5147.6	Iron	$\frac{1}{2}$		5089.0*	..	..	
5146.5*	..	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.	5087.3*	..	..	
				5085.0*	..	..	
5145.9	Iron and nickel	$\frac{1}{2}$		5085.3*	..	..	
5144.6	..	..		5082.6	Iron	$\frac{1}{2}$	
5143.9*	..	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.	5081.9	..	..	
				5079.0	Iron	$\frac{1}{2}$	
				5078.0	..	..	
				5074.2	Iron	$\frac{1}{2}$	
				5072.6*	..	..	Line about 0.2 tenth-metre in breadth, seen only over the spot.

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
5071.8	Iron	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.	5011.6	Iron	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.
5079.0*	..	..		5010.4*	..	..	
5068.3	Iron	$\frac{1}{2}$		5008.9*	..	..	
5056.5	Iron	$\frac{1}{2}$	Line about 0.2 tenth-metre in breadth, seen only over the spot.	5006.7	Iron and titanium	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.
5055.2*	..	..		5005.6	Iron	$\frac{1}{2}$	
5064.5	Iron and titanium	$\frac{1}{2}$		5005.0	Iron	$\frac{1}{2}$	
5064.0*	..	..	Lines slightly diffused, seen only over the spot. These lines occupy the place of some of the "bands" seen first on 1880 November 27.	5004.2*	..	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.
5063.0*	..	..		5003.2	Iron	$\frac{1}{2}$	
5061.0*	..	..		5002.1	..	$\frac{1}{2}$	
5061.1*	..	..		5001.2	..	$\frac{1}{2}$	
5059.9	Iron	$\frac{1}{2}$	Lines slightly diffused, seen only over the spot. These lines occupy the place of some of the "bands" seen first on 1880 November 27.	5000.6*	..	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.
5058.4	..	..		5000.0	..	$\frac{1}{2}$	
5057.3*	..	..		4998.9	Titanium	$\frac{1}{2}$	
5056.4*	..	..		4997.5	..	$\frac{1}{2}$	
5055.9*	..	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.	4996.1	..	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.
5055.7*	..	..		4994.8	..	$\frac{1}{2}$	
5051.1*	Iron	$\frac{1}{2}$		4993.4	Iron	$\frac{1}{2}$	
5049.5	Iron	$\frac{1}{2}$		4990.5	Iron and titanium	$\frac{1}{2}$	
5048.3	Iron	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.	4988.5	Iron	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.
5047.9	..	..		4984.8	..	$\frac{1}{2}$	
5046.6*	..	..		4983.5	Iron, nickel, and sodium.	$\frac{1}{2}$	
5045.1*	..	..	Line about 0.4 tenth-metre in breadth, seen only over the spot.	4982.0	Iron and sodium.	$\frac{1}{2}$	Two lines, each about 0.1 tenth-metre in breadth, seen only over the spot.
5043.5	Iron	$\frac{1}{2}$		4981.1	Titanium	$\frac{1}{2}$	
5042.6*	..	..		4979.8	Nickel and titanium.	$\frac{1}{2}$	
5041.3	Iron and calcium	$\frac{1}{2}$	Two lines, each about 0.1 tenth-metre in breadth, seen only over the spot.	4977.9	Iron	$\frac{1}{2}$	Two lines, each about 0.1 tenth-metre in breadth, seen only over the spot.
5040.3	Iron	$\frac{1}{2}$		4977.2*	..	$\frac{1}{2}$	
5038.8	Titanium	Slight		4976.2*	..	$\frac{1}{2}$	
5038.3	Iron	$\frac{1}{2}$	Line about 0.2 tenth-metre in breadth, seen only over the spot.	4975.9	..	$\frac{1}{2}$	Line about 0.2 tenth-metre in breadth, seen only over the spot.
5037.8	Titanium	Slight		4975.2	..	$\frac{1}{2}$	
5035.9	Titanium	Slight		4973.6*	..	$\frac{1}{2}$	
5035.5	Titanium	$\frac{1}{2}$	Three lines, each about 0.2 tenth-metre in breadth, seen only over the spot.	4972.4	Iron	$\frac{1}{2}$	Two lines, each 0.1 tenth-metre in breadth, seen only over the spot.
5035.0	Nickel	$\frac{1}{2}$		4970.1	..	$\frac{1}{2}$	
5033.7*	..	..		4969.5	Iron	$\frac{1}{2}$	
5032.4*	..	..	Two lines, each 0.1 tenth-metre in breadth, seen only over the spot.	4969.1	Iron	$\frac{1}{2}$	Two lines, each 0.1 tenth-metre in breadth, seen only over the spot.
5031.1*	..	..		4967.6	Iron	$\frac{1}{2}$	
5030.3	..	..		4967.2	Iron	$\frac{1}{2}$	
5029.1	..	..	Two lines, each 0.1 tenth-metre in breadth, seen only over the spot.	4965.5	..	$\frac{1}{2}$	Line about 0.2 tenth-metre in breadth, seen only over the spot.
5027.4	Iron	$\frac{1}{2}$		4964.8	..	$\frac{1}{2}$	
5026.5	..	..		4963.1*	..	$\frac{1}{2}$	
5024.2*	..	..	Two lines, each 0.1 tenth-metre in breadth, seen only over the spot.	4961.8	Iron	$\frac{1}{2}$	Two lines, each 0.1 tenth-metre in breadth, seen only over the spot.
5023.8*	..	..		4960.3*	..	$\frac{1}{2}$	
5021.9	..	..		4958.3*	..	$\frac{1}{2}$	
5019.5	Iron and titanium	Slight	Two lines, each 0.1 tenth-metre in breadth, seen only over the spot.	4956.9	..	$\frac{1}{2}$	Two lines, each 0.1 tenth-metre in breadth, seen only over the spot.
5017.8	..	..		4954.4	Iron	$\frac{1}{2}$	
5016.8	Nickel	$\frac{1}{2}$		4952.2	Iron	$\frac{1}{2}$	
5015.0*	..	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.	4951.0	..	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.
5014.4	Iron	$\frac{1}{2}$		4949.5	..	$\frac{1}{2}$	
5013.3	Titanium	$\frac{1}{2}$		4948.7	..	$\frac{1}{2}$	
5012.5*	..	..		4947.2	..	$\frac{1}{2}$	

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.				Tenth-metres.			
4944.0	Iron	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.	4884.7	Iron and titanium	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.
4933.6	Barium	$\frac{1}{2}$		4883.0	..	$\frac{1}{2}$	
4927.0	Iron	$\frac{1}{2}$		4881.1	Iron	$\frac{1}{2}$	
4915.2	Iron	$\frac{1}{2}$	Line about 0.3 tenth-metre in breadth, seen only over the spot.	4877.6	Iron and calcium	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.
4910.9	Iron	$\frac{1}{2}$		4875.5	Iron	$\frac{1}{2}$	
4918.3	Iron	$\frac{1}{2}$		4874.2*	..	$\frac{1}{2}$	
4910.0	..	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.	4872.9*	..	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.
4907.1	Iron	$\frac{1}{2}$		4871.4	Iron	$\frac{1}{2}$	
4904.1	Nickel	$\frac{1}{2}$		4870.6	Iron	$\frac{1}{2}$	
4902.6	Iron	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.	4867.7	Cobalt	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.
4899.5	Barium	$\frac{1}{2}$		4866.2*	..	$\frac{1}{2}$	
4892.3	..	..		4865.4	Nickel	$\frac{1}{2}$	
4891.0	Iron	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.	4864.3*	..	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.
4890.2	Iron	$\frac{1}{2}$		4863.7	Iron	$\frac{1}{2}$	
4889.4	..	$\frac{1}{2}$		4860.7	Hydrogen	..	
4888.1	..	$\frac{1}{2}$	Line about 0.1 tenth-metre in breadth, seen only over the spot.	4860.7	..	$\frac{1}{2}$	F. III-defined over the spot. Not distinctly seen to be broadened.
4886.8	Iron	$\frac{1}{2}$		4859.3	Iron	$\frac{1}{2}$	
4886.8	Iron	$\frac{1}{2}$		4859.3	Iron	$\frac{1}{2}$	

1883 July 5.

The definition was very bad, clouds were constantly passing, and the images were very unsteady. A comparison of the spectrum of the spot with the chart made on 1883 July 2 showed that its general character had suffered little or no change. No lines were noticed to be reversed, but two or three appeared much broader than on July 2. The "bands" could not be distinguished, probably on account of the bad definition. One-prism train direct. Magnifying power 28. Position angle of slit 60°.

Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres.			
6562.1	Hydrogen	..	C. III-defined over the spot. Not distinctly seen to be broadened.
5895.1	Sodium	$\frac{1}{2}$	D ₁ .
5889.1	Sodium	$\frac{1}{2}$	D ₂ . No displacement noticed on this line, the broadening seeming symmetrical with the line.
5269.1	Iron	Slight	E.
5183.1	Magnesium	$\frac{1}{2}$	b ₁ .
5172.2	Magnesium	$\frac{1}{2}$	b ₂ .
5168.5	Iron and nickel	$\frac{1}{2}$	b ₃ .
5166.9	Iron and magnesium.	$\frac{1}{2}$	b ₄ .
4867.7	Cobalt	..	More than doubled. Very much broader than on July 2.
4860.7	Hydrogen	..	F. III-defined over the spot. Not distinctly seen to be broadened.

SPOT No. 1444.

1883 October 15.

The nucleus of this spot showed a spectrum which differed in an important degree from most of those examined during the last two years. With a very dark, uniformly dark continuous spectrum, the traces of selective absorption in the part of the spectrum between b and F as shown by the broadening of individual lines were very slight. Many lines on the contrary were much fainter over the nucleus, so that the loss of distinctness of many of the lines was more noticeable than any increase in breadth. It was, however, a very difficult phenomenon to observe satisfactorily, particularly as the images were unsteady and clouds were frequently passing. A hasty inspection showed that the lines

below b presented more of their usual appearance than the lines between b and F , i.e., they were broadened rather than weakened. The "bands" were seen but were not conspicuous. The penumbra showed very slight absorption of any kind. One prism-train direct. Magnifying power 28. Position angle of slit 55° .

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres. 6562.1	Hydrogen	..	C. Slightly broadened, but not so dark over the spot as on the Sun.	5117.8*	}	..	Two bands, each 0.8 tenth-metre in breadth, seen only over the spot.
5895.1	Sodium	2	D ₁ } The broadening was to D ₂ } faint and different. The coronal line, 1474 K. Very faint. Scarcely visible.	5116.0*		..	
5889.1	Sodium	2		5066.2*	}	..	A broad "band," seen only over the spot.
5315.9	..	..		5053.8*		..	
5269.1	Iron	..	E. Ill-defined over the spot. The lines were believed to be slightly broader and at the same time slightly fainter.	5093.8*	..	..	A "band," about 0.8 tenth-metre in breadth, seen only over the spot.
5183.1	Magnesium	..	b ₁ . Somewhat ill-defined. Not noticed to be either broader or fainter.	5089.6*	}	..	Three "bands," each about 1.0 tenth-metre in breadth, seen only over the spot.
5172.2	Magnesium	1/2	b ₂ . Very ill-defined indeed. Somewhat ill-defined.	5087.8*		..	
5168.5	Iron and nickel	1/2		5083.9*		..	
5166.9	Iron and magnesium.	..	b ₄ . Not noticed to be either broader or fainter.	5076.8*	..	..	A "band," about 1.0 tenth-metre in breadth, seen only over the spot.
5164.2	..	1/2	..	5071.8	Iron	..	Double line. The two components were not separated with the dispersion employed. The line appeared to be displaced towards the red.
5162.3*	..	1/2		5064.5	Iron and titanium	1/2	
5159.6	..	..	A "band," 1.0 tenth-metre in breadth, seen only over the spot.	5063.0*	}	..	Two "bands," each about 0.8 tenth-metre in breadth, seen only over the spot.
5158.6	Iron	1/2	Line 0.3 tenth-metre in breadth, seen only over the spot.	5061.2*		..	
5156.2*	..	..		5059.9	Iron	1/2	Five "bands," each about 0.8 tenth-metre in breadth, seen only over the spot.
5153.2	..	..	These two lines were much broadened so that they were confused together over the spot.	5058.5*	}	..	
5152.7	Sodium and copper.	..		5057.1*		..	
5141.4	..	..	Line about 0.1 tenth-metre in breadth, seen only over the spot.	5059.9*	}	..	
5138.8	Iron	1/2		5054.3*		..	
5136.9	Iron and nickel	1/2		5052.9*	..	..	Fainter over the spot.
5124.8*	..	..		5048.5	Iron	..	
5124.5	Iron	Very slight.	Line about 0.4 tenth-metre in breadth over the spot.	5047.9	..	..	Two lines, each about 0.3 tenth-metre in breadth, seen only over the spot.
5123.3	Iron	Very slight.		5044.2	..	..	
5120.1	Titanium	..		5042.8*	..	..	Line about 0.4 tenth-metre in breadth over the spot.
				5033.9	Titanium	1/2	
				5035.5	Titanium	1/2	Line about 0.4 tenth-metre in breadth over the spot.
				5009.0*	..	..	
				5003.2	Iron	..	Fainter over the spot.
				5002.1	Iron	..	
				5001.2	..	..	Fainter over the spot.
				4998.9	Titanium	1/2	
				4997.3	..	..	Fainter over the spot.
				4993.4	..	..	
				4992.5	Iron and titanium	1/2	Fainter over the spot.
				4987.5	..	..	
				4984.8	Iron	1/2	Fainter over the spot.
				4977.9	..	..	
				4975.9	..	..	Fainter over the spot.
				4963.5	..	..	
				4964.8	..	..	Fainter over the spot.
				4961.8	..	..	

Wave-length.	Element.	Amount of Broadening.	Remarks.	Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres. 4954.4	Iron	1/2	Displaced towards the red. About 0.3 tenth-metre in breadth over the spot.	Tenth-metres. 4999.5	Barium	1/2	Fainter over the spot although considerably broadened.
4949.5	Iron	1/2		4891.0	Iron	..	Fainter over the spot.
4947.5*	..	..		4890.2	Iron	..	Fainter over the spot.
4945.7	Iron	1/2		4891.1	Iron	..	Fainter over the spot.
4937.4	..	..	Very much fainter over the spot.	4871.4	Iron	Very slight.	Much fainter over the spot.
4936.5	..	..		4870.6	Iron	..	Fainter over the spot.
4932.2	Iron	..		4868.8	..	..	F. Very slightly broadened but much fainter over the spot.
4919.9	Iron	1/2		4867.7	Cobalt	1/2	
4918.3	Iron	1/2	Displaced towards the red. Much fainter over the spot.	4863.7	Iron	..	
4907.1	Nickel	..		4860.7	Hydrogen	..	
4904.1	..	..	Fainter over the spot.	4859.3	Iron	..	Much fainter over the spot.

SPOT No. 1138.

1883 October 15.

The part of the spot examined was the nucleus nearest the limb. The spectrum was nearly as dark as that of Spot No. , but there was much greater evidence of selective absorption as seen in the broadening of particular lines. With the spectroscope reversed, two-prism train, magnifying powers 56 and 28, the C and F lines were perceived to be reversed, and each displaced about 1/2 tenth-metre towards the blue. This reversal took place on the following edge of the nucleus examined and extended about 1/3 of the distance towards its centre. Several lines appeared fainter or smudged over the spot, the pairs of iron lines 4919.9, 4918.3, and 4871.4, 4870.6 being specially noted. The following observations were made with the one-prism train direct. Magnifying power 28, position angle of slit 95° . The observations were much interrupted by passing cloud.

