ROYAL OBSERVATORY, GREENWICH.

SPECTROSCOPIC OBSERVATIONS

MADE AT THE

ROYAL OBSERVATORY, GREENWICH,

1890.

MEASURES of DISPLACEMENT of LINES in the SPECTRA of STARS, SUN, MOON, AND PLANETS as compared with those of TERRESTRIAL ELEMENTS, and CONCLUDED MOTIONS in the LINE of SIGHT, from OBSERVATIONS at the ROYAL OBSERVATORY, GREENWICH, in the Year 1890.

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

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

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

1 rev. of the micrometer corresponds with one "half-prism" to 10·4 tenth-metres or 375 miles per second for the *b* lines, and to 7·91 tenth-metres or 304 miles per second for the F line.

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 6°.

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

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

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

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Jan. 4. 22. 0	M	Aldebaran.....	F	0·198	+0·329	+ ¾	+ 11·2	+ 88·7	+ 57·3	Spectrum very faint. Star-line seen with great difficulty. Position Circle 6°.
22. 1	M	,,	F	0·198	+0·165	+ ⅓	+ 11·2	− 38·9	+ 19·3	
Feb. 7. 20. 23	M	Aldebaran.....	F	0·198	+0·169	+ ⅔	+ 17·7	+ 33·6	+ 43·2	Spectrum faint. Definition bad. Star-line seen with great difficulty. Position Circle 6°.
20. 26	M	,,	F	0·198	+0·103	+ ½	+ 17·7	+ 13·6	+ 28·0	
Feb. 18. 20. 10	M	Rigel	F	0·170	+0·119	+ ¼	+ 15·5	+ 20·6	+ 10·0	Spectrum rather faint but fairly steady. Definition fair.
20. 11	M	,,	F	0·170	+0·175	+ ½	+ 15·5	+ 37·6	+ 35·5	
20. 16	M	γ Orionis	F	0·170	+0·118	+ ⅛	+ 17·0	+ 18·8	+ 17·0	Spectrum rather faint but fairly steady. Definition poor.
20. 18	M	,,	F	0·170	+0·104	+ ¼	+ 17·0	+ 14·6	+ 8·5	
20. 28	M	β Tauri	F	0·170	+0·061	+ 1/10	+ 17·5	+ 1·0	− 7·3	
20. 32	M	,,	F	0·170	−0·068	− 1/10	+ 17·5	− 38·1	− 27·7	
20. 34	M	,,	F	0·170	+0·089	+ ¼	+ 17·5	+ 9·5	+ 8·0	
20. 36	M	,,	F	0·170	+0·040	+ 1/10	+ 17·5	− 5·4	− 7·3	
20. 46	M	δ Orionis	F	0·170	+0·168	+ ½	+ 16·1	+ 34·9	+ 34·9	Spectrum faint but fairly steady. Star-line faint and very difficult to see. Measures rough and made with much difficulty.
20. 50	M	,,	F	0·170	−0·096	− ⅓	+ 16·1	− 45·2	− 50·1	
20. 51	M	,,	F	0·170	+0·044	+ 1/10	+ 16·1	− 3·3	− 5·9	
20. 53	M	,,	F	0·170	+0·080	+ ⅕	+ 16·1	+ 8·2	+ 4·3	
21. 25	M	Sirius.....	F	0·170	−0·034	− 1/10	+ 10·7	− 21·0	− 20·9	Spectrum bright but very unsteady. Direct comparison appeared to show a very small displacement towards the red.
21. 26	M	,,	F	0·170	+0·020	+ 1/10	+ 10·7	− 4·6	− 0·5	
21. 27	M	,,	F	0·170	+0·009	0	+ 10·7	− 8·0	− 10·7	
21. 29	M	,,	F	0·170	+0·055	+ 1/10	+ 10·7	+ 6·0	− 0·5	
21. 44	M	Procyon.....	F	0·170	+0·030	+ ¼	+ 10·6	− 1·5	+ 14·9	Spectrum bright and steady. Star-line seen well.
21. 45	M	,,	F	0·170	+0·049	+ ¼	+ 10·6	+ 4·3	+ 14·9	
21. 51	M	Pollux	F	0·170	−0·038	− 1/10	+ 11·6	− 23·2	− 21·8	Spectrum fairly bright and steady. Star-line faint and seen with difficulty.
22. 1	M	,,	F	0·170	−0·037	− 1/10	+ 11·6	− 22·9	− 21·8	
22. 9	M	Castor.....	F	0·170	+0·176	+ ⅔	+ 12·3	+ 41·2	+ 55·7	Spectrum fairly bright and steady. Star-line seen fairly well.
22. 12	M	,,	F	0·170	+0·160	+ ⅔	+ 12·3	+ 36·3	+ 55·7	

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement. Measured.	Displacement. Estimated.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second. Measured.	Concluded Motion of Star in Miles per Second. Estimated.	REMARKS.
d h m				r	r					
Feb. 18. 22. 20	M	γ Geminorum..	F	0·170	+0·185	+ ½	+ 14·8	(+ 41·4)	(+ 36·2)	Attempts to bisect the star-line were very unsatisfactory.
22. 22	M	,,	F	0·170	−0·117	− ⅓	+ 14·8	(− 50·3)	(− 48·8)	
22. 23	M	,,	F	0·170	+0·128	+ ⅓	+ 14·8	(+ 24·1)	(+ 19·2)	
22. 25	M	,,	F	0·170	−0·137	− ½	+ 14·8	(− 56·4)	(− 65·8)	
22. 44	M	Aldebaran.....	F	0·170	+0·142	+ ⅔	+ 18·5	+ 24·6	+ 49·5	Spectrum very unsteady. Star-line faint.
22. 45	M	,,	F	0·170	+0·103	+ ⅓	+ 18·5	+ 12·8	+ 15·5	
22. 51	M	β Aurigæ	F	0·170	+0·031	+ 1/10	+ 15·4	− 6·0	− 5·2	Spectrum steady and fairly bright. Star-line seen well.
22. 52	M	,,	F	0·170	−0·006	0	+ 15·4	− 17·2	− 15·4	Position Circle, 6°.
Mar. 3. 19. 55	M	Rigel	F	0·210	+0·162	+ ½	+ 16·0	+ 33·2	+ 39·3	Spectrum faint and very unsteady.
19. 56	M	,,	F	0·210	+0·232	+ ⅗	+ 16·0	+ 54·5	+ 50·3	
19. 57	M	,,	F	0·210	+0·117	+ 3/10	+ 16·0	+ 19·5	+ 17·2	
19. 59	M	,,	F	0·210	+0·101	+ ¼	+ 16·0	+ 14·7	+ 11·6	
20. 9	M	γ Orionis	F	0·210	+0·190	+ ¾	+ 17·8	+ 39·9	+ 9·8	Spectrum faint and very unsteady. Star-line dark.
20. 11	M	,,	F	0·210	+0·014	+ ⅓	+ 17·8	− 13·5	+ 19·1	
20. 18	M	β Tauri	F	0·210	+0·086	+ 3/10	+ 18·4	+ 7·7	+ 14·8	Spectrum faint but fairly steady. Star-line dark.
20. 20	M	,,	F	0·210	+0·117	+ ⅓	+ 18·4	+ 17·1	+ 18·5	
20. 30	M	Sirius.....	F	0·210	+0·025	+ 1/10	+ 12·6	− 5·0	− 1·5	Spectrum exceedingly unsteady. Star-line unusually broad and diffused. Measures very rough.
20. 32	M	,,	F	0·210	+0·058	+ ⅕	+ 12·6	+ 5·0	+ 9·5	
20. 34	M	,,	F	0·210	−0·100	− 3/10	+ 12·6	− 43·0	− 45·8	
20. 36	M	,,	F	0·210	+0·081	+ 1/10	+ 12·6	+ 12·0	− 1·5	
20. 38	M	,,	F	0·210	+0·012	+ 1/10	+ 12·6	− 9·0	− 1·5	
20. 39	M	,,	F	0·210	+0·001	0	+ 12·6	− 12·3	− 12·6	
20. 57	M	γ Geminorum..	F	0·210	+0·088	+ ¼	+ 16·9	+ 9·8	+ 10·7	Spectrum faint but fairly steady. Definition fair.
20. 59	M	,,	F	0·210	+0·075	+ 3/10	+ 16·9	+ 5·9	+ 16·3	
21. 9	M	Procyon.....	F	0·210	+0·031	+ ⅕	+ 13·6	− 4·2	+ 8·5	Spectrum fairly bright and steady. Star-line seen well.
21. 11	M	,,	F	0·210	+0·062	+ ¼	+ 13·6	+ 5·2	+ 14·0	
21. 25	M	Pollux	F	0·210	−0·029	− 1/10	+ 14·6	− 23·4	− 25·7	Spectrum faint but steady. Star-line very faint and seen with great difficulty.
21. 29	M	,,	F	0·210	−0·031	− 1/10	+ 14·6	− 24·0	− 25·7	
21. 37	M	Castor	F	0·210	+0·105	+ ⅓	+ 15·0	+ 16·9	+ 21·9	Spectrum fairly bright and steady. Star-line seen well.
21. 38	M	,,	F	0·210	+0·150	+ ½	+ 15·0	+ 30·6	+ 40·3	
21. 49	M	Moon..	F	0·210	+0·033			+ 10·0		The coincidence of the two spectra appeared perfect.
21. 50	M	,,	F	0·210	−0·025			− 7·6		
21. 52	M	,,	F	0·210	−0·087			− 26·4		
21. 53	M	,,	F	0·210	+0·032			+ 9·7		
21. 54	M	,,	F	0·210	+0·009			+ 2·7		
22. 11	M	β Aurigæ	F	0·210	+0·032	+ 1/10	+ 16·8	− 7·1	− 5·7	Star-line very broad, diffused, and ill-defined.
22. 14	M	,,	F	0·210	−0·099	− ⅓	+ 16·8	− 46·9	− 53·7	
22. 22	M	Capella	F	0·210	+0·106	+ ⅖	+ 17·1	+ 15·1	+ 27·1	Spectrum bright but very unsteady. Star-line seen fairly well.
22. 23	M	,,	F	0·210	+0·076	+ ⅓	+ 17·1	+ 6·0	+ 19·8	
22. 41	M	β Persei.....	F	0·210	−0·099	− ⅓	+ 16·4	− 46·5	− 53·3	Spectrum faint and very unsteady. Measures made with great difficulty.
22. 42	M	,,	F	0·210	−0·142	− ⅖	+ 16·4	− 59·5	− 60·6	Position Circle, 6°.
Mar. 7. 21. 46	M	Sirius.....	F	0·210	+0·008	+ 1/20	+ 13·0	− 10·6	− 7·5	Spectrum exceedingly unsteady. Much cloud, definition bad.
21. 48	M	,,	F	0·210	−0·118	− ⅓	+ 13·0	− 48·8	− 49·9	
21. 49	M	,,	F	0·210	−0·147	− ⅖	+ 13·0	− 57·7	− 57·2	
21. 50	M	,,	F	0·210	−0·013	− 1/10	+ 13·0	− 17·0	− 24·1	Position Circle, 6°.
Mar. 12. 19. 51	M	Sirius.....	F	0·225	+0·108	+ ¼	+ 13·4	+ 19·4	+ 12·5	Spectrum bright but most unsteady. Definition very bad. Star line observed with great difficulty.
19. 52	M	,,	F	0·225	+0·047	+ 1/10	+ 13·4	+ 0·9	− 3·0	
20. 2	M	,,	F	0·225	+0·093	+ ¼	+ 13·4	+ 14·9	+ 12·5	
20. 5	M	,,	F	0·225	−0·157	− ⅓	+ 13·4	− 61·1	− 47·9	
20. 6	M	,,	F	0·225	−0·113	− ⅓	+ 13·4	− 47·7	− 47·9	
20. 8	M	,,	F	0·225	−0·062	− ¼	+ 13·4	− 32·2	− 39·3	
20. 24	M	Rigel	F	0·225	+0·121	+ ⅖	+ 15·8	+ 20·9	+ 25·6	Spectrum exceedingly unsteady. Definition bad. Star-line seen with great difficulty.
20. 25	M	,,	F	0·225	+0·080	+ ⅓	+ 15·8	+ 8·5	+ 18·7	

