

ROYAL OBSERVATORY, GREENWICH.

SPECTROSCOPIC OBSERVATIONS

MADE AT THE

ROYAL OBSERVATORY, GREENWICH,

1880.

GREENWICH OBSERVATIONS, 1880.

5 A

OBSERVATIONS of BRIGHT LINES in the SPECTRUM of SOLAR PROMINENCES and of the CHROMOSPHERE, made at the ROYAL OBSERVATORY, GREENWICH, in the Year 1880.

Note.—The Position-Angles for Solar Prominences, or for the part of the Chromosphere examined, are reckoned from the North Pole of the Sun's Axis in the direction N., E., S., W., N. In the case of Prominences, the position-angles for the two extremities of the prominence are given.

The Height in seconds of arc, the estimated Brightness, and the estimated Breadth of the several bright lines seen, are given for each Prominence and for selected points of the Chromosphere. The average Brightness of each line is 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. In the case of the *b* lines, the letter *f* denotes that the dark lines are faint in the spectrum of the prominence or chromosphere, but are not seen actually reversed. The average Breadth of each line is estimated in terms of the breadth of the corresponding dark line in the Solar Spectrum, except in the case of the bright line D_3 , the breadth of which is estimated in terms of the dark line C. The bright lines are usually narrower at the extremity than at the base.

On several occasions the F line has been seen "doubly reversed" in the neighbourhood of the limb, *i.e.*, a fine dark line is seen in the middle of the bright F line, which is itself in the middle of the dark F line much broadened. This phenomenon is more particularly described in the observations of the prominence at 73° on November 22, given in a separate table at the end. In other cases the "double reversal" is indicated in the Remarks by the words "Dark F," followed by a record of the height (measured from the Sun's limb) to which the dark F line was traced in the middle of the bright line.

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

Observer, M.

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					REMARKS.
		C	D_3	1474	<i>b</i>	F	
d h m	° ' "	"	"	"	"	"	
Jan. 19. 0. 13	36. 53 } 39. 43 }	31					The entire limb of the Sun was examined with the slit radial on the C line only.
0. 8	121. 26 } 122. 53 }	17					
0. 5	148. 43 } 149. 28 }	19					
0. 45	262. 53 } 264. 33 }	29					
Jan. 26.							
Jan. 30. 1. 30	21. 7 } 22. 37 }	41	41	0		0	Very faint. The chromosphere averaged 7" in height, occasionally 12", and frequently 8". The entire limb of the Sun was examined with the slit radial. The examination was not very thorough, as the clock drove very badly, and the spectroscope had to be constantly readjusted.
1. 32	105. 57 } 106. 27 }	19	19	5		19	
1. 10	316. 2 } 317. 51 }	38	38	5		38	
Feb. 5. 1. 0	16. 39 } 18. 39 }	38					
to	51. 59 } 53. 39 }	48					Each of the prominences was brilliant, but the chromosphere was faint. The entire limb of the Sun was examined with the slit radial on the C line only.
1. 45	131. 49 } 133. 9 }	58					
	305. 9 } 310. 9 }	29					
Feb. 13. 0. 50	226. 18 } 227. 28 }	29					
to	233. 30 } 234. 33 }	17					
1. 45	250. 5 } 253. 38 }	38					Straight jet. Straight jet. A broken prominence, showing much detail. Straight jet. Somewhat faint. A small cloud above a straight jet. A fine prominence much broken, and showing a good deal of detail. The entire limb of the Sun was examined once with the slit radial on the C line only.
	308. 6 } 309. 58 }	29					
	310. 56 } 312. 35 }	26					
	313. 15 } 314. 18 }	43					
Mar. 18.	10. 52 } 25. 52 }	7	7	2	0	7	
0. 28	29. 52 } 31. 32 }	10	11	5	0	10	
		19	19	0	0	19	

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					REMARKS.
		C	D ₃	1474	b	F	
Mar. 18. 0. 30	40. 22 } 41. 52 } 55. 52 } 70. 52 } 85. 52 } 100. 52 } 110. 52 }	36	36	0	0	36	Very faint indeed.
0. 40	111. 52 } 113. 12 }	41					Detached solar cloud. Seen as a faint straight jet at 0 ^h . 32 ^m . At 0 ^h . 40 ^m , in the course of a second search, an exceedingly brilliant solar cloud was seen above it, upper edge 41" from the limb, depth about 14". At 0 ^h . 42 ^m , the cloud, which had grown rapidly fainter, disappeared, leaving only the jet 24" in height. It was two or three times as bright as the prominence at 297°, but grew fainter so rapidly that there was only time to take its position and height on the C line.
0. 20	115. 52 } 130. 52 } 145. 52 } 160. 52 } 175. 52 } 190. 52 } 205. 52 } 220. 52 } 235. 52 } 250. 52 } 265. 52 } 280. 52 } 287. 32 } 288. 22 }	7	7	2	0	7	Fairly bright.
	294. 52 } 299. 12 } 295. 52 } 310. 52 } 325. 52 } 340. 52 } 355. 52 }	22	22	5	0	22	
							None of the prominences showed any detail. They seemed merely straight regular jets. The D, b, and E lines were all examined, but the prominences could not be made out on any of them. The entire limb of the Sun was examined twice with the slit radial.
Mar. 19. 0. 20 to 1. 10	75. 8 } 79. 12 } 127. 2 } 127. 52 }	24	24	0	0	24	Apparently a bright jet in a large faint cloud, but the existence of the latter was doubtful. The chromosphere averaged 8" in height. 1474 K, the D and b lines were all examined, but the prominences were not seen on them. Sun in white haze; limb very tremulous and badly defined. The entire limb of the Sun was examined with the slit radial.
Mar. 20. 0. 40 to 1. 30	65. 24 } 66. 29 } 138. 29 } 142. 14 } 299. 24 } 306. 1 }	22	22	0	0	22	Small faint jet.
		46	46	0	0	0	Fine prominence.
		31	31	0	0	31	Fine series of solar clouds and broken jets. The prominences could not be made out on 1474 K, the D, b, or E lines. The entire limb of the Sun was examined with the slit radial.
Mar. 23.	3. 18 } 33. 18 } 48. 18 } 63. 18 } 68. 3 } 68. 23 }	10	10	?	0	7	Small faint tuft.
22. 44		8	8	?	0	8	
		8	8	?	0	8	
		8	8	2?	0	8	
23. 10	96. 8 } 96. 28 }	12					
	123. 18 }	11	12	?	0	11	
	138. 18 }	6	6	?	0	6	
	168. 18 }	7	7	?	0	7	
	198. 18 }	8	8	2	0	8	
	273. 18 }	8	8	0	0	7	
	288. 18 }	11	11	0	0	8	
21. 55	297. 59 } 298. 15 }	43	43	2	0	43	
	303. 18 }	8	10	0	0	7	

OBSERVATIONS OF BRIGHT LINES IN THE SPECTRUM OF SOLAR PROMINENCES AND OF THE CHROMOSPHERE,

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					REMARKS.										
		C	D ₃	1474	b	F											
d h m	° ' "	"	"	"	"	"											
Mar. 23. 21. 55	318. 18 333. 18	6 6	6 6	? ?	o o	6 6	The D ₁ , D ₂ , and the E lines were carefully examined at each of these points, but no reversal of them was detected. The entire limb of the Sun was examined with the slit radial.										
Mar. 25. 0. 25	27. 29 } 33. 59 }	58	58	? ?	o o	58	Fine bright prominence.										
0. 32	56. 39 } 62. 24 }	41	41	? ?	o o	41	Fine bright prominence; not so large as the preceding.										
0. 20	67. 37 } 68. 41 }	19	19	? ?	o o	19	Fairly bright prominence.										
0. 10	70. 24 } 76. 32 }	24	24	2 2	o o	24	Bright prominence but not tall; much broken.										
0. 8	106. 19 } 115. 29 }	46	46	o o	o o	46	Very brilliant prominence.										
0. 0	130. 21 } 131. 5 }	12	12	2 2	o o	7	Very small faint jet.										
0. 58	276. 35 } 281. 17 }	24	24	2 2	o o	24											
0. 43	289. 33 } 290. 45 }	29	o	2 2	o o	o	Very faint prominence.										
0. 38	297. 1 } 305. 56 }	50	50	o o	o o	50	Large prominence, much broken; three principal jets, two faint, the third bright. Nothing could be detected on the D ₁ , D ₂ , b, or E lines, which were carefully examined when a prominence was seen on C. The entire limb of the Sun was examined with the slit radial.										
Apr. 15. 23. 7	142. 23 } 145. 5 }	50	43	10 10	o o	19	A straight jet brilliant at the base, but becoming rapidly fainter higher up.										
16. 0. 24	213. 50 } 215. 20 }	19	19	2 2	o o	10	Faint jet.										
15. 23. 14	316. 56 } 319. 15 }	43	43	2 2	o o	10	Nearly detached, leaning over towards the West. Chromosphere undulating; average height 10". The prominences were examined on the D, b, and E lines, but showed nothing. The entire limb of the Sun was examined with the slit radial.										
Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F	
d h m	° ' "	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
Apr. 16. 22. 15	44. 45 } 45. 20 }	14	14	2 2	4 4	10	$\frac{1}{4}$	$\frac{1}{4}$		f'		$\frac{1}{2}$	$\frac{1}{2}$				b ₃ not seen, b ₄ little changed, b ₂ more than b ₁ .
to	146. 52 } 150. 0 }	26	26	2 2	4 4	26	$\frac{1}{3}$	$\frac{2}{3}$		f'	$\frac{1}{3}$	1	$\frac{1}{2}$			$\frac{1}{10}$	b ₃ not seen, b ₄ little changed, b ₂ more than b ₁ .
23. 15	185. 48 } 186. 53 }	17	17	2 2	o o	8	$\frac{1}{3}$	$\frac{1}{3}$		o	8						b ₃ not seen, b ₄ little changed, b ₂ more than b ₁ .
	216. 52 } 218. 42 }	22	22	2 2	4 4	22	1	1		f'	$\frac{1}{5}$	1	1			$\frac{9}{10}$	b ₃ not seen, b ₄ little changed, b ₂ more than b ₁ .
	319. 50 } 322. 3 }	19	19	o o	o o	o	$\frac{1}{4}$	$\frac{1}{4}$	o	o	o	$\frac{1}{2}$	$\frac{1}{2}$	o	o	o	The prominences were examined on the D and E lines, but showed nothing. The prominences were simply straight jets. The entire limb of the Sun was examined with the slit radial.
Apr. 18. 23. 50	69. 16 } 117. 16 } 119. 22 }	19 29	19	2 2	o o	19	$\frac{1}{2}$	$\frac{1}{8}$		o	$\frac{1}{4}$	1	$\frac{1}{2}$		o	$\frac{3}{4}$	Straight jet. Straight bright jet with a small faint jet near. The fainter prominence spreads out into a rounded head. D ₃ and F show the gradual tapering of the lines as they recede from the Sun, but C does not; 1474 K was only seen in the chromosphere. Part of the Sun's limb (from 240° to 120° through the North point) was examined with the slit radial.

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F	
d h m	° ' "	"	"	"	"	"											
Apr. 29. 1. 15	40. 13	22															The entire limb of the Sun was examined with the slit radial on the C line only.
to	41. 33																
	56. 13	72															
	63. 53																
1. 30	134. 23	14															
	134. 43																
	141. 53	29															
	143. 3																
	214. 33	22															The entire limb of the Sun was examined with the slit radial on the C line only.
	216. 43																
	228. 23	46															
	232. 13																
Apr. 30. 2. 0	108. 54	24															
to	111. 34																
	117. 54	26															
	121. 34																
2. 30	212. 54	36															
	214. 34																
	254. 14	19															
	255. 54																
Apr. 30. 21. 15	208. 7	29	29	0	0	0	$\frac{1}{4}$	$\frac{1}{8}$	0	0	0	$\frac{1}{2}$	$\frac{1}{2}$	0	0	0	The F, 1474 K, the D, b, and E lines were also examined, but nothing was seen on them. The Sun was in much white haze, the limb "boiling" and badly defined. The entire limb of the Sun was examined with the slit radial.
to	209. 49																
	235. 10	31	31	0	0	0	$\frac{1}{4}$	$\frac{1}{8}$	0	0	0	$\frac{1}{2}$	$\frac{1}{2}$	0	0	0	
22. 45	239. 59	41	41	0	0	0	$\frac{1}{4}$	$\frac{1}{8}$	0	0	0	$\frac{1}{2}$	$\frac{1}{2}$	0	0	0	
	295. 43																A narrow faint jet with a narrow strip of cloud above it. Straight regular jet. Straight bright jet. Small faint straight jet very narrow. A jet bending over towards the South varying in brilliancy. Faint narrow jet with a narrow strip of cloud above it. The entire limb of the Sun was examined with the slit radial.
	297. 46																
May 14. 1. 20	42. 34	24	24			0	$\frac{1}{4}$	$\frac{1}{8}$		0		$\frac{1}{3}$	$\frac{1}{3}$			0	
	43. 24																
1. 0	53. 54	29	29		17		$\frac{1}{2}$	$\frac{1}{2}$		$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$			$\frac{3}{8}$	
	54. 44																
	57. 44	36	36		36	1	$\frac{3}{8}$	$\frac{3}{8}$		$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$			$\frac{3}{8}$	
	59. 44																
	63. 24	24	24			0	$\frac{1}{10}$	$\frac{1}{10}$		0		$\frac{1}{4}$	$\frac{1}{4}$			0	
1. 7	135. 24	43	43		36	1	$\frac{3}{4}$	$\frac{3}{4}$		$\frac{1}{2}$	1	1	1			1	
	138. 14																Small triangular prominence. Not seen in second examination. Narrow detached jet. Tall bright jet rising straight from the Sun bending over towards the South. Small faint jet bending over to the South. A long low bank, average height 17", but rising at its southern end to a jet 29" in height. A brilliant jet bending over to the South. Short straight jet. A straight jet for some distance from the Sun, then expanding into a rounded head. 1474 K was seen reversed in the chromosphere all round the Sun to a height of 2", but no difference was detected in the prominences. The D, b, and E lines were all examined, but showed no reversal. The entire limb of the Sun was examined twice with the slit radial.
	310. 24	58	58		43	1	$\frac{3}{8}$	$\frac{3}{8}$		$\frac{1}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$			$\frac{3}{4}$	
	313. 14																
May 14. 23. 55	10. 41	19	19	2	0	14	1	$\frac{1}{2}$		0	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{8}$			0	
	12. 1																
	37. 41	19	19	2	0	0	$\frac{1}{8}$	$\frac{1}{8}$		0	0	$\frac{1}{8}$	$\frac{1}{8}$			0	
	38. 21																
23. 15	43. 51	46	46	2	0	0	1	$\frac{1}{2}$		0	$\frac{1}{10}$	$\frac{3}{8}$	$\frac{1}{10}$			0	
	44. 21																A long low bank, average height 17", but rising at its southern end to a jet 29" in height. A brilliant jet bending over to the South. Short straight jet. A straight jet for some distance from the Sun, then expanding into a rounded head. 1474 K was seen reversed in the chromosphere all round the Sun to a height of 2", but no difference was detected in the prominences. The D, b, and E lines were all examined, but showed no reversal. The entire limb of the Sun was examined twice with the slit radial.
23. 18	54. 41	55	55	2	0	48	1	$\frac{1}{8}$		0	$\frac{1}{8}$	$1\frac{1}{4}$	$\frac{5}{8}$			0	
	56. 11																
23. 25	59. 1	36	36	2	0	0	$\frac{1}{8}$	$\frac{1}{10}$		0	0	$\frac{1}{8}$	$\frac{1}{10}$			0	
	59. 51																
	109. 41	29	29	2	0	17	1	$\frac{1}{2}$		0	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{8}$			0	
	122. 31																
15. 0. 40	136. 1	72	72	2	0	48	1	$\frac{1}{2}$		0	$\frac{1}{10}$	1	$\frac{1}{2}$			0	
	139. 41																Short straight jet. A straight jet for some distance from the Sun, then expanding into a rounded head. 1474 K was seen reversed in the chromosphere all round the Sun to a height of 2", but no difference was detected in the prominences. The D, b, and E lines were all examined, but showed no reversal. The entire limb of the Sun was examined twice with the slit radial.
	139. 41	19	19	2	0	19	1	$\frac{3}{8}$		0	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{8}$			0	
	142. 31																
14. 23. 45	305. 21	65	65	2	0	48	1	$\frac{1}{2}$		0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{8}$			0	
	307. 21																

OBSERVATIONS OF BRIGHT LINES IN THE SPECTRUM OF SOLAR PROMINENCES AND OF THE CHROMOSPHERE,

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.	
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F		
d h m	° ' "	"	"	"	"	"												
May 17. 1. 18	112. 25 } 116. 11 }	24	24			24	1	$\frac{3}{4}$			$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{8}$				$\frac{1}{2}$	The entire limb of the Sun was examined with the slit radial.
1. 0	140. 41 } 143. 55 }	36	36			29	1	$\frac{3}{4}$			$\frac{2}{3}$	$\frac{2}{3}$	$\frac{1}{3}$				$\frac{1}{3}$	
1. 45	312. 31 } 314. 19 }	31	31			0	$\frac{1}{2}$	$\frac{1}{4}$			0	$\frac{1}{3}$	$\frac{1}{6}$			0		
1. 32	316. 35 } 318. 16 }	31	31			0	$\frac{1}{2}$	$\frac{1}{4}$			0	$\frac{1}{3}$	$\frac{1}{6}$			0		
May 18. 1. 45	119. 43 } 120. 33 }	24																The Sun was in much white haze, and clouds constantly interrupted the observations. The limb could not be examined on any line but C as the breaks were so short, and even C was very faint in the chromosphere. The definition of the limb was very bad. The entire limb of the Sun was examined with the slit radial.
1. 20	318. 40 } 319. 53 }	22																
May 21. 1. 15	26. 53 } 31. 37 }	46																Straight jet. Straight jet. Faint detached cloud. Straight jet. Straight jet. The entire limb of the Sun was examined with the slit radial on the C line only.
to	44. 35 } 46. 34 }	43																
2. 10	48. 19 } 49. 26 }	31																
	111. 11 } 113. 4 }	34																
	115. 6 } 116. 4 }	29																
May 24. 23. 55	18. 44 } 33. 14 }	26	26	2	0	26	1	1		0	$\frac{1}{3}$	$1\frac{1}{4}$	$\frac{5}{8}$		0	$1\frac{1}{4}$	Straight jet showing no detail. Straight jet showing no detail. Straight jet showing no detail. The D, b, and E lines were examined at each of the prominences, but showed no reversal. 1474 K was seen as usual, i.e., reversed in the chromosphere all round the limb to a height of from 2" to 4", but showing no difference at the prominences. The entire limb of the Sun was examined twice with the slit radial.	
25. 0. 0	54. 54 } 55. 54 }	19	19	2	0	19	1	1		0	1	1	1		0	1		
0. 6	58. 24 } 60. 34 }	14	14	2	0	14	1	1		0	1	1	$\frac{1}{2}$		0	1		
June 28. 22. 45	30. 3 } 30. 23 }	53	50			0	$\frac{1}{3}$	$1\frac{1}{2}$			0	$\frac{1}{2}$	$\frac{1}{2}$			0	A fine but not very bright prominence bending over towards the South. Straight jet without any detail. Short straight jet, the upper part of which is nearly detached. Straight jet. Fine bright prominence bending over towards the South. Forked jet. Straight jet very brilliant. Tall faint prominence bending over towards the West. Small straight jet, fairly bright. Nearly detached. The entire limb of the Sun was examined with the slit radial.	
to	37. 13 } 40. 3 }	46	46			0	$\frac{1}{3}$	$1\frac{1}{2}$			0	$\frac{1}{2}$	$\frac{1}{2}$			0		
29. 1. 0	47. 53 } 48. 43 }	24	24			17	$\frac{1}{2}$	$\frac{1}{4}$		$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{4}$			$\frac{1}{2}$			
	62. 33 } 67. 3 }	29	29			0	$\frac{1}{3}$	$\frac{1}{2}$			0	$\frac{1}{4}$	$\frac{1}{4}$			0		
	69. 33 } 73. 53 }	41	36			24	$\frac{2}{3}$	$\frac{1}{3}$		$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{4}$			$\frac{1}{2}$			
	122. 43 } 125. 3 }	34	34			12	$\frac{1}{2}$	$\frac{1}{4}$		$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{4}$			0			
	204. 43 } 208. 13 }	62	58			50	$1\frac{1}{4}$	1		$\frac{3}{4}$	1	$\frac{2}{3}$			$\frac{3}{4}$			
	230. 3 } 233. 53 }	65	60			36	$\frac{1}{2}$	$\frac{1}{4}$		$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{3}$			0			
	244. 3 } 247. 43 }	19	17			12	1	$\frac{3}{4}$		$\frac{1}{2}$	1	$\frac{2}{3}$			1			
	308. 43 } 309. 13 }	29	24			19	$\frac{2}{3}$	$\frac{1}{2}$		$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$			$\frac{2}{3}$			

Greenwich Mean Solar Time, 1880.			Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
				C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F	
d	h	m	°	"	"	"	"	"											
June 30.	1.	18	26.52	36															Nearly detached.
			30.31																
	1.	22	42.25	53															A bright prominence completely detached.
			43.32																
	1.	26	47.24	55															A prominence bending over towards the South, only just touching the limb at its northern end.
			49.28																
	1.	28	109.13	38															Straight jet.
			111.52																The limb of the Sun was examined from 296° to 112° through the N. point, with the slit radial on the C line only.
July	7.	22. 15	47.22	77															Splendid prominence; very bright; much detail.
			50.52																
	22.	18	64.29	31															Straight jet.
			65.57																
	22.	20	112.40	18															Straight jet; not visible at 23 ^h . 50 ^m .
			115.19																
	23.	25	208.15	26															Faint straight jet.
			209.22																
	23.	27	212.17	36															Faint straight jet.
			213.12																
	23.	20	240.53	60															Fine bright prominence. A jet rising straight from the limb to a height of 41", then bending towards the North.
			242.55																
	23.	13	296.36	60															Very fine prominence occupying 16° of the limb; much detail; outline very irregular; several jets rising from it.
			312.51																
	23.	2	325.54	41															Jet much bent over towards the North; separate from the limb from 326°. 52' to 330°. 42'.
			330.42																The observations were much interrupted by clouds constantly passing, and there was much light cloud about through which the prominences were very faintly seen, but when the Sun was in a clear space of sky the definition was very good.
																			The entire limb of the Sun was examined twice with the slit radial on the C line only.
July	8.	23. 15	48. 9	38															Jet bending over to the North.
			49. 19																
	23.	15	49. 29	33															Straight jet.
			51. 9																
	23.	46	65. 41	22															Small straight jet. Not seen in the first examination.
			67. 1																
	23.	20	112. 29	46															A long detached cloud floating just above the chromosphere, which it almost touches at its S. end. The chromosphere at that point is 11" in height.
			115. 36																
	23.	56	208. 21	17															Small faint jet.
			210. 11																
	23.	58	212. 51	19															Small faint jet.
			213. 41																
	23.	28	238. 59	19															Small but bright cloud.
			243. 44																
	23.	30	294. 49	98															Superb prominence; much detail; average height 65"; tallest jet 98".
			312. 21																
	23.	38	323. 16	38															Straight jet.
			326. 51																
	23.	40	327. 21	37															Straight jet.
			330. 19																At 23 ^h . 49 ^m . the prominence at 114" had receded a long way from the limb. It was 36" across at its S. end, and its lower edge was 48" from the limb, making its height 84". At the N. end it was 55" from the limb and 14" across.
																			The entire limb was examined twice with the slit radial on the C line only.