Wave-length.	Element.	Amount of Broadening.	Remarks.
Tenth-metres. 6562.1	Hydrogen	..	C. Reversed, but no displacement noticed.
5895.1	Sodium	1 1/2	D ₁ . Diffused over the spot.
5889.1	Sodium	1 1/2	D ₂ . Diffused over the spot.
5871.0	..	..	D ₃ . Not seen.
5315.9	..	..	The coronal line. 1474 K. No change perceived.
5269.1	Iron	1/2	E.
5183.1	Magnesium	1/2	b ₁ .
5172.2	Magnesium	1/2	b ₂ .
5168.5	Iron and nickel	1/2	b ₃ .
5166.9	Iron and magnesium.	1/2	b ₄ .
4860.7	Hydrogen	..	F. Reversed, but no displacement noticed.

MEASURES OF DISPLACEMENT OF LINES IN THE SPECTRA OF STARS, as compared with those of
ROYAL OBSERVATORY, GREENWICH.

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. The numerals in the third column denote the number of "Half-prisms" used. 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 181° 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° . The dispersions have been inferred from measurements of the distance between b_1 and b_4 as compared with the wave-length measure.

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
Jan. 15. 6. 9	M	1	0	Moon F	0'657	+ 0'009	r	r
	"	"	"	H β	0'648			
	"	"	"	Moon F	0'659			
	"	"	"	H β	0'649			
	"	"	"	Moon F	0'646			
	"	"	"	H β	0'653	+ 0'014		
Feb. 16. 7. 0	M	1	5	Sirius F	0'505	+ 0'080	$\frac{1}{2}$ towards red	
	"	"	"	H β	0'483			
	"	"	"	Sirius F	0'505			
	"	"	"	H β	0'427			
	"	"	"	Sirius F	0'477			
7.15	"	"	"	H β	0'422	+ 0'055	$\frac{1}{2}$ towards red	
7.35	"	"	"	Sirius F	0'485	+ 0'054	$\frac{1}{2}$ towards red	
7.50	"	"	"	H β	0'431			
Feb. 16. 8. 0	M	1	5	Procyon F	0'433	+ 0'090	$\frac{1}{2}$ towards red	
	"	"	"	H β	0'343			
	"	"	"	Procyon F	0'448			
8.10	"	"	"	H β	0'336	+ 0'112	$\frac{1}{2}$ towards red	
Feb. 16. 8.25	M	1	5	Pollux F	0'304	- 0'079	$\frac{1}{2}$ towards blue	
	"	"	"	H β	0'383			
	"	"	"	Pollux F	0'239			
8.35	"	"	"	H β	0'411			
Feb. 16. 8.45	M	1	5	Castor F	0'711	+ 0'089	$\frac{1}{2}$ towards red	
	"	"	"	H β	0'612			
	"	"	"	Castor F	0'697			
	"	"	"	H β	0'652			
	"	"	"	Castor F	0'775			
8.55	"	"	"	H β	0'682	+ 0'093	$\frac{1}{2}$ towards red	
9. 5	"	"	"					
Feb. 16. 9.15	M	1	5	Moon F	0'651	- 0'012		
	"	"	"	H β	0'663			
	"	"	"	Moon F	0'652			
	"	"	"	H β	0'677			
	"	"	"	Moon F	0'662			
	"	"	"	H β	0'654	+ 0'008		
	"	"	"	Moon F	0'655	- 0'006		
	"	"	"	H β	0'664			
	"	"	"	Moon F	0'670			
9.35	"	"	"	H β	0'646	+ 0'024		

TERRESTRIAL ELEMENTS, and CONCLUDED MOTIONS in the LINE OF SIGHT, from OBSERVATIONS at the
in the Year 1883.

1^{mm} of the micrometer corresponds, with one "half-prism" to 10.4 tenth-metres or 37.5 miles per second for the δ 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 7.6 miles per second for δ and to 1.71 tenth-metres or 6.6 miles per second for F.

1^{mm} 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 estimations of the displacements have been made by *indirect* comparison with the comparison-line, except where the contrary is expressly stated.

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
	+ 2'8		Moon in cloud. Spectrum faint. Coincidence apparently perfect.
	+ 3'1		
	+ 4'3		
+ 10'3	+ 14'2	+ 18'7	Definition poor.
+ 10'3	+ 13'6	+ 18'7	
+ 10'3	+ 6'6	+ 13'9	
+ 10'3	+ 6'3	+ 13'9	
+ 10'1	+ 17'5	+ 26'1	Definition good.
+ 10'1	+ 24'3	+ 38'2	
+ 10'8	- 35'0	- 59'1	Definition fair.
+ 10'8	- 63'6	- 83'2	
+ 11'8	+ 15'4	+ 36'5	Definition good.
+ 11'8	+ 2'0	+ 17'2	Star-line not satisfactorily seen.
+ 11'8	+ 16'7	+ 36'5	Conditions as good as for the first observation.
	- 3'7		Coincidence appeared perfect.
	- 7'7		
	+ 2'5		
	- 1'8		
	+ 7'4		

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
Feb. 23. 6.10	M	1	5	Rigel F.	1'112			
6.30	"	"	"	H β	0'963	+ 0'150	$\frac{1}{2}$ towards red	0'250
	"	"	"	Rigel F.	1'054			
	"	"	"	H β	0'932	+ 0'100	$\frac{1}{2}$ towards red	0'250
Feb. 23. 6.50	M	1	5	Sirius F.	0'684			
7. 0	"	"	"	H β	0'646	+ 0'038	$\frac{1}{2}$ towards red	0'250
7.20	"	"	"	Sirius F.	0'732			
7.35	"	"	"	H β	0'672	+ 0'060	$\frac{1}{2}$ towards red	0'250
	"	"	"	Sirius F.	0'731			
	"	"	"	H β	0'690	+ 0'041	$\frac{1}{2}$ towards red	0'250
	"	"	"	Sirius F.	0'691			
	"	"	"	H β	0'691	0'000	Coincident	0'250
Feb. 23. 7.55	M	1	5	Procyon F.	0'780			
8. 5	"	"	"	H β	0'662	+ 0'118	$\frac{1}{2}$ towards red	0'250
	"	"	"	Procyon F.	0'748			
	"	"	"	H β	0'684	+ 0'064	$\frac{1}{2}$ towards red	0'250
Feb. 23. 8.20	M	1	5	Pollux F.	0'828			
8.30	"	"	"	H β	0'861	- 0'033	$\frac{1}{2}$ towards blue	0'250
	"	"	"	Pollux F.	0'731			
	"	"	"	H β	0'835	- 0'101	$\frac{1}{2}$ towards blue	0'250
Feb. 23. 8.40	M	1	5	Regulus F.	0'348			
8.50	"	"	"	H β	0'273	+ 0'075	$\frac{1}{2}$ towards red	0'250
	"	"	"	Regulus F.	0'382			
	"	"	"	H β	0'288	+ 0'094	$\frac{1}{2}$ towards red	0'250
Feb. 23. 9. 0	M	1	5	Moon F.	0'954			
	"	"	"	H β	0'949	+ 0'005		0'250
	"	"	"	Moon F.	0'952			
	"	"	"	H β	0'947	+ 0'005		0'250
	"	"	"	Moon F.	0'962			
	"	"	"	H β	0'973	- 0'011		0'250
	"	"	"	Moon F.	0'983			
	"	"	"	H β	0'990	- 0'007		0'250
9.15	"	"	"	Moon F.	0'991			
	"	"	"	H β	0'999	- 0'008		0'250
Mar. 30. 7.40	M	1	5	Sirius F.	0'869			
7.50	"	"	"	H β	0'597	- 0'028	$\frac{1}{2}$ towards blue	0'165
	"	"	"	Sirius F.	0'545			
	"	"	"	H β	0'384	- 0'039	$\frac{1}{2}$ towards blue	0'165
Mar. 30. 8.10	M	2	5	Sirius F.	1'279			
8.20	"	"	"	H β	0'961	+ 0'318	$\frac{1}{2}$ towards red	0'165
8.30	"	"	"	Sirius F.	0'795			
8.40	"	"	"	H β	0'883	- 0'008	$\frac{1}{2}$ towards blue	0'165
	"	"	"	Sirius F.	0'420			
	"	"	"	H β	0'068	+ 0'352	$\frac{1}{2}$ towards red	0'115
	"	"	"	Sirius F.	0'116			
	"	"	"	H β	0'102	+ 0'014	Coincident	0'115
Mar. 30. 8.50	M	1	5	Sirius F.	0'128			
9. 0	"	"	"	H β	0'098	+ 0'030	$\frac{1}{2}$ towards red	0'115
9.10	"	"	"	Sirius F.	0'091			
9.20	"	"	"	H β	0'120	- 0'031	$\frac{1}{2}$ towards blue	0'115
	"	"	"	Sirius F.	0'154			
	"	"	"	H β	0'150	+ 0'002	Coincident	0'115
	"	"	"	Sirius F.	0'112			
	"	"	"	H β	0'145	- 0'033	$\frac{1}{2}$ towards blue	0'115

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
+ 15'8	+ 30'2	+ 30'2	Star-line faint, observations difficult.
+ 15'8	+ 14'9	+ 14'9	
+ 11'4	+ 0'3	- 1'8	Definition good. Spectrum bright. Though the measures are accordant, the star-line is so difficult to bisect from its breadth and diffused character, that the agreement may be largely accidental. Repeated and careful direct comparisons seemed to show an exceedingly small displacement towards the red.
+ 11'4	+ 7'0	+ 7'8	
+ 11'4	+ 1'2	- 1'8	
+ 11'4	+ 11'4	- 11'4	
+ 11'8	+ 24'4	+ 26'6	Star-line well seen.
+ 11'8	+ 7'8	+ 7'4	
+ 12'5	- 22'6	- 20'2	Star-line very faint, and difficult to see.
+ 12'5	- 43'5	- 43'2	
+ 2'2	+ 20'8	+ 23'4	Star-line distinct. Observations considered quite satisfactory.
+ 2'2	+ 26'6	+ 28'5	
	+ 1'5		Coincidence appeared perfect. Both spectra well defined.
	+ 1'5		
	- 3'4		
	- 2'2		
	- 2'5		
+ 14'2	- 22'8	- 24'9	Spectrum steady. Definition good. Direct comparison showed little or no displacement.
+ 14'2	- 26'2	- 24'9	
+ 14'2	+ 6'6	+ 11'3	The star-line with this dispersion is so exceedingly broad and ill-defined that the bisections are necessarily very rough.
+ 14'2	- 20'0	- 21'9	
+ 14'2	+ 8'8	+ 11'9	
+ 14'2	- 13'3	- 14'2	
+ 14'2	- 5'0	- 3'4	
+ 14'2	- 23'7	- 25'0	
+ 14'2	- 13'6	- 14'2	
+ 14'2	- 24'3	- 25'0	

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
Mar. 30. 9.50 10. 0	M	1	5	Procyon F..... H β Procyon F..... H β	r 0'228 0'186 0'182 0'133	r + 0'042 + 0'049	r $\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	r 0'115 0'115
Mar. 30. 10. 10 10. 20	M	2	5	Procyon F..... H β Procyon F..... H β	0'970 0'389 0'756 0'546	+ 0'381 + 0'210	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'115 0'115
Mar. 30. 10. 55 11. 15	M	1	5	Pollux F..... H β Pollux F..... H β	0'099 0'240 0'202 0'138	- 0'141 - 0'036	$\frac{3}{4}$ towards blue $\frac{1}{2}$ towards blue	0'115 0'115
Mar. 30. 11. 35 11. 50	M	1	5	Regulus F..... H β Regulus F..... H β	0'808 0'706 0'838 0'742	+ 0'102 + 0'096	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'115 0'115
Mar. 30. 12. 10 12. 25	M	1	5	Spica F..... H β Spica F..... H β	0'990 1'009 0'942 0'971	- 0'019 - 0'029	$\frac{1}{10}$ towards blue $\frac{1}{2}$ towards blue	0'115 0'115
Mar. 30. 12. 40 12. 55	M	1	5	Arcturus F..... H β Arcturus F..... H β	0'090 0'208 0'068 0'204	- 0'118 - 0'136	$\frac{3}{4}$ towards blue $\frac{3}{4}$ towards blue	0'115 0'115
May 7. 14. 0 14. 15	M	1	6	Spica F..... H β Spica F..... H β	0'128 0'287 0'152 0'289	- 0'159 - 0'157	$\frac{3}{4}$ towards blue $\frac{3}{4}$ towards blue	0'148 0'148
May 7. 14. 35 14. 50	M	1	6	Arcturus F..... H β Arcturus F..... H β	0'130 0'332 0'282 0'394	- 0'202 - 0'112	$\frac{3}{4}$ towards blue $\frac{3}{4}$ towards blue	0'148 0'148
May 15. 14. 18 14. 22 14. 27 14. 32	N	1	5	Moon F..... H β Moon F..... H β Moon F..... H β Moon F..... H β	0'361 0'367 0'190 0'200 0'198 0'210 0'002 0'013	- 0'006 - 0'010 - 0'012 - 0'011		
May 16. 13. 30 13. 45 14. 5	M	1	6	Pollux F..... H β Pollux F..... H β Pollux F..... H β	0'354 0'096 0'538 0'604 0'378 0'603	- 0'242 - 0'046 - 0'225	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'205 0'205 0'205

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
+ 17'2	- 4'3	- 6'4	
+ 17'2	- 2'1	- 3'7	
+ 17'2	+ 7'7	+ 8'9	Spectrum too faint for the two-prism train to be used with advantage. Definition fair.
+ 17'2	- 3'5	- 4'1	Spectrum steady.
+ 17'8	- 61'1	- 53'8	Star-line faint and very difficult to bisect.
+ 17'8	- 28'9	- 28'6	
+ 12'3	+ 19'0	+ 14'7	Definition good. Spectrum steady. Star-line fairly easy to bisect.
+ 12'3	+ 17'2	+ 14'7	
- 3'9	- 1'9	- 1'5	Definition good.
- 3'9	- 5'0	- 6'9	
- 3'4	- 32'8	- 29'0	Star-line well seen. Definition good.
- 3'4	- 38'3	- 32'6	
+ 7'6	- 55'9	- 50'5	Definition very bad, and bisections therefore by no means satisfactory.
+ 7'6	- 55'3	- 50'5	
+ 6'4	- 67'8	- 54'7	Spectrum tremulous. Star-line faint. Definition poor.
+ 6'4	- 40'4	- 32'2	
- 1'8			Coincidence appeared perfect.
- 3'0			
- 3'6			
- 3'3			
+ 14'9	- 88'4	- 63'5	Spectrum tremulous. Definition bad. Star-line only seen by glimpses.
+ 14'9	- 28'9	- 28'8	
+ 14'9	- 83'3	- 63'5	