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Mar. 12. 20. 32	M	δ Orionis	F	0·225	−0·061	− 1/4	+ 17·0	− 35·5	− 42·9	Spectrum faint and very unsteady for first two observations, but better for last two.
20. 33	M	,,	F	0·225	+0·090	+ 1/3	+ 17·0	+ 10·3	+ 17·5	
20. 35	M	,,	F	0·225	+0·114	+ 1/3	+ 17·0	+ 17·6	+ 17·5	
20. 37	M	,,	F	0·225	−0·007	0	+ 17·0	− 19·1	− 17·0	
20. 49	M	ε Orionis	F	0·225	+0·105	+ 2/5	+ 16·9	+ 15·0	+ 24·5	Spectrum faint and very unsteady. The work of bisecting the line was most difficult and trying, the star-line being very faint.
20. 51	M	,,	F	0·225	+0·088	+ 1/4	+ 16·9	+ 9·8	+ 9·0	
20. 53	M	,,	F	0·225	+0·099	+ 1/3	+ 16·9	+ 13·2	+ 17·6	
20. 55	M	,,	F	0·225	+0·049	+ 1/5	+ 16·9	− 2·0	+ 3·8	
21. 3	M	ζ Orionis	F	0·225	+0·022	+ 1/10	+ 16·8	− 10·1	− 6·4	Spectrum very unsteady. Star-line faint, but seen well by glimpses.
21. 5	M	,,	F	0·225	−0·024	− 1/10	+ 16·8	− 24·1	− 27·2	
21. 7	M	,,	F	0·225	+0·010	+ 1/20	+ 16·8	− 13·8	− 11·6	
21. 8	M	,,	F	0·225	−0·008	0	+ 16·8	− 19·2	− 16·8	
21. 16	M	γ Orionis	F	0·225	−0·015	0	+ 17·8	− 22·4	− 17·8	Spectrum unsteady, but star-line seen fairly well.
21. 18	M	,,	F	0·225	−0·004	0	+ 17·8	− 19·0	− 17·8	
21. 26	M	β Tauri	F	0·225	+0·094	+ 1/3	+ 18·5	+ 10·1	+ 16·0	Spectrum fairly bright and steady. Star-line seen fairly well.
21. 28	M	,,	F	0·225	+0·078	+ 1/4	+ 18·5	+ 5·2	+ 7·4	
21. 37	M	Aldebaran	F	0·225	+0·173	+ 1/2	+ 18·0	+ 34·5	+ 33·8	Spectrum very unsteady. Star-line seen with much difficulty. Measures rough.
21. 39	M	,,	F	0·225	+0·056	+ 1/4	+ 18·0	− 1·0	+ 7·9	
21. 49	M	β Aurigæ	F	0·225	−0·113	− 2/5	+ 17·2	− 51·5	− 58·6	Spectrum fairly bright but unsteady.
21. 53	M	,,	F	0·225	−0·125	− 1/3	+ 17·2	− 55·2	− 51·7	
22. 5	M	Capella	F	0·225	+0·051	+ 1/3	+ 17·1	− 1·6	+ 17·4	Spectrum unsteady. Star-line faint and seen with great difficulty.
22. 7	M	,,	F	0·225	+0·159	+ 1/2	+ 17·1	+ 31·2	+ 34·7	
22. 14	M	β Persei.....	F	0·225	−0·111	− 1/3	+ 15·2	− 48·9	− 49·7	Spectrum fairly bright but unsteady. Star-line seen fairly well.
22. 16	M	,,	F	0·225	−0·116	− 1/3	+ 15·2	− 50·5	− 49·7	
22. 17	M	,,	F	0·225	−0·211	− 1/2	+ 15·2	− 79·3	− 67·0	
22. 19	M	,,	F	0·225	−0·135	− 1/3	+ 15·2	− 56·2	− 49·7	
22. 26	M	α Persei	F	0·225	−0·064	− 1/5	+ 14·9	− 34·3	− 35·6	Spectrum fairly bright and steady. Star-line seen fairly well.
22. 29	M	,,	F	0·225	−0·130	− 1/3	+ 14·9	− 54·4	− 49·4	
22. 37	M	γ Geminorum..	F	0·225	−0·090	− 1/3	+ 17·8	− 45·1	− 52·3	Spectrum fairly bright and steady. Star-line seen fairly well.
22. 39	M	,,	F	0·225	−0·053	− 1/4	+ 17·8	− 33·9	− 43·7	
22. 45	M	Castor	F	0·225	+0·152	+ 2/5	+ 16·4	+ 29·8	+ 25·0	Spectrum bright and fairly steady.
22. 47	M	,,	F	0·225	+0·109	+ 1/3	+ 16·4	+ 16·7	+ 18·1	
22. 48	M	,,	F	0·225	+0·101	+ 1/3	+ 16·4	+ 14·3	+ 18·1	
22. 50	M	,,	F	0·225	−0·019	0	+ 16·4	− 22·2	− 16·4	
22. 59	M	Pollux	F	0·225	−0·121	− 3/5	+ 16·1	− 52·8	− 78·2	Spectrum bright and fairly steady. Star-line faint, but seen fairly well.
23. 1	M	,,	F	0·225	−0·120	− 2/5	+ 16·1	− 52·5	− 57·5	
23. 13	M	Procyon.....	F	0·225	−0·009	0	+ 15·2	− 17·9	− 15·2	Spectrum bright but very unsteady.
23. 15	M	,,	F	0·225	−0·026	− 1/20	+ 15·2	− 23·1	− 20·4	
23. 16	M	,,	F	0·225	−0·074	− 1/4	+ 15·2	− 37·7	− 41·1	
23. 18	M	,,	F	0·225	−0·073	− 1/5	+ 15·2	− 37·4	− 35·9	
										Position Circle, 6°.
Mar. 14. 11. 50	M	Sky.....	F	0·225	−0·014			− 4·3		The coincidence of the two spectra appeared perfect.
11. 55	M	,,	F	0·225	−0·022			− 6·7		
12. 0	M	,,	F	0·225	+0·008			+ 2·4		
12. 5	M	,,	F	0·225	−0·005			− 1·5		
12. 10	M	,,	F	0·225	−0·015			− 4·6		
										Position Circle, 6°.
Mar. 17. 20. 34	M	Nebula in Orion ..	N_1	0·095	+0·086		+ 16·2	+ 13·0		Compared with Nitrogen. The measures of the nebular line were made with great difficulty but may give a fair result for the position of the line. Assuming the wave-length of the Nitrogen line as 5005·2 tenth-metres that of the chief line in the Orion nebula, would be 5005·0, when corrected for the motion of the earth in its orbit. But the measures of the nebular line are not only too rough to give any trustworthy determination of the motion of the nebula in the line of sight, but must also be corrected for the difference in wave-length, as yet not precisely determined, between the nebular line and the line of Nitrogen.
20. 41	M	,,	N_1	0·095	+0·118		+ 16·2	+ 23·9		
20. 48	M	,,	N_1	0·095	−0·032		+ 16·2	− 27·1		
20. 53	M	,,	N_1	0·095	+0·121		+ 16·2	+ 24·9		
20. 57	M	,,	N_1	0·095	−0·074		+ 16·2	− 41·3		
21. 5	M	,,	N_1	0·095	−0·047		+ 16·2	− 32·2		
21. 15	M	,,	N_1	0·095	+0·009		+ 16·2	− 13·1		

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d h m				r	r					
Mar. 17. 22. 1	M	α Orionis	b_1	0·095	+0·031	+ 1/10	+ 17·8	− 6·2	− 3·9	Spectrum exceedingly unsteady. Star-lines seen with great difficulty.
22. 3	M	,,	b_1	0·095	+0·100	+ 1/2	+ 17·8	+ 19·7	+ 28·6	
22. 4	M	,,	b_4	0·095	+0·145	+ 2/5	+ 17·8	+ 36·6	+ 27·0	
22. 7	M	,,	b_4	0·095	+0·093	+ 1/2	+ 17·8	+ 17·1	+ 38·2	
22. 11	M	,,	b_1	0·095	+0·062	+ 2/5	+ 17·8	+ 5·5	+ 37·9	
22. 12	M	,,	b_1	0·095	+0·049	+ 1/4	+ 17·8	+ 0·6	+ 17·0	
22. 14	M	,,	b_4	0·095	+0·074	+ 1/3	+ 17·8	+ 10·0	+ 19·5	
22. 15	M	,,	b_4	0·095	+0·081	+ 2/5	+ 17·8	+ 12·6	+ 27·0	
22. 27	M	Aldebaran.....	b_1	0·095	+0·065	+ 3/10	+ 17·4	+ 7·0	+ 24·4	Spectrum exceedingly unsteady. Star-lines seen with great difficulty.
22. 29	M	,,	b_1	0·095	+0·053	+ 3/10	+ 17·4	+ 2·5	+ 24·4	
22. 37	M	Capella	b_1	0·095	+0·098	+ 1/2	+ 16·9	+ 19·9	+ 52·7	Spectrum exceedingly unsteady. Star-line seen well from time to time.
22. 39	M	,,	b_1	0·095	+0·051	+ 1/4	+ 16·9	+ 2·2	+ 17·9	
22. 40	M	,,	b_1	0·095	+0·089	+ 1/3	+ 16·9	+ 16·5	+ 29·5	
22. 41	M	,,	b_1	0·095	+0·051	+ 1/4	+ 16·9	+ 2·2	+ 29·5	
22. 49	M	Pollux	b_1	0·095	+0·052	− 1/4	+ 16·7	− 36·2	− 51·5	Spectrum faint and exceedingly unsteady. Star-line seen with great difficulty.
22. 51	M	,,	b_1	0·095	−0·006	0	+ 16·7	− 18·9	− 16·7	
23. 33	M	Arcturus	b_1	0·095	−0·155	− 1/2	− 6·8	− 51·4	− 62·8	Spectrum exceedingly unsteady. Star-line dark and distinct.
23. 34	M	,,	b_1	0·095	−0·073	− 1/4	− 6·8	− 20·6	− 28·0	
23. 35	M	,,	b_1	0·095	−0·077	− 1/4	− 6·8	− 22·1	− 28·0	
23. 36	M	,,	b_1	0·095	−0·072	− 1/4	− 6·8	− 20·2	− 28·0	
										Position Circle, 6°.
Mar. 18. 12. 2	M	Sky.....	b_1	0·095	+0·008			+ 3·0		The coincidence of the two spectra appeared perfect.
12. 4	M	,,	b_1	0·095	+0·003			+ 1·1		
12. 6	M	,,	b_1	0·095	+0·018			+ 6·8		
12. 8	M	,,	b_1	0·095	−0·018			− 6·8		
12. 10	M	,,	b_1	0·095	+0·002			+ 0·8		
										Position Circle 6°.
Mar. 21. 23. 0	M	Procyon.....	F	0·208	−0·038	− 1/10	+ 16·4	− 28·0	− 27·7	Spectrum bright and steady. Star-line seen well.
23. 15	M	,,	F	0·208	−0·056	− 1/5	+ 16·4	− 33·4	− 38·9	
23. 30	M	Castor	F	0·208	+0·114	+ 1/3	+ 17·4	+ 17·2	+ 20·2	Spectrum bright and steady. Star-line seen well.
23. 40	M	,,	F	0·208	+0·025	+ 1/10	+ 17·4	− 9·8	− 6·1	
23. 55	M	Pollux	F	0·208	−0·172	− 1/2	+ 17·2	− 69·5	− 73·6	Spectrum bright and steady. Star-line seen well.
22. 0. 5	M	,,	F	0·208	−0·165	− 1/2	+ 17·2	− 67·3	− 73·6	
0. 30	M	Regulus.....	F	0·208	+0·031	+ 1/10	+ 10·1	− 0·7	+ 1·2	Passing cloud interrupted the observations and rendered them difficult and rough.
0. 40	M	,,	F	0·208	−0·036	− 1/10	+ 10·1	− 21·0	− 21·4	
										Position Circle, 6°.
Mar. 28. 22. 33	M	Moon	F	0·208	−0·014			− 4·3		The coincidence of the two spectra appeared perfect. Both spectra were seen well.
22. 36	M	,,	F	0·208	+0·002			+ 0·6		
22. 39	M	,,	F	0·208	−0·011			− 3·3		
22. 42	M	,,	F	0·208	−0·026			− 7·9		
22. 45	M	,,	F	0·208	+0·010			+ 3·0		
22. 50	M	γ Geminorum..	F	0·208	−0·169	− 1/2	+ 18·3	− 69·6	− 74·7	Spectrum bright but somewhat unsteady. Star-line seen well.
23. 0	M	,,	F	0·208	−0·164	− 1/2	+ 18·3	− 68·1	− 74·7	
23. 10	M	,,	F	0·208	−0·208	− 3/5	+ 18·3	− 81·5	− 85·9	
23. 20	M	,,	F	0·208	−0·194	− 3/5	+ 18·3	− 77·2	− 85·9	
23. 30	M	Castor	F	0·208	+0·044	+ 1/10	+ 17·8	− 4·4	− 6·5	Spectrum bright and steady. Star-line seen well.
23. 40	M	,,	F	0·208	+0·012	+ 1/10	+ 17·8	− 14·2	− 6·5	
23. 55	M	Pollux	F	0·208	−0·064	− 1/5	+ 17·8	− 37·2	− 40·3	Spectrum bright but unsteady. Star-line faint and seen with difficulty.
29. 0. 5	M	,,	F	0·208	−0·172	− 1/2	+ 17·8	− 70·1	− 74·2	
0. 15	M	Procyon.....	F	0·208	−0·060	− 1/5	+ 17·0	− 35·2	− 39·5	Spectrum bright but very unsteady. Star-line seen fairly well.
0. 25	M	,,	F	0·208	−0·011	0	+ 17·0	− 20·3	− 17·0	
0. 35	M	,,	F	0·208	−0·008	0	+ 17·0	− 19·4	− 17·0	
0. 45	M	,,	F	0·208	−0·052	− 1/5	+ 17·0	− 32·8	− 39·5	
0. 55	M	Regulus.....	F	0·208	+0·077	+ 1/4	+ 11·8	+ 11·6	+ 16·4	Spectrum bright but unsteady. Star-line seen well.
1. 0	M	,,	F	0·208	+0·113	+ 1/3	+ 11·8	+ 22·5	+ 25·8	
1. 15	M	γ Leonis	F	0·208	−0·055	− 1/10	+ 11·8	− 28·5	− 23·1	Spectrum bright and fairly steady, but star-line faint and difficult to see.
1. 25	M	,,	F	0·208	+0·028	0	+ 11·8	− 3·3	− 11·8	
1. 35	M	β Leonis	F	0·208	+0·142	+ 2/5	+ 5·6	+ 37·5	+ 39·5	Spectrum bright and steady. Star-line seen fairly well, but very broad and diffused.
1. 45	M	,,	F	0·208	+0·031	+ 1/10	+ 5·6	+ 3·8	+ 5·7	
										Position Circle, 6°.