OBSERVATIONS OF BRIGHT LINES IN THE SPECTRUM OF SOLAR PROMINENCES AND OF THE CHROMOSPHERE,

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F	
July 20. 0. 45	28. 23	"	"	"	"	"											The prominences were all straight jets. The chromosphere averaged 8" in height. The entire limb of the Sun was examined with the slit radial on the C line only.
	28. 33	22															
0. 45	54. 53	23															
	56. 53																
0. 50	141. 3	31															
	142. 53																
0. 55	209. 13	22															Faint prominence, showing, however, a fair amount of detail. Partly detached. Straight jet. Straight jet. Fairly bright. Partly detached. Very faint. Partly detached. Chromosphere averaged 8" in height. The entire limb of the Sun was examined with the slit radial on the C line only.
	211. 43	19															
0. 35	283. 53																
	284. 53																
July 22. 23. 37	40. 46	19															
	45. 14																
23. 39	48. 46	15															A fine bright prominence partly detached, showing a considerable amount of detail. A bright but small straight jet; no detail. A bright but small straight jet; no detail. Fainter than the two preceding, but showing more detail. Straight jet. Straight jet, very bright. Straight jet, not seen in the first examination. Small bright straight jet; no detail. Partly detached; not so bright as the preceding prominence. Very brilliant prominence, partly detached. Straight jet; no detail. Faint straight jet; no detail. The entire limb of the Sun was examined twice with the slit radial on the C line only.
	49. 56																
23. 41	54. 6	17															
	55. 26																
23. 44	239. 46	41															
	241. 46																
23. 46	313. 36	36															
	314. 46																
July 27. 1. 24	22. 33	55															
	27. 40																
1. 38	113. 30	26															
	113. 51																
1. 41	120. 40	19															
	121. 48																
1. 44	138. 21	43															
	140. 20																
2. 8	140. 49	19															
	142. 3																
2. 10	142. 18	34															
	144. 58																
2. 11	185. 58	26															
	186. 51																
1. 55	198. 53	14															
	200. 13																
1. 57	221. 23	29															
	224. 23																
1. 59	239. 15	24															Very faint straight jet. Straight jet, very bright. A straight jet, bending over towards the North. A straight jet, fainter than the preceding. The limb of the Sun from 284° to 41° (through the North point) was examined with the slit radial on the C line only.
	249. 1																
2. 1	264. 13	19															
	265. 27																
2. 2	304. 43	17															
	306. 25																
July 29. 1. 50	23. 28	31															
	24. 1																
1. 48	26. 36	46															
	30. 49																
1. 42	294. 45	24															
	296. 49																
1. 44	306. 33	39															Straight jet. Straight jet.
	308. 30																
July 30. 1. 48	27. 53	38	38			0	$\frac{3}{4}$	$\frac{1}{4}$			0	$\frac{1}{2}$	$\frac{1}{4}$			0	
	31. 6																
1. 54	47. 32	22	22			0	$\frac{1}{2}$	$\frac{3}{4}$			0	$\frac{1}{2}$	$\frac{1}{4}$			0	Straight jet.
	49. 13																

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F	
July 30. 1. 59	127. 58 } 129. 30 }	62	62			0	$\frac{1}{2}$	$\frac{1}{6}$			0	$\frac{1}{2}$	$\frac{1}{4}$			0	Straight jet.
2. 3	196. 6 } 198. 32 }	26	26			17	$\frac{2}{3}$	$\frac{1}{3}$			$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{3}$			1	Straight jet.
2. 6	202. 18 } 204. 8 }	31	31			19	$\frac{2}{3}$	$\frac{1}{3}$			$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{3}$			1	
2. 10	236. 52 } 240. 56 }	31	31			26	1	$\frac{1}{2}$			$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{2}$			1	Jet bending over to the North.
2. 15	245. 31 } 247. 38 }	18	18			14	1	$\frac{1}{2}$			$\frac{1}{10}$	1	$\frac{1}{2}$			1	Straight jet.
2. 15	264. 5 } 265. 25 }	29	29			0	$\frac{1}{2}$	$\frac{1}{3}$			0	$\frac{1}{2}$	$\frac{1}{4}$			0	Straight jet.
1. 49	310. 46 } 313. 28 }	29	29			0	$\frac{2}{3}$	$\frac{1}{4}$			0	$\frac{1}{2}$	$\frac{1}{4}$			0	Straight jet; no detail. The entire limb of the Sun was examined with the slit radial.
Aug. 28.	0. 0 }	8	8	2	0	7	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{10}$	0	$\frac{1}{2}$	1	$\frac{1}{2}$	1	0	$\frac{1}{2}$	Small jet bending over to the North; nearly detached.
1. 34	0. 10 } 2. 0 }	19	17	0	0	0	$\frac{1}{4}$	$\frac{1}{10}$	0	0	0	$\frac{1}{2}$	$\frac{1}{4}$	0	0	0	
1. 40	15. 0 }	8	8	2	0	7	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{10}$	0	$\frac{1}{2}$	1	$\frac{1}{2}$	1	0	$\frac{1}{2}$	Broken jet.
2. 40	22. 20 } 24. 50 }	36	29	2	0	7	$\frac{1}{3}$	$\frac{1}{10}$	$\frac{1}{10}$	0	$\frac{1}{12}$	$\frac{1}{3}$	$\frac{1}{5}$	1	0	$\frac{1}{2}$	
1. 45	30. 0 }	8	8	2	0	7	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{10}$	0	$\frac{1}{2}$	1	$\frac{1}{2}$	1	0	$\frac{1}{2}$	Jet bending slightly over to the North.
2. 45	45. 0 }	8	8	2	0	7	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{10}$	0	$\frac{1}{2}$	1	$\frac{1}{2}$	1	0	$\frac{1}{2}$	
1. 55	51. 40 } 52. 40 }	31	31	2	0	24	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{10}$	0	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{4}$	1	0	$\frac{1}{2}$	Dark F line 3" in height. Small faint jet bending over to the North. F line fully as broad as the dark line, possibly broader.
2. 55	60. 0 }	7	7	2	0	7	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{10}$	0	$\frac{1}{4}$	1	$\frac{1}{3}$	?	0	1	
1. 55	75. 0 }	7	7	2	0	7	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{10}$	0	$\frac{1}{4}$	1	$\frac{1}{3}$	?	0	1	Dark F seen, but not so marked as at 75°.
2. 55	85. 20 }	22	22	?	0	17	$\frac{1}{3}$	$\frac{1}{4}$	?	0	$\frac{1}{3}$	$\frac{1}{4}$	?	0	?	?	
2. 10	87. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	Dark F, as at 90°.
2. 10	90. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	
2. 10	105. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	Dark F, as at 90°.
2. 10	120. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	
2. 10	135. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	Dark F seen, but too tremulous to measure height.
2. 10	147. 50 }	22	22	?	0	7	$\frac{1}{3}$	$\frac{1}{5}$	?	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	?	0	1	
2. 10	150. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	Straight jet. Definition of limb very bad.
2. 10	165. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	
2. 10	180. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	Dark F, as at 135°.
2. 10	195. 0 }	7	7	?	0	?	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	
2. 10	210. 0 }	8	8	?	0	7	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{4}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	Dark F, as at 135°.
2. 10	225. 0 }	8	8	?	0	7	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{4}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	
2. 20	240. 10 }	26	26	2	0	24	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{10}$	0	$\frac{1}{5}$	$\frac{2}{3}$	$\frac{1}{3}$	1	0	1	Straight jet.
2. 20	242. 40 }	6	6	0	0	6	$\frac{1}{2}$	$\frac{1}{4}$	0	0	$\frac{1}{5}$	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{2}$	
2. 20	255. 0 }	6	6	0	0	6	$\frac{1}{2}$	$\frac{1}{4}$	0	0	$\frac{1}{5}$	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{2}$	Straight jet.
2. 20	270. 0 }	6	6	0	0	6	$\frac{1}{2}$	$\frac{1}{4}$	0	0	$\frac{1}{5}$	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{2}$	
2. 20	285. 0 }	7	7	?	0	7	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	Straight jet.
2. 20	300. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	
2. 30	304. 0 }	17	17	?	0	7	$\frac{1}{3}$	$\frac{1}{5}$	?	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	?	0	$\frac{1}{2}$	The entire spectrum from B to F was examined at each of the above points of the Sun's circumference.
2. 30	305. 30 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	
2. 30	315. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	D ₁ and D ₂ were not seen reversed at any of the points examined.
2. 30	330. 0 }	7	7	?	0	6	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	
2. 30	345. 0 }	8	8	2	0	7	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	The bright F line in the spectrum of the prominences becomes fainter than the atmospheric spectrum at no great distance above the chromosphere. Thus, whilst it is easy to see that the bright F line, close to the limb, is considerably broader than the dark F line of the atmospheric spectrum, it is only possible to note that, higher up, it is fully as wide: for if the bright line exceeded the dark line in breadth the superior brilliancy of the atmospheric spectrum would prevent the breadth being seen.
2. 30	345. 0 }	8	8	2	0	7	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{3}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	?	
The bright F line of the chromospheric spectrum, close to																	

OBSERVATIONS OF BRIGHT LINES IN THE SPECTRUM OF SOLAR PROMINENCES AND OF THE CHROMOSPHERE.

[illegible]

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F	
1882 GOALM 42F...1A																	
Sept. 2. 1.40 —continued. 1.45 1.45	208.15 301.15 319.5 320.15 321.15 323.35	48 24 22	48 24 22	?	?	48	$\frac{3}{3}$ $\frac{1}{2}$ $\frac{1}{2}$	?	?	?	$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{5}$	$\frac{2}{3}$ $\frac{1}{2}$ $\frac{1}{3}$	?	?	?	$\frac{3}{4}$ $\frac{1}{3}$ $\frac{1}{3}$	Small straight jet. The entire limb of the Sun was examined with the slit radial.
Sept. 2.	0.0 15.0	8 7	8 7	2 ?	2 ?	8 7	$\frac{3}{3}$ $\frac{1}{2}$	$\frac{1}{10}$ $\frac{1}{2}$	f ?	$\frac{1}{3}$ $\frac{1}{3}$	1 $\frac{1}{3}$	$\frac{1}{2}$ $\frac{1}{2}$	1 ?	?	?	$\frac{1}{2}$ 1	b ₁ and b ₂ faint and indistinct. Dark F seen 4" in height. Chromosphere varies from 7" to 10" in height, from 0° to 15°.
23.10	20.41 21.41 30.0 45.0 60.0	17 7 7 7 7	17 7 7 7 7	?	?	17 7 7 7 7	$\frac{3}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{2}$	?	?	$\frac{1}{5}$ $\frac{1}{3}$ $\frac{1}{3}$ f $\frac{1}{3}$	$\frac{2}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$	$\frac{1}{3}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{3}$	?	?	?	1 1 1 1 1	Straight jet. b ₁ and b ₂ faint and indistinct. Chromosphere undulating from 45° to 60°. Dark F seen 2" in height.
22.6	62.21 64.11	22 22	22 22	4	?	17	$\frac{1}{2}$ $\frac{1}{3}$	$\frac{1}{5}$ $\frac{1}{5}$	?	$\frac{1}{4}$ $\frac{2}{3}$	$\frac{2}{3}$ $\frac{1}{4}$	$\frac{1}{4}$ $\frac{1}{4}$	1	?	?	$\frac{1}{2}$ 1	Triangular prominence.
22.8	65.1 67.1 75.0	29 7 7	29 7 7	4	?	24 7 7	$\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{2}$	$\frac{1}{5}$ $\frac{1}{2}$?	?	$\frac{1}{4}$ $\frac{2}{3}$ $\frac{1}{4}$	$\frac{2}{3}$ $\frac{1}{3}$ $\frac{1}{3}$	$\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{3}$	1	?	?	$\frac{1}{2}$ 1 1	Triangular prominence. Chromosphere undulating from 60° to 75°. Dark F seen 2" in height.
22.15	90.0 104.51 107.11	7 14 14	7 14 14	2	?	7 14 14	$\frac{2}{3}$ $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$	?	$\frac{1}{5}$ $\frac{1}{3}$ $\frac{1}{3}$	$\frac{3}{4}$ $\frac{3}{4}$ $\frac{3}{4}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	1	?	?	1 1 1	A very low bank. At 23 ^h . 25 ^m . a jet 22" in height.
22.20	108.31 110.11	26 26	26 26	2	?	26	$\frac{2}{3}$ $\frac{1}{2}$	$\frac{1}{10}$ $\frac{1}{10}$	?	$\frac{1}{3}$ $\frac{1}{3}$	$\frac{3}{4}$ $\frac{3}{4}$	$\frac{1}{2}$ $\frac{1}{2}$	1	?	?	1 1	Triangular jet. At 23 ^h . 25 ^m . a jet 29" in height bending over to the South.
	120.0 135.0 150.0 165.0 180.0 195.0	8 8 7 8 7 7	8 8 7 8 7 7	?	?	8 7 5 7 5 5	$\frac{2}{3}$ $\frac{2}{3}$ $\frac{2}{3}$ $\frac{2}{3}$ $\frac{1}{2}$ $\frac{1}{2}$	?	?	$\frac{1}{3}$ $\frac{1}{5}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$	$\frac{2}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$	$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$	?	?	?	1 1 1 1 1 1	Limb very unsteady. Dark F 2" (?) in height. Chromosphere undulating from 135° to 150°. Chromosphere undulating from 6" to 10", from 150° to 165°. Seen in haze; limb "boiling."
22.25	206.1 210.41	62					$\frac{1}{5}$	$\frac{1}{10}$	?	$\frac{1}{10}$	$\frac{1}{3}$	$\frac{1}{2}$	1	?	?	1	Chromosphere undulating from 7" to 8", from 180° to 195°. A very broken prominence. Very faint; could not be made out on any other line beyond the usual chromospheric height.
	210.0 225.0	19 5	19 5	?	?	7 5	$\frac{1}{4}$ $\frac{1}{2}$	$\frac{1}{10}$ $\frac{1}{2}$	?	$\frac{1}{10}$ $\frac{1}{10}$	$\frac{1}{3}$ $\frac{1}{3}$	$\frac{1}{4}$ $\frac{1}{3}$	?	?	?	1 1	Faint detached cloud. Upper surface, 50"; lower, 24" from the limb. Seen only on the C line.
23.30	226.21 227.41 240.0 255.0	50 7 7 7	50 7 7 7	?	?	5 6 6 6	$\frac{2}{3}$ $\frac{2}{3}$ $\frac{2}{3}$ $\frac{2}{3}$	$\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$	?	$\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$	$\frac{2}{3}$ $\frac{2}{3}$ $\frac{2}{3}$ $\frac{2}{3}$	$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$	?	?	?	1 1 1 1	Chromosphere undulating from 6" to 10", from 225° to 240°. Chromosphere undulating from 6" to 10", from 240° to 255°. Dark F 2" in height.
23.58	270.0 277.21 278.1	7 17 17	7 17 17	?	?	7 10	$\frac{2}{3}$ $\frac{1}{2}$	?	?	$\frac{1}{4}$ $\frac{1}{10}$	$\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{4}$ $\frac{1}{4}$	?	?	?	1 1	Faint triangular jet.
22.30	280.1 280.41	29															Triangular jet. Sun in too much haze to see prominence on any other line. At 23 ^h . 55 ^m . it is nearly detached. Height 34". It joins the limb at its southern point.
3.0.0	285.0 289.31 290.11 300.0	7 17 17 8	7 17 17 8	?	?	5 7 7 8	$\frac{2}{3}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{2}{3}$	?	?	$\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$	$\frac{2}{3}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{2}{3}$	$\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{2}{3}$	?	?	?	1 1 1 1	Chromosphere undulating from 7" to 12", from 270° to 285°. Faint triangular jet.
2.22.31	303.41 305.21 315.0	34 34 8	34 34 8	?	?	34 7	$\frac{2}{3}$ $\frac{1}{2}$ $\frac{2}{3}$	?	?	$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{5}$	$\frac{3}{4}$ $\frac{3}{4}$ $\frac{2}{3}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{2}{3}$	?	?	?	1 1 1	Fine bright straight jet.
22.38	321.21 323.21 330.0 345.0	19 19 7 8	19 19 7 8	?	?	10 6 8	$\frac{1}{3}$ $\frac{1}{3}$ $\frac{2}{3}$ $\frac{2}{3}$	?	f ?	$\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{3}$	$\frac{2}{3}$ $\frac{2}{3}$ $\frac{2}{3}$ 1	$\frac{1}{3}$ $\frac{1}{3}$ $\frac{2}{3}$ $\frac{1}{2}$	?	?	?	1 1 1 $\frac{1}{2}$	Straight jet; b ₁ and b ₂ indistinct and faint. b ₁ and b ₂ faint and indistinct. Dark F seen 4" in height. The prominences at 106°, 110°, and 280° suffered considerable change between the first examination at 22 ^h . 15 ^m . and the second at 23 ^h . 25 ^m . Prominences at 21°, 227°, 277°, and 290° were only seen in the second examination.

OBSERVATIONS OF BRIGHT LINES IN THE SPECTRUM OF SOLAR PROMINENCES AND OF THE CHROMOSPHERE,

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F	
Sept. 2. —continued.																	The entire spectrum from B to F was examined at all the above points of the Sun's circumference. The entire limb of the Sun was examined twice with the slit radial.
Sept. 4. 1. 5	67.45 } 69.5 }	24															Straight jet.
1. 5	70.25 } 71.5 }	19															Jet bending over to the South.
1. 5	108.45 } 113.45 }	24															Straight jet.
1. 0	285.45 } 286.45 }	22															Straight jet.
1. 2	323.45 } 326.5 }	22															Forked prominence.
1. 3	327.5 } 327.45 }	24															Nearly detached. The entire limb of the Sun was examined with the slit radial on the C line only.
Sept. 10. 0. 20	0.0 } 1.48 }	8	8	2		8	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{10}$	f	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{2}$	1		$1\frac{1}{4}$	Dark F seen about 2" in height.
	2.8 }	14	14	2	2	10	$\frac{3}{4}$	$\frac{1}{3}$	$\frac{1}{10}$	f	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{3}$	1		1	Straight jet.
	15.0 }	8	8	2		8	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{10}$	f	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{2}$	1		$1\frac{1}{4}$	Dark F seen about 2" in height.
	30.0 }	7	7	2		7	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	f	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{2}$	1		$1\frac{1}{4}$	Dark F seen about 2" in height.
9. 23. 30	41.28 } 42.38 }	55	55	?		55	$\frac{1}{2}$	$\frac{1}{3}$	?	f	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{3}$	?		1	Fine prominence, nearly detached.
	45.0 }	7	7	2	0	7	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	0	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	1	0	$1\frac{1}{4}$	Dark F seen about 2" in height.
9. 23. 27	50.48 } 52.38 }	60	0	0	0	0	$\frac{1}{10}$	0	0	0	0	$\frac{1}{2}$	0	0	0	0	Very faint prominence just touching the limb at its southern end. Not seen in the second examination.
	60.0 }	7	7	2	0	7	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	0	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	1	0	$1\frac{1}{4}$	Dark F seen about 2" in height.
	75.0 }	7	7	4	0	7	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{10}$	0	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{3}$	1	0	1	
10. 0. 12	79.48 } 80.48 }	24	24	?	0	7	$\frac{1}{10}$	$\frac{1}{5}$	?	0	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{4}$	?	0	1	The southern part of the prominence was detached from the limb.
	87.8 }	12	12	2	0	8	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	0	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{3}$	1	0	1	Bending over to the North.
	88.8 }	7	7	2	2	7	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{10}$	f	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{3}$	1		1	
10. 0. 0	103.8 }	38	38	2	2	38	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{10}$	f	$\frac{1}{5}$	$\frac{3}{4}$	$\frac{1}{4}$	1		$\frac{3}{4}$	Bending over to the North; b ₁ , b ₂ , b ₃ , and D ₁ , D ₂ , all indistinct and faint close to the limb.
9. 23. 59	105.18 }	43	43	?	0	41	$\frac{3}{4}$	$\frac{1}{2}$	?	0	$\frac{1}{5}$	$\frac{3}{4}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	Fine prominence detached at its northern end.
	108.8 }	6	6	2	2	6	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{10}$	f	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{3}$	1		1	
	110.8 }	7	7	2	0	6	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{10}$	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	1	0	$1\frac{1}{4}$	Dark F seen about 2" in height.
23. 55	135.0 }	26	26	2	2	19	$\frac{1}{4}$	$\frac{1}{7}$	$\frac{1}{10}$	f	$\frac{1}{10}$	$\frac{1}{3}$	$\frac{1}{4}$	1		$\frac{1}{2}$	Bending slightly over to the West.
	138.48 }	7	7	?	0	6	$\frac{1}{2}$	$\frac{1}{2}$	?	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$1\frac{1}{4}$	
	140.8 }	7	7	?	0	6	$\frac{1}{2}$	$\frac{1}{2}$	?	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$1\frac{1}{4}$	
	150.0 }	7	7	?	0	6	$\frac{1}{2}$	$\frac{1}{2}$	?	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$1\frac{1}{4}$	
	165.0 }	7	7	?	0	6	$\frac{1}{2}$	$\frac{1}{2}$	?	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$1\frac{1}{4}$	
	180.0 }	7	7	?	0	7	$\frac{1}{2}$	$\frac{1}{2}$	?	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$1\frac{1}{4}$	Dark F seen about 2" in height.
	195.0 }	7	7	?	0	7	$\frac{1}{2}$	$\frac{1}{2}$	?	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$1\frac{1}{4}$	
23. 45	207.28 }	41	41	2	2	24	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{10}$	f	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{3}$	1		1	Partly detached.
	210.48 }	7	7	2	0	7	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	0	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{3}$	1	0	$1\frac{1}{4}$	
10. 1. 5	225.0 }	19	19	?	0	14	$\frac{1}{2}$	$\frac{1}{2}$	?	0	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$\frac{3}{4}$	
	239.8 }	6	6	2		6	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	f	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{3}$	1		1	
	240.48 }	6	6	2		6	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	f	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{3}$	1		1	
	255.0 }	8	8	2		7	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	f	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{3}$	1		$1\frac{1}{4}$	
	270.0 }	7	7	2	0	6	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{10}$	0	$\frac{1}{5}$	$\frac{3}{4}$	$\frac{1}{2}$	1	0	$1\frac{1}{4}$	
10. 0. 25	285.0 }	17	17	0	0	17	$\frac{1}{2}$	$\frac{1}{4}$	0	0	$\frac{1}{10}$	$\frac{1}{3}$	$\frac{1}{5}$	0	0	1	Partly detached on the northern side.
	300.0 }	7	7	0	0	7	$\frac{1}{2}$	$\frac{1}{4}$	0	0	$\frac{1}{10}$	$\frac{1}{3}$	$\frac{1}{5}$	0	0	$1\frac{1}{4}$	
	305.8 }	7	7	0	0	7	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{7}$	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$1\frac{1}{4}$	
9. 23. 20	306.48 }	29	29	?		22	$\frac{1}{2}$	$\frac{1}{2}$	?	f	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{3}$	?		1	Straight jet.
	315.0 }	7	7	0	0	7	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{7}$	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$1\frac{1}{4}$	
	327.18 }	7	7	0	0	7	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{7}$	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$1\frac{1}{4}$	
	328.48 }	7	7	0	0	7	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{7}$	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$1\frac{1}{4}$	
	330.0 }	7	7	0	0	7	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{7}$	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$1\frac{1}{4}$	
	345.0 }	7	7	2	0	7	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{7}$	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$1\frac{1}{4}$	The entire spectrum from B to F was examined at all these points of the Sun's circumference. The entire limb of the Sun was examined twice with the slit radial.