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
May 16. 14. 25	M	1	6	Moon F..... H β Moon F..... H β Moon F..... H β Moon F..... H β Moon F..... H β	0'511 0'500 0'492 0'498 0'488 0'482 0'493 0'486 0'484 0'492	+ 0'011 — 0'006 + 0'006 + 0'007 — 0'008		0'205 0'205 0'205 0'205 0'205 0'205 0'205 0'205 0'205 0'205
May 16. 15. 20	M	1	6	Spica F..... H β Spica F..... H β Spica F..... H β	0'425 0'492 0'408 0'497 0'480 0'486	— 0'067 — 0'089 — 0'006	$\frac{1}{2}$ towards blue $\frac{1}{4}$ towards blue Coincident	0'205 0'205 0'205 0'205 0'205 0'205
May 16. 16. 20	M	1	6	α Coronae F..... H β α Coronae F..... H β	0'286 0'147 0'220 0'150	+ 0'139 + 0'070	$\frac{1}{4}$ towards red $\frac{1}{4}$ towards red	0'205 0'205 0'205 0'205
May 16. 17. 5	M	1	6	α Lyrae F..... H β α Lyrae F..... H β	0'762 0'925 0'787 0'954	— 0'163 — 0'167	$\frac{1}{4}$ towards blue $\frac{1}{4}$ towards blue	0'205 0'205 0'205 0'205
May 21. 13. 30	M	1	6	Arcturus F..... H β Arcturus F..... H β	0'272 0'402 0'278 0'408	— 0'130 — 0'130	$\frac{3}{8}$ towards blue $\frac{3}{8}$ towards blue	0'175 0'175 0'175 0'175
May 21. 14. 0	M	1	6	Moon F..... H β Moon F..... H β Moon F..... H β Moon F..... H β Moon F..... H β	0'678 0'708 0'698 0'692 0'737 0'730 0'820 0'830 0'796 0'782	— 0'030 + 0'006 + 0'007 — 0'010 + 0'014		0'175 0'175 0'175 0'175 0'175 0'175 0'175 0'175 0'175 0'175
May 21. 14. 50	M	1	6	η Ursae Majoris F..... H β	0'211 0'190	+ 0'021	$\frac{1}{10}$ towards red	0'175 0'175
May 22. 15. 25	N	1	10	Moon F..... H β Moon F..... H β Moon F..... H β Moon F..... H β	0'354 0'340 0'337 0'364 0'440 0'453 0'494 0'511	+ 0'014 — 0'007 — 0'013 — 0'017		0'259 0'259 0'259 0'259 0'259 0'259 0'259 0'259
May 23. 13. 41	N	1	6	Regulus F..... H β Regulus F..... H β	0'897 0'865 0'892 0'862	+ 0'032 + 0'030	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'145 0'145 0'145 0'145

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
	+ 3.3 — 1.8 + 1.8 + 2.1 — 2.4		Coincidence appeared perfect.
+ 9.9 + 9.9 + 9.9	— 30.3 — 36.9 — 11.7	— 29.3 — 34.2 — 9.9	Spectrum bright, but tremulous. Definition poor.
+ 3.4 + 3.4	+ 38.8 + 17.9	+ 45.2 + 20.9	Spectrum steady. Definition fair.
— 6.3 — 6.3	— 43.2 — 44.4	— 42.3 — 42.3	Definition very good.
+ 9.5 + 9.5	— 49.0 — 49.0	— 45.7 — 45.7	Star-line well seen, measures considered very satisfactory.
	— 9.1 + 1.8 + 2.1 — 3.0 + 4.3		Coincidence appeared perfect.
+ 9.5	— 3.1	— 3.5	Spectrum faint.
	+ 4.3 — 2.1 — 4.0 — 5.1		Coincidence appeared perfect. Observations interrupted by clouds.
+ 17.8 + 17.8	— 8.1 — 8.7	— 8.0 — 8.0	Spectrum very tremulous. Star-line dark and fairly well defined.

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
May 23. 14. 5 14. 15	M	1	6	Regulus F. H β Regulus F. H β	0'987 0'994 0'975 0'902	+ 0'083 + 0'073	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'145 0'145
May 23. 14. 30 14. 40	M	1	6	β Leonis F. H β β Leonis F. H β	0'052 0'016 0'138 0'036	+ 0'036 + 0'102	$\frac{1}{2}$ towards red $\frac{3}{4}$ towards red	0'145 0'145
May 23. 15. 5 15. 20 15. 40 15. 50	M	1	6	γ Ursae Majoris F. H β γ Ursae Majoris F. H β γ Ursae Majoris F. H β γ Ursae Majoris F. H β	0'152 0'048 0'122 0'071 0'149 0'051 0'107 0'071	+ 0'104 + 0'051 + 0'098 + 0'036	$\frac{3}{4}$ towards red $\frac{1}{2}$ towards red $\frac{3}{4}$ towards red $\frac{1}{2}$ towards red	0'145 0'145 0'145 0'145
May 23. 16. 15 16. 20	M	1	6	Arcturus F. H β Arcturus F. H β	0'094 0'168 0'093 0'178	- 0'074 - 0'085	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'145 0'145
May 23. 16. 33 16. 40	M	1	6	α Coronae F. H β α Coronae F. H β	0'408 0'337 0'370 0'328	+ 0'071 + 0'042	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'145 0'145
May 23. 16. 50 16. 55	M	1	6	α Ophiuchi F. H β α Ophiuchi F. H β	0'708 0'686 0'756 0'692	+ 0'022 + 0'064	$\frac{1}{10}$ towards red $\frac{1}{2}$ towards red	0'145 0'145
May 23. 17. 10 17. 30	M	1	6	Moon F. H β Moon F. H β Moon F. H β Moon F. H β Moon F. H β	0'742 0'748 0'755 0'759 0'754 0'754 0'773 0'765 0'755 0'764	- 0'006 - 0'004 + 0'008 - 0'009		0'145 0'145 0'145 0'145 0'145 0'145 0'145 0'145
May 24. 14. 10 14. 30	M	1	6	Spica F. H β Spica F. H β	0'874 1'001 0'845 0'976	- 0'127 - 0'131	$\frac{3}{4}$ towards blue $\frac{3}{4}$ towards blue	0'145 0'145
May 24. 15. 0 15. 20	M	1	6	β Librae F. H β β Librae F. H β	0'985 1'102 0'047 0'118	- 0'117 - 0'071	$\frac{3}{4}$ towards blue $\frac{1}{2}$ towards blue	0'145 0'145
May 24. 15. 45 16. 0	M	1	6	α Ophiuchi F. H β α Ophiuchi F. H β	0'380 0'417 0'353 0'408	- 0'037 - 0'055	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'145 0'145

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
+ 17'8	+ 7'4	+ 6'5	
+ 17'8	+ 4'4	+ 6'5	
+ 16'7	- 5'8	- 0'5	Star-spectrum steadier than that of Regulus, but star-line broader and not so well defined.
+ 16'7	+ 14'3	+ 15'7	
+ 9'6	+ 22'0	+ 22'8	Star-line faint and ill-defined.
+ 9'6	+ 5'9	+ 6'6	
+ 9'6	+ 20'2	+ 22'8	
+ 9'6	+ 1'3	+ 6'6	
+ 9'9	- 32'4	- 34'2	Spectrum very bright. Star-line well defined though rather faint. Spectrum steady.
+ 9'9	- 35'7	- 34'2	
+ 4'8	+ 16'8	+ 19'5	Spectrum steady and fairly bright. Line dark and broad, a little ill-defined at edges.
+ 4'8	+ 7'9	+ 11'4	
- 4'5	+ 11'2	+ 9'4	Spectrum very bright and steady, but star-line very difficult to bisect, as it was faint and very diffused.
- 4'5	+ 23'9	+ 20'7	
- 1'8			Coincidence apparently perfect. Both spectra seen very well.
- 1'2			
0'0			
+ 2'4			
- 2'7			
+ 11'8	- 50'4	- 49'6	Measures considered fairly satisfactory. Spectrum bright but tremulous. Star-line ill-defined and fuzzy.
+ 11'8	- 51'6	- 54'4	
+ 4'8	- 40'3	- 38'9	Star-spectrum and line faint. Definition poor.
+ 4'8	- 26'4	- 23'7	
- 4'3	- 6'9	- 3'8	Star-line very diffused. Spectrum faint. Observation difficult.
- 4'3	- 12'4	- 9'9	

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
d h m May 24. 16. 20	M	1	6	α Lyrae F	0'458			0'145
16. 30	"	"	"	H β	0'602	- 0'144	$\frac{1}{2}$ towards blue	0'145
	"	"	"	α Lyrae F	0'442			
	"	"	"	H β	0'588	- 0'146	$\frac{1}{2}$ towards blue	0'145
May 24. 16. 50	M	1	6	Moon F.	0'754			0'145
	"	"	"	H β	0'745	+ 0'009		0'145
	"	"	"	Moon F.	0'740			0'145
	"	"	"	H β	0'736	+ 0'004		0'145
	"	"	"	Moon F.	0'738			0'145
	"	"	"	H β	0'739	- 0'001		0'145
	"	"	"	Moon F.	0'762			0'145
17. 15	"	"	"	H β	0'748	+ 0'014		0'145
	"	"	"	Moon F.	0'747			0'145
	"	"	"	H β	0'756	- 0'009		0'145
May 28. 13. 55	M	1	10	Arcturus δ_1	0'848			0'105
14. 10	"	"	"	Mg ₁	0'996	- 0'148	$\frac{1}{2}$ towards blue	0'105
	"	"	"	Arcturus δ_1	0'856			0'105
	"	"	"	Mg ₁	1'020	- 0'164	$\frac{1}{2}$ towards blue	0'105
May 28. 14. 40	M	1	10	ϵ_2 Boötis δ_1	0'072			0'105
14. 55	"	"	"	Mg ₁	0'048	+ 0'024	$\frac{1}{2}$ towards red	0'105
	"	"	"	ϵ_2 Boötis δ_1	0'009			0'105
	"	"	"	Mg ₁	0'052	- 0'043	$\frac{1}{2}$ towards blue	0'105
May 28. 16. 45	M	1	10	α Herculis δ_4	0'409			0'105
17. 0	"	"	"	Mg ₂	0'545	- 0'116	$\frac{1}{2}$ towards blue	0'105
	"	"	"	α Herculis δ_4	0'415			0'105
	"	"	"	Mg ₂	0'511	- 0'096	$\frac{1}{2}$ towards blue	0'105
May 31. 16. 18	N	1	10	Regulus F.	0'844			0'175
	"	"	"	H β	0'808	+ 0'036	$\frac{1}{2}$ towards red	0'175
May 31. 17. 0	N	1	10	Spica F.	0'899			0'175
17. 4	"	"	"	H β	0'924	- 0'025	$\frac{1}{2}$ towards blue	0'175
	"	"	"	Spica F.	0'950			0'175
	"	"	"	H β	0'968	- 0'018	$\frac{1}{10}$ towards blue	0'175
May 31. 17. 55	N	1	10	β Librae F.	0'189			0'175
18. 2	"	"	"	H β	0'100	- 0'011	Nearly coincident	0'175
	"	"	"	β Librae F.	0'135			0'175
	"	"	"	H β	0'250	- 0'115	$\frac{1}{2}$ towards blue	0'175
May 31. 18. 45	N	1	10	α Lyrae F.	0'211			0'175
18. 50	"	"	"	H β	0'281	- 0'070	$\frac{1}{2}$ towards blue	0'175
	"	"	"	α Lyrae F.	0'208			0'175
	"	"	"	H β	0'288	- 0'080	$\frac{1}{2}$ towards blue	0'175
June 1. 14. 10	M	1	10	Arcturus F.	0'679			0'154
14. 25	"	"	"	H β	0'854	- 0'175	$\frac{1}{2}$ towards blue	0'154
	"	"	"	Arcturus F.	0'690			0'154
	"	"	"	H β	0'845	- 0'155	$\frac{1}{2}$ towards blue	0'154
June 1. 14. 50	M	1	10	α Canum Venat. F. ...	0'292			0'154
15. 5	"	"	"	H β	0'212	+ 0'080	$\frac{1}{2}$ towards red	0'154
	"	"	"	α Canum Venat. F. ...	0'204			0'154
	"	"	"	H β	0'208	+ 0'086	$\frac{1}{2}$ towards red	0'154

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
- 5.5	- 38.2	- 37.1	Spectrum bright but very tremulous. Definition poor.
- 5.5	- 38.8	- 37.1	
	+ 2.7		Coincidence appeared perfect. Both spectra seen very well.
	+ 1.2		
	- 0.3		
	+ 4.3		
	- 2.7		
+ 10.8	- 66.4	- 68.5	Measures considered very satisfactory. Star-line well defined.
+ 10.8	- 72.4	- 68.5	
+ 8.9	+ 0.1	+ 3.1	Star-spectrum very faint. Star-lines only caught at rare intervals. Displacement evidently very small.
+ 8.9	- 35.0	- 32.9	
- 1.8	- 41.7	- 39.5	Measures not wholly satisfactory, as the δ_4 line could not be clearly isolated.
- 1.8	- 34.2	- 47.8	
+ 17.5	- 6.6	- 0.7	Star very low and spectrum somewhat faint.
+ 13.3	- 20.9	- 23.8	
+ 13.3	- 18.8	- 21.7	
+ 6.7	- 10.0	- 6.7	Spectrum faint. Star-line very well seen at times.
+ 6.7	- 41.6	- 48.7	Star-line much better seen than in the first observation.
- 4.7	- 16.6	- 16.3	
- 4.7	- 19.6	- 16.3	
+ 10.2	- 63.3	- 55.6	Spectrum bright, star-line not very distinct.
+ 10.2	- 57.3	- 55.6	
+ 13.4	+ 10.9	+ 9.3	Spectrum faint, but star-line dark and distinct.
+ 13.4	+ 12.7	+ 9.3	