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Apr. 3. 20. 9	M	Rigel	F	0·192	−0·010	0	+ 13·7	− 16·7	− 13·7	Spectrum bright but very unsteady. Star-line faint and very difficult to see.
20. 11	M	,,	F	0·192	+0·156	+ 2/5	+ 13·7	+ 33·7	+ 26·3	
20. 22	M	γ Orionis	F	0·192	+0·012	+ 1/10	+ 15·9	− 12·3	− 10·9	Spectrum unsteady. Star-line faint and difficult to see.
20. 24	M	,,	F	0·192	−0·054	− 1/10	+ 15·9	− 32·3	− 25·9	
20. 31	M	β Tauri	F	0·192	−0·048	− 1/5	+ 16·8	− 31·4	− 36·8	Spectrum fairly bright and steady. Star-line seen fairly well.
20. 32	M	,,	F	0·192	−0·057	− 1/4	+ 16·8	− 34·1	− 41·8	
20. 45	M	Sirius.....	F	0·192	+0·046	+ 1/4	+ 14·1	− 0·2	+ 10·9	Spectrum very unsteady indeed.
20. 46	M	,,	F	0·192	−0·057	− 1/3	+ 14·1	− 31·4	− 47·4	Position Circle, 6°.
Apr. 22. 20. 37	M	Procyon.....	F	0·192	−0·080	− 1/4	+ 17·2	− 41·5	− 40·2	Spectrum fairly bright and steady. Star-line seen well.
20. 39	M	,,	F	0·192	−0·102	0	+ 17·2	− 20·8	− 17·2	
20. 41	M	,,	F	0·192	−0·054	− 1/5	+ 17·2	− 33·6	− 35·6	
20. 42	M	,,	F	0·192	−0·069	− 1/10	+ 17·2	− 38·2	− 26·4	
20. 53	M	Castor.....	F	0·192	+0·141	+ 2/3	+ 17·3	+ 25·5	+ 44·1	Spectrum bright and steady. Star-line seen well.
20. 55	M	,,	F	0·192	+0·102	+ 1/3	+ 17·3	+ 13·7	+ 13·4	
21. 3	M	Pollux	F	0·192	−0·150	− 2/5	+ 17·7	− 63·3	− 54·5	Spectrum bright and steady. Star-line seen fairly well.
21. 5	M	,,	F	0·192	−0·057	− 1/4	+ 17·7	− 35·0	− 40·7	
21. 15	M	Regulus.....	F	0·192	+0·099	+ 1/2	+ 16·3	+ 13·8	+ 29·7	Spectrum bright and steady. Star-line seen well.
21. 17	M	,,	F	0·192	+0·013	0	+ 16·3	− 12·3	− 16·3	
21. 19	M	,,	F	0·192	+0·052	+ 1/3	+ 16·3	− 0·5	+ 14·4	
21. 21	M	,,	F	0·192	+0·044	+ 1/5	+ 16·3	− 2·9	+ 2·1	
21. 40	M	γ Leonis	F	0·192	−0·067	− 1/5	+ 16·2	− 36·6	− 34·6	Spectrum bright and fairly steady, but star-line faint and seen with difficulty.
21. 43	M	,,	F	0·192	−0·011	0	+ 16·2	− 19·5	− 16·2	
21. 54	M	β Leonis	F	0·192	+0·085	+ 3/10	+ 12·0	+ 13·8	+ 15·6	Spectrum bright and steady. Star-line seen fairly well.
21. 56	M	,,	F	0·192	+0·083	+ 1/2	+ 12·0	+ 13·2	+ 34·0	
22. 6	M	Spica	F	0·192	+0·049	+ 1/4	+ 3·3	+ 11·6	+ 19·7	Spectrum bright but unsteady. Star-line seen fairly well.
22. 9	M	,,	F	0·192	+0·103	+ 1/3	+ 3·3	+ 28·0	+ 27·4	
22. 23	M	Arcturus	F	0·192	−0·070	− 1/4	+ 2·7	− 24·0	− 25·7	Spectrum bright and steady. Star-line seen fairly well.
22. 24	M	,,	F	0·192	−0·087	− 1/3	+ 2·7	− 29·1	− 33·4	
22. 34	M	α Coronæ Bor.	F	0·192	+0·042	+ 1/10	− 1·8	+ 14·6	+ 11·0	Spectrum bright and steady. Star-line seen fairly well.
22. 37	M	,,	F	0·192	+0·109	+ 1/2	− 1·8	+ 34·9	+ 47·8	
22. 39	M	,,	F	0·192	+0·123	+ 1/2	− 1·8	+ 39·2	+ 47·8	
22. 40	M	,,	F	0·192	+0·118	+ 2/5	− 1·8	+ 37·6	+ 38·6	
22. 49	M	β Libræ	F	0·192	−0·089	− 3/10	− 4·7	− 22·3	− 22·9	Spectrum rather faint and unsteady, but star-line seen fairly well.
22. 51	M	,,	F	0·192	−0·051	− 1/4	− 4·7	− 10·8	− 18·3	Position Circle, 6°.
Apr. 30. 21. 6	M	Procyon.....	F	0·192	+0·036	+ 1/5	+ 16·7	− 5·8	+ 1·7	Spectrum faint and very unsteady. Star-line seen fairly well.
21. 7	M	,,	F	0·192	−0·005	0	+ 16·7	− 18·2	− 16·7	
21. 16	M	Castor	F	0·192	+0·029	+ 1/4	+ 16·6	− 7·8	+ 6·4	Spectrum faint. Star-line seen fairly well.
21. 19	M	,,	F	0·192	+0·013	0	+ 16·6	− 12·6	− 16·6	
21. 26	M	Pollux	F	0·192	−0·096	− 3/10	+ 17·0	− 46·1	− 44·6	Spectrum faint but fairly steady. Measures made with difficulty.
21. 29	M	,,	F	0·192	−0·198	− 1/2	+ 17·0	− 77·1	− 63·0	
21. 42	M	Regulus.....	F	0·192	−0·140	− 2/5	+ 17·2	− 59·7	− 54·0	Spectrum rather faint and very unsteady. Star-line faint and very diffused.
21. 46	M	,,	F	0·192	−0·113	− 3/10	+ 17·2	− 51·5	− 44·8	
21. 53	M	γ Leonis	F	0·192	−0·107	− 1/3	+ 17·1	− 49·6	− 47·8	Spectrum faint and unsteady. Star-line very faint.
21. 55	M	,,	F	0·192	−0·075	− 1/4	+ 17·1	− 39·9	− 40·1	
22. 5	M	β Leonis	F	0·192	−0·032	− 1/8	+ 13·6	− 23·3	− 25·1	Spectrum fairly steady. Star-line seen fairly well.
22. 7	M	,,	F	0·192	−0·010	0	+ 13·6	− 16·6	− 13·6	
22. 10	M	Moon	F	0·192	+0·017			+ 5·1		The coincidence of the two spectra appeared perfect.
22. 11	M	,,	F	0·192	+0·007			+ 2·1		
22. 11	M	,,	F	0·192	+0·001			+ 0·3		
22. 12	M	,,	F	0·192	+0·013			+ 4·0		
22. 13	M	,,	F	0·192	−0·020			− 6·1		
22. 35	M	Spica	F	0·192	−0·067	− 1/4	+ 5·6	− 26·0	− 28·6	Spectrum bright and fairly steady. Star-line seen fairly well.
22. 37	M	,,	F	0·192	−0·081	− 1/4	+ 5·6	− 30·2	− 28·6	
22. 55	M	Arcturus	F	0·192	−0·188	− 3/5	+ 4·8	− 61·9	− 60·0	Spectrum bright and fairly steady. Star-line seen fairly well.
22. 57	M	,,	F	0·192	−0·098	− 2/5	+ 4·8	− 34·6	− 41·6	
22. 59	M	,,	F	0·192	−0·081	− 1/3	+ 4·8	− 29·4	− 35·5	
23. 1	M	,,	F	0·192	−0·060	− 1/4	+ 4·8	− 23·0	− 27·8	
23. 31	M	β Libræ	F	0·192	+0·020	+ 1/20	− 2·3	+ 8·4	+ 6·9	Spectrum fairly bright and steady. Star-line seen well.
23. 32	M	,,	F	0·192	+0·009	+ 1/20	− 2·3	+ 5·0	+ 6·9	

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
					Measured.	Estimated		Measured.	Estimated.	
d h m				r	r					
Apr. 30. 23. 43	M	α Ophiuchi ...	F	0·192	−0·019	0	− 9·5	+ 3·7	+ 9·5	Spectrum fairly bright and steady. Star-line very broad and difficult to bisect.
23. 44	M	,,	F	0·192	−0·093	− 3/10	− 9·5	− 18·8	− 18·1	
23. 46	M	,,	F	0·192	−0·114	− 1/4	− 9·5	− 25·1	− 13·5	
23. 50	M	,,	F	0·192	−0·128	− 1/3	− 9·5	− 29·4	− 21·2	
May 1. 0. 1	M	Vega	F	0·192	−0·159	− 2/5	− 7·7	− 40·6	− 29·1	Spectrum bright and steady. Star-line seen well, but observing position very awkward.
0. 3	M	,,	F	0·192	−0·094	− 1/3	− 7·7	− 20·9	− 23·0	Position Circle, 6°.
May 5. 21. 31	M	Arcturus	F	0·192	−0·044	− 1/4	+ 5·9	− 19·3	− 28·9	Spectrum steady but faint. Star-line very faint. Measures made with difficulty.
21. 33	M	,,	F	0·192	−0·137	− 2/5	+ 5·9	− 47·5	− 42·7	
21. 41	M	Moon	F	0·192	−0·012			− 3·6		
21. 42	M	,,	F	0·192	−0·008			− 2·4		
21. 43	M	,,	F	0·192	+0·012			+ 3·6		
21. 44	M	,,	F	0·192	+0·007			+ 2·1		
21. 45	M	,,	F	0·192	+0·036			+ 10·9		Position Circle, 6°.
May 7. 21. 22	M	Arcturus	F	0·192	−0·048	− 1/5	+ 6·4	− 21·0	− 24·8	Spectrum bright but very unsteady. Star-line faint, but seen well by glimpses.
21. 25	M	,,	F	0·192	−0·118	− 1/3	+ 6·4	− 42·2	− 37·1	
21. 40	M	η Ursæ Majoris	F	0·192	−0·067	− 3/10	+ 8·2	− 28·6	− 35·8	Spectrum bright and fairly steady. Star-line ill-defined and difficult to bisect.
21. 45	M	,,	F	0·192	+0·006	0	+ 8·2	− 6·4	− 8·2	
21. 57	M	ζ Ursæ Majoris	F	0·192	−0·127	− 1/2	+ 8·9	− 47·5	− 54·9	Spectrum bright and fairly steady. Star-line ill-defined and difficult to bisect.
22. 2	M	,,	F	0·192	−0·110	− 2/5	+ 8·9	− 42·3	− 54·9	
22. 17	M	ε Ursæ Majoris	F	0·192	−0·180	− 2/3	+ 9·9	− 64·6	− 65·1	Spectrum bright and fairly steady. Star-line seen fairly well.
22. 24	M	,,	F	0·192	−0·123	− 2/5	+ 9·9	− 47·3	− 36·7	
22. 47	M	δ Ursæ Majoris	F	0·192	+0·077	+ 1/2	+ 10·9	+ 12·5	+ 35·1	Spectrum bright and steady. Star-line ill-defined.
22. 50	M	,,	F	0·192	+0·034	+ 1/10	+ 10·9	− 0·6	− 1·7	
23. 5	M	γ Ursæ Majoris	F	0·192	−0·029	− 1/5	+ 12·0	− 20·8	− 30·4	Spectrum bright and fairly steady. Star-line very diffused and ill-defined.
23. 9	M	,,	F	0·192	−0·128	− 1/3	+ 12·0	− 50·9	− 42·7	
23. 21	M	β Ursæ Majoris	F	0·192	−0·151	− 2/5	+ 12·7	− 58·5	− 49·5	Spectrum bright and fairly steady. Star-line ill-defined.
23. 24	M	,,	F	0·192	−0·236	− 3/5	+ 12·7	− 84·4	− 67·9	
23. 42	M	α Ursæ Majoris	F	0·192	−0·197	− 1/2	+ 11·6	− 71·4	− 57·6	Spectrum bright but unsteady. Star-line faint and seen with great difficulty. Measures very rough. Throughout the evening the measures were made with great difficulty on account of the awkward position of the instrument.
23. 45	M	,,	F	0·192	−0·031	− 1/4	+ 11·6	− 21·0	− 34·6	Position Circle, 6°.
May 12. 22. 10	M	Spica	F	0·192	−0·147	− 1/2	+ 8·9	− 53·6	− 54·9	Spectrum very faint and unsteady. Observation interrupted by cloud. Position Circle, 6°.
May 15. 21. 45	M	Spica	F	0·192	−0·046	− 3/10	+ 9·7	− 23·7	− 37·1	Spectrum bright and fairly steady. Star-line seen fairly well, but appeared rather broader, fainter, and more diffused than usual.
21. 47	M	,,	F	0·192	−0·159	− 1/2	+ 9·7	− 58·0	− 55·4	
21. 49	M	,,	F	0·192	−0·276	− 3/5	+ 9·7	− 93·5	− 64·5	
21. 52	M	,,	F	0·192	−0·170	− 1/2	+ 9·7	− 61·3	− 55·4	
22. 4	M	Arcturus	F	0·192	−0·152	− 1/2	+ 8·2	− 54·4	− 53·9	Spectrum bright and fairly steady. Star-line faint and seen with difficulty.
22. 5	M	,,	F	0·192	−0·060	− 1/4	+ 8·2	− 26·4	− 31·0	
22. 17	M	β Libræ	F	0·192	−0·160	− 2/3	+ 2·2	− 50·8	− 63·1	Spectrum fairly bright and steady. Star-line seen well.
22. 19	M	,,	F	0·192	−0·144	− 1/3	+ 2·2	− 45·9	− 32·7	
22. 21	M	,,	F	0·192	−0·064	− 1/3	+ 2·2	− 21·6	− 32·7	
22. 22	M	,,	F	0·192	−0·103	− 1/3	+ 2·2	− 33·5	− 32·7	
22. 44	M	α Coronæ Bor.	F	0·192	+0·102	+ 2/5	+ 3·2	+ 27·8	+ 33·4	Spectrum bright and steady. Star-line seen well.
22. 47	M	,,	F	0·192	+0·150	+ 1/2	+ 3·2	+ 42·4	+ 42·5	
23. 0	M	α Ophiuchi ...	F	0·192	−0·019	− 1/10	− 6·4	+ 0·6	− 2·7	Spectrum bright and steady. Star-line broad, diffused, and difficult to bisect.
23. 2	M	,,	F	0·192	−0·048	0	− 6·4	− 8·2	+ 6·4	
23. 3	M	,,	F	0·192	−0·079	− 1/4	− 6·4	− 17·6	− 16·4	
23. 4	M	,,	F	0·192	−0·068	− 1/4	− 6·4	− 14·3	− 16·4	