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
		C	D ₃	¹⁴⁷⁴	b	F	C	D ₃	¹⁴⁷⁴	F	C	D ₃	¹⁴⁷⁴	b	F		
d h m	° ' "	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
Nov. 1.	0. 0	8	8	2	0	7	1	$\frac{3}{4}$	$\frac{1}{10}$	0	$\frac{2}{3}$	1	$\frac{1}{2}$	1	0	$1\frac{1}{4}$	
	15. 0	8	8	2	0	7	1	$\frac{3}{4}$	$\frac{1}{10}$	0	$\frac{2}{3}$	1	$\frac{1}{2}$	1	0	$1\frac{1}{4}$	
	30. 0	7	7	?	0	6	1	$\frac{3}{4}$	?	0	1	$\frac{1}{2}$	?	0	0	1	
	45. 0	7	7	?	0	6	1	$\frac{3}{4}$	?	0	1	$\frac{1}{2}$	?	0	0	1	
23. 45	51. 16	22	22	2	5	7	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{10}$	f	$\frac{1}{4}$	$\frac{2}{3}$	$\frac{1}{3}$	1		1	Straight jet.
	53. 16																Dark F seen 2" in height.
	60. 0	7	7	2	0	7	1	$\frac{3}{4}$	$\frac{1}{10}$	0	$\frac{1}{3}$	1	$\frac{1}{2}$	1	0	$1\frac{1}{4}$	
	75. 0	7	7	2	0	6	1	$\frac{3}{4}$	$\frac{1}{10}$	0	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$1\frac{1}{4}$	
	90. 0	6	6	?	0	5	$\frac{1}{3}$	$\frac{1}{4}$	?	0	$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{3}$	?	0	1	
	105. 0	7	7	?	0	6	$\frac{1}{3}$	$\frac{1}{4}$	?	0	$\frac{1}{4}$	1	$\frac{1}{2}$	?	0	1	
	120. 0	7	7	?	0	6	$\frac{1}{3}$	$\frac{1}{4}$	?	0	$\frac{1}{4}$	1	$\frac{1}{2}$	?	0	1	
23. 55	122. 19	22	19	2	0	17	$\frac{3}{4}$	$\frac{1}{3}$	$\frac{1}{10}$	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	1	0	1	Jet spreading out a little at the head.
	123. 21																
2. 0. 10	125. 36	118	116	2	0	109	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{10}$	0	$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{4}$	1	0	1	Very fine prominence.
	133. 2																
	135. 0	7	7	?	0	6	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$\frac{1}{5}$	1	$\frac{1}{2}$	?	0	$1\frac{1}{4}$	
	150. 0	7	7	?	0	6	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$\frac{1}{5}$	1	$\frac{1}{2}$	?	0	$1\frac{1}{4}$	
	165. 0	7	7	?	0	6	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$\frac{1}{5}$	1	$\frac{1}{2}$	?	0	$1\frac{1}{4}$	
	180. 0	7	7	?	0	7	$\frac{3}{4}$	$\frac{1}{3}$	?	0	$\frac{1}{10}$	1	$\frac{1}{2}$	?	0	1	
	195. 0	7	7	2	0	7	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{10}$	0	$\frac{1}{4}$	1	$\frac{1}{2}$	1	0	1	
	210. 0	8	8	2	0	7	1	$\frac{1}{3}$	$\frac{1}{10}$	0	$\frac{1}{5}$	1	$\frac{1}{2}$	1	0	1	
	225. 0	8	8	2	0	7	1	$\frac{1}{3}$	$\frac{1}{10}$	0	$\frac{1}{5}$	1	$\frac{1}{2}$	1	0	1	
0. 45	232. 21	19															Straight jet. The Sun clouded over before any line but
	233. 16																C could be examined. Not seen at 1 ^h . 20 ^m .
	240. 0	6	6	0	0	6	$\frac{1}{2}$	$\frac{1}{3}$	0	0	$\frac{1}{5}$	1	$\frac{1}{2}$	0	0	1	Misty.
1. 12	242. 1	14	14	?	0	?	$\frac{1}{3}$	$\frac{1}{3}$	?	0	?	$\frac{2}{3}$	$\frac{1}{3}$	?	0	?	Faint low bank. Not seen during the first examination.
	243. 36																
1. 8	248. 41	14	14	?	0	10	1	$\frac{3}{4}$	?	0	$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{2}$	?	0	1	Jet bending over to the North. Not seen in first examination.
	249. 39																
	255. 0	6	6	0	0	6	$\frac{1}{2}$	$\frac{1}{3}$	0	0	$\frac{1}{5}$	1	$\frac{1}{2}$	0	0	1	Sky misty.
	270. 0	6	6	0	0	6	$\frac{1}{2}$	$\frac{1}{3}$	0	0	$\frac{1}{5}$	1	$\frac{1}{2}$	0	0	1	Sky misty.
	285. 0	7	7	?	0	6	$\frac{1}{2}$	$\frac{1}{3}$	?	0	$\frac{1}{4}$	1	$\frac{1}{2}$	?	0	$1\frac{1}{4}$	
0. 55	297. 36	16	16	?	4	6	$\frac{1}{2}$	$\frac{1}{3}$	?	f	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	?		$1\frac{1}{4}$	Faint straight jet.
	298. 26																
	300. 0	7	7	?	0	6	$\frac{1}{2}$	$\frac{1}{3}$	?	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{3}$	?	0	1	Sky misty.
	315. 0	6	6	0	0	5	$\frac{1}{2}$	$\frac{1}{3}$	0	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{1}{2}$	0	0	1	
1. 23. 28	328. 1	29	29	2	0	22	1	$\frac{3}{4}$	$\frac{1}{10}$	0	$\frac{1}{2}$	1	$\frac{1}{2}$	1	0	1	Straight jet.
	329. 44																
	345. 0	6	6	0	0	5	$\frac{1}{3}$	$\frac{1}{3}$	0	0	$\frac{1}{10}$	1	$\frac{1}{2}$	0	0	1	Nothing was seen on the D ₁ , D ₂ , or E lines. The entire limb of the Sun was examined twice with the slit radial.
Nov. 3. 0. 20	45. 27	58	58	?		36	$\frac{3}{4}$	$\frac{1}{4}$	?		$\frac{1}{5}$	$\frac{2}{3}$	$\frac{1}{3}$	?		$\frac{1}{2}$	Fine prominence with considerable detail.
	54. 47																
0. 25	67. 7	89	77	?		68	$\frac{1}{3}$	$\frac{1}{4}$	?		$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{2}$	?		1	Completely detached cloud 34" from the limb.
	69. 57																
0. 26	126. 47	163	158	?		137	$\frac{1}{3}$	$\frac{1}{3}$	?		$\frac{1}{5}$	$\frac{2}{3}$	$\frac{1}{3}$	?		$\frac{2}{3}$	Fine prominence all but completely detached.
	133. 7																
0. 30	133. 27	65	65	?		?	$\frac{1}{3}$	$\frac{1}{5}$	?		?	$\frac{1}{2}$	$\frac{1}{4}$	?		?	Straight jet.
	135. 17																
0. 40	227. 17	29	17	?		7	$\frac{1}{2}$	$\frac{1}{3}$	?		$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{3}$	?		1	
	234. 7																
0. 45	328. 47	41	41	?		24	$\frac{1}{3}$	$\frac{1}{3}$	?		$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{4}$	?		$\frac{3}{4}$	A jet a little broken.
	331. 47																The entire limb of the Sun was examined with the slit radial.
Nov. 3.	0. 0	8	8	?	0	7	$\frac{3}{4}$	$\frac{2}{3}$	?	0	$\frac{1}{3}$	1	$\frac{1}{2}$	?	0	$1\frac{1}{2}$	Dark F seen 2" in height.
	15. 0	8	8	?	0	7	$\frac{3}{4}$	$\frac{2}{3}$	?	0	$\frac{1}{3}$	1	$\frac{1}{2}$	?	0	$1\frac{1}{2}$	Dark F seen 2" in height.
	30. 0	8	10	?	0	6	1	$\frac{2}{3}$	?	0	$\frac{1}{3}$	1	$\frac{1}{3}$	?	0	$1\frac{1}{2}$	
22. 50	33. 8	48	48	0	0	6	$\frac{1}{3}$	$\frac{1}{5}$	0	0	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{4}$	?	0	$1\frac{1}{4}$	Broken jet. No displacement noticed in the prominence lines.
	38. 48																
22. 55	44. 38	29	29	0	0	24	$\frac{3}{4}$	$\frac{2}{3}$	0	0	$\frac{1}{10}$	1	$\frac{1}{2}$	0	0	1	Jet leaning over to the North.
	47. 28																

OBSERVATIONS OF BRIGHT LINES IN THE SPECTRUM OF SOLAR PROMINENCES AND OF THE CHROMOSPHERE,

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F	
d h m	° ' "	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	
Nov. 3. 23. 0	49. 18 } 51. 28 } 60. 0 } 75. 0 }	34	34	2	0	29	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{3}{4}$	1	0	1	Jet leaning over to the North. The F line was slightly displaced towards the blue.
23. 5	78. 28 } 79. 58 }	8	8	2	0	7	1	1	$\frac{1}{10}$	0	$\frac{1}{2}$	1	$\frac{1}{2}$	1	0	$\frac{1}{2}$	Nearly detached; sky misty.
23. 10	83. 28 } 84. 38 }	29	29	0	0	6	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{3}$	0	0	$1\frac{1}{2}$	Nearly detached; sky misty.
	90. 0 } 105. 0 }	26	26	0	0	6	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{3}$	0	0	$1\frac{1}{2}$	
	120. 0 }	7	7	2	2	7	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	f	$\frac{1}{4}$	1	$\frac{1}{2}$	1	1	$1\frac{1}{2}$	
23. 15	128. 38 } 136. 48 }	7	7	2	2	7	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	f	$\frac{1}{4}$	1	$\frac{1}{2}$	1	1	$1\frac{1}{2}$	
		7	8	0	0	6	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{4}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{2}$	
		144	144	120	0	130	1	1	0	0	$\frac{1}{3}$	1	1	0	0	$\frac{2}{3}$	Fine prominence. At 23 ^h . 35 ^m . the height on C = 182'', on D ₃ = 185'', on F = 163''. At 1 ^h . 10 ^m . the height on C = 187'', on D ₃ = 192''. The F line was displaced 0.5 tenthmetre towards the blue on the northern edge of the prominence, and a like amount towards the red on the southern edge, corresponding to a motion of 19 miles per second. No displacement of the C line could be clearly established.
	150. 0 }	7	8	0	0	6	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{2}$	
	165. 0 }	8	8	0	0	7	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{2}$	
	180. 0 }	8	8	0	0	7	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{4}$	
	195. 0 }	7	7	0	0	7	1	1	0	0	0	1	1	0	0	$1\frac{1}{4}$	
23. 40	207. 28 } 211. 28 }	65	70	0	0	41	$\frac{3}{4}$	$\frac{3}{4}$	0	0	$\frac{1}{10}$	$\frac{3}{4}$	$\frac{3}{4}$	0	0	1	Straight jet.
	225. 0 }	6	6	0	0	5	$\frac{1}{3}$	$\frac{1}{3}$	0	0	$\frac{1}{4}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{2}$	
4. 1. 30	239. 56 } 240. 24 }	24	24	0	0	6	$\frac{1}{4}$	$\frac{1}{5}$	0	0	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$1\frac{1}{4}$	Faint straight jet.
	240. 0 }	7	0	0	0	0	$\frac{3}{4}$	0	0	0	0	1	0	0	0	0	C line in the chromosphere.
	255. 0 }	7	7	0	0	6	$\frac{3}{4}$	$\frac{3}{4}$	0	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{4}$	
	270. 0 }	7	7	0	0	6	$\frac{3}{4}$	$\frac{3}{4}$	0	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{4}$	
	285. 0 }	7	7	0	0	6	$\frac{3}{4}$	$\frac{3}{4}$	0	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{4}$	
22. 30	294. 58 } 295. 48 }	22	29	0	0	7	$\frac{1}{4}$	$\frac{1}{5}$	0	0	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{5}$	0	0	$1\frac{1}{4}$	Faint straight jet. No detail. Not seen at 23 ^h . 45 ^m .
	300. 0 }	7	7	0	0	6	$\frac{3}{4}$	$\frac{3}{4}$	0	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{4}$	
22. 33	310. 28 } 311. 58 }	22	22	0	0	17	$\frac{2}{3}$	$\frac{1}{2}$	0	0	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{2}{3}$	Perfectly straight jet. Not seen at 23 ^h . 45 ^m . The C line was displaced at the highest point of the prominence towards the red, and at the northern edge towards the blue, in both cases by about 0.5 tenthmetre, corresponding to motions of recession and approach respectively of 14 miles per second. The F line was displaced about 0.3 tenthmetre towards the blue at the highest point of the prominence, corresponding to a motion of approach of 13 miles; and 0.5 tenthmetre towards the blue at the northern edge, corresponding to a motion of approach of 19 miles per second.
	315. 0 }	7	7	0	0	6	$\frac{3}{4}$	$\frac{3}{4}$	0	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{4}$	
22. 45	323. 28 } 329. 28 }	41	46	0	0	29	$\frac{2}{3}$	$\frac{2}{3}$	0	0	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{3}$	0	0	1	Forked prominence. No displacement was noticed in the prominence lines.
	330. 0 }	8	8	0	0	7	$\frac{3}{4}$	$\frac{3}{4}$	0	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{2}$	
	345. 0 }	7	7	0	0	6	$\frac{3}{4}$	$\frac{3}{4}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$1\frac{1}{2}$	
																	The entire spectrum from B to F was examined at each of the above points of the Sun's circumference. The entire limb of the Sun was examined twice with the slit radial.
Nov. 7.	0. 0 }	10	10	2	5	8	1	$\frac{3}{4}$	$\frac{1}{10}$	f	$\frac{2}{3}$	1	$\frac{2}{3}$	1	1	$1\frac{1}{2}$	
	15. 0 }	8	8	2	0	7	1	$\frac{3}{4}$	$\frac{1}{10}$	0	0	1	1	0	0	$1\frac{1}{2}$	
22. 45	29. 58 } 33. 48 }	31	31	0	0	24	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{2}$	Bright regular jet with a faint diffused edge.
22. 48	37. 8 } 37. 58 }	24	24	0	0	19	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{2}$	Bright regular jet.
	45. 0 }	8	8	2	0	7	1	$\frac{3}{4}$	$\frac{1}{10}$	0	$\frac{2}{3}$	1	$\frac{1}{2}$	1	0	$1\frac{1}{2}$	
	60. 0 }	7	7	2	4	7	1	$\frac{3}{4}$	$\frac{1}{10}$	f	$\frac{2}{3}$	1	$\frac{1}{2}$	1	1	$1\frac{1}{2}$	
23. 0	72. 28 } 83. 8 }	31	29	0	0	29	$\frac{3}{4}$	$\frac{1}{2}$	0	0	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{3}$	0	0	$\frac{1}{2}$	

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F	
d h m	° ' "	"	"	"	"	"											
Nov. 7. 23. 0 —continued.	80. 48	29	29			29											There seems a distinct difference between the modifications of the C, D ₃ , and F lines at this point. C is of the same brightness all the way up, with the exception of the extreme tip of the line, which is a little fainter. D ₃ becomes slightly narrower and fainter at a height of 12", and from thence to 22" was narrow and faint. F is scarcely visible from 7" to 19", but from 19" to 29" is quite bright. The greatest height of each line at this point is 29".
	90. 0	6	6	2	4	5	1	$\frac{3}{4}$	$\frac{1}{10}$	f	$\frac{1}{3}$	1	$\frac{1}{2}$	1		$\frac{1}{2}$	b ₂ was very marked, b ₄ slightly.
	105. 0	7	7	0	0	6	$\frac{1}{4}$	$\frac{2}{3}$	0	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0	0	$\frac{1}{2}$	
23. 20	105. 48	12	13	?	0	11	1	$\frac{2}{3}$	?	0	$\frac{1}{3}$	1	$\frac{1}{2}$	?	0	1	Slight elevation of the chromosphere. No details.
	107. 48																
	120. 0	7	7	0	0	6	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{2}$	
	135. 0	7	7	0	0	6	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{2}$	
23. 30	148. 28	12	12	0	0	10	$\frac{2}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{3}$	0	0	1	Small jet.
	149. 38																
	150. 0	7	7	0	0	6	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{2}$	
23. 32	160. 28																
	161. 38	24	?	0	0	0	$\frac{3}{4}$	?	0	0	0	$\frac{2}{3}$	?	0	0	0	Detached cloud. Height of upper surface 24", of lower 17". Very slight displacement towards the blue on C line, about 0.2 tenthmetre, corresponding to 6 miles per second.
																	Chromosphere below the cloud.
	165. 0	8	8	0	0	7	1	$\frac{1}{2}$	0	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0	0	$\frac{1}{4}$	
	180. 0	8	8	0	0	6	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{4}$	
	195. 0	7	7	0	0	6	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{4}$	
23. 45	209. 38																
	212. 28	62	65	0	0	6	$\frac{1}{5}$	$\frac{1}{5}$	0	0	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{4}$	0	0	$\frac{1}{4}$	The bright part of the prominence ends at 212°. 28', but a very faint cloud is seen for 2° further along the limb.
	214. 28																Brightness of C and D ₃ in the chromosphere.
	225. 0	6	7	0	0	6	$\frac{1}{5}$	$\frac{1}{4}$	0	0	$\frac{1}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{4}$	
8. 0. 0	234. 8																
	234. 48	17	19	0	0	6	$\frac{1}{3}$	$\frac{1}{4}$	0	0	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	0	0	$\frac{1}{2}$	Small jet nearly detached.
																	Brightness of C and D ₃ in the chromosphere.
	240. 0	7	7	0	0	6	1	$\frac{1}{2}$	0	0	$\frac{2}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{2}$	Between 240° and 255° the chromosphere was undulating, sometimes reaching 12" in height.
	255. 0	8	8	0	0	7	1	$\frac{1}{2}$	0	0	$\frac{2}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{2}$	
	270. 0	8	8	0	0	7	1	$\frac{2}{3}$	0	0	$\frac{2}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{2}$	
0. 10	277. 28																
	280. 8	14	14	0	0	12	$\frac{3}{4}$	$\frac{1}{3}$	0	0	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{3}$	0	0	1	Low bank.
	285. 0	7	7	0	0	6	1	$\frac{2}{3}$	0	0	$\frac{2}{3}$	1	$\frac{1}{2}$	0	0	$\frac{1}{4}$	Sky misty.
0. 15	288. 28																
	291. 28	19	19	0	0	6	$\frac{1}{2}$	$\frac{1}{3}$	0	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	0	0	$\frac{1}{4}$	Brightness in the chromosphere.
	300. 0	8	8	2	0	7	1	$\frac{1}{3}$	$\frac{1}{10}$	0	$\frac{1}{3}$	1	$\frac{1}{2}$	1	0	$\frac{1}{2}$	Between 300° and 315° the chromosphere was undulating, from 7" to 12" in height.
	315. 0	8	8	2	0	7	1	$\frac{3}{4}$	$\frac{1}{10}$	0	$\frac{1}{3}$	1	$\frac{1}{2}$	1	0	$\frac{1}{2}$	
0. 40	324. 8																
	327. 28	38	41	?	0	24	$\frac{2}{3}$	$\frac{1}{3}$	?	0	$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{2}$	?	0	1	Straight jet; no detail.
	330. 0	11	11	0	0	7	1	$\frac{1}{2}$	?	0	$\frac{1}{3}$	1	$\frac{1}{2}$	?	0	$\frac{1}{4}$	
	345. 0	7	7	?	0	6	1	$\frac{1}{3}$	?	0	$\frac{1}{4}$	1	$\frac{1}{2}$	?	0	$\frac{1}{4}$	
																	The entire spectrum from B to F was examined at each of the above points of the Sun's circumference.
																	The entire limb of the Sun was examined with the slit radial.
Nov. 22. 0. 50	29. 51																
	32. 49	41	41	2	2	36	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{2}$	$\frac{1}{4}$	1	$\frac{1}{4}$	$\frac{1}{2}$	Straight jet.
0. 10	71. 44																
	75. 19	115	48	5	5	48	$\frac{1}{3}$	$\frac{1}{10}$	$\frac{1}{4}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{4}$	1	$\frac{1}{4}$	$\frac{2}{3}$	C line shows varying displacement, the bright lower part of the prominence being displaced towards the blue, the detached fainter upper portions towards the red; in each case by about two-thirds of the breadth of the dark C line, corresponding to motions of approach and recession respectively of 19 miles per second. The D lines were very distinctly reversed, but not displaced, and the bright lines were seen neatly bisecting the corresponding dark lines. On F the lower part of the prominence was displaced about $\frac{1}{5}$ tenthmetre towards the blue, corresponding to a motion of approach of 19 miles per second, but the upper detached portions seen on the C line were not visible upon F.

Greenwich Mean Solar Time, 1880.	Position Angle from Sun's Axis.	Height in Seconds of arc.					Brightness.					Breadth.					REMARKS.	
		C	D ₃	1474	b	F	C	D ₃	1474	b	F	C	D ₃	1474	b	F		
d h m	° ' "	"	"	"	"	"												
Nov. 22. 1. 5	81. 29	19	22	2	4	19	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{3}$	1	$\frac{1}{4}$	1	A bright jet in the midst of a faint cloudy mass.	
	81. 53																	
	o. 35	234. 5	46	46	2	4	29	$\frac{1}{4}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{3}$	1	$\frac{1}{3}$		1
	238. 16																	
	1. 0	247. 39	14	17	2	4	12	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{10}$	$\frac{2}{3}$	$\frac{1}{3}$	1	$\frac{1}{4}$		1
	248. 34																	
	o. 39	287. 34	19	17	2	2	17	1	$\frac{1}{2}$	$\frac{1}{7}$	$\frac{1}{10}$	$\frac{1}{3}$	1	$\frac{1}{2}$	1	$\frac{1}{4}$		$\frac{3}{4}$
	290. 14																	
	o. 55	291. 54	17	19	?	?	14	$\frac{1}{4}$	$\frac{1}{5}$	?	?	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{4}$	?	?		1
	292. 31																	

OBSERVATIONS OF BRIGHT LINES IN THE SPECTRUM OF THE SOLAR PROMINENCE AT POSITION ANGLE 73°, 1880, November 22. 0^h.—2^h.

Wave-length in Tenths metres.	Element.	Height in Seconds of arc.	Brightness.		Breadth.	REMARKS.
			First Observations.	When Brightest.		
6677	..	4.8	..	$\frac{1}{2}$	$\frac{1}{2}$	C line.
6562	H	115.0	$\frac{1}{3}$	$\frac{1}{2}$		D ₁ .
5895	Na	4.8	$\frac{1}{10}$	$\frac{3}{4}$		D ₂ .
5889	Na	4.8	$\frac{1}{10}$	$\frac{3}{4}$		D ₃ .
5871	..	48.0	$\frac{1}{10}$	$1\frac{1}{2}$	$\frac{1}{4}$	
5327	Fe	1.8		$\frac{1}{4}$	1	Coronal line. 1474 K.
5316	..	4.8	$\frac{1}{4}$	$\frac{3}{8}$		
5275	..	3.6				
5270	Fe			$\frac{1}{20}$		} The E lines. Suspected to be reversed.
5269	Fe			$\frac{1}{20}$		
5233	Mn	2.4		$\frac{1}{4}$		
5226	Fe			$\frac{1}{20}$		Suspected to be reversed.
5197	..	2.4		$\frac{1}{4}$		
5183	Mg	4.8	$\frac{1}{10}$	$\frac{1}{2}$		b ₁ .
5172	Mg	4.8	$\frac{1}{10}$	$\frac{1}{2}$		b ₂ .
5169	Ni	4.8		1		b ₃ .
5167	Mg	4.8	$\frac{1}{10}$	$\frac{1}{4}$		b ₄ .
5018	..	4.8		$\frac{1}{4}$		
5013	Ti	3.6		$\frac{1}{4}$		
4923	Fe	3.6		$\frac{1}{5}$		
4861	H	48.0	$\frac{1}{10}$	$1\frac{1}{2}$	$\frac{2}{3}$	F. It was seen bright on the Sun for about 7" from the limb and "doubly reversed," the bright F line being seen on a dark haze (dark F being wider than usual) and becoming broader at the base, where the F line reversed—sharp, pointed, and very black—was seen upon it.

Wave Length 5895 (D) - 5540.