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
June 1. 15. 35 15. 50	M	1	10	γ Ursae Majoris F..... H β	σ 237 σ 163	+ σ 074	$\frac{1}{2}$ towards red	σ 154
	"	"	"	γ Ursae Majoris F..... H β	σ 259 σ 180	+ σ 079	$\frac{1}{2}$ towards red	σ 154
June 4. 15. 15 15. 30	M	1	10	Arcturus b_1	σ 413 σ 306	- σ 107	$\frac{1}{10}$ towards blue	σ 150
	"	"	"	Arcturus b_1	σ 388 σ 308	- σ 080	$\frac{1}{2}$ towards blue	σ 150
June 4. 15. 55 16. 20	M	1	10	α Boötis b_1	σ 285 σ 284	- σ 002	Coincident	σ 150
	"	"	"	α Boötis b_1	σ 352 σ 317	- σ 035	$\frac{1}{2}$ towards blue	σ 150
June 6.	M	1	10	Sky b_1	σ 075	- σ 032		σ 150
	"	"	"	Mg $_1$	σ 045	- σ 061		σ 150
	"	"	"	Sky b_1	σ 059	- σ 002		σ 150
	"	"	"	Mg $_1$	σ 069	- σ 008		σ 150
	"	"	"	Sky b_1	σ 061	+ σ 005		σ 150
	"	"	"	Mg $_1$	σ 741	- σ 008		σ 150
	"	"	"	Sky b_1	σ 746	- σ 008		σ 150
	"	"	"	Mg $_1$	σ 744 σ 736	- σ 008		σ 150
June 8. 18. 25 18. 30	N	1	10	Arcturus b_1	σ 199 σ 386	- σ 187	$\frac{3}{2}$ towards blue	σ 125
	"	"	"	Arcturus b_1	σ 252 σ 370	- σ 108	$\frac{1}{2}$ towards blue	σ 125
June 14. 16. 20 16. 24	N	1	10	Arcturus b_1	σ 461 σ 639	- σ 178	$\frac{1}{2}$ towards blue	σ 125
	"	"	"	Arcturus b_1	σ 530 σ 640	- σ 110	$\frac{1}{10}$ towards blue	σ 125
June 14. 16. 44 16. 48	N	1	10	Moon b_1	σ 701 σ 704	- σ 003	Coincident	σ 125
	"	"	"	Moon b_1	σ 618 σ 621	- σ 003	Coincident	σ 125
June 14. 17. 47 18. 5	N	1	10	α Cygni b_1	σ 186 σ 234	- σ 048	$\frac{1}{10}$ towards blue	σ 125
	"	"	"	α Cygni b_1	σ 335 σ 183	+ σ 140	$\frac{1}{2}$ towards red	σ 125
	"	"	"	Mg $_1$	σ 568 σ 497	+ σ 071	$\frac{1}{2}$ towards red	σ 125
June 26. 18. 5 10. 10	N	1	10	Arcturus F.....	σ 884 σ 937	- σ 053	$\frac{1}{2}$ towards blue	σ 075
	"	"	"	H β	σ 883 σ 932	- σ 049	$\frac{1}{2}$ towards blue	σ 075
June 26. 18. 28 18. 33	N	1	10	α Lyrae F.....	σ 889 σ 944	- σ 055	$\frac{1}{2}$ towards blue	σ 075
	"	"	"	H β	σ 858 σ 957	- σ 099	$\frac{1}{2}$ towards blue	σ 075

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
- 2'2	+ 24'7	+ 24'9	Spectrum fairly bright. Star-line fairly distinct, but a little ill-defined at edges. Measures considered fairly good.
- 2'2	+ 26'2	+ 24'9	
+ 12'0	- 52'2	- 55'2	Star-spectrum bright and steady, but star-lines not very well defined.
+ 12'0	- 42'0	- 48'1	
+ 10'0	- 10'8	- 10'0	Star-line very difficult to see.
+ 10'0	- 23'1	- 30'6	
	- 12'0		
	- 0'8		
	- 3'0		
	+ 1'9		
	- 3'0		
+ 12'6	- 82'8	- 66'0	Sky hazy. Spectrum not very bright. Measures made with difficulty.
+ 12'6	- 53'1	- 48'2	
+ 13'4	- 80'2	- 78'2	
+ 13'4	- 54'7	- 52'2	
	- 1'1		
	- 1'1		
- 8'4	- 9'6	- 4'6	A doubtful measure. Spectrum bright, but star-line diffused and difficult to bisect.
- 8'4	+ 61'0	+ 51'6	
- 8'4	+ 35'0	+ 34'3	
+ 14'6	- 30'7	- 30'6	Star-line distinct and readily bisected.
+ 14'6	- 29'5	- 30'6	
- 1'3	- 15'4	- 14'7	
- 1'3	- 28'8	- 30'8	

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
June 26. 19. 0 19. 4	N	1	10	Moon F..... H β Moon F..... H β	0'200 0'199 0'181 0'196	+ 0'001 — 0'015	Coincident Coincident	0'075 0'075
July 4. 17. 30 17. 45 18. 0	M	1	10	Arcturus b_1 Mg..... Arcturus b_1 Mg..... Arcturus b_1 Mg.....	0'382 0'218 0'255 0'208 0'274 0'188	— 0'164 — 0'047 — 0'086	$\frac{3}{4}$ towards blue $\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'155 0'155 0'155
July 4. 19. 0 19. 15	M	1	10	γ Draconis b_1 Mg..... γ Draconis b_1 Mg.....	0'042 0'068 0'030 0'077	+ 0'026 + 0'057	$\frac{1}{10}$ towards red $\frac{1}{2}$ towards red	0'155 0'155
July 4. 19. 45 20. 5	M	1	10	γ Cygni b_1 Mg..... γ Cygni b_1 Mg.....	1'022 0'989 1'037 1'014	— 0'033 — 0'023	$\frac{1}{10}$ towards blue $\frac{1}{10}$ towards blue	0'155 0'155
July 4. 20. 25 20. 35	M	1	10	α Cygni b_1 Mg..... α Cygni b_1 Mg.....	0'953 0'892 1'030 0'908	— 0'061 — 0'122	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards red	0'155 0'155
July 4. 7. 15	M	1	10	Sky b_1 Mg..... Sky b_1 Mg..... Sky b_1 Mg..... Sky b_1 Mg..... Sky b_1 Mg..... Sky b_1 Mg.....	0'448 0'459 0'441 0'452 0'472 0'472 0'468 0'488 0'464 0'473	+ 0'011 + 0'011		0'155 0'155 0'155 0'155 0'155 0'155
July 5. 18. 2 18. 7	N	1	10	Arcturus b_1 Mg..... Arcturus b_1 Mg.....	0'373 0'470 0'339 0'480	— 0'097 — 0'141	$\frac{1}{2}$ towards blue $\frac{3}{4}$ towards blue	0'125 0'125
July 5. 18. 59 19. 9	N	1	10	α Boötis b_1 Mg..... α Boötis b_1 Mg.....	0'820 0'900 0'814 0'950	— 0'080 — 0'136	$\frac{1}{2}$ towards blue $\frac{3}{4}$ towards blue	0'125 0'125
July 5. 19. 47 19. 54 20. 8	N	1	10	α Cygni b_1 Mg..... α Cygni b_1 Mg..... α Cygni b_1 Mg.....	0'650 0'769 0'514 0'709 0'848 0'923	— 0'119 — 0'195 — 0'075	$\frac{1}{2}$ towards blue $\frac{3}{4}$ towards blue $\frac{1}{2}$ towards blue	0'125 0'125 0'125
July 5. 20. 34 20. 40	N	1	10	α Cygni b_1 Mg..... α Cygni b_1 Mg.....	0'050 0'252 0'189 0'347	— 0'202 — 0'158	$\frac{3}{4}$ towards blue $\frac{1}{2}$ towards blue	0'125 0'125

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
	+ 0'3 — 4'6		
+ 15'0 + 15'0 + 15'0	— 76'6 — 32'7 — 47'3	— 78'1 — 36'0 — 50'1	Spectrum tremulous. Star-line very well seen at times, but not steadily visible.
+ 1'3 + 1'3	+ 8'4 + 20'1	+ 9'2 + 19'7	Definition fair.
— 6'3 — 6'3	— 6'1 — 2'3	— 4'2 — 4'2	Star-lines very difficult to see. Definition poor.
— 6'9 — 6'9	— 16'0 — 38'9	— 19'4 — 45'6	Star-lines faint and rather hard to see. Definition poor.
	+ 4'1 + 4'1 0'0 + 7'5 + 3'4		
+ 15'1 + 15'1	— 51'5 — 68'0	— 55'4 — 60'4	
+ 13'1 + 13'1	— 43'1 — 64'1	— 43'3 — 58'6	Star-line very faint and ill-defined.
— 6'8 — 6'8 — 6'8	— 37'9 — 66'4 — 21'3	— 33'5 — 68'8 — 23'4	Star-line fuzzy.
— 7'8 — 7'8	— 68'0 — 51'5	— 67'8 — 52'7	Spectrum bright. Star-line distinct and sharp.

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
July 6. 16. 25 16. 35 16. 45	M	1	10	Arcturus δ_1 Mg ₂ Arcturus δ_1 Mg ₂ Arcturus δ_1 Mg ₂	0'282 0'441 0'242 0'368 0'312 0'392	— 0'159 — 0'156 — 0'080	$\frac{2}{3}$ towards blue $\frac{2}{3}$ towards blue $\frac{1}{2}$ towards blue	0'195 0'195 0'195
July 6. 17. 5 17. 20	M	2	10	Arcturus δ_1 Mg ₂ Arcturus δ_1 Mg ₂	0'230 0'638 0'298 0'667	— 0'408 — 0'369	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'195 0'195
July 6. 17. 45 18. 0	M	1	10	α Serpens δ_1 Mg ₂ α Serpens δ_1 Mg ₂	0'581 0'498 0'654 0'521	+ 0'083 + 0'133	$\frac{1}{2}$ towards red $\frac{2}{3}$ towards red	0'195 0'195
July 6. 18. 15 18. 30	M	1	10	β Herculis δ_1 Mg ₂ β Herculis δ_1 Mg ₂	0'495 0'574 0'467 0'583	— 0'079 — 0'116	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'195 0'195
July 6. 18. 55 19. 10	M	1	10	γ Herculis δ_1 Mg ₂ γ Herculis δ_1 Mg ₂	0'525 0'541 0'446 0'525	— 0'016 — 0'079	Coincident $\frac{1}{2}$ towards blue	0'195 0'195
July 7.	M	1	10	Sky δ_1 Mg ₂ Sky δ_1 Mg ₂ Sky δ_1 Mg ₂ Sky δ_1 Mg ₂ Sky δ_1 Mg ₂	0'173 0'227 0'180 0'180 0'171 0'179 0'202 0'213 0'191 0'202	— 0'054 — 0'000 — 0'008 — 0'011 — 0'011		0'195 0'195 0'195 0'195 0'195 0'195
July 9. 17. 50 18. 5	M	1	10	Arcturus δ_1 Mg ₂ Arcturus δ_1 Mg ₂	0'310 0'422 0'324 0'419	— 0'112 — 0'095	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'200 0'200
July 13. 17. 25 17. 40	M	1	10	Arcturus F H β Arcturus F H β	0'642 0'773 0'652 0'780	— 0'131 — 0'128	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'143 0'143
July 13. 17. 50	M	1	10	Moon F H β Moon F H β Moon F H β Moon F H β Moon F H β	0'215 0'215 0'196 0'206 0'232 0'249 0'248 0'244 0'252 0'246	0'000 — 0'010 + 0'003 + 0'004 + 0'006		0'143 0'143 0'143 0'143 0'143 0'143

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
+ 15'1	— 74'8	— 71'4	Spectrum tremulous. Definition fair.
+ 15'1	— 73'7	— 71'4	
+ 15'1	— 45'1	— 50'3	
+ 15'1	— 46'3	— 50'3	
+ 15'1	— 43'3	— 44'4	
+ 13'0	+ 18'2	+ 22'2	Star-line faint and difficult to bisect, but better seen than is usual in stars of this type.
+ 13'0	+ 36'9	+ 43'3	
+ 9'2	— 38'9	— 44'4	Star-line better seen than usual for this star, in which the lines are peculiarly faint and difficult to bisect.
+ 9'2	— 52'7	— 56'1	
+ 7'4	— 13'4	— 7'4	Star-lines difficult to bisect.
+ 7'4	— 37'1	— 42'6	
	— 20'3		
	0'0		
	— 3'0		
	— 4'1		
	— 4'1		
+ 15'2	— 57'3	— 54'3	Spectrum tremulous and watery. Star-lines somewhat difficult to bisect. They were, however, well seen at times.
+ 15'2	— 50'9	— 54'3	
+ 15'3	— 55'1	— 40'7	Spectrum tremulous. Star-line not very well seen.
+ 15'3	— 54'2	— 40'7	
	0'0		
	— 3'0		
	+ 0'9		
	+ 1'2		
	+ 1'8		

Date, 1883. Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
d h m July 13. 18. 25	M	1	10	β Ursæ Majoris F . . . H β	0'184 0'182 0'166 0'170	+ 0'002	Coincident	0'143
18. 40	"	"	"	β Ursæ Majoris F . . . H β	0'184 0'176 0'216 0'184	+ 0'027 + 0'032	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'143
July 13. 18. 50	M	1	10	γ Ursæ Majoris F . . . H β	0'203 0'176 0'216 0'184	+ 0'027 + 0'032	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'143
18. 55	"	"	"	γ Ursæ Majoris F . . . H β	0'203 0'176 0'216 0'184	+ 0'027 + 0'032	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'143
July 13. 19. 0	M	1	10	ϵ Ursæ Majoris F . . . H β	0'205 0'170 0'210 0'182	+ 0'035 + 0'028	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'143
19. 5	"	"	"	ϵ Ursæ Majoris F . . . H β	0'205 0'170 0'210 0'182	+ 0'035 + 0'028	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'143
July 13. 19. 15	M	1	10	ζ Ursæ Majoris F . . . H β	0'323 0'200 0'292 0'201	+ 0'123 + 0'091	$\frac{3}{8}$ towards red $\frac{3}{8}$ towards red	0'143
19. 20	"	"	"	ζ Ursæ Majoris F . . . H β	0'323 0'200 0'292 0'201	+ 0'123 + 0'091	$\frac{3}{8}$ towards red $\frac{3}{8}$ towards red	0'143
July 13. 19. 45	M	1	10	η Ursæ Majoris F . . . H β	0'175 0'135 0'017 0'135	+ 0'040 - 0'118	$\frac{1}{2}$ towards red $\frac{3}{8}$ towards blue	0'143
20. 0	"	"	"	η Ursæ Majoris F . . . H β	0'175 0'135 0'017 0'135	+ 0'040 - 0'118	$\frac{1}{2}$ towards red $\frac{3}{8}$ towards blue	0'143
July 17. 19. 8	N	1	12	Arcturus F H β	0'879 1'052 0'930 1'058	- 0'153 - 0'128	$\frac{3}{8}$ towards blue $\frac{1}{2}$ towards blue	0'175
19. 16	"	"	"	Arcturus F H β	0'879 1'052 0'930 1'058	- 0'153 - 0'128	$\frac{3}{8}$ towards blue $\frac{1}{2}$ towards blue	0'175
July 17. 19. 41	N	1	12	Moon F H β	0'431 0'478 0'574 0'566	- 0'047 + 0'008		0'175
19. 46	"	"	"	Moon F H β	0'431 0'478 0'574 0'566	- 0'047 + 0'008		0'175
July 19. 18. 19	N	1	11	Moon F H β	0'296 0'272 0'234 0'278	+ 0'024 - 0'044		0'145
18. 15	"	"	"	Moon F H β	0'296 0'272 0'234 0'278	+ 0'024 - 0'044		0'145
18. 24	"	"	"	Moon F H β	0'296 0'272 0'234 0'278	+ 0'024 - 0'044		0'145
18. 37	"	"	"	Moon F H β	0'296 0'272 0'234 0'278	+ 0'024 - 0'044		0'145
July 19. 19. 9	N	1	11	α Lyrae F H β	0'399 0'485 0'208 0'349	- 0'086 - 0'141	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'145
19. 16	"	"	"	α Lyrae F H β	0'399 0'485 0'208 0'349	- 0'086 - 0'141	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'145
July 19. 19. 33	N	1	11	α Aquilæ F H β	0'383 0'362 0'140 0'017	+ 0'021 + 0'123	Nearly coincident $\frac{3}{8}$ towards red	0'145
19. 44	"	"	"	α Aquilæ F H β	0'383 0'362 0'140 0'017	+ 0'021 + 0'123	Nearly coincident $\frac{3}{8}$ towards red	0'145
19. 50	"	"	"	α Aquilæ F H β	0'383 0'362 0'140 0'017	+ 0'021 + 0'123	Nearly coincident $\frac{3}{8}$ towards red	0'145
July 26. 19. 30	N	1	10	α Lyrae F H β	0'950 1'006 0'883 0'970	- 0'056 - 0'087	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'175
19. 37	"	"	"	α Lyrae F H β	0'950 1'006 0'883 0'970	- 0'056 - 0'087	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'175