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					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
May 15. 23. 19	M	Vega	F	0·192	−0·022	− 1/10	− 6·4	− 0·3	− 2·7	Spectrum bright and steady. Star-line very broad, diffused, and difficult to bisect.
23. 21	M	,,	F	0·192	−0·044	− 1/10	− 6·4	− 7·0	− 2·7	
23. 31	M	α Cygni	F	0·192	−0·239	− 3/5	− 8·9	− 63·6	− 46·0	Spectrum bright and steady. Star-line rather faint but seen fairly well.
23. 33	M	,,	F	0·192	−0·157	− 1/2	− 8·9	− 38·8	− 36·8	
23. 47	M	α Cephei	F	0·192	−0·126	− 1/3	− 4·5	− 33·8	− 26·0	Spectrum bright and steady. Star-line seen well.
23. 49	M	,,	F	0·192	−0·154	− 2/5	− 4·5	− 42·3	− 32·1	
16. 0. 2	M	Altair.....	F	0·192	−0·040	− 1/10	− 14·2	+ 2·1	+ 5·1	Spectrum bright and steady. Star-line seen well.
0. 4	M	,,	F	0·192	−0·088	− 1/4	− 14·2	− 12·5	− 8·6	Position Circle, 6°.
May 16. 11. 30	M	Sun	F	0·192	−0·002			− 0·6		Both spectra seen well. The coincidence of the two spectra appeared perfect.
	M	,,	F	0·192	+0·009			+ 2·7		
	M	,,	F	0·192	+0·008			+ 2·4		
	M	,,	F	0·192	+0·003			+ 0·9		
	M	,,	F	0·192	0·000			0·0		Position Circle, 6°.
May 17. 21. 41	M	Regulus.....	F	0·192	+0·091	+ 2/5	+ 17·9	+ 9·7	+ 18·7	Spectrum bright and steady. Star-line seen well, but observations interrupted by cloud. Position Circle, 6°.
May 21. 21. 30	M	Regulus.....	F	0·174	−0·176	− 2/3	+ 17·9	− 71·4	− 75·0	Spectrum very unsteady. Observations made with difficulty.
21. 40	M	,,	F	0·174	−0·141	− 1/2	+ 17·9	− 60·7	− 60·8	
21. 55	M	γ Leonis.....	F	0·174	−0·053	− 1/5	+ 17·7	− 33·8	− 34·8	Spectrum unsteady. Star-line faint and difficult to see.
22. 5	M	,,	F	0·174	−0·009	0	+ 17·7	− 20·4	− 17·7	
22. 15	M	β Leonis	F	0·174	+0·046	+ 1/10	+ 16·5	− 2·5	− 7·9	Spectrum unsteady. Star-line seen with difficulty.
22. 25	M	,,	F	0·174	+0·035	+ 1/10	+ 16·5	− 5·9	− 7·9	
22. 40	M	Spica	F	0·174	+0·136	+ 1/2	+ 11·1	+ 30·2	+ 31·8	Spectrum exceedingly unsteady. Measures made with great difficulty.
22. 55	M	,,	F	0·174	+0·112	+ 1/3	+ 11·1	+ 22·9	+ 17·5	
23. 20	M	Arcturus	F	0·174	−0·120	− 2/5	+ 9·5	− 45·9	− 43·8	Spectrum bright but unsteady. Star-line seen well.
23. 30	M	,,	F	0·174	−0·117	− 2/5	+ 9·5	− 45·0	− 43·8	
23. 45	M	α Coronæ Bor..	F	0·174	+0·027	+ 1/10	+ 4·4	+ 3·8	+ 4·2	Spectrum bright but unsteady. Star-line seen well.
23. 58	M	,,	F	0·174	+0·125	+ 2/5	+ 4·4	+ 33·6	+ 29·9	
22. 0. 8	M	α Ophiuchi ...	F	0·174	−0·016	− 1/10	− 5·0	+ 0·1	− 3·6	Spectrum fairly bright and steady. Star-line seen fairly well.
0. 15	M	,,	F	0·174	−0·057	− 1/5	− 5·0	− 12·3	− 12·1	
0. 30	M	Vega	F	0·174	−0·189	− 2/3	− 5·8	− 51·6	− 51·3	Spectrum bright and fairly steady. Star-line seen well.
0. 40	M	,,	F	0·174	−0·199	− 2/3	− 5·8	− 54·6	− 51·3	Position Circle, 6°.
May 23. 21. 31	M	Castor.....	F	0·193	+0·274	+ 2/3	+ 12·7	+ 70·5	+ 55·2	Spectrum faint. Star-line extremely broad and diffused.
21. 33	M	,,	F	0·193	+0·261	+ 2/3	+ 12·7	+ 66·6	+ 55·2	
21. 43	M	Pollux	F	0·193	−0·176	− 2/5	+ 13·4	− 66·9	− 54·1	Spectrum faint and unsteady but star-line seen well.
21. 44	M	,,	F	0·193	−0·140	− 1/2	+ 13·4	− 55·9	− 64·3	
21. 59	M	Moon	F	0·193	+0·006			+ 1·8		Both spectra seen well. The coincidence of the two spectra appeared perfect.
22. 0	M	,,	F	0·193	−0·010			− 3·0		
22. 1	M	,,	F	0·193	+0·007			+ 2·1		
22. 2	M	,,	F	0·193	−0·019			− 5·8		
22. 3	M	,,	F	0·193	−0·005			− 1·5		
22. 13	M	Regulus.....	F	0·193	+0·032	+ 1/10	+ 17·8	− 8·1	− 7·6	Spectrum bright but unsteady. Star-line seen well.
22. 15	M	,,	F	0·193	+0·006	0	+ 17·8	− 16·0	− 17·8	
22. 27	M	γ Leonis.....	F	0·193	+0·028	+ 1/5	+ 17·6	− 9·1	+ 2·8	Spectrum faint and unsteady. Star-line very faint. Measures rough.
22. 29	M	,,	F	0·193	−0·033	0	+ 17·6	− 27·6	− 17·6	
22. 37	M	β Leonis.....	F	0·193	+0·219	+ 2/3	+ 16·7	+ 49·8	+ 51·2	Spectrum unsteady. Star-line very broad and very difficult to bisect.
22. 39	M	,,	F	0·193	+0·014	+ 1/1	+ 16·7	− 12·4	+ 8·8	
22. 58	M	Spica	F	0·193	−0·161	− 2/3	+ 11·6	− 60·5	− 62·5	Spectrum bright but very unsteady. Star-line seen well.
23. 0	M	,,	F	0·193	−0·200	− 2/3	+ 11·6	− 72·3	− 72·7	

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second		REMARKS.
					Measured.	Estimated		Measured.	Estimated.	
d h m				r	r					
May 23. 23. 11	M	Arcturus	F	0·193	−0·158	− ½	+ 9·9	− 57·9	− 60·8	Spectrum bright and steady. Star-line seen fairly well.
23. 13	M	,,	F	0·193	−0·155	− ½	+ 9·9	− 57·0	− 60·8	
23. 32	M	β Libræ.....	F	0·193	−0·034	− 1/10	+ 4·5	− 14·8	− 14·7	Spectrum fairly bright and steady. Star-line seen well but broad and diffused.
23. 33	M	,,	F	0·193	−0·087	− ¼	+ 4·5	− 30·9	− 30·0	
23. 41	M	α Coronæ Bor..	F	0·193	+0·086	+ 3/10	+ 4·8	+ 21·3	+ 25·7	Spectrum bright and steady. Star-line seen well but very diffused.
23. 43	M	,,	F	0·193	+0·112	+ ⅖	+ 4·8	+ 29·2	+ 35·9	
23. 54	M	α Ophiuchi	F	0·193	−0·002	0	− 4·5	+ 3·9	+ 4·5	Spectrum bright and steady. Star-line broad and diffused.
23. 56	M	,,	F	0·193	−0·115	− ⅓	− 4·5	− 30·4	− 29·4	
24. 0. 5	M	Vega	F	0·193	−0·047	− 1/10	− 5·6	− 8·7	− 4·6	Spectrum bright and steady. Star-line seen well.
0. 7	M	,,	F	0·193	−0·056	− ¼	− 5·6	− 11·4	− 19·9	
0. 17	M	Altair.....	F	0·193	−0·102	− 3/10	− 13·2	− 17·8	− 17·3	Spectrum bright but unsteady. Star-line seen well.
0. 19	M	,,	F	0·193	−0·121	− ⅓	− 13·2	− 23·5	− 20·7	
May 31. 22. 29	M	Spica	F	0·187	−0·241	− ⅖	+ 13·3	− 86·5	− 62·0	Spectrum tremulous and rather faint, but star-line seen well.
22. 32	M	,,	F	0·187	−0·104	− 3/10	+ 13·3	− 44·9	− 37·6	
22. 34	M	,,	F	0·187	−0·146	− ⅖	+ 13·3	− 57·7	− 45·7	
22. 36	M	,,	F	0·187	−0·170	− ½	+ 13·3	− 64·9	− 53·9	
22. 45	M	Arcturus	F	0·187	−0·050	− 3/10	+ 11·3	− 26·5	− 35·6	Spectrum bright and steady. Star-line seen fairly well.
22. 47	M	,,	F	0·187	−0·142	− ⅓	+ 11·3	− 54·4	− 38·3	
22. 54	M	Moon	F	0·187	+0·023			+ 7·0		Both spectra seen well. The coincidence of the two spectra appeared perfect.
22. 55	M	,,	F	0·187	+0·005			+ 1·5		
22. 56	M	,,	F	0·187	+0·009			+ 2·7		
22. 57	M	,,	F	0·187	−0·015			− 4·6		
22. 58	M	,,	F	0·187	+0·006			+ 1·8		
23. 9	M	α Coronæ Bor..	F	0·187	+0·033	+ 1/10	+ 6·3	+ 3·7	+ 1·8	Spectrum bright and steady. Star-line seen fairly well.
23. 11	M	,,	F	0·187	+0·065	+ ⅕	+ 6·3	+ 13·4	+ 9·9	
23. 20	M	β Libræ	F	0·187	−0·162	− ½	+ 6·8	− 56·0	− 47·4	Spectrum rather faint and unsteady. Star-line seen fairly well.
23. 22	M	,,	F	0·187	−0·145	− ½	+ 6·8	− 50·8	− 47·4	
23. 29	M	Mars	F	0·187	−0·027	0		− 8·2	0·0	Spectrum bright and steady. Line in planet's spectrum seen fairly well. Calculated motion −0·8 miles per second.
23. 30	M	,,	F	0·187	+0·014	0		+ 4·3	0·0	
23. 52	M	α Ophiuchi	F	0·187	−0·093	− ¼	− 2·6	− 25·7	− 17·7	Spectrum faint but steady. Star-line seen fairly well.
23. 53	M	,,	F	0·187	−0·050	− ¼	− 2·6	− 12·6	− 17·7	
June 1. 0. 1	M	Vega	F	0·187	−0·080	− ¼	− 4·7	− 19·6	− 15·6	Spectrum very bright and steady. Star-line seen well.
0. 3	M	,,	F	0·187	−0·119	− ⅖	− 4·7	− 31·4	− 27·7	
0. 13	M	Altair.....	F	0·187	−0·111	− ¼	− 11·9	− 21·8	− 8·4	Spectrum bright and steady. Star-line seen well. Position Circle, 6°.
0. 15	M	,,	F	0·187	−0·033	− ¼	− 11·9	+ 1·9	− 8·4	
June 2. 22. 16	M	Regulus.....	F	0·187	+0·047	+ ¼	+ 17·4	− 3·1	+ 2·9	Spectrum bright but exceedingly unsteady. Observations interrupted by cloud. Position Circle, 6°.
22. 19	M	,,	F	0·187	−0·039	− ⅕	+ 17·4	− 29·2	− 33·6	
June 6. 23. 6	M	Spica	F	0·164	+0·145	+ ⅗	+ 14·4	(+ 29·6)	(+ 40·1)	Spectrum bright but very unsteady. Spectroscope found to be out of adjustment.
23. 8	M	,,	F	0·164	+0·040	+ ¼	+ 14·4	(− 2·3)	(+ 8·3)	
23. 23	M	β Libræ	F	0·164	−0·188	− ⅗	+ 8·3	− 65·4	− 62·8	Spectrum unsteady and rather faint. Star-line faint.
23. 26	M	,,	F	0·164	−0·070	− ⅘	+ 8·3	− 29·6	− 81·0	
23. 36	M	Mars	F	0·164	−0·026	0		− 7·9	0·0	Spectrum bright and fairly steady. Line in the planet's spectrum seen fairly well. Calculated motion + 0·3.
23. 38	M	,,	F	0·164	−0·014	0		− 4·3	0·0	
23. 50	M	α Ophiuchi.....	F	0·164	−0·016	0	− 1·2	− 3·7	+ 1·2	Spectrum steady and fairly bright. Star-line seen fairly well. Position Circle, 6°.
23. 52	M	,,	F	0·164	−0·063	− ¼	− 1·2	− 17·9	− 21·5	
June 27. 22. 34	M	Arcturus	F	0·164	−0·083	− ⅓	+ 14·6	− 39·8	− 33·2	Spectrum bright but unsteady. Star-line seen well for a moment now and then.
22. 36	M	,,	F	0·164	−0·069	− ¼	+ 14·6	− 35·6	− 28·6	
22. 51	M	Moon	F	0·164	+0·030			+ 9·1		Both spectra seen well. The coincidence of the two spectra appeared perfect.
22. 53	M	,,	F	0·164	+0·025			+ 7·6		
22. 55	M	,,	F	0·164	+0·008			+ 2·4		
22. 56	M	,,	F	0·164	−0·033			− 10·0		
22. 57	M	,,	F	0·164	−0·011			− 3·3		