Wave-Length 5540 - 5183 (b)



$$K_2\text{O} + 2\text{H}_2\text{O} + 5\text{H}_2\text{SO}_4 \rightarrow 2\text{H}_2\text{S}_2\text{O}_7 + \text{H}_2\text{O}$$


OBSERVATIONS of SPECTRA of SUN SPOTS made at the ROYAL OBSERVATORY, GREENWICH, in the Years 1877 to 1880.

The diagrams, Plates I., II., and III., show the lines which were observed to be broadened in the spectra of the Sun-spots examined. The length of each line represents the amount by which it is broadened—full length corresponding to a line of which the breadth is increased by one-half. In the case of lines the breadth of which is increased by more than one-half, or to which there is no corresponding line in the Solar spectrum, the breadth of the line in the diagram is intended to represent the actual breadth of the line as seen in the Spot-spectrum. Previous to 1880, May 6, and also on 1880, May 11, the amount of broadening was not noted for the individual lines (except in the case of the *b* lines on 1880, May 11). On 1877, November 3, and 1879, August 30, the line at 5316 (1474 K) was observed to be reversed in the Spot-spectrum. This is indicated by asterisks. For convenience of reference a copy of Ångström's map of the Solar spectrum from D to F, together with the corresponding lines of terrestrial elements, is given above and below the spectra of Sun-spots.

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

The observations were made by Mr. Maunder, and also, in some instances, by Mr. Christie, with the Half-prism Spectroscope mounted on the South-East Equatorial. A train of two prisms, giving a dispersion of about 80° from A to H was used, with a magnifying power of 10 on the view-telescope.

NOTES.

- 1877, October 31. } The Coronal line 1474 K was seen to be much fainter over the nucleus. No trace of reversal on any
November 3. } line was seen outside the spot in its immediate neighbourhood. Day misty, spectrum faint.
November 5. } Observers, W C and M.
- 1879, August 30. The Hydrogen lines C and F showed no change. Band α was much broader and darker than usual.
Observer, M.
- September 3. The Hydrogen line F and Magnesium lines *b* showed no change. Definition poor. Observer, M.
- November 7. Spot 295 was examined, and showed the lines C, 6399, α , D, *b*, and F all broadened. The *b* lines were not much broadened, C and F, 6399 and α , were nearly doubled, D was about trebled in breadth. Observer, W C.
- 1880, April 30. The three largest spots of the group were all on the slit at one and the same time, but no difference could be detected between their spectra. Pos. Angle of slit 245° . Definition poor. Observer, M.
- May 6. The broadening of the lines between *b* and F was very slight, and it was difficult to make sure of it. The lines between D and *b* were much more altered, and the amount of the broadening shown in the diagram is, if anything, under-estimated. Definition generally bad. Observer, W C.
- May 11. The amount by which the lines were broadened was not estimated, except in the case of the *b* lines. Observer, M.
- May 12. Some of the lines were broadened by two-thirds. Pos. Angle of slit 0° . Observer, W C.
- May 13. Broadening of the lines not so marked as yesterday, and observations much less certain. Maximum broadening, one-half or less. The C line was not affected. Definition bad. Pos. Angle of slit 355° . Observer, W C.
- July 23. The nucleus of the largest spot of the group was examined. Spectrum very dark. Observer, M.
- July 27. Intervals of sunshine very brief; examination hurried. Many of the less conspicuous lines which suffered change are therefore omitted. Observer, M.
- September 4. The C line was broadened by about one-fifth. No reversal of any line noticed. Observer, M.
- September 30. Spectrum of nucleus very dark, but the lines very little altered, except in the case of the D lines. C and F were suspected to be very slightly broadened. The calcium lines between D and C were much less broadened than is usual over a spot. Spot 367 gave a spectrum somewhat more pronounced. The C, D, *b*, and F lines were all a little more plainly affected than in Spot 368. Spot 367 was crossed by a small bridge. C and F were faint and narrow over it, say one-third their usual darkness and breadth. The *b* and D lines were a little changed, reduced perhaps to two-thirds of their usual darkness and breadth. Observer, M.
- October 1. The broadening of the lines was more marked than yesterday, except perhaps on the principal lines, C, D, *b*, and F. The alterations were a little more conspicuous over Spot 367 than over 368. C and F were darker, but little, if any, broader than usual. Spot 370 showed little or no change in the principal lines over the penumbra. Over either nucleus E was broadened slightly, *b* was broadened by a quarter, D by one-half, C and F doubtful. Over the bridge the E lines were a little narrower, D only one-third of its usual breadth, and *b* one-half. Observer, M.
- October 18. Spectrum of spot not very dark, and but little alteration in the lines. The C line showed no change. Observer, M.
- November 17. Spectrum faint, and definition poor. Observer, M.
- November 27. The principal feature of the spectrum of the spot was the appearance of a number of dark bands without any lines that could be easily detected to correspond to them in the Sun. These bands were diffused at their edges, and of an average breadth of about one tenth-metre. Observers, W C and M.
- November 30. The C and F lines were very broad, being twice their usual breadth, and the spectral lines generally showed a more marked broadening than on November 27. But the dark bands observed on that occasion were not so marked, and all or nearly all were seen to be continuations of faint lines on the general disk. These lines were, however, very narrow and faint, and hard to make out, whilst the corresponding dark bands were as broad and dark as the *b* lines. Observers, W C and M.
- December 11. Lines corresponding in position to the dark bands of the Spot of November 27 were observed on the Sun as faint fine lines, and on the Spot as faint lines, but much broader than on the Sun; by no means so broad, however, as on November 27. Several other lines of the same character, unmapped by Ångström, were also observed. Pos. Angle of slit 285° . Observer, M.

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 $18\frac{1}{2}^\circ$ from A to H, equivalent to that produced by four flint prisms of 60° , is obtained; and with a train of two a dispersion of about 80° , equivalent to that produced by sixteen flint prisms of 60° . These dispersions have been inferred from measurements of the distance between b_1 and b_4 as compared with the wave-length measure.

Date, 1880, 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			°		r	r		r
Jan. 26. 6. 10	M	1	275	Aldebaran b_1	0.864			
				Mg ₁	0.761	+ 0.103	$\frac{3}{5}$ towards red	0.160
6. 30	"	"	"	Aldebaran b_1	0.857			
				Mg ₁	0.752	+ 0.105	$\frac{3}{5}$ towards red	0.160
Jan. 26. 6. 55	M	1	275	α Orionis b_4	0.593			
				Mg ₃	0.526	+ 0.067	$\frac{1}{3}$ towards red	0.160
7. 10	"	"	"	α Orionis b_4	0.662			
				Mg ₃	0.533	+ 0.129	$\frac{1}{2}$ towards red	0.160
Jan. 26. 7. 20	M	1	275	Moon b_1	0.199			
				Mg ₁	0.194	+ 0.005		0.160
7. 30	"	"	"	Moon b_1	0.228			
				Mg ₁	0.232	— 0.004		0.160
7. 40	"	"	"	Moon b_1	0.232			
				Mg ₁	0.236	— 0.004		0.160
Jan. 26. 8. 0	M	1	275	Pollux b_1	0.117			
				Mg ₁	0.218	— 0.101	$\frac{1}{2}$ towards blue	0.160
8. 15	"	"	"	Pollux b_1	0.127			
				Mg ₁	0.216	— 0.089	$\frac{1}{2}$ towards blue	0.160
Jan. 26. 8. 55	M	1	275	Capella b_1	0.766			
				Mg ₁	0.688	+ 0.078	$\frac{1}{3}$ towards red	0.160
9. 10	"	"	"	Capella b_1	0.791			
				Mg ₁	0.705	+ 0.086	$\frac{1}{2}$ towards red	0.160
Jan. 30. 5. 0	M	1	276	Rigel F.....	0.124			
				H β	0.032	+ 0.092	$\frac{1}{3}$ towards red	0.168
5. 30	"	"	"	Rigel F.....	0.175			
				H β	0.092	+ 0.083	$\frac{1}{3}$ towards red	0.168
Jan. 30. 5. 45	M	1	276	γ Orionis F.....	0.184			
				H β	0.158	+ 0.026	$\frac{1}{10}$ towards red	0.168
5. 55	"	"	"	γ Orionis F.....	0.256			
				H β	0.158	+ 0.098	$\frac{1}{2}$ towards red	0.168
6. 5	"	"	"	γ Orionis F.....	0.228			
				H β	0.172	+ 0.056	$\frac{1}{3}$ towards red	0.168
6. 10	"	"	"	γ Orionis F.....	0.212			
				H β	0.184	+ 0.028	$\frac{1}{5}$ towards red	0.168
Jan. 30. 6. 20	M	1	276	β Tauri F.....	0.702			
				H β	0.675	+ 0.027	$\frac{1}{10}$ towards red	0.168
6. 25	"	"	"	β Tauri F.....	0.696			
				H β	0.684	+ 0.012	$\frac{1}{20}$ towards red	0.168

The day specified in the first column is the Solar Day in ordinary astronomical reckoning; the hours and minutes are those of Greenwich Sidereal Time.

TERRESTRIAL ELEMENTS, and CONCLUDED MOTIONS in the LINE of SIGHT, from OBSERVATIONS at the in the Year 1880.

1^{rev.} of the micrometer corresponds, with one "half-prism" to 10.3 tenth-metres or 372 miles per second for the *b* lines, and to 7.88 tenth-metres or 303 miles per second for the F line; and with two "half-prisms" to 2.3 tenth-metres or 83 miles per second for *b* and to 1.83 tenth-metres or 70 miles per second for F.

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

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

The weights are on a scale $\frac{1}{2}$ to 5 for each observation.

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+16.0	+ 22.4	+ 30.1	2 2	Definition very poor.
+11.5	+ 24.6	+ 20.6	2 2	Definition poor.
0.0	+ 3.7			The lines in the spectrum of the Moon were very distinctly seen. The coincidence of the lines in the two spectra seemed perfect.
+ 4.5	- 39.5	- 43.1	3 3	Definition poor.
+12.6	+ 17.7	+ 19.5	3 3	The definition was poor throughout the evening, and the images tremulous. There was much mist, and the Moon was very bright.
+13.3	+ 13.2	+ 7.3	3 3	Direct comparison. Spectrum tremulous. The F line in this star is very well adapted for measurement.
+14.1	- 1.1	+ 0.3	3 1 2 2	Spectrum rather tremulous. F line easy to bisect.
+14.3	- 8.4	- 9.7	3 3	Definition fair, but the star-line broad and ill-defined at the edges.

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession; - approach.

Date, 1880, 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 Jan. 30. 6.50	M	1	276	δ Orionis F H β	0.484 0.448	+ 0.036	$\frac{1}{2}$ towards red	0.168
7. 5	,,	,,	,,	δ Orionis F H β	0.490 0.452	+ 0.038	$\frac{1}{2}$ towards red	0.168
Jan. 30. 7.10	M	1	276	ϵ Orionis F H β	0.222 0.298	— 0.076	$\frac{1}{2}$ towards blue	0.168
7.20	,,	,,	,,	ϵ Orionis F H β	0.256 0.352	— 0.096	$\frac{1}{2}$ towards blue	0.168
7.30	,,	,,	,,	ϵ Orionis F H β	0.263 0.336	— 0.073	$\frac{1}{2}$ towards blue	0.168
Jan. 30. 7.40	M	1	276	ζ Orionis F H β	0.532 0.470	+ 0.062	$\frac{1}{4}$ towards red	0.168
7.55	,,	,,	,,	ζ Orionis F H β	0.608 0.532	+ 0.076	$\frac{1}{3}$ towards red	0.168
8. 0	,,	,,	,,	ζ Orionis F H β	0.578 0.519	+ 0.059	$\frac{1}{4}$ towards red	0.168
Jan. 30. 8.15	M	1	276	κ Orionis F H β	0.347 0.315	+ 0.032	$\frac{1}{5}$ towards red	0.168
8.30	,,	,,	,,	κ Orionis F H β	0.413 0.342	+ 0.071	$\frac{2}{7}$ towards red	0.168
Jan. 30. 8.50	M	1	276	Sirius F H β	0.534 0.412	+ 0.122	$\frac{3}{5}$ towards red	0.168
9. 0	,,	,,	,,	Sirius F H β	0.505 0.395	+ 0.110	$\frac{3}{5}$ towards red	0.168
Jan. 30. 9.10	M	2	276	Sirius F H β	1.028 0.484	+ 0.544	$\frac{2}{5}$ towards red	0.168
9.20	,,	,,	,,	Sirius F H β	1.192 0.606	+ 0.586	$\frac{1}{2}$ towards red	0.168
9.25	,,	,,	,,	Sirius F H β	1.242 0.794	+ 0.448	$\frac{1}{3}$ towards red	0.168
Jan. 30. 9.40	M	2	276	Moon F H β	0.982 0.944	+ 0.038		0.168
9.43	,,	,,	,,	Moon F H β	0.870 0.942	— 0.072		0.168
9.48	,,	,,	,,	Moon F H β	0.827 0.832	— 0.005		0.168
9.50	,,	,,	,,	Moon F H β	0.864 0.836	+ 0.028		0.168
Jan. 30. 9.55	M	1	276	Moon F H β	0.713 0.699	+ 0.014		0.168
10.10	,,	,,	,,	Moon F H β	0.635 0.662	— 0.027		0.168
10.14	,,	,,	,,	Moon F H β	0.668 0.652	+ 0.016		0.168
10.20	,,	,,	,,	Moon F H β	0.668 0.692	— 0.024		0.168
Feb. 10. 6.15	M	1	276	γ Geminorum F H β	0.889 0.748	+ 0.141	$\frac{2}{3}$ towards red	0.205
7. 0	,,	,,	,,	γ Geminorum F H β	0.723 0.654	+ 0.069	$\frac{1}{4}$ towards red	0.205

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1882GOAMM...42F...1A

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+ 13.2	- 2.0	- 0.8	1 1	Definition bad. Star-line faint and somewhat diffused; the spectrum was also faint.
+ 12.9	- 37.6	- 36.9	2 2 2	Definition poor. Star-line narrow and fairly dark.
+ 12.6	+ 7.3	+ 4.6	1 1 1	Definition bad.
+ 11.4	+ 4.2	+ 3.6	1 1	Spectrum fainter than for the stars in Orion's Belt, but the F line darker. Spectrum tremulous, and definition poor.
+ 6.9	+ 28.2	+ 30.0	4 4	Definition poor. Spectrum very tremulous indeed.
+ 6.9	+ 27.0	+ 22.6	4 4 4	The star-line with this dispersion is almost too broad to bisect with any great amount of accuracy.
0.0	- 0.2			
0.0	- 1.6			
+ 13.0	+ 18.8	+ 23.6	$\frac{1}{2}$ $\frac{1}{2}$	Neither measure satisfactory, as the star-line was lost at the moment of bisection. The star-line is broad, its edges fairly sharp, no marked condensation in the center; on the whole an easy line for a star of the first type.

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession; - approach.

Date, 1880, 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 Feb. 10. 21. 10	M	1	276	Sky F	0.348			
				H β	0.342	+ 0.006		0.205
21. 15	,,	,,	,,	Sky F	0.380			
				H β	0.382	- 0.002		0.205
Feb. 17. 6. 30	M	1	276	Moon b_1	0.936			
				Mg ₁	0.936	0.000		0.140
6. 35	,,	,,	,,	Moon b_1	0.910	- 0.028		0.140
				Mg ₁	0.938			
6. 38	,,	,,	,,	Moon b_1	0.938	0.000		0.140
				Mg ₁	0.938			
6. 45	,,	,,	,,	Moon b_1	0.946	+ 0.009		0.140
				Mg ₁	0.937			
Feb. 17. 7. 30	M	1	276	ζ Persei b_1	0.123	- 0.123	$\frac{1}{2}$ towards blue	0.140
				Mg ₁	0.246			
8. 0	,,	,,	,,	ζ Persei b_1	0.255	- 0.023	$\frac{1}{10}$ towards blue	0.140
				Mg ₁	0.278			
Feb. 17. 9. 0	M	1	276	ϵ Leonis b_1	0.303	+ 0.036	$\frac{1}{5}$ towards red	0.140
				Mg ₁	0.267			
9. 20	,,	,,	,,	ϵ Leonis b_1	0.195	- 0.047	$\frac{1}{5}$ towards blue	0.140
				Mg ₁	0.242			
Feb. 17. 9. 45	M	1	276	γ Leonis b_1	0.238	- 0.105	$\frac{1}{3}$ towards blue	0.140
				Mg ₁	0.343			
10. 0	,,	,,	,,	γ Leonis b_1	0.209	- 0.128	$\frac{1}{3}$ towards blue	0.140
				Mg ₁	0.337			
Feb. 21. 6. 25	M	1	186	γ Andromedæ b_1	0.608	- 0.042	$\frac{1}{5}$ towards blue	0.086
				Mg ₁	0.650			
6. 45	,,	,,	,,	γ Andromedæ b_1	0.594	- 0.060	$\frac{1}{4}$ towards blue	0.086
				Mg ₁	0.654			
Feb. 21. 7. 15	M	1	186	α Cassiopeïæ b_1	0.482	+ 0.038	$\frac{1}{4}$ towards red	0.086
				Mg ₁	0.444			
7. 30	,,	,,	,,	α Cassiopeïæ b_1	0.465	+ 0.022	$\frac{1}{10}$ towards red	0.086
				Mg ₁	0.443			
Feb. 21. 8. 15	M	1	186	β Ursæ Minoris b_1	0.145	+ 0.018	$\frac{1}{10}$ towards red	0.086
				Mg ₁	0.127			
8. 27	,,	,,	,,	β Ursæ Minoris b_1	0.273	+ 0.122	$\frac{1}{2}$ towards red	0.086
				Mg ₁	0.151			
8. 35	,,	,,	,,	β Ursæ Minoris b_1	0.250	+ 0.115	$\frac{1}{2}$ towards red	0.086
				Mg ₁	0.135			
8. 45	,,	,,	,,	β Ursæ Minoris b_1	0.198	+ 0.079	$\frac{1}{3}$ towards red	0.086
				Mg ₁	0.119			
Feb. 21. 9. 25	M	1	186	α Ursæ Majoris b_1	0.542	+ 0.021	Coincident	0.086
				Mg ₁	0.521			
9. 40	,,	,,	,,	α Ursæ Majoris b_1	0.494	- 0.021	Coincident	0.086
				Mg ₁	0.515			
Feb. 21. 10. 0	M	1	186	ϵ Virginis b_1	0.684	- 0.103	$\frac{3}{5}$ towards blue	0.086
				Mg ₁	0.787			
10. 10	,,	,,	,,	ϵ Virginis b_1	0.696	- 0.110	$\frac{3}{5}$ towards blue	0.086
				Mg ₁	0.806			

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1882GOAMW...42F...1A

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
0°0	+ 0°6			The coincidence of the lines in the two spectra seemed perfect.
0°0	- 1°8			The coincidence of the lines in the two spectra seemed perfect.
+ 13°4	- 40°4	- 49°5	$\frac{1}{2}$ $\frac{1}{2}$	Star-lines very faint.
+ 3°1	- 5°1	- 3°1	1 1	The displacement obviously very small. The observer could not be sure in which direction it was, if the star-line was displaced at all.
+ 0°3	- 43°3	- 40°2	$1\frac{1}{2}$ $1\frac{1}{2}$	Definition poor. Star often lost in cloud.
+ 15°5	- 34°3	- 31°4	3 3	
+ 11°5	+ 0°2	+ 1°9	3 2	Second observation interrupted by light cloud.
+ 2°0	+ 24°0	+ 19°7	2 1 1 1	Definition poor, best for first observation.
+ 4°0	- 4°0	- 4°0	1 1	Image very tremulous, definition bad.
- 10°4	- 28°9	- 32°0	1 1	Definition moderate.

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Date, 1880, 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 Feb. 21. 10. 48	M	1	186	ϵ Leonis b_1	0.996			r
10. 55	,,	,,	,,	Mg ₁	0.980	+ 0.016	$\frac{1}{10}$ towards red	0.086
	,,	,,	,,	ϵ Leonis b_1	0.963	+ 0.002	Coincident	0.086
	,,	,,	,,	Mg ₁	0.961			
Feb. 21. 10. 30	M	1	186	α Hydræ b_1	0.740			
10. 40	,,	,,	,,	Mg ₁	0.619	+ 0.121	$\frac{3}{5}$ towards red	0.086
	,,	,,	,,	α Hydræ b_1	0.707	+ 0.084	$\frac{1}{2}$ towards red	0.086
	,,	,,	,,	Mg ₁	0.623			
Feb. 21. 11. 0	M	1	186	Moon b_1	0.664			
11. 5	,,	,,	,,	Mg ₁	0.670	- 0.006		0.086
11. 10	,,	,,	,,	Moon b_1	0.662			
11. 15	,,	,,	,,	Mg ₁	0.666	- 0.004		0.086
	,,	,,	,,	Moon b_1	0.658	+ 0.002		0.086
	,,	,,	,,	Mg ₁	0.656			
	,,	,,	,,	Moon b_1	0.667	- 0.001		0.086
	,,	,,	,,	Mg ₁	0.668			
Feb. 26. 10. 30	M	1	186	Moon b_1	0.718			
10. 35	,,	,,	,,	Mg ₁	0.728	- 0.010		0.114
10. 40	,,	,,	,,	Moon b_1	0.724	+ 0.018		0.114
10. 45	,,	,,	,,	Mg ₁	0.706	- 0.028		0.114
	,,	,,	,,	Moon b_1	0.646	+ 0.004		0.114
	,,	,,	,,	Mg ₁	0.674			
	,,	,,	,,	Moon b_1	0.668			
	,,	,,	,,	Mg ₁	0.664			
Feb. 26. 11. 10	M	1	186	δ Virginis b_1	0.824			
11. 30	,,	,,	,,	Mg ₁	0.698	+ 0.126	$\frac{3}{5}$ towards red	0.114
	,,	,,	,,	δ Virginis b_1	0.846	+ 0.161	$\frac{13}{50}$ towards red	0.114
	,,	,,	,,	Mg ₁	0.685			
Feb. 26. 11. 50	M	1	186	ϵ Virginis b_1	0.209			
12. 5	,,	,,	,,	Mg ₁	0.312	- 0.103	$\frac{2}{5}$ towards blue	0.114
	,,	,,	,,	ϵ Virginis b_1	0.218	- 0.091	$\frac{3}{5}$ towards blue	0.114
	,,	,,	,,	Mg ₁	0.309			
Feb. 26. 12. 20	M	1	186	ϵ Boötis b_1	0.498			
12. 35	,,	,,	,,	Mg ₁	0.582	- 0.084	$\frac{1}{2}$ towards blue	0.114
	,,	,,	,,	ϵ Boötis b_1	0.550	- 0.064	$\frac{1}{5}$ towards blue	0.114
	,,	,,	,,	Mg ₁	0.612			
Feb. 26. 13. 0	M	1	186	α Serpentis b_4	0.747			
13. 20	,,	,,	,,	Mg ₃	0.920	- 0.173	$\frac{4}{5}$ towards blue	0.114
	,,	,,	,,	α Serpentis b_4	0.849	- 0.103	$\frac{2}{5}$ towards blue	0.114
	,,	,,	,,	Mg ₃	0.952			
Mar. 13. 8. 15	M	1	276	Rigel F	0.962			
8. 40	,,	,,	,,	H β	1.048	+ 0.086	$\frac{1}{2}$ towards red	0.125
	,,	,,	,,	Rigel F	0.897	+ 0.106	$\frac{3}{5}$ towards red	0.125
	,,	,,	,,	H β	1.003			
Mar. 13. 9. 0	M	1	276	κ Orionis F	0.037			
9. 10	,,	,,	,,	H β	0.070	+ 0.033	$\frac{1}{5}$ towards red	0.125
	,,	,,	,,	κ Orionis F	0.053	+ 0.025	$\frac{1}{5}$ towards red	0.125
	,,	,,	,,	H β	0.078			

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March 13 to 24. The pointer was coated with Balmain's luminous paint, giving a phosphorescent bright line, which was used in making the bisections.