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
+ 5.6	- 6.2	- 5.6	Spectrum tremulous. Star-line fairly defined.
+ 5.6	- 4.4	- 5.6	
+ 7.4	+ 0.8	+ 5.3	Spectrum tremulous. Star-line fairly defined.
+ 7.4	+ 2.3	+ 5.3	
+ 7.5	+ 3.1	+ 5.2	Definition good. Spectrum fairly bright.
+ 7.5	+ 1.0	+ 5.2	
+ 7.8	+ 29.6	+ 32.8	Definition good. Spectrum fairly bright.
+ 7.8	+ 19.8	+ 22.7	
+ 9.3	+ 2.8	+ 3.4	Observations not considered satisfactory. Continually interrupted by cloud. Star-line never seen distinctly.
+ 9.3	- 45.1	- 49.9	
+ 15.3	- 61.8	- 62.1	Spectrum very tremulous. Star-line faint.
+ 15.3	- 54.2	- 54.3	
	- 14.3		
	+ 2.4		
	+ 7.3		Observed through thin cloud. F line distinctly and easily measured.
	- 13.4		
	- 10.6		No cloud now over the Moon, but there is a white haze prevalent.
	- 7.6		
+ 1.9	- 28.0	- 34.0	Star-line broad, and somewhat difficult to bisect. Sky hazy.
+ 1.9	- 44.7	- 50.1	
- 0.8	+ 7.2	+ 0.8	Star-line broad and distinct.
- 0.8	+ 38.2	+ 39.3	
- 0.8	+ 18.4	+ 20.0	
+ 2.9	- 19.9	- 22.6	
+ 2.9	- 29.3	- 32.4	

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
July 26. 20. 27 20. 33	N	1	10	α Aquile F. H β	0'568 0'553 1'031 0'997	+ 0'015 + 0'034	Coincident $\frac{1}{10}$ towards red	0'175 0'175
July 26. 21. 26 21. 55 22. 1	N	1	10	α Pegasi F. H β	0'037 0'001 0'014 0'048 0'036 0'023	+ 0'036 - 0'034 + 0'003	$\frac{1}{10}$ towards red $\frac{1}{10}$ towards blue Coincident	0'175 0'175 0'175
July 26. 22. 20 22. 26	N	1	10	Moon F. H β	0'068 0'086 0'410 0'400	- 0'018 - 0'010		0'175 0'175
Aug. 3. 20. 10 20. 25	M	1	10	α Aquile F. H β	0'616 0'565 0'642 0'573	+ 0'051 + 0'069	$\frac{1}{4}$ towards red $\frac{1}{10}$ towards red	0'151 0'151
Aug. 3. 20. 40 20. 50	M	1	10	α Lyrae F. H β	0'097 0'219 0'112 0'213	- 0'122 - 0'101	$\frac{3}{8}$ towards blue $\frac{1}{4}$ towards blue	0'151 0'151
Aug. 13. 18. 45 19. 0	M	1	10	Arcturus F. H β	0'877 1'008 0'935 1'021	- 0'131 - 0'086	$\frac{3}{8}$ towards blue $\frac{1}{4}$ towards blue	0'095 0'095
Aug. 13. 19. 35 19. 40 19. 45	M	1	10	Moon F. H β	0'532 0'540 0'580 0'572 0'559 0'538	- 0'008 + 0'008 + 0'021		0'095 0'095 0'095
Aug. 13. 20. 5 20. 20	M	1	10	α Corona Borealis F. H β	0'768 0'635 0'693 0'618	+ 0'133 + 0'074	$\frac{3}{8}$ towards red $\frac{1}{4}$ towards red	0'095 0'095
Aug. 13. 20. 55 21. 20	M	1	10	γ Ursa Majoris F. H β	0'632 0'610 0'618 0'634	+ 0'022 - 0'006	$\frac{1}{4}$ towards red Coincident	0'095 0'095
Aug. 14. 18. 52 19. 4	N	1	10	α Lyrae F. H β	0'357 0'519 0'404 0'347	- 0'162 - 0'143	$\frac{1}{4}$ towards blue $\frac{1}{4}$ towards blue	0'115 0'115
Aug. 14. 19. 26 19. 30	N	1	10	Moon F. H β	0'230 0'261 0'307 0'284	- 0'031 + 0'023		0'115 0'115

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
+ 1'0	+ 3'6	- 1'0	Star-line faint and ill defined at edges.
+ 1'0	+ 9'3	+ 10'8	
- 12'5	+ 23'4	+ 24'3	Star-line faint and difficult to bisect.
- 12'5	+ 2'2	+ 0'7	
- 12'5	+ 13'4	+ 12'5	
	- 5'5		
	+ 3'0		
+ 3'0	+ 12'5	+ 11'9	
+ 3'0	+ 18'0	+ 14'9	
+ 3'9	- 41'0	- 27'7	Spectrum faint. Star-lines ill-defined. Measures very poor indeed.
+ 3'9	- 34'6	- 23'8	
+ 13'6	- 53'4	- 51'0	Star-line faint. Spectrum tremulous.
+ 13'6	- 39'7	- 38'5	
	- 2'4		
	+ 2'4		
	+ 6'4		
+ 12'6	+ 27'8	+ 24'8	Spectrum very tremulous.
+ 12'6	+ 9'9	+ 12'3	
+ 5'9	+ 0'8	+ 2'4	Observation much interrupted by cloud, and therefore somewhat uncertain.
+ 5'9	- 7'7	- 5'9	
+ 5'2	- 54'4	- 51'7	Spectrum tremulous. High wind. Clouds passing.
+ 5'2	- 48'6	- 51'7	
	- 9'4		
	+ 7'0		

Date, 1882, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
Aug. 14. 20. 7 20. 12	N	1	10	γ Aquila F. H β γ Aquila F. H β	0'100 0'122 0'031 0'153	— 0'022 — 0'102	Coincident $\frac{1}{2}$ towards blue	0'115 0'115
Aug. 16. 18. 52 18. 56	N	1	10	Moon F. H β Moon F. H β	0'299 0'300 0'304 0'323	— 0'001 — 0'019		0'126 0'126
Aug. 16. 20. 59 21. 23	N	1	10	α Pegasi F. H β α Pegasi F. H β	0'344 0'322 0'816 0'854	+ 0'022 — 0'038	Nearly coincident $\frac{1}{10}$ towards blue	0'126 0'126
Aug. 21. 19. 20 19. 24	N	1	12	Arcturus F. H β Arcturus F. H β	0'754 0'858 0'732 0'848	— 0'104 — 0'116	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'125 0'125
Aug. 21. 19. 58 20. 3	N	1	12	γ Ursae Majoris F. H β γ Ursae Majoris F. H β	1'176 1'000 1'171 0'996	+ 0'176 + 0'175	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'125 0'125
Aug. 21. 21. 35 21. 40	N	1	12	ϵ Ursae Majoris F. H β ϵ Ursae Majoris F. H β	0'650 0'554 0'618 0'540	+ 0'096 + 0'078	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'125 0'125
Aug. 21. 22. 31 22. 35 22. 39 22. 42	N	1	12	Moon F. H β Moon F. H β Moon F. H β Moon F. H β	0'220 0'231 0'243 0'257 0'234 0'240 0'285 0'300	— 0'011 — 0'014 — 0'006 — 0'015		0'125 0'125 0'125 0'125
Aug. 23. 20. 47 20. 51	N	1	12	α Lyrae F. H β α Lyrae F. H β	0'369 0'466 0'363 0'472	— 0'097 — 0'109	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'125 0'125
Aug. 23. 21. 10 21. 21	N	1	12	α Aquilae F. H β α Aquilae F. H β	0'186 0'248 0'241 0'278	— 0'062 — 0'057	$\frac{1}{2}$ towards blue $\frac{1}{10}$ towards blue	0'125 0'125
Aug. 23. 22. 8 22. 18	N	1	12	α Pegasi F. H β α Pegasi F. H β	0'947 0'969 1'011 1'021	— 0'022 — 0'010	Nearly coincident Coincident	0'125 0'125
Aug. 23. 22. 56 23. 6	N	1	12	α Andromedae F. H β α Andromedae F. H β	0'213 0'283 0'173 0'326	— 0'070 — 0'153	$\frac{1}{2}$ towards blue $\frac{2}{3}$ towards blue	0'125 0'125

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
+ 8'0	— 14'7	— 8'0	Spectrum faint and tremulous. Star-line broad but indistinct.
+ 8'0	— 39'0	— 31'2	
	— 0'3		
	— 5'8		
— 8'0	+ 14'7	+ 8'0	Spectrum faint. Star-line difficult to bisect.
— 8'0	— 3'6	— 2'8	
+ 12'5	— 44'1	— 49'6	Star-line faint.
+ 12'5	— 47'8	— 49'6	
0'0	+ 53'5	+ 55'6	Spectrum bright. Star-line very distinct but somewhat broad.
0'0	+ 53'1	+ 55'6	
+ 1'6	+ 27'5	+ 26'2	Star-line very distinct.
+ 1'6	+ 22'1	+ 20'6	
	— 3'3		
	— 4'3		
	— 1'8		
	— 4'6		
+ 6'2	— 35'7	— 33'4	Star-line broad and fuzzy.
+ 6'2	— 39'3	— 33'4	
+ 7'9	— 26'7	— 26'0	Star-line fairly distinct. Spectrum bright.
+ 7'9	— 19'2	— 18'8	
— 6'2	+ 0'5	+ 6'2	Star-line faint and only seen by glimpses.
— 6'2	+ 3'2	+ 6'2	
— 10'8	— 10'5	— 10'9	Spectrum bright. Star-line fairly well seen.
— 10'8	— 35'7	— 32'7	

Date, 1882, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
Aug. 23. 23. 23	N	1	10	Moon F.	0'118			0'125
23. 27	"	"	"	H β	0'112	+ 0'006		0'125
	"	"	"	Moon F.	0'058	- 0'025		0'125
	"	"	"	H β	0'083			
Aug. 24. 19. 45	M	1	6	Arcturus D ₂	0'203		$\frac{2}{3}$ towards blue	0'162
20. 0	"	"	"	Na ₂	0'357	- 0'154		0'162
	"	"	"	Arcturus D ₁	0'675	- 0'064	$\frac{1}{10}$ towards blue	0'162
	"	"	"	Na ₁	0'759			
Aug. 25.	M	1	6	Sky D ₁	0'091			0'162
	"	"	"	Na ₁	0'082	+ 0'009		0'162
	"	"	"	Sky D ₂	0'698	+ 0'004		0'162
	"	"	"	Na ₂	0'691			0'162
	"	"	"	Sky D ₂	0'688	- 0'016		0'162
	"	"	"	Na ₂	0'704			0'162
	"	"	"	Sky D ₁	0'091	+ 0'003		0'162
	"	"	"	Na ₁	0'088			
Sept. 18. 21. 12	N	1	6	α Lyrae F.	0'679		$\frac{1}{2}$ towards blue	0'145
21. 20	"	"	"	H β	0'728	- 0'049	$\frac{1}{2}$ towards blue	0'145
	"	"	"	α Lyrae F.	0'676	- 0'054		0'145
	"	"	"	H β	0'730			
Sept. 18. 21. 50	N	1	6	α Aquila F.	0'892		Nearly coincident	0'145
21. 57	"	"	"	H β	0'913	- 0'021	Nearly coincident	0'145
	"	"	"	α Aquila F.	0'927	- 0'007		0'145
	"	"	"	H β	0'934			
Sept. 18. 22. 24	N	1	6	Moon F.	0'797			0'145
22. 28	"	"	"	H β	0'810	- 0'013		0'145
	"	"	"	Moon F.	0'819	- 0'003		0'145
	"	"	"	H β	0'822			
Sept. 18. 23. 17	N	1	6	Capella F.	0'469		$\frac{1}{2}$ towards red	0'145
23. 25	"	"	"	H β	0'402	+ 0'067	$\frac{1}{2}$ towards red	0'145
	"	"	"	Capella F.	0'471	+ 0'048		0'145
	"	"	"	H β	0'423			
Sept. 20. 22. 1	N	1	6	α Lyrae F.	0'076		$\frac{1}{2}$ towards blue	0'175
22. 10	"	"	"	H β	0'174	- 0'098	$\frac{1}{2}$ towards blue	0'175
	"	"	"	α Lyrae F.	0'005	- 0'155	$\frac{1}{2}$ towards blue	0'175
	"	"	"	H β	0'160			0'175
	"	"	"	α Lyrae F.	0'063	- 0'142	$\frac{3}{8}$ towards blue	0'175
	"	"	"	H β	0'205			
Sept. 20. 22. 53	N	1	6	Moon F.	0'717			0'175
23. 0	"	"	"	H β	0'698	+ 0'019		0'175
	"	"	"	Moon F.	0'750	- 0'013		0'175
	"	"	"	H β	0'763			
Sept. 20. 0. 46	N	1	6	Fomalhaut F.	0'141		$\frac{2}{3}$ towards blue	0'175
	"	"	"	H β	0'260	- 0'119		0'175
Oct. 13. 21. 50	M	1	5	Moon F.	0'300			0'132
21. 55	"	"	"	H β	0'309	- 0'009		0'132
	"	"	"	Moon F.	0'311			0'132
	"	"	"	H β	0'279	+ 0'032		0'132
	"	"	"	Moon F.	0'391	- 0'016		0'132
	"	"	"	H β	0'367			

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
	+ 1'8		
	- 7'6		
+ 12'0	- 8'9	- 7'9	Star spectrum faint and very tremulous and the lines ill-defined, and, indeed, only visible at rare intervals; little weight can, therefore, be attached to the measures. The displacement was, however, unmistakably towards the blue.
+ 12'0	- 44'0	- 45'8	
	+ 4'5		
	+ 2'0		
	- 8'0		
	+ 1'5		
+ 8'2	- 23'1	- 23'1	
+ 8'2	- 24'6	- 23'1	
+ 13'1	- 19'5	- 13'1	Spectrum bright. Star-line ill-defined.
+ 13'1	- 15'2	- 13'1	
	- 4'0		
	- 0'9		
+ 16'7	+ 3'7	+ 1'2	Sky somewhat hazy.
+ 16'7	- 2'1	- 3'9	
+ 8'3	- 38'1	- 32'9	Spectrum very steady, and star-line distinct.
+ 8'3	- 55'4	- 57'5	
+ 8'3	- 51'4	- 45'2	
	+ 5'8		Moon shining through cloud.
	- 4'0		
+ 7'3	- 43'4	- 46'7	A very doubtful measure. Star spectrum faint, and star-line only seen indistinctly now and then.
	- 2'7		
	+ 9'7		
	- 4'9		