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
June 27. 23. 15	M	α Coronæ Bor..	F	0·164	−0·043	− 1/10	+ 10·5	− 23·6	− 16·1	Spectrum bright and fairly steady. Star-line seen fairly well.
23. 18	M	,,	F	0·164	+0·041	+ 1/4	+ 10·5	+ 1·9	+ 3·5	
23. 27	M	α Ophiuchi ...	F	0·164	−0·105	− 2/5	+ 3·8	− 35·7	− 26·1	Spectrum fairly bright and steady. Star-line seen well.
23. 30	M	,,	F	0·164	−0·041	− 1/5	+ 3·8	− 16·2	− 15·0	
23. 41	M	Altair	F	0·164	−0·210	− 3/5	− 6·3	− 57·5	− 27·2	Spectrum bright and steady. Star-line seen well.
23. 43	M	,,	F	0·164	−0·141	− 3/5	− 6·3	− 36·5	− 27·2	Position Circle, 6°.
July 3. 22. 4	M	Arcturus	F	0·164	−0·065	− 1/3	+ 15·0	− 34·7	− 33·6	Spectrum very unsteady. Star-line seen with difficulty.
22. 6	M	,,	F	0·164	−0·075	− 2/5	+ 15·0	− 37·8	− 37·3	
22. 13	M	α Coronæ Bor..	F	0·164	+0·019	+ 1/10	+ 11·1	− 5·3	− 5·5	Spectrum fairly bright. Star-line seen fairly well.
22. 15	M	,,	F	0·164	−0·055	− 1/5	+ 11·1	− 27·8	− 22·3	
22. 30	M	α Ophiuchi ...	F	0·164	−0·120	− 3/5	+ 5·2	− 41·6	− 38·7	Spectrum steady but rather faint. Star-line unusually broad and diffused.
22. 32	M	,,	F	0·164	−0·102	− 1/2	+ 5·2	− 36·2	− 33·2	
22. 45	M	Vega	F	0·164	−0·208	− 2/3	− 0·3	− 62·9	− 36·9	Spectrum bright but unsteady. Star-line seen well.
22. 48	M	,,	F	0·164	−0·209	− 1	− 0·3	− 63·2	− 55·5	
22. 56	M	Moon	F	0·164	+0·024			+ 7·3		The coincidence of the two spectra appeared perfect. But the Moon being very low down in the sky its spectrum was not seen well.
22. 57	M	,,	F	0·164	+0·015			+ 4·6		
22. 58	M	,,	F	0·164	+0·015			+ 4·6		
22. 59	M	,,	F	0·164	−0·003			− 0·9		
23. 0	M	,,	F	0·164	−0·008			− 2·4		
23. 11	M	Altair.....	F	0·164	−0·198	− 2/3	− 4·9	− 55·2	− 32·3	Spectrum bright and steady. Star-line seen fairly well.
23. 13	M	,,	F	0·164	−0·212	− 1	− 4·9	− 59·5	− 51·0	
23. 27	M	α Cygni	F	0·164	−0·163	− 1	− 7·0	− 42·4	− 48·8	Observations interrupted by cloud. Position Circle, 6°.
Aug. 1. 22. 4	M	α Ophiuchi ...	F	0·162	−0·169	− 1/3	+ 10·9	− 62·2	− 43·5	Spectrum faint but fairly steady. Definition poor.
22. 5	M	,,	F	0·162	−0·064	− 1/10	+ 10·9	− 30·3	− 20·7	
22. 16	M	Altair.....	F	0·162	−0·157	− 1/2	+ 2·5	− 50·2	− 51·4	Spectrum bright and steady. Star-line seen well.
22. 19	M	,,	F	0·162	−0·124	− 2/5	+ 2·5	− 40·2	− 41·6	
22. 29	M	ζ Aquilæ	F	0·162	+0·039	+ 1/10	+ 5·2	+ 6·6	+ 4·6	Spectrum faint but steady. Star-line broad and diffused, but seen fairly well.
22. 32	M	,,	F	0·162	−0·055	− 1/10	+ 5·2	− 21·9	− 15·0	
22. 43	M	γ Lyræ	F	0·162	+0·041	+ 1/5	+ 3·4	+ 9·0	+ 16·1	Spectrum faint but fairly steady. Star-line seen fairly well.
22. 45	M	,,	F	0·162	+0·031	+ 1/10	+ 3·4	+ 6·0	+ 6·4	
22. 56	M	Vega	F	0·162	−0·009	0	+ 3·7	− 6·4	− 3·7	Spectrum bright and steady. Star-line seen well.
22. 57	M	,,	F	0·162	−0·019	− 1/10	+ 3·7	− 9·5	− 13·5	
23. 20	M	α Cephei.....	F	0·162	−0·376	− 1	− 5·6	− 108·6	− 92·2	Spectrum bright and steady. Star-line seen with the utmost difficulty.
23. 24	M	,,	F	0·162	−0·239	− 1	− 5·6	− 67·0	− 92·2	
23. 36	M	α Andromedæ..	F	0·162	−0·051	− 1/4	− 14·3	− 1·2	− 10·2	Spectrum bright and steady. Star-line seen fairly well.
23. 39	M	,,	F	0·162	−0·114	− 1/3	− 14·3	− 20·3	− 18·3	
23. 50	M	α Pegasi	F	0·162	−0·155	− 2/5	− 11·3	− 35·8	− 27·8	Spectrum faint but fairly steady. Star-line seen fairly well.
23. 51	M	,,	F	0·162	−0·114	− 2/5	− 11·3	− 23·3	− 27·8	
23. 59	M	Moon	F	0·162	+0·017			+ 5·1		
2. 0. 1	M	,,	F	0·162	−0·005			− 1·5		
0. 2	M	,,	F	0·162	+0·010			+ 3·0		
0. 3	M	,,	F	0·162	+0·028			+ 8·5		
0. 3	M	,,	F	0·162	−0·013			− 3·9		Position Circle, 6°.
Aug. 4. 21. 42	M	Altair.....	F	0·162	−0·150	− 1/3	+ 3·3	− 48·9	− 35·9	Spectrum faint and unsteady, but star-line seen fairly well.
21. 44	M	,,	F	0·162	−0·119	− 2/5	+ 3·3	− 39·4	− 42·4	
21. 56	M	α Cygni	F	0·162	−0·245	− 2/3	− 3·3	− 71·1	− 61·9	Spectrum faint but fairly steady. Star-line seen fairly well.
22. 0	M	,,	F	0·162	−0·203	− 3/4	− 3·3	− 58·4	− 70·0	Position Circle, 6°.
Aug. 6. 22. 2	M	Arcturus	F	0·162	−0·101	− 2/5	+ 14·3	− 45·0	− 52·4	Spectrum most unsteady. Star-line seen with great difficulty.
22. 4	M	,,	F	0·162	−0·167	− 1/2	+ 14·3	− 65·0	− 62·0	
22. 16	M	α Coronæ Bor..	F	0·162	−0·187	− 2/5	+ 12·8	− 69·6	− 50·9	Spectrum faint and very unsteady. Star-line exceedingly ill-defined.
22. 22	M	,,	F	0·162	−0·245	− 2/3	+ 12·8	− 87·2	− 76·4	