1882GOAMM...42F...1A

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+ 4.4	- 1.1	- 0.9	$1\frac{1}{2}$ $1\frac{1}{2}$	
+ 2.2	+ 35.6	+ 36.7	$1\frac{1}{2}$ $1\frac{1}{2}$	
0.0	- 0.8			
0.0	- 1.5			The coincidence of the lines in the two spectra seemed perfect.
- 9.7	+ 62.7	+ 51.8	$\frac{1}{2}$ $\frac{1}{2}$	Definition poor. Star spectrum faint.
- 9.1	- 26.7	- 25.2	1 1	Definition poor.
- 10.6	- 14.3	- 8.3	1 3	Definition good for second observation.
- 16.1	- 30.5	- 19.3	1 2	Definition much better for second observation than for first.
+ 15.7	+ 13.4	+ 12.8	2 2	Images tremulous and definition poor.
+ 15.6	- 6.8	- 5.3	1 1	Images tremulous and definition poor.

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession; - approach.

Date, 1880, 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 Mar. 13. 9. 20	M	1	276	δ Orionis F	0.105	r		r
9. 35	"	"	"	H β	0.018	- 0.087	$\frac{1}{2}$ towards blue	0.125
9. 45	"	"	"	δ Orionis F	0.031	+ 0.005	$\frac{1}{10}$ towards red	0.125
	"	"	"	H β	0.036			
	"	"	"	δ Orionis F	0.996	+ 0.046	$\frac{1}{4}$ towards red	0.125
	"	"	"	H β	1.042			
Mar. 13. 10. 5	M	1	276	β Aurigæ F	0.632			
10. 20	"	"	"	H β	0.641	+ 0.009	$\frac{1}{10}$ towards red	0.125
	"	"	"	β Aurigæ F	0.592			
	"	"	"	H β	0.623	+ 0.031	$\frac{1}{5}$ towards red	0.125
Mar. 15. 8. 55	M	1	286	β Tauri F	0.598			
9. 10	"	"	"	H β	0.575	- 0.023	$\frac{1}{10}$ towards blue	0.120
	"	"	"	β Tauri F	0.598			
	"	"	"	H β	0.564	- 0.034	$\frac{1}{5}$ towards blue	0.120
Mar. 15. 9. 25	M	1	286	γ Geminorum F	0.202			
9. 40	"	"	"	H β	0.249	+ 0.047	$\frac{1}{4}$ towards red	0.120
	"	"	"	γ Geminorum F	0.164			
	"	"	"	H β	0.218	+ 0.054	$\frac{3}{10}$ towards red	0.120
Mar. 15. 23. 0	M	1	286	Sky F	0.602			
	"	"	"	H β	0.608	+ 0.006		0.120
	"	"	"	Sky F	0.638			
	"	"	"	H β	0.646	+ 0.008		0.120
	"	"	"	Sky F	0.627			
	"	"	"	H β	0.621	- 0.006		0.120
	"	"	"	Sky F	0.663			
	"	"	"	H β	0.652	- 0.011		0.120
	"	"	"	Sky F	0.644			
	"	"	"	H β	0.657	+ 0.013		0.120
Mar. 17. 7. 40	M	1	286	ϵ Orionis F	0.422			
7. 55	"	"	"	H β	0.392	- 0.030	$\frac{1}{5}$ towards blue	0.120
8. 15	"	"	"	ϵ Orionis F	0.569			
8. 20	"	"	"	H β	0.420	- 0.149	$\frac{1}{3}$ towards blue	0.120
	"	"	"	ϵ Orionis F	0.442			
	"	"	"	H β	0.428	- 0.014	$\frac{1}{10}$ towards blue	0.120
	"	"	"	ϵ Orionis F	0.414			
	"	"	"	H β	0.408	- 0.006	$\frac{1}{10}$ towards blue	0.120
Mar. 17. 8. 45	M	1	286	ζ Orionis F	0.491			
9. 0	"	"	"	H β	0.520	+ 0.029	$\frac{1}{5}$ towards red	0.120
	"	"	"	ζ Orionis F	0.418			
	"	"	"	H β	0.497	+ 0.079	$\frac{1}{3}$ towards red	0.120
Mar. 17. 9. 20	M	1	286	γ Orionis F	0.215			
9. 35	"	"	"	H β	0.281	+ 0.066	$\frac{1}{4}$ towards red	0.120
	"	"	"	γ Orionis F	0.245			
	"	"	"	H β	0.257	+ 0.012	$\frac{1}{10}$ towards red	0.120
Mar. 17. 9. 50	M	1	286	β Canis Minoris F ...	0.569			
10. 0	"	"	"	H β	0.559	- 0.010	Coincident	0.120
10. 5	"	"	"	β Canis Minoris F ...	0.489			
	"	"	"	H β	0.518	+ 0.029	$\frac{1}{10}$ towards red	0.120
	"	"	"	β Canis Minoris F ...	0.528			
	"	"	"	H β	0.531	+ 0.003	Coincident	0.120

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Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+ 17.0	- 18.1	- 15.7	$\frac{1}{2}$ 2 $\frac{1}{2}$	Definition generally bad, but the star-line was seen well for a moment in the second observation.
+ 17.2	- 11.1	- 9.5	1 1	Definition much better than for the Orion stars, but the star-line very broad and diffused.
+ 18.5	- 27.1	- 29.1	4 4	Definition very good. Apparent displacement very small.
+ 18.1	- 2.8	+ 1.3	4 4	Definition good, images steady.
0.0	+ 0.6			The coincidence of the lines in the two spectra seemed perfect.
+ 16.8	- 31.9	- 27.6	1 1 1 1	Images tremulous. Star-line rather difficult to bisect.
+ 16.7	- 0.3	- 0.9	1 1	Definition poor. Star-line difficult to see.
+ 17.5	- 5.7	- 7.1	1 1	Definition poor.
+ 16.6	- 14.4	- 14.6	1 1 1	Definition fairly good. Star-line broad and diffused.

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession ; - approach.

Date, 1880, 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 Mar. 17. 10. 25	M	1	286	α Leonis F	0.558	r		r
10. 35	,,	,,	,,	H β	0.671	+ 0.113	$\frac{1}{2}$ towards red	0.120
				α Leonis F	0.604	+ 0.069	$\frac{1}{3}$ towards red	0.120
				H β	0.673			
Mar. 17. 10. 55	M	1	286	ϵ Leonis F	0.997	+ 0.124	$\frac{1}{2}$ towards red	0.120
11. 10	,,	,,	,,	H β	1.121	+ 0.094	$\frac{2}{5}$ towards red	0.120
11. 25	,,	,,	,,	θ Leonis F	0.054	- 0.074	$\frac{1}{3}$ towards blue	0.120
				H β	0.148			
				θ Leonis F	0.249			
				H β	0.175			
Mar. 17. 11. 35	M	1	286	δ Leonis F	0.298	- 0.110	$\frac{1}{2}$ towards blue	0.120
11. 40	,,	,,	,,	H β	0.188	- 0.107	$\frac{1}{2}$ towards blue	0.120
				δ Leonis F	0.275			
				H β	0.168			
Mar. 17. 11. 50	M	1	286	β Leonis F	0.621	+ 0.005	Coincident	0.120
12. 0	,,	,,	,,	H β	0.626	+ 0.079	$\frac{1}{3}$ towards red	0.120
				β Leonis F	0.575			
				H β	0.654			
Mar. 17. 12. 35	M	1	286	γ Virginis F	0.135	+ 0.167	$\frac{4}{5}$ towards red	0.120
12. 55	,,	,,	,,	H β	0.302	+ 0.189	$\frac{4}{5}$ towards red	0.120
				γ Virginis F	0.132			
				H β	0.321			
Mar. 19. 7. 40	M	2	275	Sirius F	0.762	+ 0.194	$\frac{1}{3}$ towards red	0.107
8. 0	,,	,,	,,	H β	0.568	+ 0.278	$\frac{2}{5}$ towards red	0.107
				Sirius F	0.556			
				H β	0.278			
Mar. 19. 8. 15	M	2	275	Procyon F	1.063	+ 0.271	$\frac{2}{5}$ towards red	0.107
8. 25	,,	,,	,,	H β	0.792	+ 0.325	$\frac{1}{2}$ towards red	0.107
				Procyon F	1.132			
				H β	0.807			
Mar. 20. 0. 15	M	2	275	Sky F	0.876	+ 0.027		0.107
0. 18	,,	,,	,,	H β	0.849	+ 0.038		0.107
0. 22	,,	,,	,,	Sky F	0.926	+ 0.034		0.107
0. 26	,,	,,	,,	H β	0.888	- 0.034		0.107
0. 30	,,	,,	,,	Sky F	0.895			0.107
				H β	0.861			0.107
				Sky F	0.952			0.107
				H β	0.986			0.107
				Sky F	0.944			0.107
				H β	0.933			0.107
Mar. 24. 8. 55	M	2	277	Procyon F	0.898	+ 0.378	$\frac{2}{5}$ towards red	0.114
9. 10	,,	,,	,,	H β	0.520	+ 0.359	$\frac{2}{5}$ towards red	0.114
				Procyon F	0.877			
				H β	0.518			
Mar. 24. 9. 40	M	2	277	Castor F	1.317	+ 0.348	$\frac{1}{3}$ towards red	0.114
10. 0	,,	,,	,,	H β	0.969	+ 0.198	$\frac{1}{4}$ towards red	0.114
				Castor F	1.183			
				H β	0.985			

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Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+ 9.1	+ 17.5	+ 14.8	3 4	Definition fairly good.
+ 5.0	+ 13.0	+ 9.3	$\frac{1}{2}$ 1 $\frac{1}{2}$	Definition good. Star-line a very marked specimen of Secchi's first type, very dark, broad and diffused ; very difficult to bisect.
+ 5.6	- 38.4	- 35.2	4 4	Definition good.
+ 2.5	+ 10.2	+ 7.3	2 2	Definition moderate.
- 3.5	+ 57.4	+ 51.0	2 2	Definition fair. Star-line faint and fairly sharp, resembling the second rather than the first type of spectrum.
+ 13.9	+ 1.3	+ 5.8	4 4	Definition fairly good.
+ 16.2	+ 3.0	+ 8.0	4 4	
0.0	+ 1.0			Coincidence of the lines in the two spectra seemed perfect.
+ 16.7	+ 7.1	+ 6.0	5 5	Definition good. The line in this star as it is condensed in the center, though broad and ill-defined at the edges, is easier to bisect than that in Sirius, which shades off very gradually from the center.
+ 17.6	0.0	- 1.0	2 2	The star-line is very difficult to bisect.

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Date, 1880, 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 Mar. 24. 8. 0	M	2	277	Sirius F.....	0.945			r
8. 20	,,	,,	,,	H β	0.740	+ 0.205	$\frac{1}{3}$ towards red	0.114
8. 35	,,	,,	,,	Sirius F.....	1.028	+ 0.319	$\frac{2}{3}$ towards red	0.114
	,,	,,	,,	H β	0.709	+ 0.205	$\frac{1}{3}$ towards red	0.114
	,,	,,	,,	Sirius F.....	0.963			
	,,	,,	,,	H β	0.758			
Mar. 24. 10. 15	M	2	277	Moon F.....	0.839	+ 0.030		0.114
10. 20	,,	,,	,,	H β	0.809	+ 0.005		0.114
10. 23	,,	,,	,,	Moon F.....	0.973	- 0.023		0.114
10. 28	,,	,,	,,	H β	0.968	- 0.004		0.114
10. 32	,,	,,	,,	Moon F.....	0.939	+ 0.016		0.114
	,,	,,	,,	H β	0.962			
	,,	,,	,,	Moon F.....	0.888			
	,,	,,	,,	H β	0.892			
	,,	,,	,,	Moon F.....	1.003			
	,,	,,	,,	H β	0.987			
Apr. 8. 9. 45	M	1	277	β Aurigæ F.....	0.392	+ 0.010	$\frac{1}{10}$ towards red	0.130
10. 0	,,	,,	,,	H β	0.382	+ 0.015	Coincident	0.130
	,,	,,	,,	β Aurigæ F.....	0.348			
	,,	,,	,,	H β	0.333			
Apr. 8. 10. 30	M	1	277	β Ursæ Majoris F....	0.316	+ 0.024	$\frac{1}{10}$ towards red	0.130
10. 50	,,	,,	,,	H β	0.292	+ 0.051	$\frac{1}{4}$ towards red	0.130
	,,	,,	,,	β Ursæ Majoris F....	0.338			
	,,	,,	,,	H β	0.287			
Apr. 8. 11. 15	M	1	277	γ Ursæ Majoris F....	0.904	+ 0.104	$\frac{1}{3}$ towards red	0.130
11. 30	,,	,,	,,	H β	0.800	+ 0.092	$\frac{1}{3}$ towards red	0.130
	,,	,,	,,	γ Ursæ Majoris F....	0.884			
	,,	,,	,,	H β	0.792			
May 1. 13. 5	M	1	275	γ Virginis F.....	0.612	+ 0.077	$\frac{1}{3}$ towards red	0.089
13. 25	,,	,,	,,	H β	0.535	+ 0.071	$\frac{1}{3}$ towards red	0.089
	,,	,,	,,	γ Virginis F.....	0.697			
	,,	,,	,,	H β	0.626			
May 1. 14. 0	M	1	275	α Virginis F.....	0.198	+ 0.023	$\frac{1}{10}$ towards red	0.089
14. 15	,,	,,	,,	H β	0.175	+ 0.019	$\frac{1}{10}$ towards red	0.089
	,,	,,	,,	α Virginis F.....	0.196			
	,,	,,	,,	H β	0.177			
May 8. 14. 5	M	1	276	β Libræ F.....	0.614	+ 0.022	$\frac{1}{10}$ towards red	0.089
14. 20	,,	,,	,,	H β	0.592	+ 0.027	$\frac{1}{10}$ towards red	0.089
14. 30	,,	,,	,,	β Libræ F.....	0.641	+ 0.027	$\frac{1}{10}$ towards red	0.089
	,,	,,	,,	H β	0.614			
	,,	,,	,,	β Libræ F.....	0.630			
	,,	,,	,,	H β	0.603			
May 8. 14. 45	M	1	276	ϵ Serpentis F.....	0.424	+ 0.140	$\frac{1}{2}$ towards red	0.089
15. 5	,,	,,	,,	H β	0.284	+ 0.148	$\frac{1}{2}$ towards red	0.089
	,,	,,	,,	ϵ Serpentis F.....	0.424			
	,,	,,	,,	H β	0.276			

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May 1-18. The pointer coated with Balmain's luminous paint was used for these observations.

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+14'1	+ 1'6	+ 6'1	3 3 3	Image very tremulous.
0'0	+ 0'3			
+15'9	- 12'1	- 11'6	4 4	Definition unusually good. Dark pointer used this evening.
+11'4	0'0	+ 3'5	2 2	Definition good.
+ 9'7	+ 20'0	+ 18'4	3 3	
+ 9'8	+ 12'6	+ 16'5	1 1	Definition poor, and spectrum tremulous.
+ 6'1	+ 0'3	+ 1'8	3 3	Definition poor, and spectrum tremulous.
+ 0'3	+ 7'4	+ 7'6	4 4 4	Definition good. Star-line faint and not very broad.
- 1'0	+ 44'5	+ 40'3	3 3	Definition good. Star faint ; star-line broad, but fairly sharp.

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Date, 1880, 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			c		r	r		r
May 15. 13. 20	M	1	275	Moon F	0.392			
				H β	0.399	- 0.007		0.168
13. 25	,,	,,	,,	Moon F	0.407			
				H β	0.418	- 0.011		0.168
13. 35	,,	,,	,,	Moon F	0.411			
				H β	0.406	+ 0.005		0.168
13. 40	,,	,,	,,	Moon F	0.476			
				H β	0.471	+ 0.005		0.168
May 15. 13. 55	M	1	275	δ Leonis F	0.340			
				H β	0.342	- 0.002	Coincident	0.168
14. 10	,,	,,	,,	δ Leonis F	0.320			
				H β	0.330	- 0.010	$\frac{1}{20}$ towards blue	0.168
May 15. 14. 25	M	1	275	γ Virginis F	0.509			
				H β	0.630	- 0.121	$\frac{1}{2}$ towards blue	0.168
14. 35	,,	,,	,,	γ Virginis F	0.440			
				H β	0.586	- 0.146	$\frac{1}{2}$ towards blue	0.168
May 15. 14. 50	M	1	275	α Virginis F	0.343			
				H β	0.324	+ 0.019	$\frac{1}{10}$ towards red	0.168
15. 0	,,	,,	,,	α Virginis F	0.343			
				H β	0.332	+ 0.011	Coincident	0.168
May 15. 15. 50	M	1	275	γ Herculis F	0.096			
				H β	0.257	- 0.161	$\frac{2}{3}$ towards blue	0.168
16. 10	,,	,,	,,	γ Herculis F	0.051			
				H β	0.242	- 0.191	$\frac{3}{4}$ towards blue	0.168
May 18. 14. 0	M	1	276	Moon F	0.952			
				H β	0.959	- 0.007		0.104
14. 7	,,	,,	,,	Moon F	0.953			
				H β	0.950	+ 0.003		0.104
14. 12	,,	,,	,,	Moon F	0.958			
				H β	0.962	- 0.004		0.104
14. 20	,,	,,	,,	Moon F	0.944			
				H β	0.932	+ 0.012		0.104
May 18. 15. 0	M	1	276	β Libræ F	0.838			
				H β	0.773	+ 0.065	$\frac{1}{4}$ towards red	0.104
15. 20	,,	,,	,,	β Libræ F	0.832			
				H β	0.793	+ 0.039	$\frac{1}{7}$ towards red	0.104
May 18. 15. 30	M	1	276	α Coronæ F	0.246			
				H β	0.216	+ 0.030	$\frac{1}{10}$ towards red	0.104
15. 40	,,	,,	,,	α Coronæ F	0.277			
				H β	0.213	+ 0.064	$\frac{1}{4}$ towards red	0.104
May 18. 15. 50	M	1	276	ϵ Serpentis F	0.252			
				H β	0.154	+ 0.098	$\frac{1}{3}$ towards red	0.104
16. 5	,,	,,	,,	ϵ Serpentis F	0.269			
				H β	0.191	+ 0.078	$\frac{1}{4}$ towards red	0.104
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Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
0.0	- 0.6			
+ 16.9	- 18.7	- 19.8	$\frac{3}{3}$	Spectrum rather tremulous, but fairly well defined. Star-line broad and dark, and fairly sharp.
+ 13.0	- 53.4	- 71.4	$\frac{1}{2}$ $\frac{1}{2}$	Star-line faint and diffused, and very difficult to bisect, though the definition was good.
+ 9.9	- 5.4	- 4.1	$\frac{3}{3}$	Spectrum very tremulous. Star-line much narrower than usual in stars of the type, and very slightly shaded at the edges.
- 0.5	- 52.8	- 82.3	$\frac{1}{2}$ $\frac{1}{2}$	General definition of the spectrum very good, but the star is faint and the star-line very diffused.
0.0	+ 0.3			
+ 3.3	+ 12.4	+ 10.6	$\frac{2}{2}$	Definition poor, spectrum very tremulous.
+ 3.9	+ 10.3	+ 8.5	$\frac{3}{3}$	Definition poor.
+ 0.8	+ 25.8	+ 19.8	$\frac{2}{2}$	Definition poor.

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						Measured.	Estimated in Terms of the Breadth of the Comparison Line.	
d h m			°		r	r		r
May 22. 14. 30	M	1	275	Moon F	0.537			
				H β	0.525	+ 0.012		0.089
14. 37	"	"	"	Moon F	0.513	- 0.008		0.089
				H β	0.521			
14. 40	"	"	"	Moon F	0.522	- 0.005		0.089
				H β	0.527			
14. 45	"	"	"	Moon F	0.531	+ 0.012		0.089
				H β	0.519			
14. 50	"	"	"	Moon F	0.509	- 0.015		0.089
				H β	0.524			
May 22. 15. 30	M	1	275	β Ursæ Majoris F....	0.130	+ 0.081	$\frac{1}{3}$ towards red	0.089
				H β	0.049			
15. 40	"	"	"	β Ursæ Majoris F....	0.138	+ 0.085	$\frac{1}{3}$ towards red	0.089
				H β	0.053			
May 22. 16. 0	M	1	275	γ Ursæ Majoris F ...	0.261	+ 0.052	$\frac{1}{5}$ towards red	0.089
				H β	0.209			
16. 10	"	"	"	γ Ursæ Majoris F ...	0.239	+ 0.057	$\frac{1}{5}$ towards red	0.089
				H β	0.182			
May 22. 16. 20	M	1	275	ϵ Ursæ Majoris F....	0.654	+ 0.049	$\frac{1}{5}$ towards red	0.089
				H β	0.605			
16. 35	"	"	"	ϵ Ursæ Majoris F....	0.595	+ 0.021	$\frac{1}{10}$ towards red	0.089
				H β	0.572			
May 25. 13. 35	M	1	275	α Virginis F.....	1.042	+ 0.038	$\frac{1}{5}$ towards red	0.103
				H β	1.004			
13. 55	"	"	"	α Virginis F.....	1.031	+ 0.018	$\frac{1}{10}$ towards red	0.103
				H β	1.013			
May 25. 14. 15	M	1	275	α Canum Venat. F...	0.416	- 0.097	$\frac{1}{2}$ towards blue	0.103
				H β	0.513			
14. 30	"	"	"	α Canum Venat. F...	0.482	- 0.045	$\frac{1}{4}$ towards blue	0.103
				H β	0.527			
14. 45	"	"	"	α Canum Venat. F...	0.478	- 0.039	$\frac{1}{4}$ towards blue	0.103
				H β	0.517			
14. 50	"	"	"	α Canum Venat. F...	0.494	- 0.047	$\frac{1}{4}$ towards blue	0.103
				H β	0.541			
May 25. 15. 25	M	1	275	γ Herculis F.....	0.240	+ 0.045	$\frac{1}{4}$ towards red	0.103
				H β	0.195			
15. 45	"	"	"	γ Herculis F.....	0.219	+ 0.018	$\frac{1}{10}$ towards red	0.103
				H β	0.201			
May 29. 15. 25	M	1	275	Arcturus b_1	0.729	- 0.029	$\frac{1}{10}$ towards blue	0.098
				Mg ₁	0.758			
15. 45	"	"	"	Arcturus b_1	0.708	- 0.044	$\frac{1}{4}$ towards blue	0.098
				Mg ₁	0.752			
May 29. 16. 0	M	1	275	ϵ^2 Boötis b_1	0.574	+ 0.025	$\frac{1}{10}$ towards red	0.098
				Mg ₁	0.549			
16. 15	"	"	"	ϵ^2 Boötis b_1	0.592	+ 0.017	$\frac{1}{10}$ towards red	0.098
				Mg ₁	1.575			
June 4. 16. 25	M	1	275	ϵ Ursæ Majoris F....	0.889	+ 0.081	$\frac{1}{3}$ towards red	0.098
				H β	0.808			
16. 40	"	"	"	ϵ Ursæ Majoris F....	0.923	+ 0.089	$\frac{2}{5}$ towards red	0.098
				H β	0.834			

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May 25. The pointer coated with Balmain's luminous paint was used.

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Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
0.0	- 0.5			The coincidence of the lines in the two spectra seemed to be perfect. Dark pointer used this evening.
+ 12.2	+ 12.9	+ 11.7	1 1	Definition poor, spectrum faint.
+ 12.2	+ 4.3	+ 2.2	1 1	Definition poor, spectrum faint.
+ 10.4	+ 0.2	+ 0.4	2 2	Definition poor. Spectrum brighter than that of β or γ Ursæ Majoris.
+ 12.2	- 2.2	- 2.9	3 1	Definition much better for first than for second observation. Star-line faint and ill-defined but not broad, being very little broader than the F line in the Solar spectrum.
+ 13.0	- 30.2	- 29.6	2 2 2 2	A strongly marked star of the first type. The star-line resembles those of Vega, Altair, or Sirius rather than that of Procyon. It is fairly sharp, broad, and intensely black, so that a piece seems cut out of the spectrum. Definition fair.
+ 1.8	+ 7.8	+ 7.5	$\frac{1}{2}$ $\frac{1}{2}$	Definition bad, observations much interrupted by cloud, and very uncertain.
+ 11.1	- 24.6	- 27.2	3 4	Indirect comparison. A direct comparison gave -24.2 miles per second for concluded motion. Definition very bad.
+ 9.2	- 1.4	0.0	1 1	Definition bad.
+ 10.3	+ 15.4	+ 20.9	4 4	Definition good.