Date, 1883, Greenwich Sideral Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
Oct. 13. 22. 25 22. 40	M	1	5	α Aquilæ F H β α Aquilæ F H β	σ 581 σ 452 σ 469 σ 456	+ σ 129 + σ 013	$\frac{2}{3}$ towards red $\frac{1}{10}$ towards red	σ 152 σ 132
Oct. 13. 23. 0 23. 15	M	1	5	α Pegasi F H β α Pegasi F H β	σ 592 σ 682 σ 589 σ 701	- σ 090 - σ 112	$\frac{1}{2}$ towards blue $\frac{2}{3}$ towards blue	σ 132 σ 132
Oct. 17. 0. 10 0. 20	M	1	5	α Pegasi F H β α Pegasi F H β	σ 150 σ 178 σ 128 σ 180	- σ 028 - σ 052	$\frac{1}{10}$ towards blue $\frac{1}{2}$ towards blue	σ 137 σ 137
Oct. 17. 0. 30 0. 40 0. 50	M	1	5	α Andromedæ F H β α Andromedæ F H β α Andromedæ F H β	σ 177 σ 180 σ 377 σ 475 σ 388 σ 468	- σ 003 - σ 098 - σ 080	Coincident $\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	σ 137 σ 137 σ 137
Oct. 17. 0. 55 1. 0 1. 3 1. 6 1. 10	M	1	5	Moon F H β Moon F H β Moon F H β Moon F H β Moon F H β	σ 020 σ 030 σ 987 1 015 σ 999 σ 998 1 005 σ 998 σ 989 σ 997	- σ 010 - σ 028 + σ 001 + σ 007 - σ 008		σ 137 σ 137 σ 137 σ 137 σ 137
Oct. 17. 1. 20 1. 30	M	1	5	Aldebaran F H β Aldebaran F H β	σ 378 σ 220 σ 399 σ 223	+ σ 158 + σ 174	1 towards red 1 towards red	σ 137 σ 137
Oct. 22. 22. 45 22. 55 23. 5	M	1	5	α Aquilæ F H β α Aquilæ F H β α Aquilæ F H β	σ 307 σ 178 σ 201 σ 188 σ 160 σ 168	+ σ 129 + σ 013 - σ 008	$\frac{2}{3}$ towards red $\frac{1}{10}$ towards red Coincident	σ 137 σ 137 σ 137
Oct. 22. 23. 45	M	1	5	α Cygni F H β	σ 169 σ 280	- σ 111	$\frac{2}{3}$ towards blue	σ 137
Nov. 6. 3. 23 3. 36	N	1	5	Capella F H β Capella F H β	σ 756 σ 657 σ 710 σ 609	+ σ 099 + σ 101	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	σ 122 σ 122
Nov. 7. 1. 0	N	1	5	Sky F H β Sky F H β Sky F H β	σ 208 σ 226 σ 345 σ 333 σ 218 σ 201	- σ 018 + σ 012 + σ 017		σ 122 σ 122 σ 122

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
+ 15'9	+ 23'3	+ 19'9	Spectrum faint from mist. Measures difficult.
+ 15'9	- 11'9	- 10'5	
+ 8'3	- 35'6	- 35'2	Mist rising. Spectrum very faint. Moon near and bright. Atmospheric bands troublesome. Measures difficult.
+ 8'3	- 42'3	- 44'1	
+ 9'4	- 17'9	- 14'6	Measures considered very satisfactory.
+ 9'4	- 25'2	- 26'8	
+ 3'4	- 4'3	- 3'4	Star-line not very well seen.
+ 3'4	- 33'2	- 29'6	
+ 3'4	- 27'7	- 29'6	Star-line seen a little better than in the first observation.
	- 3'0		
	- 8'5		
	+ 0'3		
	+ 2'1		
	- 2'4		
- 12'8	+ 60'8	+ 65'1	Definition poor.
- 12'8	+ 65'6	+ 65'1	
+ 16'2	+ 23'0	+ 18'6	Observation not considered satisfactory.
+ 16'2	- 12'2	- 11'0	Observation considered good.
+ 16'2	- 18'6	- 16'2	Observation considered somewhat doubtful.
+ 7'7	- 41'4	- 39'1	Spectrum faint. Star-line very difficult to observe.
- 10'1	+ 40'2	+ 39'8	Measures very unsatisfactory. Sky hazy.
- 10'1	+ 40'8	+ 39'8	
	- 5'5		
	+ 3'6		
	+ 5'1		

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
Nov. 10. 22. 0	M	1	5	α Lyra F.	0'664	— 0'082	$\frac{1}{2}$ towards blue	0'122
22. 10	"	"	"	H β	0'745			
				α Lyra F.	0'766	— 0'094	$\frac{2}{3}$ towards blue	0'122
				H β	0'860			
Nov. 10. 22. 35	M	1	5	γ Cygni F.	0'386	+ 0'066	$\frac{1}{2}$ towards red	0'200
22. 50	"	"	"	H β	0'320			
				γ Cygni F.	0'261	— 0'034	$\frac{1}{10}$ towards blue	0'200
				H β	0'295			
Nov. 10. 23. 20	M	1	5	ϵ Cygni F.	0'698	+ 0'072	$\frac{1}{4}$ towards red	0'200
23. 45	"	"	"	H β	0'626			
				ϵ Cygni F.	0'667	+ 0'070	$\frac{1}{4}$ towards red	0'200
				H β	0'597			
Nov. 10. 23. 55	M	1	5	α Cygni F.	0'282	— 0'156	$\frac{1}{2}$ towards blue	0'200
0. 0	"	"	"	H β	0'338			
				α Cygni F.	0'290	— 0'155	$\frac{1}{2}$ towards blue	0'200
				H β	0'445			
Nov. 10. 0. 15	M	1	5	ϵ Pegasi F.	0'621	+ 0'081	$\frac{2}{3}$ towards red	0'200
0. 25	"	"	"	H β	0'540			
				ϵ Pegasi F.	0'609	+ 0'139	$\frac{1}{2}$ towards red	0'200
				H β	0'530			
Nov. 10. 0. 30	M	1	5	Moon F.	0'605	+ 0'005		0'200
				H β	0'600			
				Moon F.	0'576	— 0'003		0'200
				H β	0'579			
				Moon F.	0'589	+ 0'003		0'200
				H β	0'586			
				Moon F.	0'574	— 0'008		0'200
				H β	0'582			
0. 40				Moon F.	0'592	— 0'005		0'200
				H β	0'597			
Nov. 10. 0. 50	M	1	5	α Arietis F.	0'870	+ 0'010	$\frac{1}{10}$ towards red	0'200
1. 0	"	"	"	H β	0'860			
				α Arietis F.	0'982	+ 0'063	$\frac{1}{2}$ towards red	0'200
1. 10	"	"	"	H β	0'919			
				α Arietis F.	0'940	+ 0'069	$\frac{1}{2}$ towards red	0'200
				H β	0'871			
Nov. 10. 1. 30	M	1	5	Aldebaran F.	0'476	+ 0'118	$\frac{2}{3}$ towards red	0'200
1. 40	"	"	"	H β	0'358			
				Aldebaran F.	0'476	+ 0'094	$\frac{1}{2}$ towards red	0'200
				H β	0'382			
Nov. 12. 0. 50	M	1	5	Capella F.	0'790	+ 0'055	$\frac{1}{2}$ towards red	0'200
1. 5	"	"	"	H β	0'735			
				Capella F.	0'846	+ 0'077	$\frac{1}{2}$ towards red	0'200
				H β	0'769			
Nov. 12. 1. 15	M	1	5	β Aurigæ F.	0'806	+ 0'017	$\frac{1}{10}$ towards red	0'200
1. 25	"	"	"	H β	0'789			
				β Aurigæ F.	0'856	+ 0'018	$\frac{1}{10}$ towards red	0'200
				H β	0'838			

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second		REMARKS.
	Measured.	Estimated.	
+ 7'3	— 32'2	— 32'2	Star-line ill defined. Spectrum comparatively faint.
+ 7'3	— 35'9	— 40'5	
+ 10'1	+ 9'9	+ 6'4	Spectrum faint. It was necessary to open slit much wider than usual in order to see star-line; but this spoiled its definition.
+ 10'1	— 20'4	— 18'4	
+ 12'1	+ 9'8	+ 8'6	Spectrum a little better seen than for γ Cygni, but the observation was still very difficult, the star spectrum and star-line both being very faint.
+ 12'1	+ 9'2	+ 8'6	
+ 9'1	— 56'5	— 50'4	Both measures appeared excellent. Star spectrum bright. Star-line well defined.
+ 9'1	— 56'2	— 50'4	
+ 17'0	+ 7'6	+ 16'1	Star-line very faint. Observation difficult.
+ 17'0	+ 25'2	+ 10'5	
	+ 1'5		Measures of both spectra made under very favourable circumstances.
	— 0'9		
	+ 0'9		
	— 2'4		
	— 1'5		
+ 3'9	— 0'9	+ 4'4	Star-line rather faint. Bisection somewhat difficult.
+ 3'9	+ 15'2	+ 16'8	
+ 3'9	+ 17'1	+ 16'8	
— 6'3	+ 42'1	+ 39'4	Measures considered satisfactory.
— 6'3	+ 34'9	+ 33'8	
— 8'6	+ 25'3	+ 36'1	Spectrum faint. Star-line faint. Definition fair. Much mist.
— 8'6	+ 32'0	+ 36'1	
— 10'9	+ 16'0	+ 19'2	Spectrum very faint. Much mist. Measures very difficult and though accordant, no great weight can be attached to them.
— 10'9	+ 16'4	+ 19'2	

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
d h m Nov. 12. 1.40 1.50	M	1	5	β Tauri F H β β Tauri F H β	r 0'046 0'002 0'000 0'022	+ 0'044 - 0'032	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards blue	0'200 0'200
Nov. 12. 2. 5 2.15	M	1	5	Aldebaran F H β Aldebaran F H β	0'106 0'061 0'147 0'095	+ 0'045 + 0'132	$\frac{1}{2}$ towards red $\frac{3}{4}$ towards red	0'300 0'200
Nov. 12. 2.20 2.35	M	1	5	Moon F H β Moon F H β Moon F H β Moon F H β Moon F H β	0'042 0'062 0'072 0'058 0'076 0'096 0'087 0'092 0'098 0'080	- 0'020 - 0'014 - 0'020 - 0'005 - 0'018		0'200 0'200 0'200 0'200 0'200 0'200
Nov. 16. 0.25 0.40 0.50	M	1	5	α Aquile F H β α Aquile F H β α Aquile F H β	0'808 0'752 0'772 0'738 0'757 0'748	+ 0'056 + 0'034 + 0'009	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'170 0'170 0'170
Nov. 16. 1. 0 1. 5 1.10 1.15	M	1	5	β Cygni F H β β Cygni F H β β Cygni F H β β Cygni F H β	0'090 0'190 0'195 0'198 0'177 0'175 0'157 0'181	- 0'100 0'000 + 0'002 - 0'024	$\frac{1}{2}$ towards blue Coincident Coincident $\frac{1}{2}$ towards blue	0'170 0'170 0'170 0'170
Nov. 16. 1.35 1.50	M	1	5	α Cephei F H β α Cephei F H β	0'057 0'175 0'085 0'194	- 0'118 - 0'109	$\frac{3}{4}$ towards blue $\frac{3}{4}$ towards blue	0'170 0'170
Nov. 16. 2. 0 2.10 2.20	M	1	5	β Cassiopeia F H β β Cassiopeia F H β β Cassiopeia F H β	0'037 0'852 0'857 0'857 0'872 0'857	+ 0'086 0'000 + 0'015	$\frac{3}{4}$ towards red Coincident $\frac{1}{2}$ towards red	0'170 0'170 0'170
Nov. 16. 2.30 2.40 2.50	M	1	5	γ Cassiopeia F H β γ Cassiopeia F H β γ Cassiopeia F H β	1'028 0'980 0'801 0'787 0'841 0'770	+ 0'048 + 0'014 + 0'071	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0'170 0'170 0'170
Nov. 16. 3. 5 3.15 3.25	M	1	5	β Persei F H β β Persei F H β β Persei F H β	0'028 0'198 0'092 0'234 0'048 0'220	- 0'170 - 0'132 - 0'172	$\frac{3}{4}$ towards blue $\frac{3}{4}$ towards blue $\frac{3}{4}$ towards blue	0'170 0'170 0'170

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
- 9'5	+ 22'9	+ 26'0	Spectrum faint but steady. Star-line dark. The only drawback to observation was the extreme faintness of the spectrum.
- 9'5	+ 2'8	+ 5'4	
- 5'7	+ 19'4	+ 22'2	Spectrum very faint. Star-line very faint. Measures difficult.
- 5'7	+ 45'8	+ 38'8	
- 6'1			
+ 4'3			
- 6'1			
- 1'5			
+ 5'5			Very misty throughout the evening. Spectra very faint but steady. The faintness of the spectra made measures difficult and uncertain.
+ 15'0	+ 2'0	+ 1'4	Spectrum very tremulous. The star-line was however fairly well seen, and the measures were considered satisfactory.
+ 15'0	- 4'7	- 8'4	
+ 15'0	- 12'3	- 8'4	
+ 8'0	- 38'4	- 40'8	Spectrum faint and tremulous. Measures difficult. Star-line hard to see. Seen best at the last measure.
+ 8'0	- 8'0	- 8'0	
+ 8'0	- 7'4	- 8'0	
+ 8'0	- 15'3	- 14'6	
+ 4'6	- 40'4	- 44'0	Star-line evidently largely displaced towards the blue. Direct comparison seemed to show a still larger displacement. The star, from its position, was however difficult to observe.
+ 4'6	- 37'7	- 44'0	Spectrum tremulous but fairly bright. Star-line fairly well defined and not very broad.
+ 4'2	+ 21'6	+ 22'1	Star-line faint but fairly well defined and not broad. Spectrum bright and steady.
+ 4'2	- 4'2	- 4'2	
+ 4'2	+ 0'4	+ 2'4	
+ 2'6	+ 12'0	+ 10'5	This beautiful spectrum was bright and well defined, but rather tremulous. The bright F line was easily seen, but was difficult to hold steadily when the pointer was close to it; so difficult that though three perfectly distinct measures proved fairly accurate, none of them was considered wholly satisfactory. The star-line was evidently not greatly displaced.
+ 2'6	+ 17'	+ 4'0	
+ 2'6	+ 19'0	+ 17'1	
0'0	- 51'6	- 49'2	Star in awkward position. Star-line dark and fairly defined. Large displacement towards the blue.
0'0	- 40'1	- 39'4	
0'0	- 52'3	- 49'2	