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					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Aug. 6. 22. 35	M	α Ophiuchi ...	F	0·162	−0·120	− ½	+ 11·6	− 48·0	− 43·4	Spectrum faint and unsteady. Star-line ill-defined.
22. 36	M	,,	F	0·162	−0·116	− ⅓	+ 11·6	− 46·9	− 43·4	
22. 45	M	Vega	F	0·162	+0·014	+ 1/10	+ 4·3	0·0	+ 5·2	Spectrum very bright but very unsteady. Star-line seen fairly well.
22. 46	M	,,	F	0·162	−0·054	− ⅕	+ 4·3	− 20·7	− 23·4	
23. 2	M	γ Lyræ	F	0·162	−0·061	− 1/10	+ 4·2	− 22·7	− 13·7	Spectrum very faint but fairly steady. Star-line seen fairly well.
23. 5	M	,,	F	0·162	−0·018	− 1/10	+ 4·2	− 9·7	− 13·7	
23. 14	M	ζ Aquilæ	F	0·162	−0·010	0	+ 6·3	− 9·3	− 6·3	Spectrum faint. Star-line seen with difficulty.
23. 16	M	,,	F	0·162	−0·039	− 1/10	+ 6·3	− 18·1	− 15·8	
23. 27	M	Altair.....	F	0·162	−0·187	− ⅗	+ 3·8	− 60·6	− 61·0	Spectrum bright and fairly steady. Star-line seen fairly well.
23. 29	M	,,	F	0·162	−0·268	− ⅘	+ 3·8	− 85·2	− 80·1	
23. 41	M	δ Cygni	F	0·162	−0·263	− ⅘	0·0	− 79·9	− 57·2	Spectrum faint. Star-line faint and ill-defined.
23. 46	M	,,	F	0·162	−0·202	− ½	0·0	− 61·4	− 47·7	
7. 0. 1	M	α Pegasi.....	F	0·162	−0·082	− ¼	− 10·0	− 14·9	− 13·8	Spectrum rather faint but steady. Star-line seen fairly well.
0. 3	M	,,	F	0·162	−0·168	− ½	− 10·0	− 41·0	− 37·7	
0. 15	M	α Andromedæ..	F	0·162	−0·377	−1	− 13·7	−100·8	− 81·7	Spectrum faint and somewhat unsteady. Star-line faint.
0. 17	M	,,	F	0·162	−0·101	− ⅓	− 13·7	− 17·0	− 18·1	
0. 28	M	Moon	F	0·162	−0·006			− 1·8		The coincidence of the two spectra appeared perfect.
0. 29	M	,,	F	0·162	−0·008			− 2·4		
0. 30	M	,,	F	0·162	−0·015			− 4·6		
0. 31	M	,,	F	0·162	−0·008			− 2·4		
0. 32	M	,,	F	0·162	+0·001			+ 0·3		
0. 45	M	β Cassiopeiæ...	F	0·162	−0·116	− ½	− 11·0	− 24·3	− 36·7	Spectrum faint but steady. Star-line faint and seen with difficulty.
0. 48	M	,,	F	0·162	−0·132	− ½	− 11·0	− 29·1	− 36·7	
1. 0	M	γ Cassiopeiæ...	F	0·162	−0·098	− ⅓	− 11·8	− 18·0	− 20·0	Spectrum bright and steady. Star-line very little brighter than the continuous spectrum, and observed with great difficulty.
1. 3	M	,,	F	0·162	−0·027	− 1/10	− 11·8	+ 3·6	+ 2·3	Position Circle, 6°.
Sept. 8. 21. 20	M	α Coronæ Bor..	F	0·198	−0·093	− ⅖	+ 10·6	− 38·9	− 36·3	Spectrum bright and steady. Star-line seen well.
21. 23	M	,,	F	0·198	−0·014	0	+ 10·6	− 14·9	− 10·6	
21. 41	M	α Ophiuchi ...	F	0·198	−0·052	− ¼	+ 14·7	− 30·5	− 30·7	Spectrum very bright and steady. Star-line very ill-defined and difficult to observe.
21. 45	M	,,	F	0·198	−0·082	− ½	+ 14·7	− 39·6	− 46·8	
22. 1	M	Vega	F	0·198	−0·016	0	+ 7·6	− 12·5	− 7·6	Spectrum bright but rather unsteady.
22. 3	M	,,	F	0·198	−0·105	− ⅓	+ 7·6	− 39·5	− 29·0	
22. 13	M	Altair.....	F	0·198	−0·041	− ¼	+ 11·4	− 23·8	− 27·4	Spectrum bright and steady. Star-line seen well.
22. 15	M	,,	F	0·198	−0·097	− ⅓	+ 11·4	− 40·9	− 32·8	
22. 28	M	α Cygni.....	F	0·198	−0·141	− ½	+ 1·9	− 44·7	− 34·0	Spectrum bright and steady.
22. 36	M	,,	F	0·198	−0·161	− ⅔	+ 1·9	− 50·8	− 50·0	
22. 52	M	α Pegasi.....	F	0·198	−0·053	− ⅓	− 1·7	− 14·4	− 19·7	Spectrum bright and steady. Star-line faint, diffused, and observed with difficulty.
22. 55	M	,,	F	0·198	−0·102	− ⅓	− 1·7	− 29·3	− 19·7	
23. 49	M	α Andromedæ..	F	0·198	−0·064	− ¼	− 7·3	− 12·1	− 8·7	Spectrum bright and steady. Star-line seen fairly well.
23. 50	M	,,	F	0·198	−0·037	− ⅕	− 7·3	− 4·0	− 5·5	
23. 56	M	γ Pegasi.....	F	0·198	+0·112	+ ½	− 6·5	+ 40·5	+ 38·6	Spectrum fairly bright and steady. Star-line seen fairly well.
23. 58	M	,,	F	0·198	+0·069	+ ¼	− 6·5	+ 27·5	+ 22·5	Position Circle, 6°.
Sept. 10. 12. 20	M	Sky	F	0·198	+0·023			+ 7·0		The coincidence of the two spectra appeared perfect.
12. 21	M	,,	F	0·198	+0·003			+ 0·9		
12. 22	M	,,	F	0·198	+0·008			+ 2·4		
12. 23	M	,,	F	0·198	−0·006			− 1·8		
12. 24	M	,,	F	0·198	−0·012			− 3·6		Position Circle, 6°.
Sept. 11. 22. 37	M	α Pegasi.....	F	0·162	−0·172	− ⅗	− 0·9	− 51·4	− 51·9	Spectrum rather faint but steady. Star-line seen well.
22. 38	M	,,	F	0·162	−0·122	− ½	− 0·9	− 36·2	− 43·1	
22. 49	M	γ Pegasi.....	F	0·162	−0·246	− ⅔	− 5·7	− 69·0	− 53·0	Spectrum faint but fairly steady. Star-line ill-defined.
22. 51	M	,,	F	0·162	−0·147	− ⅓	− 5·7	− 39·0	− 23·7	Position Circle, 6°.

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Sept. 13. 20. 49	M	Vega	F	0·188	−0·042	− 1/10	+ 7·9	− 20·6	− 18·1	Spectrum bright and steady. Star-line seen well.
20. 51	M	,,	F	0·188	−0·068	− 1/4	+ 7·9	− 28·6	− 33·4	
21. 1	M	γ Lyræ	F	0·188	+0·034	+ 1/5	+ 9·1	+ 1·2	+ 11·3	Spectrum steady, but extremely faint.
21. 3	M	,,	F	0·188	−0·170	− 1/3	+ 9·1	− 60·7	− 43·1	
21. 14	M	ζ Aquilæ	F	0·188	+0·081	+ 1/5	+ 13·0	+ 11·6	+ 7·4	Spectrum steady, but extremely faint.
21. 15	M	,,	F	0·188	+0·073	+ 1/4	+ 13·0	+ 9·2	+ 12·5	
21. 28	M	δ Cygni	F	0·188	+0·029	+ 1/6	+ 4·6	+ 4·2	+ 15·8	Spectrum fairly bright and steady. Star-line seen fairly well.
21. 31	M	,,	F	0·188	+0·058	+ 1/3	+ 4·6	+ 13·0	+ 29·4	
21. 39	M	Altair.....	F	0·188	−0·061	− 1/4	+ 12·3	− 30·8	− 37·8	Spectrum bright and steady. Star-line seen fairly well.
21. 41	M	,,	F	0·188	−0·061	− 3/10	+ 12·3	− 30·8	− 42·9	
21. 56	M	α Cygni	F	0·188	−0·144	− 1/2	+ 2·7	− 46·4	− 53·7	Spectrum steady and fairly bright.
21. 59	M	,,	F	0·188	−0·026	− 1/4	+ 2·7	− 10·6	− 28·2	
22. 13	M	α Pegasi.....	F	0·188	+0·132	+ 1/3	− 0·3	+ 40·4	+ 34·3	Spectrum steady and fairly bright. Star-line seen fairly well.
22. 14	M	,,	F	0·188	+0·037	+ 1/10	− 0·3	+ 11·6	+ 10·5	
22. 15	M	,,	F	0·188	+0·080	+ 1/4	− 0·3	+ 24·6	+ 25·8	
22. 16	M	,,	F	0·188	+0·037	+ 1/10	− 0·3	+ 11·6	+ 10·5	
22. 23	M	γ Pegasi.....	F	0·188	−0·120	− 1/3	− 5·1	− 31·3	− 28·9	Spectrum faint but steady. Star-line ill-defined and observed with difficulty.
22. 25	M	,,	F	0·188	−0·211	− 2/3	− 5·1	− 59·0	− 62·9	
22. 33	M	α Andromedæ..	F	0·188	−0·096	− 3/10	− 6·0	− 23·1	− 24·6	Spectrum steady but not bright. Star-line seen fairly well.
22. 35	M	,,	F	0·188	−0·026	− 1/10	− 6·0	− 1·9	− 4·2	
22. 47	M	β Cassiopeiæ...	F	0·188	−0·047	− 1/4	− 7·6	− 6·7	− 17·9	Spectrum fairly bright and steady. Star-line faint and very diffused.
22. 50	M	,,	F	0·188	−0·053	− 1/10	− 7·6	− 8·5	− 2·6	
23. 0	M	γ Cassiopeiæ...	F	0·188	−0·013	0	− 9·3	+ 5·3	+ 9·3	Spectrum bright and steady. Star-line feebly bright, but observed with difficulty.
23. 2	M	,,	F	0·188	+0·006	0	− 9·3	+ 11·1	+ 9·3	
23. 13	M	δ Cassiopeiæ...	F	0·188	−0·025	− 1/10	− 1·0	− 6·6	− 9·2	Spectrum steady and fairly bright. Star-line seen fairly well.
23. 16	M	,,	F	0·188	−0·070	− 1/5	− 1·0	− 20·3	− 19·4	
23. 26	M	β Persei.....	F	0·188	−0·060	− 1/4	− 15·0	− 3·2	− 10·5	Spectrum fairly bright and steady. Star-line seen fairly well.
23. 28	M	,,	F	0·188	−0·026	− 1/10	− 15·0	+ 7·1	+ 4·8	
23. 36	M	α Persei	F	0·188	−0·064	− 1/4	− 14·7	− 4·7	− 10·8	Spectrum fairly bright and steady. Star-line seen fairly well.
23. 38	M	,,	F	0·188	−0·029	− 1/10	− 14·7	+ 5·9	+ 4·5	
23. 47	M	Capella	F	0·188	+0·117	+ 1/3	− 16·7	+ 52·2	+ 50·7	Spectrum bright but very unsteady. Star-line faint.
23. 49	M	,,	F	0·188	+0·098	+ 2/5	− 16·7	+ 46·5	+ 57·5	
										Position Circle, 6°.
Sept. 15. 11. 26	M	Sky.....	F	0·188	+0·028			+ 8·5		The coincidence of the two spectra appeared perfect.
11. 27	M	,,	F	0·188	−0·014			− 4·3		
11. 28	M	,,	F	0·188	+0·014			+ 4·3		
11. 29	M	,,	F	0·188	+0·016			+ 4·9		
11. 30	M	,,	F	0·188	+0·013			+ 4·0		
										Position Circle, 6°.
Sept. 15. 20. 30	M	Arcturus.....	b_1	0·120	−0·149	− 1/2	+ 7·8	(− 63·8)	(− 66·9)	Spectrum rather faint and very unsteady.
20. 32	M	,,	b_1	0·120	−0·092	− 1/3	+ 7·8	(− 42·3)	(− 47·2)	
20. 34	M	,,	b_1	0·120	−0·155	− 1/2	+ 7·8	(− 66·0)	(− 66·9)	
20. 36	M	,,	b_1	0·120	−0·209	− 1/2	+ 7·8	(− 86·3)	(− 66·9)	
21. 28	M	β Ursæ Minoris	b_1	0·120	−0·182	− 1/2	− 3·5	(− 64·8)	(− 55·6)	Spectrum fairly bright and steady. Star-line exceedingly faint and seen with great difficulty.
21. 30	M	,,	b_1	0·120	−0·072	− 1/4	− 3·5	(− 23·5)	(− 26·1)	
21. 51	M	α Ursæ Majoris	b_1	0·120	+0·138	+ 1/2	− 7·5	(+ 59·3)	(+ 66·6)	Spectrum very unsteady and not very bright. Star-line exceedingly faint and seen with difficulty.
21. 53	M	,,	b_1	0·120	+0·091	+ 1/3	− 7·5	(+ 41·7)	(+ 46·9)	
22. 23	M	α Cassiopeiæ...	b_1	0·120	+0·073	+ 1/5	− 8·6	(+ 36·0)	(+ 32·2)	Spectrum bright and fairly steady. Star-line exceedingly faint and seen with difficulty.
22. 27	M	,,	b_1	0·120	+0·074	+ 1/4	− 8·6	(+ 36·4)	(+ 38·2)	
22. 40	M	Capella	b_1	0·120	+0·079	+ 1/3	− 16·7	(+ 46·4)	(+ 56·1)	Spectrum bright and fairly steady. Star-line exceedingly faint.
22. 42	M	,,	b_1	0·120	+0·139	+ 1/2	− 16·7	(+ 68·9)	(+ 75·8)	
22. 58	M	γ Andromedæ.	b_1	0·120	−0·095	− 1/3	− 12·3	(− 23·4)	(− 27·1)	Spectrum fairly bright and steady. Star-line very faint.
23. 2	M	,,	b_1	0·120	−0·039	− 1/5	− 12·3	(− 2·4)	(− 11·3)	
										Position Circle, 6°.