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Date, 1880, 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 June 4. 17. 0	M	1	275	ζ Ursæ Majoris F. . . .	0.848	r		r
17. 15	,,	,,	,,	H β	0.793	+ 0.055	$\frac{1}{4}$ towards red	0.098
				ζ Ursæ Majoris F. . . .	0.872			
				H β	0.814	+ 0.058	$\frac{1}{4}$ towards red	0.098
June 4. 17. 35	M	1	275	η Ursæ Majoris F. . . .	1.003			
17. 45	,,	,,	,,	H β	0.925	+ 0.078	$\frac{1}{2}$ towards red	0.098
				η Ursæ Majoris F. . . .	0.954			
				H β	0.871	+ 0.083	$\frac{1}{3}$ towards red	0.098
June 28. 16. 40	M	1	275	γ Ursæ Majoris F. . . .	0.834			
17. 0	,,	,,	,,	H β	0.790	+ 0.044	$\frac{1}{4}$ towards red	0.133
				γ Ursæ Majoris F. . . .	0.816			
				H β	0.769	+ 0.047	$\frac{1}{4}$ towards red	0.133
June 28. 17. 25	M	1	275	δ Ursæ Majoris F. . . .	0.340			
17. 45	,,	,,	,,	H β	0.228	+ 0.112	$\frac{1}{2}$ towards red	0.133
				δ Ursæ Majoris F. . . .	0.262			
				H β	0.180	+ 0.082	$\frac{2}{3}$ towards red	0.133
June 28. 18. 10	M	1	275	ζ Ursæ Majoris F. . . .	0.581			
18. 25	,,	,,	,,	H β	0.409	+ 0.172	$\frac{3}{4}$ towards red	0.133
				ζ Ursæ Majoris F. . . .	0.509			
				H β	0.372	+ 0.137	$\frac{2}{3}$ towards red	0.133
July 7. 17. 40	WC	1	275	γ Boötis F.	0.220			
17. 50	,,	,,	,,	H β	0.293	- 0.073	$\frac{1}{2}$ towards blue	0.124
				γ Boötis F.	0.155			
				H β	0.339	- 0.184	$\frac{3}{4}$ towards blue	0.124
July 13. 17. 35	WC	1	275	β Libræ F.	0.343			
17. 50	,,	,,	,,	H β	0.542	+ 0.199	$\frac{2}{3}$ towards red	0.200
				β Libræ F.	0.448			
				H β	0.585	+ 0.137	$\frac{1}{2}$ towards red	0.200
July 15. 19. 10	M	1	276	α Ophiuchi F.	0.362			
19. 30	,,	,,	,,	H β	0.428	- 0.066	$\frac{1}{3}$ towards blue	0.136
				α Ophiuchi F.	0.402			
				H β	0.426	- 0.024	$\frac{1}{10}$ towards blue	0.136
July 15. 19. 45	M	1	276	ζ Aquilæ F.	0.255			
19. 55	,,	,,	,,	H β	0.363	- 0.108	$\frac{1}{2}$ towards blue	0.136
				ζ Aquilæ F.	0.288			
				H β	0.352	- 0.064	$\frac{1}{3}$ towards blue	0.136
July 15. 20. 40	M	1	276	δ Aquilæ F.	0.602			
20. 55	,,	,,	,,	H β	0.548	+ 0.054	$\frac{1}{3}$ towards red	0.136
				δ Aquilæ F.	0.624			
				H β	0.551	+ 0.073	$\frac{1}{3}$ towards red	0.136
July 20. 19. 55	M	1	275	α Aquilæ F.	0.826			
20. 10	,,	,,	,,	H β	0.849	- 0.023	$\frac{1}{10}$ towards blue	0.140
20. 20	,,	,,	,,	α Aquilæ F.	0.896			
20. 30	,,	,,	,,	H β	0.934	- 0.038	$\frac{1}{4}$ towards blue	0.140
				α Aquilæ F.	0.888			
				H β	0.935	- 0.047	$\frac{1}{4}$ towards blue	0.140
				α Aquilæ F.	0.902			
				H β	0.933	- 0.031	$\frac{1}{5}$ towards blue	0.140

The day specified in the first column is the Solar day in ordinary astronomical reckoning; the hours and minutes are those of Greenwich Sidereal Time.

June 28 and July 7. The pointer coated with Balmain's luminous paint was used.

July 15-29. The field was illuminated by means of a phosphorescent diaphragm coated with Balmain's luminous paint.

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+ 9.9	+ 7.2	+ 11.4	3 3	Definition fair.
+ 10.2	+ 14.2	+ 25.2	3 3	Definition good. Star-line much fainter and less distinct than those in ϵ and ζ Ursae Majoris.
+ 9.4	+ 4.4	+ 11.8	3 3	Definition fairly good. Illuminated pointer used.
+ 8.6	+ 20.8	+ 29.5	1 1	Definition moderate.
+ 9.0	+ 35.1	+ 49.3	1 3	Definition poor for the first but fair for the second observation.
+ 11.6	- 50.5	- 53.2	1 1	Illuminated pointer used.
+ 15.8	+ 35.0	+ 31.0	1 1	Spectrum watery. Star-line faint but sharp.
+ 7.9	- 21.5	- 19.6	2 2	Definition fair.
+ 1.4	- 27.4	- 23.8	3 3	Definition fairly good.
+ 0.5	+ 18.7	+ 17.4	$\frac{1}{2}$ $\frac{1}{2}$	Definition poor and spectrum very faint.
- 0.4	- 10.5	- 13.6	2 2 4 4	

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 93 250 000 miles.
The sign + denotes recession; - approach.

Date, 1880, 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 20. 21. 0	M	1	275	α Delphini F.....	0.692	r		r
21. 20	"	"	"	H β	0.668	+ 0.024	$\frac{1}{10}$ towards red	0.140
	"	"	"	α Delphini F.....	0.763			
	"	"	"	H β	0.649	+ 0.114	$\frac{1}{2}$ towards red	0.140
July 29. 19. 0	M	1	275	α Ophiuchi F.....	0.582			
19. 15	"	"	"	H β	0.528	+ 0.054	$\frac{1}{4}$ towards red	0.170
	"	"	"	α Ophiuchi F.....	0.668			
	"	"	"	H β	0.554	+ 0.114	$\frac{3}{8}$ towards red	0.170
July 29. 19. 35	M	1	275	α Lyrae F.....	0.665			
19. 45	"	"	"	H β	0.768	- 0.103	$\frac{1}{2}$ towards blue	0.170
	"	"	"	α Lyrae F.....	0.638			
	"	"	"	H β	0.669	- 0.031	$\frac{1}{5}$ towards blue	0.170
July 29. 19. 55	M	2	275	α Lyrae F.....	0.909			
20. 10	"	"	"	H β	1.132	- 0.223	$\frac{1}{4}$ towards blue	0.170
	"	"	"	α Lyrae F.....	1.003			
	"	"	"	H β	1.164	- 0.161	$\frac{1}{5}$ towards blue	0.170
July 29. 20. 40	M	1	275	δ Cygni F.....	0.522			
21. 0	"	"	"	H β	0.684	- 0.162	$\frac{3}{4}$ towards blue	0.170
	"	"	"	δ Cygni F.....	0.699			
	"	"	"	H β	0.735	- 0.036	$\frac{1}{4}$ towards blue	0.170
Sept. 3. 20. 40	M	1	95	α Ophiuchi F.....	0.367			
21. 0	"	"	"	H β	0.179	+ 0.188	$\frac{3}{4}$ towards red	0.154
	"	"	"	α Ophiuchi F.....	0.281			
	"	"	"	H β	0.203	+ 0.078	$\frac{1}{3}$ towards red	0.154
Sept. 3. 21. 25	M	1	95	α Lyrae F.....	0.322			
21. 45	"	"	"	H β	0.392	- 0.070	$\frac{1}{3}$ towards blue	0.154
	"	"	"	α Lyrae F.....	0.327			
	"	"	"	H β	0.383	- 0.056	$\frac{1}{4}$ towards blue	0.154
Sept. 3. 22. 5	M	1	95	δ Cygni F.....	0.480			
22. 25	"	"	"	H β	0.484	- 0.004	Coincident	0.154
	"	"	"	δ Cygni F.....	0.323			
	"	"	"	H β	0.440	- 0.123	$\frac{1}{2}$ towards blue	0.154
Sept. 3. 23. 0	M	1	95	α Pegasi F.....	0.246			
23. 20	"	"	"	H β	0.314	- 0.068	$\frac{1}{3}$ towards blue	0.154
	"	"	"	α Pegasi F.....	0.267			
	"	"	"	H β	0.360	- 0.093	$\frac{1}{3}$ towards blue	0.154
Sept. 4. 11. 35	M	1	95	Sky F.....	0.192			
11. 37	"	"	"	H β	0.199	- 0.007		0.154
11. 40	"	"	"	Sky F.....	0.222			
11. 43	"	"	"	H β	0.213	+ 0.009		0.154
11. 45	"	"	"	Sky F.....	0.207			
	"	"	"	H β	0.228	- 0.021		0.154
	"	"	"	Sky F.....	0.225			
	"	"	"	H β	0.229	- 0.004		0.154
	"	"	"	Sky F.....	0.218			
	"	"	"	H β	0.210	+ 0.008		0.154
Sept. 13. 21. 0	M	1	96	β Draconis b_1	0.105			
21. 25	"	"	"	Mg ₁	0.208	+ 0.103	$\frac{1}{2}$ towards red	0.082
	"	"	"	β Draconis b_1	0.067			
	"	"	"	Mg ₁	0.208	+ 0.141	$\frac{3}{8}$ towards red	0.082

The day specified in the first column is the Solar Day in ordinary astronomical reckoning; the hours and minutes are those of Greenwich Sidereal Time.

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Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
- 4.4	+ 25.3	+ 24.3	$\frac{1}{2}$ $\frac{1}{2}$	Definition poor and spectrum very faint.
+ 10.5	+ 14.9	+ 16.1	$\frac{3}{3}$	Definition fairly good.
+ 3.4	- 23.7	- 25.2	$\frac{4}{4}$	Definition fairly good.
+ 3.4	- 15.8	- 11.7	$\frac{4}{4}$	
- 1.0	- 29.0	- 27.6	$\frac{1}{1}$	Star-line very broad and dark, and diffused. It was very difficult to bisect.
+ 14.5	+ 25.7	+ 24.2	$\frac{1}{2}$ $\frac{1}{2}$	Definition bad, spectrum tremulous. Star-line very diffused.
+ 7.3	- 26.4	- 28.2	$\frac{3}{3}$	Definition bad, spectrum tremulous.
+ 3.6	- 22.8	- 21.5	$\frac{1}{2}$ $\frac{1}{2}$	Definition poor, spectrum faint.
- 2.9	- 21.5	- 20.9	$\frac{1}{1}$	Definition poor.
	- 0.9			
+ 4.5	+ 40.5	+ 32.2	$\frac{1}{1}$	Definition poor, spectrum watery, star-lines very faint.

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession; - approach.

Date, 1880, 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 Sept. 13. 21. 45	M	1	96	γ Draconis b_1	0'242	r		r
21. 55	,,	,,	,,	Mg ₁	0'213	— 0'029	$\frac{1}{5}$ towards blue	0'082
				γ Draconis b_1	0'209			
				Mg ₁	0'204	— 0'005	Coincident	0'082
Sept. 13. 22. 20	M	1	96	η Draconis b_1	0'268			
22. 35	,,	,,	,,	Mg ₁	0'347	+ 0'079	$\frac{2}{5}$ towards red	0'082
				η Draconis b_1	0'322			
				Mg ₁	0'366	+ 0'044	$\frac{1}{4}$ towards red	0'082
Sept. 13. 23. 0	M	1	96	β Ursæ Minoris b_1 ...	0'522			
23. 25	,,	,,	,,	Mg ₁	0'645	+ 0'123	$\frac{3}{5}$ towards red	0'082
				β Ursæ Minoris b_1 ...	0'606			
				Mg ₁	0'663	+ 0'057	$\frac{1}{3}$ towards red	0'082
Sept. 15. 9. 8	M	1	96	Sky b_1	0'108			
9. 12	,,	,,	,,	Mg ₁	0'114	+ 0'006		0'082
9. 15	,,	,,	,,	Sky b_1	0'124			
9. 20	,,	,,	,,	Mg ₁	0'119	— 0'005		0'082
9. 23	,,	,,	,,	Sky b_1	0'101			
				Mg ₁	0'093	— 0'008		0'082
				Sky b_1	0'102			
				Mg ₁	0'102	0'000		0'082
				Sky b_1	0'107			
				Mg ₁	0'108	+ 0'001		0'082
Sept. 20. 21. 0	M	1	96	η Draconis b_1	1'096			
21. 10	,,	,,	,,	Mg ₁	0'997	— 0'099	$\frac{3}{7}$ towards blue	0'151
21. 25	,,	,,	,,	η Draconis b_1	1'065			
				Mg ₁	0'949	— 0'116	$\frac{3}{7}$ towards blue	0'151
				η Draconis b_1	0'978			
				Mg ₁	0'943	— 0'035	$\frac{1}{8}$ towards blue	0'151
Sept. 20. 21. 40	M	1	96	β Cygni b_1	0'666			
22. 10	,,	,,	,,	Mg ₁	0'681	+ 0'015	$\frac{1}{20}$ towards red	0'151
22. 45	,,	,,	,,	β Cygni b_1	0'650			
				Mg ₁	0'661	+ 0'011	$\frac{1}{20}$ towards red	0'151
				β Cygni b_1	0'623			
				Mg ₁	0'662	+ 0'039	$\frac{1}{6}$ towards red	0'151
Sept. 27. 20. 35	M	1	95	β Draconis b_1	0'565			
20. 50	,,	,,	,,	Mg ₁	0'495	+ 0'070	$\frac{1}{3}$ towards red	0'125
21. 5	,,	,,	,,	β Draconis b_1	0'712			
21. 15	,,	,,	,,	Mg ₁	0'568	+ 0'144	$\frac{2}{3}$ towards red	0'125
				β Draconis b_1	0'566			
				Mg ₁	0'550	+ 0'016	$\frac{1}{10}$ towards red	0'125
				β Draconis b_1	0'516			
				Mg ₁	0'492	+ 0'024	$\frac{1}{10}$ towards red	0'125
Sept. 27. 21. 50	M	1	95	ξ Draconis b_1	0'595			
22. 20	,,	,,	,,	Mg ₁	0'563	+ 0'032	$\frac{1}{6}$ towards red	0'125
				ξ Draconis b_1	0'612			
				Mg ₁	0'583	+ 0'029	$\frac{1}{6}$ towards red	0'125
Sept. 27. 23. 0	M	1	95	η Pegasi b_1	0'780			
23. 20	,,	,,	,,	Mg ₁	0'818	— 0'038	$\frac{1}{5}$ towards blue	0'125
				η Pegasi b_1	0'810			
				Mg ₁	0'812	— 0'002	Coincident	0'125

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September 27. From this date the field was illuminated by means of the phosphorescent diaphragm coated with Balmain's luminous paint.

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+ 4.7	- 11.0	- 11.4	$\frac{2}{2}$	Star-lines distinct. Definition fair, but the spectrum rather tremulous.
+ 1.3	+ 21.4	+ 20.4	$\frac{1}{2}$ $\frac{1}{2}$	Star-lines very faint. Definition poor, and spectrum tremulous.
- 3.4	+ 32.6	+ 31.6	$\frac{1}{2}$	Star-lines faint. Definition poor, but spectrum fairly steady.
	- 0.4			
+ 0.9	- 27.2	- 35.2	$\frac{1}{1}$ $\frac{2}{2}$	Star-lines very faint, but definition fair and spectrum steady. The faintness of the lines made the observation difficult, and to some extent uncertain.
+ 10.2	- 3.9	- 1.5	$\frac{1}{1}$ $\frac{1}{2}$ $\frac{1}{2}$	Observations much delayed and interrupted by cloud and mist. The star, however, shone out brightly at the second observation. Star-lines fairly distinct, and definition moderate.
+ 4.2	+ 17.2	+ 18.7	$\frac{2}{1}$ $\frac{1}{1}$ $\frac{2}{2}$	Star-lines faint. Spectrum only occasionally bright. Light mist. Images fairly steady.
+ 3.0	+ 8.3	+ 11.0	$\frac{1}{2}$ $\frac{1}{2}$	Star-lines and spectrum very faint. Measures very uncertain.
+ 2.9	- 10.3	- 11.4	$\frac{1}{2}$ $\frac{1}{2}$	Spectrum very faint, and measures doubtful.

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession; - approach.

Date, 1880, 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			°		r	r		r
Sept. 27. 23. 35	M	1	95	β Pegasi b_4	0.337			
23. 45	,,	,,	,,	Mg ₃	0.236	+ 0.101	$\frac{1}{2}$ towards red	0.125
				β Pegasi b_4	0.223			
				Mg ₃	0.195	+ 0.028	$\frac{1}{10}$ towards red	0.125
Sept. 27. 23. 50	M	1	95	β Pegasi b_1	0.799			
o. 5	,,	,,	,,	Mg ₁	0.783	+ 0.016	$\frac{1}{10}$ towards red	0.125
				β Pegasi b_1	0.833			
				Mg ₁	0.791	+ 0.042	$\frac{1}{5}$ towards red	0.125
Sept. 29. 21. 10	M	1	95	η Draconis b_1	0.789			
21. 55	,,	,,	,,	Mg ₁	0.679	+ 0.110	$\frac{1}{2}$ towards red	0.133
				η Draconis b_1	0.745			
22. 10	,,	,,	,,	Mg ₁	0.677	+ 0.068	$\frac{1}{3}$ towards red	0.133
				η Draconis b_1	0.774			
				Mg ₁	0.683	+ 0.091	$\frac{2}{5}$ towards red	0.133
Sept. 29. 22. 40	M	1	95	ϵ Pegasi b_1	0.368			
23. 0	,,	,,	,,	Mg ₁	0.389	- 0.021	$\frac{1}{10}$ towards blue	0.133
				ϵ Pegasi b_1	0.393			
				Mg ₁	0.410	- 0.017	$\frac{1}{10}$ towards blue	0.133
Sept. 29. 23. 20	M	1	95	γ Cygni b_1	0.668			
23. 35	,,	,,	,,	Mg ₁	0.663	+ 0.005	Coincident	0.133
				γ Cygni b_1	0.670			
				Mg ₁	0.666	+ 0.004	Coincident	0.133
Sept. 29. 23. 50	M	1	95	α Cygni b_1	0.556			
o. 5	,,	,,	,,	Mg ₁	0.603	- 0.047	$\frac{1}{4}$ towards blue	0.133
				α Cygni b_1	0.611			
				Mg ₁	0.636	- 0.025	$\frac{1}{10}$ towards blue	0.133
Sept. 29. 0. 35	M	1	95	β Andromedæ b_1	0.643			
0. 45	,,	,,	,,	Mg ₁	0.628	+ 0.015	$\frac{1}{10}$ towards red	0.133
				β Andromedæ b_1	0.669			
1. 0	,,	,,	,,	Mg ₁	0.662	+ 0.007	Coincident	0.133
				β Andromedæ b_1	0.657			
				Mg ₁	0.652	+ 0.005	Coincident	0.133
Sept. 29. 11. 40	M	1	95	Sky b_1	0.408			
11. 43	,,	,,	,,	Mg ₁	0.399	+ 0.009		0.133
				Sky b_1	0.438			
11. 48	,,	,,	,,	Mg ₁	0.436	+ 0.002		0.133
				Sky b_1	0.415			
11. 52	,,	,,	,,	Mg ₁	0.444	- 0.029		0.133
				Sky b_1	0.413			
11. 55	,,	,,	,,	Mg ₁	0.412	+ 0.001		0.133
				Sky b_1	0.413			
				Mg ₁	0.401	+ 0.012		0.133
Oct. 1. 21. 35	M	1	95	ζ Draconis F	0.293			
21. 50	,,	,,	,,	H β	0.323	- 0.030	$\frac{1}{7}$ towards blue	0.160
				ζ Draconis F	0.184			
				H β	0.301	- 0.117	$\frac{1}{2}$ towards blue	0.160
Oct. 1. 22. 35	M	1	95	β Cassiopeæ F	0.632			
22. 45	,,	,,	,,	H β	0.475	+ 0.157	$\frac{1}{5}$ towards red	0.160
				β Cassiopeæ F	0.576			
22. 55	,,	,,	,,	H β	0.493	+ 0.083	$\frac{2}{5}$ towards red	0.160
				β Cassiopeæ F	0.512			
				H β	0.473	+ 0.039	$\frac{1}{5}$ towards red	0.160

The day specified in the first column is the Solar Day in ordinary astronomical reckoning ; the hours and minutes are those of Greenwich Sidereal Time.

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Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+ 2.1	+ 21.7	+ 23.2	$\frac{1}{1}$	Mist clearing off. Star-lines seen much better than those of ξ Draconis and η Pegasi.
+ 2.1	+ 8.6	+ 10.6	$\frac{1}{1}$	The b_1 line in this star is not so dark as b_4 , but is, perhaps, more easily isolated.
+ 0.3	+ 36.1	+ 39.2	$\frac{2}{\frac{1}{2}}$ $\frac{1}{1}$	The spectrum and the star-lines were faint, but the star was seen well for a moment during the first observation.
+ 10.2	- 17.2	- 19.0	$\frac{1}{1}$	The lines in this star are sharp, dark, and distinct, but the spectrum was so tremulous and faint that bisection was difficult.
+ 6.9	- 5.2	- 6.9	$\frac{2}{2}$	Spectrum faint and tremulous.
+ 5.1	- 18.4	- 20.5	$\frac{2}{2}$	Spectrum fairly bright but tremulous, and star-lines faint and indistinct.
- 6.0	+ 9.3	+ 8.9	$\frac{3}{3}$ $\frac{3}{3}$	Star-lines dark and sharp. Definition fair.
	- 0.4			
+ 1.5	- 23.7	- 27.0	$\frac{1}{1}$	Spectrum faint but steady. Star-line diffused. No central condensation.
- 4.7	+ 32.4	+ 40.9	$\frac{2}{3}$ $\frac{2}{2}$	Definition fair. Star-line diffused. Spectrum faint but steady.

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession; - approach.