Date, 1883, Greenwich Sidereal Time.	Observer.	Number of Half Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Sill.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
d h m Nov. 16. 3. 35 3. 45	M	1	5	α Persei F. H β α Persei F. H β	r 0'240 0'311 0'238 0'340	— 0'071 — 0'112	$\frac{1}{2}$ towards blue $\frac{3}{4}$ towards blue	0'170 0'170
Nov. 16. 4. 0 4. 10	M	1	5	Rigel F. H β Rigel F. H β	1'000 0'950 1'068 0'978	+ 0'050 + 0'090	$\frac{1}{2}$ towards red $\frac{3}{4}$ towards red	0'170 0'170
Nov. 16. 4. 15 4. 25	M	1	5	Moon F. H β Moon F. H β Moon F. H β Moon F. H β Moon F. H β	0'556 0'561 0'561 0'559 0'572 0'565 0'557 0'566 0'566 0'566	— 0'005 + 0'042 + 0'007 — 0'009 0'000		0'170 0'170 0'170 0'170 0'170 0'170
Nov. 16. 4. 40 4. 45 4. 50 4. 55	M	1	5	Sirius F. H β Sirius F. H β Sirius F. H β Sirius F. H β	0'581 0'628 0'591 0'632 0'555 0'540 0'591 0'640	— 0'047 — 0'040 — 0'085 — 0'049	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue $\frac{3}{4}$ towards blue $\frac{1}{2}$ towards blue	0'170 0'170 0'170 0'170
Nov. 20. 1. 16 1. 44	N	1	5	α Arietis b_1 α Arietis b_1 M $_{G1}$	0'058 0'049 0'107 0'081	+ 0'009 + 0'026	Coincident $\frac{1}{10}$ towards red	0'157 0'157
Nov. 20. 2. 2 2. 12	N	1	5	Aldebaran b_1 M $_{G1}$ Aldebaran b_1 M $_{G1}$	0'254 0'199 0'219 0'158	+ 0'115 + 0'052	$\frac{3}{4}$ towards red $\frac{1}{2}$ towards red	0'157 0'157
Nov. 20. 2. 55 3. 3	N	1	5	Capella b_1 M $_{G1}$ Capella b_1 M $_{G1}$	0'565 0'463 0'567 0'467	+ 0'102 + 0'100	$\frac{1}{2}$ towards red $\frac{3}{4}$ towards red	0'157 0'157
Nov. 20. 3. 27 3. 33	N	1	5	Pollux b_1 M $_{G1}$ Pollux b_1 M $_{G1}$	0'515 0'605 0'553 0'617	— 0'090 — 0'064	$\frac{1}{2}$ towards blue $\frac{1}{2}$ towards blue	0'157 0'157
Nov. 20. 3. 55 3. 58 4. 1	N	1	5	Moon b_1 M $_{G1}$ Moon b_1 M $_{G1}$ Moon b_1 M $_{G1}$	0'920 0'931 0'928 0'953 0'965 0'968	— 0'011 — 0'025 — 0'003		0'157 0'157 0'157 0'157
Nov. 23. 2. 35 2. 45 3. 0	M	1	5	Capella b_1 M $_{G1}$ Capella b_1 M $_{G1}$ Capella b_1 M $_{G1}$	0'486 0'342 0'490 0'344 0'430 0'338	+ 0'144 + 0'146 + 0'082	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red $\frac{1}{10}$ towards red	0'110 0'110 0'140

Earth's Motion in Miles per Second.	Concluded Motion of Star in Mile per Second.		REMARKS.
	Measured.	Estimated.	
— 1'7	— 19'9	— 20'2	Star-line ill-defined.
— 1'7	— 32'3	— 37'7	
— 5'7	+ 20'9	+ 22'1	Spectrum tremulous. Star-line, however, pretty fairly defined.
— 5'7	+ 33'0	+ 32'0	
	— 1'5		Moon spectrum most beautifully defined.
	+ 12'7		
	+ 2'1		
	— 2'7		
	0'0		
— 10'8	— 3'5	— 2'3	Direct comparison showed a distinct displacement towards the blue. It was difficult, however, to be sure of the exact amount from the broad ill-defined nature of the star-line. The direct comparison suggested, however, that the largest measure made (the third) was more correct than the smaller, as the displacement was quite unmistakable.
— 10'8	— 1'3	— 2'3	
— 10'8	— 15'0	— 15'5	
— 10'8	— 4'1	— 2'3	
+ 7'0	— 3'6	— 7'0	Spectrum bright but tremulous.
+ 7'0	+ 2'7	+ 5'2	
— 3'2	+ 46'4	+ 52'2	
— 3'2	+ 22'7	+ 23'6	
— 6'4	+ 44'7	+ 47'2	Spectrum bright and steady, and star-line bisected easily.
— 6'4	+ 43'9	+ 47'2	
— 15'2	— 18'6	— 25'6	Spectrum bright. Star-line tolerably distinct.
— 15'2	— 8'8	— 9'3	
	— 4'1		
	— 9'4		
	— 1'1		
— 5'6	+ 59'7	+ 43'7	Definition very bad.
— 5'6	+ 60'4	+ 43'7	
— 5'6	+ 36'4	+ 34'6	

Date, 1883. Greenwich Sidereal Time.	Observer.	Number of Half- Prisms.	Reading of Position Circle.	Objects compared.	Micrometer Readings.	Displacement.		Width of Slit.
						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
Nov. 23. 3. 15 3. 25	M	1	5	Aldebaran b_1 Mg..... Aldebaran b_1 Mg.....	0°712 0°712 0°738 0°718	0°000 + 0°020	Coincident $\frac{1}{15}$ towards red	0°140 0°140
Nov. 23. 3. 35 3. 45	M	1	5	α Orionis b_1 Mg..... α Orionis b_1 Mg.....	0°886 0°809 0°878 0°817	+ 0°007 + 0°061	$\frac{2}{3}$ towards red $\frac{1}{3}$ towards red	0°140 0°140
Nov. 23. 4. 0 4. 10	M	1	5	Pollux b_1 Mg..... Pollux b_1 Mg.....	0°280 0°389 0°312 0°380	- 0°109 - 0°068	$\frac{1}{2}$ towards blue $\frac{1}{15}$ towards blue	0°140 0°140
Nov. 27.	M	1	5	Sky b_1 Mg..... Sky b_1 Mg..... Sky b_1 Mg..... Sky b_1 Mg..... Sky b_1 Mg.....	0°458 0°472 0°469 0°489 0°470 0°465 0°464 0°460 0°485 0°482	- 0°014 - 0°020 + 0°005 + 0°004 + 0°003		0°140 0°140 0°140 0°140 0°140
Dec. 5. 0. 28	N	1	5	α Lyræ F..... H β	0°916 0°980	- 0°064	$\frac{1}{2}$ towards blue	0°160
Dec. 5. 3. 1 3. 9	N	1	5	Aldebaran F..... H β Aldebaran F..... H β	0°521 0°424 0°579 0°480	+ 0°097 + 0°099	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0°160 0°160
Dec. 5. 3. 51 4. 10	N	1	5	Capella F..... H β Capella F..... H β	0°179 0°102 0°365 0°120	+ 0°077 + 0°245	$\frac{1}{2}$ towards red $\frac{1}{2}$ towards red	0°160 0°160
Dec. 5. 4. 45 4. 50	N	1	5	Sirius F..... H β Sirius F..... H β	0°772 0°777 0°741 0°789	- 0°005 - 0°048	Nearly coincident $\frac{1}{2}$ towards blue	0°160 0°160

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
	Measured.	Estimated.	
- 2'2	+ 2'2	+ 2'2	Star-line dark, but spectrum very tremulous and measures difficult.
- 2'2	+ 9'7	+ 11'8	
- 7'8	+ 36'7	+ 46'4	Definition very bad. Measures not considered satisfactory.
- 7'8	+ 30'7	+ 40'0	
- 14'6	- 26'3	- 33'7	Spectrum very tremulous, though bright. Measures difficult and of little weight.
- 14'6	- 10'9	- 14'4	
- 5'5	- 7'5		The lines of magnesium and of the sky spectrum were not absolutely parallel to each other. They seemed perfectly coincident in the centre of the spectrum, where the measures are made, but the sky spectrum was slightly displaced towards the blue at the lower part of the field.
- 7'5	+ 1'9		
+ 1'5	+ 1'1		
+ 4'5	- 23'9	- 20'8	A doubtful measure, star spectrum being very faint and tremulous.
+ 1'8	+ 27'7	+ 25'3	Observations difficult. Spectrum faint and very unsteady.
+ 1'8	+ 28'3	+ 25'3	
- 2'0	+ 25'4	+ 22'4	Spectrum very bright.
- 2'0	+ 76'4	+ 63'1	
- 7'0	+ 5'5	+ 7'0	Star-line very broad, but a well-marked central condensation was shown.
- 7'0	- 7'6	- 6'6	

COLLECTED RESULTS FOR MOTIONS OF STARS in the line of Sight, from SPECTROSCOPIC OBSERVATIONS made at the ROYAL OBSERVATORY, GREENWICH, in the Year 1883.										
(F for the Star or Moon is compared with H _β of Hydrogen, and b ₁ , b ₂ , b ₃ with Mg _D , Mg ₂ , Mg ₃ of Magnesium.)										
(+ denotes Recession ; — Approach.)										
Date, 1883.	Observer.	Number of Measures.	Number of Triums.	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.										
August 23	N	2	1	10	0°125.	F	— 10·8	— 23·1	— 21·8	
October 17	M	3	1	5	0°137	F	+ 3·4	— 21·7	— 20·9	
β CASSIOPEIÆ.										
November 16	M	3	1	5	0°170	F	+ 4·2	+ 5·9	+ 6·8	
γ CASSIOPEIÆ.										
November 16	M.	3	1	5	0°170	F	+ 2·6	+ 10·9	+ 10·5	
α ARIETIS.										
November 10	M	3	1	5	0°200	F	+ 3·9	+ 10·5	+ 12·7	
20	N	2	1	5	0°157	b ₁	+ 7·0	— 0·5	— 0·9	
β PERSEI.										
November 16	M	3	1	5	0°170	F	+ 0·0	— 48·0	— 45·9	
α PERSEI.										
November 16	M	2	1	5	0°170	F	— 1·7	— 26·1	— 29·0	

Date, 1883.	Observer.	Number of Measures.	Number of Triums.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		
								Measured.	Estimated.	
α TAURI (<i>Aldebaran</i>).										
October 17	M	2	1	5	0°137	F	- 12·8	+ 63·2	+ 65·1	
November 10	M	2	1	5	0°200	F	- 6·3	+ 38·5	+ 36·6	
12	M	2	1	5	0°200	F	- 5·7	+ 32·6	+ 30·5	
20	N	2	1	5	0°157	b ₁	- 3·2	+ 34·6	+ 37·9	
23	M	2	1	5	0°140	b ₁	- 2·2	+ 6·0	+ 7·0	
December 5	N	2	1	5	0°160	F	+ 1·8	+ 28·0	+ 25·3	
α AURIGÆ (<i>Capella</i>).										
September 18	N	2	1	6	0°145	F	+ 16·7	+ 0·8	- 1·4	
November 6	N	2	1	5	0°122	F	- 10·1	+ 40·5	+ 39·8	
12	M	2	1	5	0°200	F	- 8·6	+ 28·7	+ 36·1	
20	N	2	1	5	0°157	b ₁	- 6·4	+ 44·3	+ 47·2	
23	M	3	1	5	0°110 & 0°140	b ₁	- 5·6	+ 52·2	+ 40·7	
December 5	N	2	1	5	0°160	F	- 2·0	+ 50·9	+ 42·8	
β ORIONIS (<i>Rigel</i>).										
February 23	M	2	1	5	0°250	F	+ 15·8	+ 22·6	+ 22·6	
November 16	M	2	1	5	0°170	F	- 5·7	+ 27·0	+ 27·1	
β TAURI.										
November 12	M	2	1	5	0°200	F	- 9·5	+ 12·9	+ 15·7	
α ORIONIS.										
November 23	M	2	1	5	0°140	b ₁	- 7·8	+ 33·7	+ 43·2	
β AURIGÆ.										
November 12	M	2	1	5	0°200	F	- 10·9	+ 16·2	+ 19·2	

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

Date, 1883.	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 MAJORIS (<i>Sirius</i>).									
February 16	M	4	1	5	..	F	+ 10.3	+ 10.2	+ 16.3
23	M	4	1	5	0.250	F	+ 11.4	- 0.7	- 1.8
March 30	M	2	1	5	0.165	F	+ 14.2	- 24.5	- 24.9
	M	4	1	5	0.115	F	+ 14.2	- 16.7	- 16.9
	M	2	2	5	0.165	F	+ 14.2	- 6.7	- 5.3
	M	2	2	5	0.115	F	+ 14.2	- 2.3	- 1.2
November 16	M	4	1	5	0.170	F	- 10.8	- 6.0	- 5.6
December 5	N	2	1	5	0.160	F	- 7.0	- 1.1	+ 0.2
α^2 GEMINORUM (<i>Castor</i>).									
February 16	M	3	1	5	..	F	+ 11.8	+ 11.4	+ 30.1
α CANIS MINORIS (<i>Procyon</i>).									
February 16	M	2	1	5	..	F	+ 10.1	+ 20.9	+ 32.2
23	M	2	1	5	0.250	F	+ 11.8	+ 16.1	+ 17.0
March 30	M	2	1	5	0.115	F	+ 17.2	- 3.2	- 5.0
30	M	2	2	5	0.115	F	+ 17.2	+ 2.1	+ 2.4
β GEMINORUM (<i>Pollux</i>).									
February 16	M	2	1	5	..	F	+ 10.8	- 49.3	- 71.2
23	M	2	1	5	0.250	F	+ 12.5	- 33.1	- 31.7
March 30	M	2	1	5	0.115	F	+ 17.8	- 45.0	- 41.2
May 16	M	3	1	6	0.205	F	+ 14.9	- 66.9	- 51.9
November 20	N	2	1	5	0.157	b_1	- 15.2	- 13.7	- 17.5
23	N	2	1	5	0.140	b_1	- 14.6	- 18.6	- 24.1
α LEONIS (<i>Regulus</i>).									
February 23	M	2	1	5	0.250	F	+ 2.2	+ 23.7	+ 25.9
March 30	M	2	1	5	0.115	F	+ 12.3	+ 18.1	+ 14.7
May 23	N	2	1	6	0.145	F	+ 17.8	- 8.4	- 8.0
	M	2	1	6	0.145	F	+ 17.8	+ 5.9	+ 6.5
May 31	N	1	1	10	0.175	F	+ 17.5	- 6.6	- 0.7

Date, 1883.	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 URSÆ MAJORIS.									
July 13	M	2	1	10	0.143	F	+ 5.6	- 5.3	- 5.6
β LEONIS.									
May 23	M	2	1	6	0.145	F	+ 16.7	+ 4.3	+ 7.6
γ URSÆ MAJORIS.									
July 13	M	2	1	10	0.143	F	+ 7.4	+ 1.6	+ 5.3
August 21	N	2	1	12	0.125	F	0.0	+ 53.3	+ 55.6
ϵ URSÆ MAJORIS.									
July 13	M	2	1	10	0.143	F	+ 7.5	+ 2.1	+ 5.2
August 21	N	2	1	12	0.125	F	+ 1.6	+ 24.8	+ 23.4
α CANUM VENATICUM.									
June 1	M	2	1	10	0.154	F	+ 13.4	+ 11.8	+ 9.3
α VIRGINIS (<i>Spica</i>).									
March 30	M	2	1	5	0.115	F	- 3.9	- 3.5	- 4.2
May 7	M	2	1	6	0.148	F	+ 7.6	- 55.6	- 50.5
16	M	3	1	6	0.205	F	+ 9.9	- 26.3	- 24.5
24	M	2	1	6	0.145	F	+ 11.8	- 51.0	- 52.0
31	N	2	1	10	0.175	F	+ 13.3	- 19.8	- 22.7
ζ URSÆ MAJORIS.									
June 1	M	2	1	10	0.154	F	- 2.2	+ 25.4	+ 24.9
July 13	M	2	1	10	0.143	F	+ 7.8	+ 24.7	+ 27.7