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement. Measured.	Displacement. Estimated.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second. Measured.	Concluded Motion of Star in Miles per Second. Estimated.	REMARKS.
d h m				r	r					
Sept. 17. 11. 32	M	Sky.....	b_1	0·120	−0·027			− 10·1		The sky spectrum was found to be displaced towards the blue by a very small but unmistakeable amount, and the measures made on the night of Sept. 15–16 have therefore been rejected. Position Circle, 6°.
11. 33	M	,,	b_1	0·120	−0·034			− 12·8		
11. 34	M	,,	b_1	0·120	−0·024			− 9·0		
11. 35	M	,,	b_1	0·120	−0·011			− 4·1		
11. 36	M	,,	b_1	0·120	−0·018			− 6·8		
Sept. 24. 20. 36	M	Vega	F	0·120	−0·061	− 1/3	+ 8·5	− 27·0	− 36·1	Cloud passing.
20. 39	M	,,	F	0·120	−0·124	− 1/3	+ 8·5	− 46·2	− 36·1	
20. 42	M	,,	F	0·120	−0·064	− 1/4	+ 8·5	− 27·9	− 29·2	
20. 44	M	,,	F	0·120	−0·098	− 1/3	+ 8·5	− 38·2	− 36·1	Position Circle, 6°.
Oct. 1. 21. 12	M	Vega	F	0·168	−0·005	0	+ 8·7	− 10·2	− 8·7	Spectrum bright but unsteady. Definition bad. Wind high.
21. 13	M	,,	F	0·168	−0·033	0	+ 8·7	− 18·7	− 8·7	
21. 26	M	Altair.....	F	0·168	−0·049	− 1/10	+ 14·9	− 29·8	− 23·2	Spectrum bright but unsteady. Definition bad. Wind high.
21. 27	M	,,	F	0·168	−0·085	− 3/10	+ 14·9	− 40·7	− 39·8	
21. 36	M	α Cygni	F	0·168	−0·022	− 1/10	+ 5·3	− 12·0	− 13·6	Spectrum bright but unsteady. Definition bad.
21. 39	M	,,	F	0·168	+0·026	+ 1/10	+ 5·3	+ 2·6	+ 3·0	
21. 55	M	α Pegasi	F	0·168	−0·095	− 1/3	+ 5·0	− 33·8	− 32·6	Spectrum bright but unsteady. Definition poor.
21. 56	M	,,	F	0·168	−0·034	− 1/10	+ 5·0	− 15·3	− 13·3	
22. 8	M	γ Pegasi.....	F	0·168	−0·018	− 1/10	+ 0·3	− 5·8	− 8·6	Spectrum faint. Cloud passing. Definition bad.
22. 10	M	,,	F	0·168	−0·072	− 1/4	+ 0·3	− 22·2	− 21·0	
22. 15	M	α Andromedæ..	F	0·168	−0·042	− 1/10	− 1·2	− 11·5	− 7·1	Spectrum faint and unsteady. Observations interrupted by cloud. Definition bad. Position Circle 6°.
Oct. 3. 20. 59	M	Vega	F	0·158	+0·010	0	+ 8·7	− 5·7	− 8·7	Spectrum bright and fairly steady. Definition fair.
21. 2	M	,,	F	0·158	−0·091	− 3/10	+ 8·7	− 36·3	− 38·3	
21. 15	M	Altair.....	F	0·158	−0·151	− 2/5	+ 15·1	− 60·9	− 54·6	Spectrum bright and fairly steady. Definition fair.
21. 17	M	,,	F	0·158	−0·121	− 1/3	+ 15·1	− 51·8	− 48·0	
21. 42	M	α Cygni	F	0·158	−0·119	− 1/3	+ 5·5	− 41·6	− 38·4	Spectrum bright and steady. Star-line rather faint. Definition fair.
21. 44	M	,,	F	0·158	−0·086	− 1/5	+ 5·5	− 31·6	− 25·2	Position Circle, 6°.
Oct. 9. 20. 23	M	Vega	F	0·159	−0·075	− 1/5	+ 8·7	− 31·5	− 38·8	Spectrum bright and steady. Star-line seen fairly well.
20. 27	M	,,	F	0·159	−0·164	− 2/5	+ 8·7	− 58·5	− 44·8	
20. 39	M	Altair.....	F	0·159	−0·147	− 1/4	+ 15·6	− 60·3	− 38·1	Spectrum bright and steady. Star-line seen fairly well.
20. 41	M	,,	F	0·159	−0·040	− 1/4	+ 15·6	− 27·7	− 38·1	
20. 51	M	α Cygni	F	0·159	−0·137	− 1/2	+ 6·3	− 47·9	− 51·4	Spectrum bright and steady. Star-line seen fairly well.
20. 55	M	,,	F	0·159	−0·100	− 1/3	+ 6·3	− 36·7	− 36·4	
21. 25	M	α Pegasi	F	0·159	−0·021	− 1/10	+ 7·2	− 13·6	− 16·2	Spectrum bright and steady. Star-line seen fairly well.
21. 26	M	,,	F	0·159	−0·060	− 1/3	+ 7·2	− 25·4	− 37·3	
21. 35	M	γ Pegasi.....	F	0·159	+0·039	+ 1/10	+ 2·8	+ 9·0	+ 6·2	Spectrum bright but unsteady. Definition poor.
21. 39	M	,,	F	0·159	+0·003	0	+ 2·8	− 1·9	− 2·8	
21. 54	M	α Andromedæ..	F	0·159	+0·005	0	+ 1·1	+ 0·4	− 1·1	Spectrum bright but unsteady. Definition bad.
21. 59	M	,,	F	0·159	+0·009	0	+ 1·1	+ 1·6	− 1·1	
22. 13	M	β Arietis	F	0·159	−0·040	− 1/10	− 4·9	− 7·2	− 4·1	Spectrum bright and steady. Star-line seen fairly well.
22. 18	M	,,	F	0·159	−0·046	− 1/5	− 4·9	− 9·1	− 13·1	
22. 31	M	β Persei.....	F	0·159	−0·217	− 3/5	− 10·5	− 55·4	− 43·6	Spectrum bright and steady. Star-line seen fairly well.
22. 34	M	,,	F	0·159	−0·199	− 2/3	− 10·5	− 49·9	− 49·6	
22. 45	M	α Persei.....	F	0·159	+0·029	+ 1/10	− 11·1	+ 19·9	+ 20·1	Spectrum bright and steady. Star-line seen fairly well.
22. 48	M	,,	F	0·159	−0·021	− 1/10	− 11·1	+ 4·7	+ 2·1	Position Circle, 6°.
Oct. 11. 19. 32	M	β Cassiopeiæ...	F	0·172	−0·027	− 1/5	− 3·0	− 5·2	− 11·3	Spectrum bright and steady. Star-line seen well.
19. 35	M	,,	F	0·172	−0·082	− 1/4	− 3·0	− 21·9	− 14·9	

Date, 1890. Greenwich Civil Time.	Observer.	Object.	Line.	Width of Slit.	Displacement.		Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.		REMARKS.
					Measured.	Estimated.		Measured.	Estimated.	
d h m				r	r					
Oct. 11. 19. 52	M	γ Cassiopeiæ ...	F	0·172	+0·081	+ 1/3	− 4·9	+ 29·5	+ 28·7	Star-line very little brighter than the continuous spectrum, and observed with great difficulty.
19. 56	M	,,	F	0·172	+0·018	+ 1/10	− 4·9	+ 10·4	+ 12·0	
20. 13	M	δ Cassiopeiæ ...	F	0·172	+0·247	+ 2/3	− 6·0	+ 81·0	+ 53·6	Spectrum bright but very unsteady. Definition bad.
20. 15	M	,,	F	0·172	+0·203	+ 2/3	− 6·0	+ 67·7	+ 53·6	
20. 55	M	Vega	F	0·172	−0·119	− 2/5	+ 8·7	− 44·8	− 37·3	Spectrum bright but very unsteady. Definition bad.
20. 56	M	,,	F	0·172	−0·097	− 1/3	+ 8·7	− 38·2	− 32·5	
21. 3	M	Altair.....	F	0·172	−0·204	− 1/2	+ 15·8	− 77·8	− 51·5	Spectrum bright but very unsteady. Definition bad.
21. 5	M	,,	F	0·172	−0·196	− 3/5	+ 15·8	− 75·3	− 58·6	
21. 17	M	γ Cygni	F	0·172	−0·193	− 3/5	+ 8·2	− 66·8	− 51·0	Spectrum faint and unsteady. Definition bad.
21. 18	M	,,	F	0·172	−0·090	− 1/3	+ 8·2	− 35·5	− 32·0	
21. 25	M	α Cygni	F	0·172	−0·165	− 1/3	+ 6·5	− 56·6	− 30·3	Spectrum bright but unsteady. Definition poor.
21. 28	M	,,	F	0·172	−0·015	0	+ 6·5	− 11·1	− 6·5	
21. 39	M	α Cephei	F	0·172	−0·140	− 1/3	+ 0·8	− 43·3	− 24·6	Spectrum bright, but definition exceedingly bad.
21. 45	M	,,	F	0·172	−0·030	− 1/5	+ 0·8	− 9·9	− 15·1	
22. 7	M	α Pegasi.....	F	0·172	−0·035	− 1/10	+ 7·8	− 18·4	− 14·9	Spectrum bright and fairly steady. Definition poor.
22. 10	M	,,	F	0·172	−0·094	− 1/3	+ 7·8	− 36·4	− 31·6	
22. 21	M	γ Pegasi.....	F	0·172	+0·063	+ 1/4	+ 3·4	+ 15·7	+ 14·5	Spectrum bright but unsteady. Definition poor.
22. 23	M	,,	F	0·172	−0·008	0	+ 3·4	− 5·8	− 3·4	
22. 27	M	α Andromedæ.	F	0·172	−0·019	− 1/10	+ 1·7	− 7·5	− 8·8	Spectrum bright but unsteady. Definition poor. Position Circle, 6°.
22. 29	M	,,	F	0·172	−0·048	− 1/4	+ 1·7	− 16·3	− 19·6	
Oct. 16. 19. 9	M	Vega	F	0·198	−0·105	− 3/10	+ 8·6	− 40·5	− 30·6	Spectrum very faint, unsteady, and definition poor. Wind high.
19. 11	M	,,	F	0·198	−0·161	− 2/5	+ 8·6	− 57·5	− 38·0	
19. 13	M	,,	F	0·198	−0·060	− 3/10	+ 8·6	− 26·8	− 30·6	
19. 15	M	,,	F	0·198	−0·055	− 1/4	+ 8·6	− 25·3	− 27·0	
19. 28	M	Altair.....	F	0·198	−0·058	− 1/4	+ 16·1	− 33·7	− 34·5	Spectrum unsteady. Definition bad. Observations interrupted by cloud.
19. 38	M	,,	F	0·198	−0·132	− 1/3	+ 16·1	− 56·2	− 40·6	
19. 48	M	α Cephei.....	F	0·198	−0·044	− 1/10	+ 1·4	− 14·8	− 8·7	Spectrum unsteady. Definition bad. Position for observing very awkward. Position Circle, 6°.
19. 50	M	,,	F	0·198	−0·058	− 3/10	+ 1·4	− 19·0	− 23·4	

COLLECTED RESULTS for MOTIONS of STARS in the line of Sight, from SPECTROSCOPIC OBSERVATIONS made at the ROYAL OBSERVATORY, GREENWICH, in the Year 1890.

(F for the Star or Moon is compared with Hβ of Hydrogen; and b_1, b_2, b_4, with Mg_1, Mg_2, Mg_3, of Magnesium.)

(+ denotes Recession; − Approach.)

Date, 1890.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
α ANDROMEDÆ. F line broad and nebulous.									
August 1	M	2	1	6	0·162	F	− 14·3	− 10·8	− 14·3
7	M	2	1	6	0·162	F	− 13·7	− 58·9	− 49·9
September 8	M	2	1	6	0·198	F	− 7·3	− 8·1	− 7·1
13	M	2	1	6	0·188	F	− 6·0	− 12·5	− 14·4
October 1	M	1	1	6	0·168	F	− 1·2	− 11·5	− 7·1
9	M	2	1	6	0·159	F	+ 1·1	+ 1·0	− 1·1
11	M	2	1	6	0·172	F	+ 1·7	− 11·9	− 14·2
β CASSIOPEIÆ. F line broad, faint, and diffused at the edges.									
August 7	M	2	1	6	0·162	F	− 11·0	− 26·7	− 36·7
September 13	M	2	1	6	0·188	F	− 7·6	− 7·6	− 10·3
October 11	M	2	1	6	0·172	F	− 3·0	− 13·6	− 13·1
γ PEGASI. F line broad and diffused at the edges.									
September 8	M	2	1	6	0·198	F	− 6·5	+ 34·0	+ 30·6
11	M	2	1	6	0·162	F	− 5·7	− 54·0	− 38·4
13	M	2	1	6	0·188	F	− 5·1	− 45·2	− 45·9
October 1	M	2	1	6	0·168	F	+ 0·3	− 14·0	− 14·8
9	M	2	1	6	0·159	F	+ 2·8	+ 3·6	+ 1·7
11	M	2	1	6	0·172	F	+ 3·4	+ 5·0	+ 5·6
α CASSIOPEIÆ. *b* lines fairly distinct.									
September 15	M	2	1	6	0·120	b_1	− 8·6	(+ 36·2)	(+ 35·2)

Date, 1890.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
γ CASSIOPELÆ. F line narrow and feebly bright.									
August 7	M	2	1	6	0·162	F	− 11·8	− 7·2	− 8·9
September 13	M	2	1	6	0·188	F	− 9·3	+ 8·2	+ 9·3
October 11	M	2	1	6	0·172	F	− 4·9	+ 20·0	+ 20·4
δ CASSIOPELÆ. F line broad, dark, and diffused.									
September 13	M	2	1	6	0·188	F	− 1·0	− 13·5	− 14·3
October 11	M	2	1	6	0·172	F	− 6·0	+ 74·4	+ 53·6
β ARIETIS. F line broad, dark, and diffused.									
October 9	M	2	1	6	0·159	F	− 4·9	− 8·2	− 8·6
γ ANDROMEDÆ. The two components of this double star have been observed together as one star. *b* lines narrow and sharp, but faint.									
September 15	M	2	1	6	0·120	b_1	− 12·3	(− 12·9)	(− 19·2)
β PERSEI (*Algol*). F line broad, dark, and diffused.									
March 3	M	2	1	6	0·210	F	+ 16·4	− 53·0	− 57·0
12	M	4	1	6	0·225	F	+ 15·2	− 58·7	− 54·0
September 13	M	2	1	6	0·188	F	− 15·0	+ 2·0	− 2·9
October 9	M	2	1	6	0·159	F	− 10·5	− 52·7	− 46·6