Date, 1880, 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.	
Oct. ^d 1. ^h 23. ^m 15	M	1	95	γ Cassiopeiae F	0.508			
				H β	0.504	+ 0.004	Coincident	0.160
23. 25	"	"	"	γ Cassiopeiae F	0.438			
				H β	0.543	- 0.105	$\frac{1}{2}$ towards blue	0.160
23. 35	"	"	"	γ Cassiopeiae F	0.440			
				H β	0.537	- 0.097	$\frac{2}{3}$ towards blue	0.160
23. 40	"	"	"	γ Cassiopeiae F	0.474			
				H β	0.542	- 0.068	$\frac{1}{3}$ towards blue	0.160
Oct. 29. 23. 54	M	1	337°. 30'	Jupiter I. F	0.881			
				Jupiter II. F	0.962	+ 0.081		0.110
0. 9	"	"	"	Jupiter II. F	0.869			
				Jupiter I. F	0.849	+ 0.020		0.110
0. 24	"	"	"	Jupiter I. F	0.851			
				Jupiter II. F	0.963	+ 0.112		0.110
0. 34	"	"	"	Jupiter II. F	0.930			
				Jupiter I. F	0.901	+ 0.029		0.110
0. 39	"	"	"	Jupiter II. F	0.943			
				Jupiter I. F	0.898	+ 0.045		0.110
Oct. 29. 0. 59	M	1	337°. 30'	Jupiter I. b_1	0.309			
				Jupiter II. b_1	0.335	+ 0.026		0.110
1. 15	"	"	"	Jupiter II. b_1	0.409			
				Jupiter I. b_1	0.354	+ 0.055		0.110
1. 20	"	"	"	Jupiter I. b_1	0.432			
				Jupiter II. b_1	0.425	- 0.007		0.110
1. 35	"	"	"	Jupiter II. b_1	0.484			
				Jupiter I. b_1	0.472	+ 0.012		0.110
1. 45	"	"	"	Jupiter I. b_1	0.448			
				Jupiter II. b_1	0.567	+ 0.119		0.110
Nov. 8. 22. 15	M	1	96	ζ Draconis F	0.402			
				H β	0.273	- 0.129	$\frac{2}{3}$ towards blue	0.141
22. 35	"	"	"	ζ Draconis F	0.364			
				H β	0.321	- 0.043	$\frac{1}{3}$ towards blue	0.141
Nov. 8. 22. 55	M	1	96	δ Cygni F	0.078			
				H β	0.062	- 0.016	Coincident	0.141
23. 5	"	"	"	δ Cygni F	0.044			
				H β	0.061	+ 0.017	Coincident	0.141
23. 15	"	"	"	δ Cygni F	0.049			
				H β	0.089	+ 0.040	$\frac{1}{10}$ towards red	0.141
23. 30	"	"	"	δ Cygni F	0.048			
				H β	0.041	- 0.007	Coincident	0.141
Nov. 8. 0. 5	M	1	96	α Andromedæ F	1.011			
				H β	0.952	- 0.059	$\frac{1}{4}$ towards blue	0.141
0. 20	"	"	"	α Andromedæ F	1.101			
				H β	0.994	- 0.107	$\frac{2}{3}$ towards blue	0.141
Nov. 8. 0. 55	M	1	96	α Persei F	0.685			
				H β	0.760	+ 0.075	$\frac{1}{3}$ towards red	0.141
1. 10	"	"	"	α Persei F	0.680			
				H β	0.764	+ 0.084	$\frac{1}{3}$ towards red	0.141
1. 25	"	"	"	α Persei F	0.722			
				H β	0.785	+ 0.063	$\frac{1}{4}$ towards red	0.141
Nov. 17. 1. 0	W C	1	340	γ Pegasi F	0.797			
				H β	0.729	- 0.068	$\frac{1}{3}$ towards blue	?
1. 15	"	"	"	γ Pegasi F	0.485			
				H β	0.455	- 0.030	$\frac{1}{10}$ towards blue	0.150

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Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
- 6.6	- 18.2	- 23.0	1 3 3 2	The F line is bright in this star, and often beautifully shown, looking at times quite brilliant on the background of the continuous spectrum. It is not a sharp line, but fairly broad and ill-defined at the edges, though with bright central condensation. Definition often good, always fair. Image steady.
	+ 17.4		1 1 1 1 1	Relative motion in the line of sight of points near the East and West limbs of Jupiter, as deduced from the relative displacements of the F and b lines. The point measured was in each case as nearly as possible $1\frac{1}{2}$ " from the limb. The slit was just 1" in width, and the edge nearer the limb was 1" from it. The slit was placed accurately in the focus of the object-glass. A convex cylindrical lens was used in front of the slit, with its axis perpendicular to the slit. The F and b lines were easy to measure in the center of the disk, but the faintness of the limb made it difficult to measure them there. Still there was an evident displacement as between the two limbs, and even between the limb and the center a displacement could be detected with a little trouble. Computed relative motion = 29.2 miles per second.
	+ 15.1		$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	
- 1.2	- 20.5	- 18.6	1 2	Spectrum faint, star-line diffused.
+ 8.1	- 6.0	- 6.6	3 3 2 2	Spectrum faint; line diffused; much mist. Images very steady.
+ 9.5	- 37.0	- 35.4	2 4	Images steady, but spectrum faint.
- 3.8	+ 26.2	+ 26.5	2 2 2	Spectrum faint, and line diffused. Much mist, but images very steady.
+ 13.8	- 28.6	- 20.7	1 1	F line in the star narrow and sharp.

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession; - approach.

Date, 1880, 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. 17. 1. 40	WC	1	340	β Arietis F	0.700			
				H β	0.530	— 0.170		0.150
1. 50	,,	,,	,,	β Arietis F	0.612			
				H β	0.532	— 0.080	$\frac{1}{3}$ towards blue	0.150
2. 5	,,	,,	,,	β Arietis F	0.570			
				H β	0.542	— 0.028	$\frac{1}{4}$ towards blue	0.150
Nov. 17. 2. 20	WC	1	340	α Piscium F	0.625			
				H β	0.570	— 0.055	$\frac{1}{3}$ towards blue	0.150
2. 30	,,	,,	,,	α Piscium F	0.580			
				H β	0.530	— 0.050		0.150
Nov. 17. 2. 55	WC	1	340	β Persei F	0.205			
				H β	0.153	— 0.052	$\frac{1}{3}$ towards blue	0.150
3. 5	,,	,,	,,	β Persei F	0.535			
				H β	0.405	— 0.130	$\frac{2}{3}$ towards blue	0.150
Nov. 18.	M	1	340	Sky F	0.980			
	,,	,,	,,	H β	0.959	— 0.021		0.150
	,,	,,	,,	Sky F	0.952			
	,,	,,	,,	H β	0.948	— 0.004		0.150
	,,	,,	,,	Sky F	0.909			
	,,	,,	,,	H β	0.936	+ 0.027		0.150
	,,	,,	,,	Sky F	0.949			
	,,	,,	,,	H β	0.978	+ 0.029		0.150
	,,	,,	,,	Sky F	0.912			
	,,	,,	,,	H β	0.903	— 0.009		0.150
Nov. 20. 23. 0	M	1	276	β Cygni b_1	1.007			
				Mg ₁	0.977	— 0.030	$\frac{1}{10}$ towards blue	0.119
23. 15	,,	,,	,,	β Cygni b_1	1.043			
				Mg ₁	0.992	— 0.051	$\frac{1}{6}$ towards blue	0.119
23. 30	,,	,,	,,	β Cygni b_1	0.966			
				Mg ₁	0.964	— 0.002	Coincident	0.119
Nov. 20. 0. 5	M	1	276	ζ Cygni b_1	1.138			
				Mg ₁	1.074	— 0.064	$\frac{2}{3}$ towards blue	0.119
0. 30	,,	,,	,,	ζ Cygni b_1	1.095			
				Mg ₁	1.052	— 0.043	$\frac{1}{3}$ towards blue	0.119
Nov. 20. 1. 5	M	1	276	β_2 Cephei b_1	0.493			
				Mg ₁	0.675	+ 0.182	$\frac{3}{4}$ towards red	0.119
1. 35	,,	,,	,,	β_2 Cephei b_1	0.505			
				Mg ₁	0.683	+ 0.178	$\frac{3}{4}$ towards red	0.119
1. 40	,,	,,	,,	β_2 Cephei b_1	0.583			
				Mg ₁	0.677	+ 0.094	$\frac{2}{3}$ towards red	0.119
Nov. 20. 2. 0	M	1	276	α Cassiopeiæ b_1	0.015			
				Mg ₁	0.193	+ 0.178	$\frac{3}{4}$ towards red	0.119
2. 15	,,	,,	,,	α Cassiopeiæ b_1	0.975			
				Mg ₁	1.068	+ 0.093	$\frac{2}{3}$ towards red	0.119
Nov. 20. 2. 35	M	1	276	α Arietis b_1	0.978			
				Mg ₁	0.909	— 0.069	$\frac{1}{4}$ towards blue	0.119
Nov. 21. 1. 45	WC	1	275	α Cephei F	0.732			
				H β	0.950	— 0.218	$\frac{2}{3}$ towards blue	0.150
2. 25	,,	,,	,,	α Cephei F	0.575			
				H β	0.825	— 0.250	$\frac{2}{3}$ towards blue	0.150

The day specified in the first column is the Solar Day in ordinary astronomical reckoning; the hours and minutes are those of Greenwich Sidereal Time.

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
- 7.9	- 20.1	- 12.1	2 2 2	F line in the star strong and broad, about three times as broad as the H β line.
+ 8.7	- 24.8	- 31.6	1 $\frac{1}{2}$	F line in the star narrow and sharp.
+ 0.5	- 24.1	- 29.5	2 1	F line in the star strong, sharp, and twice as broad as the H β line.
	+ 1.3			
+ 10.8	- 23.1	- 22.3	1 2 1	Star-lines faint.
- 13.0	- 6.7	- 18.8	$\frac{1}{2}$ $\frac{1}{2}$	Star spectrum faint and lines indistinct.
+ 2.7	+ 53.1	+ 53.8	1 1 1	Spectrum faint, star-line indistinct.
+ 5.0	+ 37.1	+ 42.7	1 3	
+ 7.3	- 32.8	- 33.8	3	
+ 5.1	- 75.9	- 48.6	1 1	Star-line strong, sharp, and twice the breadth of the H β line.

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession; - approach.

Date, 1880, 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. 21. 2. 50	WC	1	275	γ Cassiopeiae F	0.270			
3. 0	"	"	"	H β	0.438	- 0.168	$\frac{1}{2}$ towards blue	0.150
	"	"	"	γ Cassiopeiae F	0.365	- 0.175	$\frac{2}{3}$ towards blue	0.150
	"	"	"	H β	0.540			
Nov. 25. 2. 25	WC	1	275	α Pegasi F	0.472			
2. 30	"	"	"	H β	0.696	- 0.224	$\frac{1}{2}$ towards blue	0.150
	"	"	"	α Pegasi F	0.535	- 0.186	$\frac{1}{2}$ towards blue	0.150
	"	"	"	H β	0.721			
Nov. 27. 22. 25	M	1	275	α Lyrae F	1.109			
22. 30	"	"	"	H β	0.991	- 0.118	$\frac{1}{2}$ towards blue	0.159
	"	"	"	α Lyrae F	1.068	- 0.071	$\frac{1}{4}$ towards blue	0.159
22. 40	"	"	"	H β	0.997	- 0.085	$\frac{1}{3}$ towards blue	0.159
	"	"	"	α Lyrae F	1.074			
	"	"	"	H β	0.989			
Nov. 27. 0. 5	M	1	275	γ Lyrae F	0.012			
0. 20	"	"	"	H β	0.073	+ 0.061	$\frac{1}{4}$ towards red	0.159
	"	"	"	γ Lyrae F	0.015	+ 0.046	$\frac{1}{4}$ towards red	0.159
	"	"	"	H β	0.061			
Nov. 27. 0. 40	M	1	275	α Pegasi F	0.425			
0. 45	"	"	"	H β	0.306	- 0.119	$\frac{1}{2}$ towards blue	0.159
	"	"	"	α Pegasi F	0.408	- 0.071	$\frac{1}{3}$ towards blue	0.159
0. 50	"	"	"	H β	0.337	- 0.035	$\frac{1}{7}$ towards blue	0.159
1. 0	"	"	"	α Pegasi F	0.342	- 0.066	$\frac{1}{3}$ towards blue	0.159
	"	"	"	H β	0.307			
	"	"	"	α Pegasi F	0.412			
	"	"	"	H β	0.346			
Nov. 27. 1. 15	M	1	275	γ Pegasi F	0.509			
1. 25	"	"	"	H β	0.358	- 0.151	$\frac{1}{2}$ towards blue	0.159
	"	"	"	γ Pegasi F	0.478	- 0.136	$\frac{1}{2}$ towards blue	0.159
1. 30	"	"	"	H β	0.342	- 0.168	$\frac{1}{2}$ towards blue	0.159
	"	"	"	γ Pegasi F	0.515			
	"	"	"	H β	0.347			
Nov. 27. 1. 45	M	1	275	α Piscium F	0.509			
2. 0	"	"	"	H β	0.424	- 0.085	$\frac{1}{3}$ towards blue	0.159
	"	"	"	α Piscium F	0.485	- 0.064	$\frac{1}{3}$ towards blue	0.159
2. 10	"	"	"	H β	0.421	- 0.066	$\frac{1}{3}$ towards blue	0.159
	"	"	"	α Piscium F	0.522			
	"	"	"	H β	0.456			
Nov. 28. 1. 30	WC	1	275	α Persei F	0.032			
	"	"	"	H β	0.077	+ 0.045	$\frac{1}{4}$ towards red	0.150
Nov. 29.	M	1	275	Sky F	0.932			
	"	"	"	H β	0.942	+ 0.010		0.150
	"	"	"	Sky F	0.934	+ 0.017		0.150
	"	"	"	H β	0.951	- 0.048		0.150
	"	"	"	Sky F	0.956	+ 0.029		0.150
	"	"	"	H β	0.908	- 0.017		0.150
	"	"	"	Sky F	0.873			
	"	"	"	H β	0.902			
	"	"	"	Sky F	0.933			
	"	"	"	H β	0.916			

The day specified in the first column is the Solar Day in ordinary astronomical reckoning; the hours and minutes are those of Greenwich Sidereal Time.

1882GOAMW...42F...1A

Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		Weight.	REMARKS.
	Measured.	Estimated.		
+ 3.8	- 55.3	- 35.9	2 1	The F line in this star is <i>bright</i> , and equal in breadth to the H β line. Definition bad. East wind.
+ 17.0	- 77.1	- 51.4	1 2	Star-line strong, fairly sharp, and half as broad again as the H β line.
+ 5.5	- 33.1	- 40.0	4 4 4	
+ 7.6	+ 8.6	+ 16.3	3 3	Star-line broad and fuzzy.
+ 17.2	- 39.9	- 50.0	3 4 2 4	
+ 15.7	- 61.6	- 63.5	4 4 4	
+ 11.5	- 33.2	- 43.4	2 2 2	Spectrum faint and star-line ill-defined.
+ 1.9	+ 11.7	+ 15.3	1	
	- 0.5			

The velocity of light has been taken as 186 660 miles per second, and the distance of the Sun as 92 250 000 miles.
The sign + denotes recession; - approach.

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

COLLECTED RESULTS for MOTIONS of STARS in the line of Sight, from SPECTROSCOPIC OBSERVATIONS made at the ROYAL OBSERVATORY, GREENWICH, in the Year 1880.

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

(+ denotes Recession; - Approach.)

Date.	Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.		
									Measured.	Estimated.	
α ANDROMEDÆ.											
1880, November 8	M	2	6	1	$\begin{smallmatrix} o \\ 96 \end{smallmatrix}$	$\begin{smallmatrix} r \\ 0.141 \end{smallmatrix}$	F	+ 9.5	— 37.0	— 35.4	
β CASSIOPELE.											
1880, October 1	M	3	7	1	95	0.160	F	— 4.7	+ 32.4	+ 40.9	
γ PEGASÆ.											
1880, November 17 27	WC	2	2	1	340	0.150	F	+ 13.8	— 28.6	— 20.7	
	M	3	12	1	275	0.159	F	+ 15.7	— 61.6	— 63.5	
α CASSIOPELÆ.											
1880, February 21 November 20	M	2	5	1	186	0.086	b_1	+ 11.5	+ 0.2	+ 1.9	
	M	2	4	1	276	0.119	b_1	+ 5.0	+ 37.1	+ 42.7	
γ CASSIOPELE.											
1880, October 1 November 21	M	4	9	1	95	0.160	F	— 6.6	— 18.2	— 23.0	
	WC	2	3	1	275	0.150	F	+ 3.8	— 55.3	— 35.9	
β ANDROMEDÆ.											
1880, September 29	M	3	9	1	95	0.133	b_1	— 6.0	+ 9.3	+ 8.9	
β ARIETIS.											
1880, November 17	WC	3	6	1	340	0.150	F	— 7.9	— 20.1	— 12.1	
α PISCUM.											
1880, November 17 27	WC	2	$1\frac{1}{2}$	1	340	0.150	F	+ 8.7	— 24.8	— 31.6	
	M	3	6	1	275	0.159	F	+ 11.5	— 33.2	— 43.4	
γ ANDROMEDÆ.											
1880, February 21	M	2	6	1	186	0.086	b_1	+ 15.5	— 34.3	— 31.4	

1882GQAMW..42F..1A

1882G0AMW...427.

Date.	Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.		
									Measured.	Estimated.	
α ARIETIS.											
1880, November 20	M	1	3	1	^o 276	^r 0°119	<i>h</i> ₁	+ 7·3	— 32·8	— 33·8	
β PERSEI.											
1880, November 17	WC	2	3	1	340	0°150	F	+ 0·5	— 24·1	— 29·5	
α PERSEI.											
1880, November 8 28	M	3	6	1	96	0°141	F	— 3·8	+ 26·2	+ 26·5	
	WC	1	1		275	0°150	F	+ 1·9	+ 11·7	+ 15·3	
ζ PERSEI.											
1880, February 17	M	2	1	1	276	0°140	<i>h</i> ₁	+ 13·4	— 40·4	— 49·5	
α TAURI (<i>Aldebaran</i>).											
1880, January 26	M	2	4	1	275	0°160	<i>h</i> ₁	+ 16·0	+ 22·4	+ 30·1	
α AURIGÆ (<i>Capella</i>).											
1880, January 26	M	2	6	1	275	0°160	<i>h</i> ₁	+ 12·6	+ 17·7	+ 19·5	
β ORIONIS (<i>Rigel</i>).											
1880, January 30 March 13	M	2	6	1	276	0°168	F	+ 13·3	+ 13·2	+ 7·3	
	M	2	4	1	276	0°125	F	+ 15·7	+ 13·4	+ 12·8	
β TAURI.											
1880, January 30 March 15	M	2	6	1	276	0°168	F	+ 14·3	— 8·4	— 9·7	
	M	2	8	1	286	0°120	F	+ 18·5	— 27·1	— 29·1	
γ ORIONIS.											
1880, January 30 March 17	M	4	8	1	276	0°168	F	+ 14·1	— 1·1	+ 0·3	
	M	2	2	1	286	0°120	F	+ 17·5	— 5·7	— 7·1	
δ ORIONIS.											
1880, January 30 March 13	M	2	2	1	276	0°168	F	+ 13·2	— 2·0	— 0·8	
	M	3	3	1	276	0°125	F	+ 17·0	— 18·1	— 15·7	

5 G 2

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

Date.	Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.		
									Measured.	Estimated.	
ε ORIONIS.											
1880, January March	30	M	3	6	1	^o 276	^r 0.168	F	+ 12.9	— 37.6	— 36.9
	17	M	4	4	1	286	0.120	F	+ 16.8	— 31.9	— 27.6
ζ ORIONIS.											
1880, January March	30	M	3	3	1	276	0.168	F	+ 12.6	+ 7.3	+ 4.6
	17	M	2	2	1	286	0.120	F	+ 16.7	— 0.3	— 0.9
κ ORIONIS.											
1880, January March	30	M	2	2	1	276	0.168	F	+ 11.4	+ 4.2	+ 3.6
	13	M	2	2	1	276	0.125	F	+ 15.6	— 6.8	— 5.3
α ORIONIS.											
1880, January	26	M	2	4	1	275	0.160	b ₄	+ 11.5	+ 24.6	+ 20.6
β AURIGÆ.											
1880, March April	13	M	2	2	1	276	0.125	F	+ 17.2	— 11.1	— 9.5
	8	M	2	8	1	277	0.130	F	+ 15.9	— 12.1	— 11.6
γ GEMINORUM.											
1880, February March	10	M	2	1	1	276	0.205	F	+ 13.0	+ 18.8	+ 23.6
	15	M	2	8	1	286	0.120	F	+ 18.1	— 2.8	+ 1.3
α CANIS MAJORIS (<i>Sirius</i>).											
1880, January March	30	M	2	8	1	276	0.168	F	+ 6.9	+ 28.2	+ 30.0
	30	M	3	12	2	276	0.168	F	+ 6.9	+ 27.0	+ 22.6
	19	M	2	8	2	275	0.107	F	+ 13.9	+ 1.3	+ 5.8
	24	M	3	9	2	277	0.114	F	+ 14.1	+ 1.6	+ 6.1
β CANIS MINORIS.											
1880, March	17	M	3	3	1	286	0.120	F	+ 16.6	— 14.4	— 14.6
α ² GEMINORUM (<i>Castor</i>).											
1880, March	24	M	2	4	2	277	0.114	F	+ 17.6	0.0	— 1.0

Date.		Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.	
										Measured.	Estimated.
α CANIS MINORIS (<i>Procyon</i>).											
1880, March	19	M	2	8	2	^o 275	^r 0'107	F	+ 16'2	+ 3'0	+ 8'0
	24	M	2	10		277	0'114	F	+ 16'7	+ 7'1	+ 6'0
β GEMINORUM (<i>Pollux</i>).											
1880, January	26	M	2	6	1	275	0'160	b ₁	+ 4'5	- 39'5	- 43'1
α HYDRÆ.											
1880, February	21	M	2	3	1	186	0'086	b ₁	+ 2'2	+ 35'6	+ 36'7
ϵ LEONIS.											
1880, February	17	M	2	2	1	276	0'140	b ₁	+ 3'1	- 5'1	- 3'1
	21	M	2	3		186	0'086	b ₁	+ 4'4	- 1'1	- 0'9
α LEONIS (<i>Regulus</i>).											
1880, March	17	M	2	7	1	286	0'120	F	+ 9'1	+ 17'5	+ 14'8
γ LEONIS.											
1880, February	17	M	2	3	1	276	0'140	b ₁	+ 0'3	- 43'3	- 40'2
β URSÆ MAJORIS.											
1880, April May	8	M	2	4	1	277	0'130	F	+ 11'4	0'0	+ 3'5
	22	M	2	2		275	0'089	F	+ 12'2	+ 12'9	+ 11'7
α URSÆ MAJORIS.											
1880, February	21	M	2	2	1	186	0'086	b ₁	+ 4'0	- 4'0	- 4'0
δ LEONIS.											
1880, March May	17	M	2	8	1	286	0'120	F	+ 5'6	- 38'4	- 35'2
	15	M	2	6		275	0'168	F	+ 16'9	- 18'7	- 19'8
θ LEONIS.											
1880, March	17	M	3	2	1	286	0'120	F	+ 5'0	+ 13'0	+ 9'3

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

Date.	Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.		
									Measured.	Estimated.	
β LEONIS.											
1880, March	17	M	2	4	1	^o 286	^r 0.120	F	+ 2.5	+ 10.2	+ 7.3
γ URSÆ MAJORIS.											
1880, April	8	M	2	6	1	277	0.130	F	+ 9.7	+ 20.0	+ 18.4
May	22	M	2	2	1	275	0.089	F	+ 12.2	+ 4.3	+ 2.2
June	28	M	2	6	1	275	0.133	F	+ 9.4	+ 4.4	+ 11.8
δ URSÆ MAJORIS.											
1880, June	28	M	2	2	1	275	0.133	F	+ 8.6	+ 20.8	+ 29.5
γ VIRGINIS.*											
1880, March	17	M	2	4	1	286	0.120	F	— 3.5	+ 57.4	+ 51.0
May	1	M	2	2	1	275	0.089	F	+ 9.8	+ 12.6	+ 16.5
	15	M	2	1	1	275	0.168	F	+ 13.0	— 53.4	— 71.4
ε URSÆ MAJORIS.											
1880, May	22	M	2	4	1	275	0.089	F	+ 10.4	+ 0.2	+ 0.4
June	4	M	2	8	1	275	0.098	F	+ 10.3	+ 15.4	+ 20.9
δ VIRGINIS.											
1880, February	26	M	2	1	1	186	0.114	b ₁	— 9.7	+ 62.7	+ 51.8
ε VIRGINIS.											
1880, February	21	M	2	2	1	186	0.086	b ₁	— 10.4	— 28.9	— 32.0
	26	M	2	2	1	186	0.114	b ₁	— 9.1	— 26.7	— 25.2
α CANUM VENATICORUM.											
1880, May	25	M	4	8	1	275	0.103	F	+ 13.0	— 30.2	— 29.6
* The discordance in these results appears to be due to the bad conditions under which the observations were made, and to the character of the F line, which, in this star, is faint and diffused.											