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Date, 1883.	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.	
η URSE MAJORIS.										
May	21	M	1	1	6	0.175	F	+ 9.5	— 3.1	— 3.5
	23	M	4	1	6	0.145	F	+ 9.6	+ 12.4	+ 14.7
July	13	M	2	1	10	0.143	F	+ 9.3	— 21.1	— 23.3
August	13	M	2	1	10	0.095	F	+ 5.9	— 3.5	— 1.8
α BOÖTIS (<i>Arcturus</i>).										
March	30	M	2	1	5	0.115	F	— 3.4	— 35.6	— 30.8
May	7	M	2	1	6	0.148	F	+ 6.4	— 54.1	— 43.5
	21	M	2	1	6	0.175	F	+ 9.5	— 49.0	— 45.7
	23	M	2	1	6	0.145	F	+ 9.9	— 34.1	— 34.2
	28	M	2	1	10	0.105	b ₁	+ 10.8	— 69.4	— 68.5
June	1	M	2	1	10	0.154	F	+ 10.2	— 60.3	— 55.6
	4	M	2	1	10	0.150	b ₁	+ 12.0	— 47.1	— 51.7
	8	N	2	1	10	0.123	b ₁	+ 12.6	— 68.0	— 57.1
	14	N	2	1	10	0.125	b ₁	+ 13.4	— 67.5	— 65.2
	26	N	2	1	10	0.075	F	+ 14.6	— 30.1	— 30.6
July	4	M	3	1	10	0.155	b ₁	+ 15.0	— 52.2	— 54.7
	5	N	2	1	10	0.125	b ₁	+ 15.1	— 59.8	— 57.9
	6	M	3	1	10	0.195	b ₁	+ 15.1	— 64.5	— 64.4
		M	2	2	10	0.195	b ₁	+ 15.1	— 44.8	— 47.4
	9	M	2	1	10	0.200	b ₁	+ 15.2	— 54.1	— 54.3
	13	M	2	1	10	0.143	F	+ 15.3	— 54.6	— 40.7
	17	N	2	1	12	0.175	F	+ 15.3	— 58.0	— 58.2
August	13	M	2	1	10	0.095	F	+ 13.6	— 46.6	— 44.8
	21	N	2	1	12	0.125	F	+ 12.5	— 46.0	— 49.6
	24	M	1	1	6	0.162	D ₂	+ 12.0	— 89.1	— 79.9
		M	1	1	6	0.162	D ₁	+ 12.0	— 44.0	— 45.8
ε ₂ BOÖTIS.										
May	28	M	2	1	10	0.105	b ₁	+ 8.9	— 12.5	— 14.9
June	4	M	2	1	10	0.150	b ₁	+ 10.0	— 17.0	— 20.3
July	5	N	2	1	10	0.125	b ₁	+ 13.1	— 53.6	— 50.9
β LIBRÆ.										
May	24	M	2	1	6	0.145	F	+ 4.8	— 33.4	— 31.3
	31	N	2	1	10	0.175	F	+ 6.7	— 25.9	— 27.7

Date, 1883.		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 CORONÆ BOREALIS.										
May	16	M	2	1	0	r	F	+ 3.4	+ 28.3	+ 33.1
	23	M	2	1	6	0.205	F	+ 4.8	+ 12.4	+ 15.5
August	13		2	1	10	0.095	F	+ 12.6	+ 18.9	+ 18.6
α SERPENTIS.										
July	6	M	2	1	10	0.195	b ₁	+ 13.0	+ 27.5	+ 32.8
β HERCULIS.										
July	6	M	2	1	10	0.195	b ₁	+ 9.2	- 45.8	- 50.3
ζ HERCULIS.										
July	6	M	2	1	10	0.195	b ₁	+ 7.4	- 25.2	- 25.0
α HERCULIS.										
May	28	M	2	1	10	0.105	b ₄	- 1.8	- 38.0	- 43.6
α OPHIUCHI.										
May	23	M	2	1	6	0.145	F	- 4.5	+ 17.6	+ 15.1
	24	M	2	1	6	0.145	F	- 4.3	- 9.7	- 6.9
γ DRACONIS.										
July	4	M	2	1	10	0.155	b ₁	+ 1.3	+ 14.3	+ 14.5

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

Date, 1883.	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 (<i>Vega</i>).										
May	16	M	2	1	6	0°205	F	— 6.3	— 43.8	— 42.3
	24	M	2	1	6	0°145	F	— 5.5	— 38.5	— 37.1
	31	N	2	1	10	0°175	F	— 4.7	— 18.1	— 16.3
June	26	N	2	1	10	0°075	F	— 1.3	— 22.1	— 22.7
July	19	N	2	1	11	0°145	F	+ 1.9	— 36.4	— 42.0
	26	N	2	1	10	0°175	F	+ 2.9	— 24.6	— 27.5
August	3	M	2	1	10	0°151	F	+ 3.9	— 37.8	— 25.8
	14	N	2	1	10	0°115	F	+ 5.2	— 51.5	— 51.7
	23	N	2	1	10	0°125	F	+ 6.2	— 37.5	— 33.4
September	18	N	2	1	6	0°145	F	+ 8.2	— 23.9	— 23.1
	20	N	3	1	6	0°175	F	+ 8.3	— 48.3	— 45.2
November	10	M	2	1	5	0°122	F	+ 7.3	— 34.1	— 36.4
December	5	N	1	1	5	0°160	F	+ 4.5	— 23.9	— 20.8
ζ AQUILÆ.										
August	14	N	2	1	10	0°115	F	+ 8.0	— 26.9	— 19.6
δ CYGNI.										
November	16	M	4	1	5	0°170	F	+ 8.0	— 17.3	— 17.9
α AQUILÆ (<i>Altair</i>).										
July	19	N	3	1	11	0°145	F	— 0.8	+ 21.3	+ 20.0
	26	N	2	1	10	0°175	F	+ 1.0	+ 6.5	+ 4.9
August	3	M	2	1	10	0°151	F	+ 3.0	+ 15.3	+ 13.4
	23	N	2	1	10	0°125	F	+ 7.9	— 23.0	— 22.4
September	18	N	2	1	6	0°145	F	+ 13.1	— 17.4	— 13.1
October	13	M	2	1	5	0°132	F	+ 15.9	+ 5.7	+ 4.7
	22	M	3	1	5	0°137	F	+ 16.2	— 2.6	— 2.9
November	16	M	3	1	5	0°170	F	+ 15.0	— 5.0	— 5.1
γ CYGNI.										
July	4	M	2	1	10	0°155	b_1	— 6.3	— 4.2	— 4.2
November	10	M	2	1	5	0°122	F	+ 10.1	— 5.3	— 6.0

Date, 1883.	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 CYGNI.										
June 14	N	3	1	10	0.125	b_1	- 8.4	(+ 28.8)	(+ 27.1)	
July 4	M	2	1	10	0.155	b_1	- 6.9	- 27.5	- 32.5	
	N	3	1	10	0.125	b_1	- 6.8	- 41.9	- 41.9	
October 22	M	1	1	5	0.137	F	+ 7.7	- 41.4	- 39.1	
November 10	M	2	1	5	0.200	F	+ 9.1	- 56.4	- 50.4	
ϵ CYGNI.										
July 5	N	2	1	10	0.125	b_1	- 7.8	- 59.8	- 60.2	
November 10	M	2	1	5	0.200	F	+ 12.1	+ 9.5	+ 8.6	
α CEPHEI.										
November 16	M	2	1	5	0.170	F	+ 4.6	- 39.1	- 44.0	
ϵ PEGASI.										
November 10	MJ	2	1	5	0.200	F	+ 17.0	+ 16.4	+ 13.3	
α PISCIS AUSTRALIS (<i>Fomalhaut</i>).										
September 20	N	1	1	6	0.175	F	+ 7.3	- 43.4	- 46.7	
α PEGASI.										
July 26	N	3	1	10	0.175	F	- 12.5	+ 13.0	+ 12.5	
August 16	N	2	1	10	0.126	F	- 8.0	+ 5.6	+ 2.6	
	N	2	1	10	0.125	F	- 6.2	+ 1.9	+ 6.2	
October 13	M	2	1	5	0.132	F	+ 8.3	- 39.0	- 39.7	
	M	2	1	5	0.137	F	+ 9.4	- 21.6	- 20.7	

GREENWICH OBSERVATIONS, 1883.

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

Date, 1883.	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.										
January 15	M	3	1	5	..	F	..	+ 3.4	..	
February 16	M	5	1	5	..	F	..	— 0.7	..	
23	M	5	1	5	0.250	F	..	— 1.0	..	
May 15	N	4	1	5	..	F	..	— 3.0	..	
16	M	5	1	6	0.205	F	..	+ 0.6	..	
21	M	5	1	6	0.175	F	..	— 0.8	..	
22	N	4	1	10	0.259	F	..	— 1.7	..	
23	M	5	1	6	0.145	F	..	— 0.7	..	
24	M	5	1	6	0.145	F	..	+ 1.0	..	
June 14	N	2	1	10	0.125	b ₁	..	— 1.1	..	
26	N	2	1	10	0.075	F	..	— 2.2	..	
July 13	M	5	1	10	0.143	F	..	+ 0.2	..	
17	N	2	1	12	0.175	F	..	— 5.9	..	
19	N	4	1	11	0.145	F	..	— 6.1	..	
26	N	2	1	10	0.175	F	..	— 1.3	..	
August 13	M	3	1	10	0.095	F	..	+ 2.1	..	
14	N	2	1	10	0.115	F	..	— 1.2	..	
16	N	2	1	10	0.126	F	..	— 3.0	..	
21	N	4	1	12	0.125	F	..	— 3.5	..	
23	N	2	1	10	0.125	F	..	— 2.9	..	
September 18	N	2	1	6	0.145	F	..	— 2.5	..	
20	N	2	1	6	0.175	F	..	+ 0.9	..	
October 13	M	3	1	5	0.132	F	..	+ 0.7	..	
17	M	5	1	5	0.137	F	..	— 2.3	..	
November 10	M	5	1	5	0.200	F	..	— 0.5	..	
12	M	5	1	5	0.200	F	..	— 0.8	..	
16	M	5	1	5	0.170	F	..	+ 2.1	..	
20	N	3	1	5	0.157	b ₁	..	— 4.9	..	
SKY SPECTRUM.										
June 6	M	5	1	10	0.150	b ₁	..	— 3.4	..	
July 4	M	5	1	10	0.155	b ₁	..	+ 3.8	..	
7	M	5	1	10	0.195	b ₁	..	— 6.3	..	
August 25	M	4	1	6	0.162	D	..	0.0	..	
November 7	N	3	1	5	0.122	F	..	+ 1.1	..	
27	M	5	1	5	0.140	b ₁	..	— 1.7	..	

OBSERVATIONS of the SPECTRA of COMET *b* 1883, and of η CETI, made at the ROYAL OBSERVATORY, GREENWICH, in the YEAR 1883.COMET *b* 1883 (PONS-BROOKS).

1883, November 27.

Half-prism Spectroscope. One "half-prism" reversed.

Observer, M.

The observations were much interrupted by the passage of light cloud, and no measures were obtained. The spectrum consisted of the three usual cometary bands, with edges bright and sharp towards the red, and fading gradually away towards the blue. No continuous spectrum could be certainly made out, though the band in the yellow, which was very faint, could be traced nearly up to the sharp edge of the band in the green, and that again could be traced very nearly up to the sharp edge of the band in the blue. The bands in the red and violet were not looked for. The band in the green was fairly bright, and the edge towards the red sharp and well-defined. The band in the blue was much fainter, and its less refrangible edge not so well defined as that of the band in the green. The band in the yellow was fainter even than that in the blue.

As seen in the finder, the Comet appeared nearly circular, about 4' or 5' in diameter; it showed a central condensation of stellar appearance and a faint prolongation of the Comet at about 20° position angle seemed to indicate the commencement of a tail.

1883, December 6.

Half-prism Spectroscope. One "half-prism" reversed.

Width of Slit, $0^{\text{in}}.01688$.

Observer, M.

The Comet was decidedly brighter than on November 27, but its appearance as seen in the finder had not undergone any material change. The spectrum, however, seemed somewhat different. There was a very distinct continuous spectrum about 1" in breadth, and a fainter continuous spectrum was suspected to extend for 25" or 30" on both sides of this bright central spectrum. The band in the green was traced for a total length of 4' and probably extended further still. The band in the yellow was traced for a total length of about 2' or 2' 10"; the band in the blue for about 70" or 80". The band in the yellow was now very much brighter than that in the blue; the intensities of the three bands being roughly estimated as follows:—Yellow band 5. Green band 10. Blue band 1. The red and violet bands were not looked for. The less refrangible edges of all three bands were very sharp and well defined.

The following measures were obtained of the sharp edge of the green band of the comet spectrum as compared with the green band of the spectrum given by a vacuum tube containing alcohol-vapour.

Greenwich Sidereal Time.	Comet-band — Alcohol-band.		Inferred Wave-length of Comet-band.
	Micrometer Reading.	Wave-length.	
h m	r	tenth-metres.	tenth-metres.
0. 30	1.885	34.5	5162.5
0. 45	2.269	41.5	5155.5
1. 5	2.176	39.8	5157.2
1. 20	1.980	36.2	5160.8
1. 40	1.708	31.3	5165.7
		Mean.....	5160.3

The green band of the Comet spectrum was obviously not coincident with the green band of the alcohol spectrum, but considerably further towards the blue. There was, however, a bright line in the spectrum from the alcohol vacuum tube coincident with the green band of the Bunsen-flame, and with this the Comet-band was very nearly coincident. It seemed, however, to be a little nearer the blue. The width of the slit during the above measures was 15.8 tenth-metres.

Thalén's wave-length for the less refrangible edge of the green band in the spectrum of the alcohol was assumed throughout, viz., 5197.0 tenth-metres.

η CETI.

1883, December 11.

Half-prism Spectroscope. One "half-prism" reversed.

Magnifying powers 15 and 28.

Observer, M.

The character of the evening was very unfavourable for the examination of the spectrum of this star, the Moon being bright, and there being much mist, so that the star, which was low down, was hardly visible to the naked eye.

With the lowest power eye-piece, magnifying power 15, no cylindrical lens being used, the spectrum was a narrow line of irregular intensity, and the presence of a number of bright lines was suggested. The red end of the spectrum was however very feeble, and nothing like a bright line could be detected near C. There was a noticeable change in the intensity of the spectrum about F, and there seemed some suspicion of several bright lines near D.

But when the cylindrical lens was employed it became evident that there was no bright line near F, nor could any appearance of bright lines be detected near D, whether a high power or a low power was employed. A few dark lines were made out with difficulty, probably *b*, E, and F, but the sky clouded over before their positions could be determined. A distinct dark edge was seen near F, probably exactly at it, and the spectrum on the blue side of this edge was perceptibly fainter than that on the other side; but the intensity of the light in the solar spectrum seems to change just about F, and the occurrence of so dark a line just at that point might readily account for the appearance presented by the spectrum of η Ceti, which indeed looked just like a faint solar spectrum viewed under bad circumstances. The spectrum of η Ceti would therefore appear to be of the ordinary second type.