Date.	Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.			
									Measured.	Estimated.		
α VIRGINIS (<i>Spica</i>).												
1880, May	1	M	2	6	1	275	o	0.089	F	+ 6.1	+ 0.3	+ 1.8
	15	M	2	6	1	275	r	0.168	F	+ 9.9	- 5.4	- 4.1
	25	M	2	4	1	275		0.103	F	+ 12.2	- 2.2	- 2.9
ζ URSÆ MAJORIS.												
1880, June	4	M	2	6	1	275		0.098	F	+ 9.9	+ 7.2	+ 11.4
	28	M	2	4	1	275		0.133	F	+ 9.0	+ 35.1	+ 49.3
η URSÆ MAJORIS.												
1880, June	4	M	2	6	1	275		0.098	F	+ 10.2	+ 14.2	+ 25.2
α BOÖTIS (<i>Arcturus</i>).												
1880, May	29	M	2	7	1	275	*	0.098	F	+ 11.1	- 24.6	- 27.2
γ BOÖTIS.												
1880, July	7	WC	2	2	1	275		0.124	F	+ 11.6	- 50.5	- 53.2
ϵ^2 BOÖTIS.												
1880, February	26	M	2	4	1	186		0.114	b_1	- 10.6	- 14.3	- 8.3
	May 29	M	2	2	1	275		0.098	b_1	+ 9.2	- 1.4	0.0
β URSÆ MINORIS.												
1880, February	21	M	4	5	1	186		0.086	b_1	+ 2.0	+ 24.0	+ 19.7
	September 13	M	2	3	1	96		0.082	b_1	- 3.4	+ 32.6	+ 31.6
β LIBRÆ.												
1880, May	8	M	3	12	1	276		0.089	F	+ 0.3	+ 7.4	+ 7.6
	18	M	2	4	1	276		0.104	F	+ 3.3	+ 12.4	+ 10.6
July	13	WC	2	2	1	275		0.200	F	+ 15.8	+ 35.0	+ 31.0
α CORONÆ.												
1880, May	18	M	2	6	1	276		0.104	F	+ 3.9	+ 10.3	+ 8.5

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

Date.	Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.		
									Measured.	Estimated.	
α SERPENTIS.											
1880, February 26	M	2	3	1	^o 186	^r 0.114	b_4	- 16.1	- 30.5	- 19.3	
ϵ SERPENTIS.											
1880, May 8	M	2	6	1	276	0.089	F	- 1.0	+ 44.5	+ 40.3	
18	M	2	4	1	276	0.104	F	+ 0.8	+ 25.8	+ 19.8	
γ HERCULIS.*											
1880, May 15	M	2	1	1	275	0.168	F	- 0.5	- 52.8	- 82.3	
25	M	2	1	1	275	0.103	F	+ 1.8	+ 7.8	+ 7.5	
η DRACONIS.*											
1880, September 13	M	2	1	1	96	0.082	b_1	+ 1.3	+ 21.4	+ 20.4	
20	M	3	4	1	96	0.151	b_1	+ 0.9	- 27.2	- 35.2	
29	M	3	3½	1	95	0.133	b_1	+ 0.3	+ 36.1	+ 39.2	
ζ DRACONIS.											
1880, October 1	M	2	2	1	95	0.160	F	+ 1.5	- 23.7	- 27.0	
November 8	M	2	3	1	96	0.141	F	- 1.2	- 20.5	- 18.6	
β DRACONIS.											
1880, September 13	M	2	2	1	96	0.082	b_1	+ 4.5	+ 40.5	+ 32.2	
27	M	4	6	1	96	0.125	b_1	+ 4.2	+ 17.2	+ 18.7	
α OPHIUCHI.											
1880, July 15	M	2	4	1	276	0.136	F	+ 7.9	- 21.5	- 19.6	
29	M	2	6	1	275	0.170	F	+ 10.5	+ 14.9	+ 16.1	
September 3	M	2	1	1	95	0.154	F	+ 14.5	+ 25.7	+ 24.2	
ξ DRACONIS.											
1880, September 27	M	2	1	1	95	0.125	b_1	+ 3.0	+ 8.3	+ 11.0	
γ DRACONIS.											
1880, September 13	M	2	4	1	96	0.082	b_1	+ 4.7	- 11.0	- 11.4	
* The discordances appear to be due to the character of the lines in these stars, F being diffused in γ Herculis, and b_1 very faint in η Draconis.											

Date.	Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.		
									Measured.	Estimated.	
α LYRÆ (<i>Vega</i>).											
1880, July	29	M	2	8	1	^o 275	^r 0.170	F	+ 3.4	— 23.7	— 25.2
	29	M	2	8	2	275	0.170	F	+ 3.4	— 15.8	— 11.7
September	3	M	2	6	1	95	0.154	F	+ 7.3	— 26.4	— 28.2
November	27	M	3	12	1	275	0.159	F	+ 5.5	— 33.1	— 40.0
γ LYRÆ.											
1880, November	27	M	2	6	1	275	0.159	F	+ 7.6	+ 8.6	+ 16.3
ζ AQUILÆ.											
1880, July	15	M	2	6	1	276	0.136	F	+ 1.4	— 27.4	— 23.8
δ AQUILÆ.											
1880, July	15	M	2	1	1	276	0.136	F	+ 0.5	+ 18.7	+ 17.4
β CYGNI.											
1880, September	20	M	3	3	1	96	0.151	b_1	+ 10.2	— 3.9	— 1.5
November	20	M	3	4	1	276	0.119	b_1	+ 10.8	— 23.1	— 22.3
δ CYGNI.											
1880, July	29	M	2	2	1	275	0.170	F	— 1.0	— 29.0	— 27.6
September	3	M	2	1	1	95	0.154	F	+ 3.6	— 22.8	— 21.5
November	8	M	4	10	1	96	0.141	F	+ 8.1	— 6.0	— 6.6
α AQUILÆ (<i>Altair</i>).											
1880, July	20	M	4	12	1	275	0.140	F	— 0.4	— 10.5	— 13.6
γ CYGNI.											
1880, September	29	M	2	4	1	95	0.133	b_1	+ 6.9	— 5.2	— 6.9
α DELPHINI.											
1880, July	20	M	2	1	1	275	0.140	F	— 4.4	+ 25.3	+ 24.3

GREENWICH OBSERVATIONS, 1880.

5 H

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

Date.	Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.	
									Measured.	Estimated.
α CYGNI.										
1880, September 29	M	2	4	1	⁰ 95	^r 0'133	F	+ 5'1	- 18'4	- 20'5
ζ CYGNI.										
1880, November 20	M	2	1	1	276	0'119	b_1	- 13'0	- 6'7	- 18'8
α CEPHEI.										
1880, November 21	WC	2	2	1	275	0'150	F	+ 5'1	- 75'9	- 48'6
β^2 CEPHEI.										
1880, November 20	M	3	3	1	276	0'119	b_1	+ 2'7	+ 53'1	+ 53'8
ϵ PEGASI.										
1880, September 29	M	2	2	1	95	0'133	b_1	+ 10'2	- 17'2	- 19'0
η PEGASI.										
1880, September 27	M	2	1	1	95	0'125	b_1	+ 2'9	- 10'3	- 11'4
β PEGASI.										
1880, September 27	M	2	2	1	95	0'125	b_4	+ 2'1	+ 21'7	+ 23'2
	M	2	2	1	95	0'125	b_1	+ 2'1	+ 8'6	+ 10'6
α PEGASI.										
1880, September 3 November 25 27	M	2	2	1	95	0'154	F	- 2'9	- 21'5	- 20'9
	WC	2	3	1	275	0'150	F	+ 17'0	- 77'1	- 51'4
	M	4	13	1	275	0'159	F	+ 17'2	- 39'9	- 50'0

Date.	Observer.	Number of Measures.	Weight.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star.		
									Measured.	Estimated.	
ROTATION OF JUPITER.											
Relative Motion of the E. and W. limbs in the Line of Sight.											
1880, October	29	M	5	5	1	337.30	0'110	F	..	+ 17'4	..
	29	M	5	2½	1	337.30	0'110	b ₁	..	+ 15'1	..
MOON.											
1880, January	26	M	3	..	1	275	0'160	b ₁	..	+ 3'7	..
	30	M	4	..	2	276	0'168	F	..	— 0'2	..
	30	M	4	..	1	276	0'168	F	..	— 1'6	..
February	17	M	4	..	1	276	0'140	b ₁	..	— 1'8	..
	21	M	4	..	1	186	0'086	b ₁	..	— 0'8	..
	26	M	4	..	1	186	0'114	b ₁	..	— 1'5	..
March	24	M	5	..	2	277	0'114	F	..	+ 0'3	..
May	15	M	4	..	1	275	0'168	F	..	— 0'6	..
	18	M	4	..	1	276	0'104	F	..	+ 0'3	..
	22	M	4	..	1	275	0'089	F	..	— 0'5	..
SKY SPECTRUM.											
1880, February	11	M	2	..	1	276	0'205	F	..	+ 0'6	..
March	15	M	5	..	1	286	0'120	F	..	+ 0'6	..
	20	M	5	..	2	275	0'107	F	..	+ 1'0	..
September	4	M	5	..	1	95	0'154	F	..	— 0'9	..
	15	M	5	..	1	96	0'082	F	..	— 0'4	..
	29	M	5	..	1	95	0'133	b ₁	..	— 0'4	..
November	18	M	5	..	1	340	0'150	F	..	+ 1'3	..
	29	M	5	..	1	275	0'150	F	..	— 0'5	..
The coincidence between the H_β line in the comparison spectrum and the F line in the sky spectrum was also verified on May 26; July 14; July 16; July 21; and October 2. In each case no change had been made in the adjustment of the spectroscope since the measures of displacement obtained on the previous evening. The adjustment of the spectroscope was the same— On the evenings of March 13 and 17 as on the morning of March 16. „ May 29 and June 4 „ May 26. „ September 13 and 20 „ September 15. „ September 27 „ September 29. „ November 27 and 28 „ November 29.											

MEAN RESULTS for MOTIONS of STARS in the LINE of SIGHT, from SPECTROSCOPIC OBSERVATIONS made at the
ROYAL OBSERVATORY, GREENWICH, in the YEARS 1875 to 1880.

The Concluded Motions are given in miles per second, and the probable errors of the results, inferred from the separate discordances, are appended with the sign $\pm$, in cases where there are sufficient observations to give a rough estimate of the probable error.

The character of the line measured is given in the remarks, as on this depends very largely the accuracy of the observations.

Star's Name.	Concluded Motion.	Weight.	No. of Measures.	No. of Nights.	Remarks.
α Andromedæ	- 35 $\pm$ 3.5	28	18	9	F broad ; nebulous.
β Cassiopeiæ	+ 37 ?	7	3	1	F broad ; diffused.
γ Pegasi	- 37	18	7	3	F diffused.
α Cassiopeiæ	+ 23 ?	9	4	2	b_1 .
γ Cassiopeiæ	- 26	12	6	2	F bright ; nebulous.
β Andromedæ	+ 12	18	6	2	b_1 distinct.
β Arietis	- 13	11	8	2	F broad ; very dark.
α Piscium	- 35	7 $\frac{1}{2}$	5	2	F narrow ; sharp.
γ^1 Andromedæ	- 13 ?	10	4	2	b_1 .
α Arietis	- 15	11	7	4	b_1 distinct.
α Ceti	- 34 ?	4	4	1	b_1, b_4 ; fluted spectrum.
β Persei	- 30	3	2	1	F very dark ; sharp.
α Persei	+ 23	7	4	2	F faint ; diffused.
ζ Persei	- 45	1	2	1	b_1 very faint.
Aldebaran	+ 22 $\pm$ 2.3	26 $\frac{1}{2}$	15	7	b_1 very distinct.
Capella	+ 29 $\pm$ 3.6	53	23	9	b_1 distinct ; F sharp.
Rigel	+ 19 $\pm$ 1.7	40 $\frac{1}{2}$	22	9	F very distinct.
γ Orionis	0 $\pm$ 2.0	25	14	4	F very distinct.
β Tauri	- 15	17	7	3	F broad ; diffused.
δ Orionis	+ 5 $\pm$ 5.1	11 $\frac{1}{2}$	12	6	F faint ; narrow.
ϵ Orionis	- 15 $\pm$ 6.4	23	15	6	F faint ; narrow.
ζ Orionis	+ 9	7	7	3	F faint ; narrow.
κ Orionis	- 1	4	4	2	F distinct.
α Orionis	+ 19 $\pm$ 1.9	54	20	8	b_1, b_4 ; fluted spectrum.
β Aurigæ	+ 3	12	8	3	F very broad ; nebulous.
γ Geminorum	+ 10	9	4	2	F broad ; sharp.
Sirius	+ 19 $\pm$ 2.0	81	26	10	F very broad ; diffused.
β Canis Minoris	- 15 ?	3	3	1	F broad ; diffused.
Castor	+ 27 $\pm$ 3.4	34	15	8	F very broad ; diffused.
Procyon	+ 25 $\pm$ 2.8	65	20	10	F broad ; nebulous.
Pollux	- 27 $\pm$ 2.7	74	34	13	b_1 distinct ; F faint ; sharp.
α Hydræ	+ 38	7 $\frac{1}{2}$	5	2	b_1 .
ϵ Leonis	- 13	8	6	3	b_1 distinct.
Regulus	+ 26 $\pm$ 2.2	48	15	8	F broad.
γ^1 Leonis	- 32 $\pm$ 4.3	25	13	5	b_1 .
β Ursæ Majoris	+ 24 $\pm$ 4.0	34	16	8	F very dark ; broad ; nebulous.
α Ursæ Majoris	- 21	6	4	2	b_1 ; F faint.
δ Leonis	- 28	14	4	2	F broad ; dark.
θ Leonis	+ 8 ?	2	3	1	F very dark ; broad ; diffused.
χ Ursæ Majoris	+ 35 ?	1	2	1	F very dark ; broad ; nebulous.
β Leonis	+ 25	18	9	4	F broad.
γ Ursæ Majoris	+ 15 $\pm$ 2.3	30	12	6	F very dark ; broad ; nebulous.
δ Ursæ Majoris	+ 11	6	5	2	F very dark ; broad ; nebulous.
γ Virginis	+ 9 ?	10	8	4	F faint ; diffused.
ϵ Ursæ Majoris	+ 16 $\pm$ 2.8	27	10	5	F broad ; diffused.
δ Virginis	+ 57 ?	1	2	1	b_4 ; fluted spectrum.
α Canum Venaticum	- 30 ?	8	4	1	F very dark ; broad ; sharp.
ϵ Virginis	- 28	4	4	2	b_1 .
Spica	+ 6 $\pm$ 3.2	36	16	7	F narrow ; sharp.
ζ Ursæ Majoris	+ 22	16	6	3	F very dark ; broad ; nebulous.
η Ursæ Majoris	- 12	13	5	3	F broad ; diffused.
η Boötis	- 34 ?	4	2	1	b_1 distinct.
Arcturus	- 32 $\pm$ 2.0	110	36	14	b_1 very distinct ; D dark ; F sharp.
γ Boötis	- 52 ?	2	2	1	F broad.
ϵ^2 Boötis	- 4 $\pm$ 3.1	36	16	7	b_1, b_4 distinct.
β Ursæ Minoris	+ 29	8	6	2	b_1 faint.
β Libræ	+ 16	18	7	3	F faint ; sharp.
α Coronæ	+ 41 $\pm$ 4.1	35	16	7	F very dark ; broad ; diffused.
α Serpentis	- 29 ?	3	2	1	b_4 ; fluted spectrum.

Star's Name.	Concluded Motion.	Weight.	No. of Measures.	No. of Nights.	Remarks.
ϵ Serpentis	+ 33	10	4	2	F broad.
γ Herculis	- 30 ?	2	4	2	F diffused.
η Draconis	+ 4 ?	$8\frac{1}{2}$	8	3	b_1 very faint.
β Herculis	+ 1 ?	$4\frac{1}{2}$	5	2	b_1 very faint.
ζ Herculis	+ 23	7	3	2	b_1 .
ζ Draconis	- 24	5	4	2	F diffused.
α Herculis	- 32	$5\frac{1}{2}$	4	2	b_4 ; fluted spectrum.
β Draconis	+ 19	$9\frac{1}{2}$	9	4	b_1, b_4 very faint.
α Ophiuchi	+ 8 $\pm$ 4.7	38	19	9	F very diffused.
ξ Draconis	+ 10 ?	1	2	1	b_1 very faint.
γ Draconis	- 17 $\pm$ 2.8	$18\frac{1}{2}$	10	4	b_1, b_4 very distinct.
α Lyrae	- 34 $\pm$ 1.9	126	35	14	F very dark; broad; diffused.
γ Lyrae	+ 9	14	6	2	F broad; diffused.
ζ Aquilæ	- 21 $\pm$ 12.8	$27\frac{1}{2}$	11	5	F very broad; diffused.
δ Aquilæ	+ 18 ?	1	2	1	F broad.
β Cygni	- 18	10	8	3	b_1 distinct.
γ Aquilæ	- 28	7	6	3	b_1 distinct.
δ Cygni	- 18 $\pm$ 3.3	25	12	5	F diffused.
α Aquilæ	- 13 $\pm$ 7.6	21	21	9	F very broad; diffused.
γ Cygni	- 16 $\pm$ 2.6	37	18	9	b_1, b_4 distinct; F sharp.
α Delphini	+ 23	3	4	2	F very broad.
α Cygni	- 41 $\pm$ 3.6	51	17	9	b_1 faint; F sharp.
ϵ Cygni	+ 16	$12\frac{1}{2}$	8	4	b_1, b_4 .
ζ Cygni	- 13 ?	1	2	1	b_1 indistinct.
α Cephei	- 62 ?	2	2	1	F very dark; sharp.
β^2 Cephei	+ 54 ?	3	3	1	b_1 indistinct.
ϵ Pegasi	- 17 $\pm$ 1.8	32	22	10	b_1, b_2, b_4 distinct.
η Pegasi	- 17	5	4	2	b_1 .
Fomalhaut	+ 5 ?	9	5	2	F distinct.
β Pegasi	+ 20	14	9	3	b_1, b_4 ; fluted spectrum.
α Pegasi	- 33 $\pm$ 4.2	34	16	7	F broad; distinct.

In forming these mean results equal weight has been given to each individual measure, as it appears that there is no relation between the probable error of a measure, inferred from its discordance from the mean, and the weight assigned by the observer. The following table gives the probable error corresponding to Weight 1, and the probable error of a single measure disregarding the weight, as well as the number of measures, and the mean weight of each measure. It will be seen that the probable error corresponding to Weight 1 is very large in the case of those stars which have a heavy mean weight, and that the probable error of one measure is no smaller for such stars than for others to which the observer has assigned a small weight.

Star's Name.	No. of Measures.	Mean Weight.	Probable Error for Weight 1.	Probable Error of 1 Measure.	Star's Name.	No. of Measures.	Mean Weight.	Probable Error for Weight 1.	Probable Error of 1 Measure.
α Andromedæ	18	1.6	± 22.7	± 14.5	ϵ Ursæ Majoris	10	2.7	± 20.2	± 8.8
Aldebaran	15	1.8	± 10.4	± 8.9	Spica	16	2.3	± 24.8	± 12.8
Capella	23	2.3	± 34.0	± 15.4	Arcturus	36	3.1	± 29.5	± 12.1
Rigel	22	1.8	± 12.3	± 7.6	ϵ^2 Boötis	16	2.3	± 22.6	± 12.4
γ Orionis	14	1.8	± 7.4	± 7.3	α Coronæ	16	2.2	± 28.4	± 16.4
δ Orionis	12	1.0	± 21.9	± 16.6	α Ophiuchi	19	2.0	± 45.1	± 20.5
ϵ Orionis	15	1.5	± 52.0	± 24.3	γ Draconis	10	1.9	± 9.1	± 9.0
α Orionis	20	2.7	± 13.9	± 8.3	α Lyrae	35	3.6	± 27.8	± 11.4
Sirius	26	3.1	± 22.2	± 10.1	ζ Aquilæ	11	2.5	± 91.6	± 40.5
Castor	15	2.3	± 25.3	± 13.1	δ Cygni	12	2.1	± 18.8	± 11.4
Procyon	20	3.3	± 32.4	± 12.7	α Aquilæ	21	1.0	± 55.3	± 34.6
Pollux	34	2.2	± 34.6	± 15.9	γ Cygni	18	2.1	± 21.3	± 10.8
Regulus	15	3.2	± 17.5	± 8.5	α Cygni	17	3.0	± 32.6	± 14.8
γ^1 Leonis	13	1.9	± 24.0	± 15.2	ϵ Pegasi	22	1.5	± 14.2	± 8.6
β Ursæ Majoris	16	2.1	± 28.3	± 16.1	α Pegasi	16	2.1	± 35.6	± 16.6
γ Ursæ Majoris	12	2.5	± 15.4	± 8.0					

OBSERVATIONS of the SPECTRUM of COMET 1880 *d* (HARTWIG's), made at the ROYAL OBSERVATORY, GREENWICH,
in the YEAR 1880.

1880, October 7, 11, and 12.

Single-prism Spectroscope.

Observer, W C.

The spectrum consisted of the three usual cometary bands, the nucleus giving a continuous spectrum. Of the three bands, the middle one in the green was estimated to be fully five times as bright as the two others.

The following determinations were obtained of the position of the less refrangible edge of the brightest band in the comet-spectrum, as compared with that of the green carbon-band at 5198 tenth-metres, W.L., as given by alcohol in a vacuum tube :—

Greenwich Mean Time.	Comet-band.	Wave-length inferred.	Width of Slit.
h m			in.
9. 0	Red edge	$5198 - 13 = 5185$	0.018 = 35 tenth-metres.
9. 0	Red edge	$5198 + 15 = 5213$	
9. 0	Red edge	$5198 + 6 = 5204$	

On October 11 the center of the brightest part of the comet-band was compared with that of the green carbon-band at 5165 tenth-metres, W.L., given by the blue base of a flame, with the following results :—

Greenwich Mean Time.	Comet-band.	Wave-length inferred.	Width of Slit.
h m			in.
9. 0	Center	$5165 - 22 = 5143$	0.0195 = 38 tenth-metres.
9. 20	Center	$5165 + 36 = 5201$	

On October 12 the center of the brightest part of the comet-band was compared, first with that of the carbon-band at 5198 tenth-metres, W.L., and then with that of the carbon-band at 5165 tenth-metres, W.L.

Greenwich Mean Time.	Comet-band.	Wave-length inferred.	Width of Slit.
h m			in.
7. 30	Center	$5198 + 7 = 5205$	0.0165 = 32 tenth-metres.
8. 0	Center	$5198 - 44 = 5154$	
8. 20	Center	$5198 - 50 = 5148$	
8. 20	Center	$5198 - 2 = 5196$	

MEANS :—

	Wave-length.	Width of Slit.
October 7	5201	0.018 = 35 tenth-metres.
October 11 and 12	5169	0.018 = 35 tenth-metres.

These measures leave it uncertain whether the comet-band coincides with the band in the second spectrum of carbon (vacuum tube) at 5198, or with that in the first spectrum (blue base of flame) at 5165.

The measures on October 7 were more satisfactory than those on October 11 and 12, and are entitled to more confidence, both the comet-band and the carbon-band being much brighter. On October 12 the carbon-band from the vacuum-tube (which was an old one) was hardly visible, being overpowered by the complex or band-spectrum of hydrogen, which had in course of time replaced the ordinary hydrogen spectrum of four lines. The measures of the carbon-band were thus little more than guesses on this day. In the comparisons with the flame spectrum it was difficult to avoid parallax, the slit being wide and the flame blown about by the wind.