Date, 1890.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
α PERSEI. F line rather broad and diffused, but not very dark.									
March 12	M	2	1	6	0·225	F	+ 14·9	− 44·4	− 42·5
September 13	M	2	1	6	0·188	F	− 14·7	+ 0·6	− 3·2
October 9	M	2	1	6	0·159	F	− 11·1	+ 12·3	+ 11·1
α TAURI (*Aldebaran*). F line narrow and sharp. *b* lines narrow, sharp, and distinct.									
January 4	M	2	1	6	0·198	F	+ 11·2	+ 63·8	+ 38·3
February 7	M	2	1	6	0·198	F	+ 17·7	+ 23·6	+ 35·6
18	M	2	1	6	0·170	F	+ 18·5	+ 18·7	+ 32·5
March 12	M	2	1	6	0·225	F	+ 18·0	+ 16·8	+ 20·9
17	M	2	1	6	0·095	b_1	+ 17·4	+ 4·8	+ 24·4
α AURIGÆ (*Capella*). F line narrow and sharp, but not very dark. *b* lines narrow and sharp.									
March 3	M	2	1	6	0·210	F	+ 17·1	+ 10·6	+ 23·5
12	M	2	1	6	0·225	F	+ 17·1	+ 14·7	+ 26·1
17	M	4	1	6	0·095	b_1	+ 16·9	+ 10·2	+ 32·4
September 13	M	2	1	6	0·188	F	− 16·7	+ 49·4	+ 54·1
15	M	2	1	6	0·188	b_1	− 16·7	(+ 57·7)	(+ 66·0)
β ORIONIS (*Rigel*). F line narrow and sharp, but occasionally faint.									
February 18	M	2	1	6	0·170	F	+ 15·5	+ 29·1	+ 22·8
March 3	M	4	1	6	0·210	F	+ 16·0	+ 30·5	+ 29·6
12	M	2	1	6	0·225	F	+ 15·8	+ 14·7	+ 22·2
April 3	M	2	1	6	0·192	F	+ 13·7	+ 8·5	+ 6·3

Date, 1890.		Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
									Measured.	Estimated.
γ ORIONIS. F line somewhat diffused at the edges, but not very broad.										
February	18	M	2	1	6	0·170	F	+ 17·0	+ 16·7	+ 12·8
March	3	M	2	1	6	0·210	F	+ 17·8	+ 13·2	+ 14·5
	12	M	2	1	6	0·225	F	+ 17·8	− 20·7	− 17·8
April	3	M	2	1	6	0·192	F	+ 15·9	− 22·3	− 18·4
β TAURI. F line broad and fairly dark.										
February	18	M	4	1	6	0·170	F	+ 17·5	− 8·3	− 8·6
March	3	M	2	1	6	0·210	F	+ 18·4	+ 12·4	+ 16·7
	12	M	2	1	6	0·225	F	+ 18·5	+ 7·7	+ 11·7
April	3	M	2	1	6	0·192	F	+ 16·8	− 32·8	− 39·3
δ ORIONIS. F line faint and ill-defined.										
February	18	M	4	1	6	0·170	F	+ 16·1	− 1·4	− 4·2
March	12	M	4	1	6	0·225	F	+ 17·0	− 6·7	− 6·2
ε ORIONIS. F line narrow and fairly dark.										
March	12	M	4	1	6	0·225	F	+ 16·9	+ 9·0	+ 13·7
ζ ORIONIS. F line narrow but faint.										
March	12	M	4	1	6	0·225	F	+ 16·8	− 16·8	− 15·5

Date, 1890.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
α ORIONIS.									
Third type spectrum. The *b* lines stand out on the back ground of a shaded band from which it is often difficult to separate them.									
March 17	M	4	1	6	0·095	b_1	+ 17·8	+ 4·9	+ 19·9
17	M	4	1	6	0·095	b_4	+ 17·8	+ 19·1	+ 27·9
β AURIGÆ.									
F line broad and diffused.									
February 18	M	2	1	6	0·170	F	+ 15·4	− 11·6	− 10·3
March 3	M	2	1	6	0·210	F	+ 16·8	− 27·0	− 29·7
12	M	2	1	6	0·225	F	+ 17·2	− 53·4	− 55·2
γ GEMINORUM.									
F line dark, broad, and diffused at the edges.									
February 18	M	4	1	6	0·170	F	+ 14·8	(− 10·3)	(− 14·8)
March 3	M	2	1	6	0·210	F	+ 16·9	+ 7·9	+ 13·5
12	M	2	1	6	0·225	F	+ 17·8	− 39·5	− 48·0
28	M	4	1	6	0·208	F	+ 18·3	− 74·1	− 80·3
α CANIS MAJORIS (*Sirius*).									
F line dark, but very broad and diffused at the edges.									
February 18	M	4	1	6	0·170	F	+ 10·7	− 6·9	− 8·2
March 3	M	6	1	6	0·210	F	+ 12·6	− 8·7	− 8·9
7	M	4	1	6	0·210	F	+ 13·0	− 33·5	− 34·7
12	M	6	1	6	0·225	F	+ 13·4	− 17·6	− 18·9
April 3	M	2	1	6	0·192	F	+ 14·1	− 15·8	− 18·3

Date, 1890.		Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
									Measured.	Estimated.
α GEMINORUM (*Castor*).										
The two components of this double star have been observed together as one star. F line very broad and diffused.										
February	18	M	2	1	6	0·170	F	+ 12·3	+ 38·8	+ 55·7
March	3	M	2	1	6	0·210	F	+ 15·0	+ 23·8	+ 31·1
	12	M	4	1	6	0·225	F	+ 16·4	+ 19·7	+ 11·2
	21	M	2	1	6	0·208	F	+ 17·4	+ 3·7	+ 7·1
	28	M	2	1	6	0·208	F	+ 17·8	− 9·3	− 6·5
April	22	M	2	1	6	0·192	F	+ 17·3	+ 19·6	+ 28·8
	30	M	2	1	6	0·192	F	+ 16·6	− 10·2	− 5·1
May	23	M	2	1	6	0·193	F	+ 12·7	+ 68·6	+ 55·2
α CANIS MINORIS (*Procyon*).										
F line narrow but rather faint, and on a background of a faint diffused shading.										
February	18	M	2	1	6	0·170	F	+ 10·6	+ 1·4	+ 14·9
March	3	M	2	1	6	0·210	F	+ 13·6	+ 0·5	+ 11·3
	12	M	4	1	6	0·225	F	+ 15·2	− 29·0	− 28·2
	21	M	2	1	6	0·208	F	+ 16·4	− 30·7	− 33·3
	29	M	4	1	6	0·208	F	+ 17·0	− 26·9	− 28·3
April	22	M	4	1	6	0·192	F	+ 17·2	− 33·5	− 29·8
	30	M	2	1	6	0·192	F	+ 16·7	− 12·0	− 7·5
β GEMINORUM (*Pollux*).										
F line narrow but faint. *b* lines narrow and sharp but faint.										
February	18	M	2	1	6	0·170	F	+ 11·6	− 23·1	− 21·8
March	3	M	2	1	6	0·210	F	+ 14·6	− 23·7	− 25·7
	12	M	2	1	6	0·225	F	+ 16·1	− 52·7	− 67·9
	17	M	2	1	6	0·095	b_1	+ 16·7	− 27·6	− 34·1
	21	M	2	1	6	0·208	F	+ 17·2	− 68·4	− 73·6
	28	M	2	1	6	0·208	F	+ 17·8	− 53·7	− 57·3
April	22	M	2	1	6	0·192	F	+ 17·7	− 49·2	− 47·6
	30	M	2	1	6	0·192	F	+ 17·0	− 61·6	− 53·8
May	23	M	2	1	6	0·193	F	+ 13·4	− 61·4	− 59·2

Date, 1890.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
α LEONIS (*Regulus*). F line faint and diffused at the edges.									
March 21	M	2	1	6	0·208	F	+ 10·1	− 10·9	− 10·1
29	M	2	1	6	0·208	F	+ 11·8	+ 17·1	+ 21·1
April 22	M	4	1	6	0·192	F	+ 16·3	− 0·5	+ 7·5
30	M	2	1	6	0·192	F	+ 17·2	− 55·6	− 49·4
May 17	M	1	1	6	0·192	F	+ 17·9	+ 9·7	+ 18·7
21	M	2	1	6	0·174	F	+ 17·9	− 66·1	− 67·9
23	M	2	1	6	0·193	F	+ 17·8	− 12·1	− 12·7
June 2	M	2	1	6	0·187	F	+ 17·4	− 16·2	− 15·4
γ LEONIS. The two components of this double star have been observed together as one star. F line narrow, but faint.									
March 29	M	2	1	6	0·208	F	+ 11·8	− 15·9	− 17·5
April 22	M	2	1	6	0·192	F	+ 16·2	− 28·1	− 25·4
30	M	2	1	6	0·192	F	+ 17·1	− 44·8	− 44·0
May 21	M	2	1	6	0·174	F	+ 17·7	− 27·1	− 26·3
23	M	2	1	6	0·193	F	+ 17·6	− 18·4	− 7·4
β URSÆ MAJORIS. F line broad and diffused at the edges.									
May 7	M	2	1	6	0·192	F	+ 12·7	− 71·5	− 58·7
α URSÆ MAJORIS. F line narrow and faint. *b* lines narrow and faint.									
May 7	M	2	1	6	0·192	F	+ 11·6	− 46·2	− 46·1
September 15	M	2	1	6	0·120	b_1	− 7·5	(+ 50·5)	(+ 56·8)

Date, 1890.		Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
									Measured.	Estimated.
β LEONIS. F line dark and very broad, and diffused.										
March	29	M	2	1	6	0·208	F	+ 5·6	+ 20·7	+ 22·6
April	22	M	2	1	6	0·192	F	+ 12·0	+ 13·5	+ 24·8
	30	M	2	1	6	0·192	F	+ 13·6	− 20·0	− 19·4
May	21	M	2	1	6	0·174	F	+ 16·5	− 4·2	− 7·9
	23	M	2	1	6	0·193	F	+ 16·7	+ 18·7	+ 30·0
γ URSÆ MAJORIS. F line broad, very diffused, and ill-defined.										
May	7	M	2	1	6	0·192	F	+ 12·0	− 35·9	− 36·6
δ URSÆ MAJORIS. F line rather faint and ill-defined.										
May	7	M	2	1	6	0·192	F	+ 10·9	+ 6·0	+ 16·7
ε URSÆ MAJORIS. F line broad and ill-defined.										
May	7	M	2	1	6	0·192	F	+ 9·9	− 56·0	− 50·9
α VIRGINIS (*Spica*). F line faint and rather narrow.										
April	22	M	2	1	6	0·192	F	+ 3·3	+ 19·8	+ 23·6
	30	M	2	1	6	0·192	F	+ 5·6	− 28·1	− 28·6
May	12	M	1	1	6	0·192	F	+ 8·9	− 53·6	− 54·9
	15	M	4	1	6	0·192	F	+ 9·7	− 59·1	− 53·1
	21	M	2	1	6	0·174	F	+ 11·1	+ 26·6	+ 24·7
	23	M	2	1	6	0·193	F	+ 11·6	− 66·4	− 67·6
	31	M	4	1	6	0·187	F	+ 13·3	− 63·5	− 49·8
June	6	M	2	1	6	0·164	F	+ 14·4	(+ 13·7)	(+ 24·2)

Date, 1890.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
ζ URSÆ MAJORIS. F line broad and ill-defined.									
May 7	M	2	1	6	0·192	F	+ 8·9	− 44·9	− 54·9
η URSÆ MAJORIS. F line faint and ill-defined.									
May 7	M	2	1	6	0·192	F	+ 8·2	− 17·5	− 22·0
α BOÖTIS (*Arcturus*). F line narrow and sharp. *b* lines narrow, sharp, and dark.									
March 17	M	4	1	6	0·095	b_1	− 6·8	− 28·6	− 36·7
April 22	M	2	1	6	0·192	F	+ 2·7	− 26·6	− 29·6
30	M	4	1	6	0·192	F	+ 4·8	− 37·2	− 41·2
May 5	M	2	1	6	0·192	F	+ 5·9	− 33·4	− 34·8
7	M	2	1	6	0·192	F	+ 6·4	− 31·6	− 31·0
15	M	2	1	6	0·192	F	+ 8·2	− 40·4	− 42·5
21	M	2	1	6	0·174	F	+ 9·5	− 45·5	− 43·8
23	M	2	1	6	0·193	F	+ 9·9	− 57·5	− 60·8
31	M	2	1	6	0·187	F	+ 11·3	− 40·5	− 37·0
June 27	M	2	1	6	0·164	F	+ 14·6	− 37·7	− 30·9
July 3	M	2	1	6	0·164	F	+ 15·0	− 36·3	− 35·5
August 6	M	2	1	6	0·162	F	+ 14·3	− 55·0	− 57·2
September 15	M	4	1	6	0·120	b_1	+ 7·8	(− 64·7)	(− 62·0)
β URSÆ MINORIS. *b* lines exceedingly faint.									
September 15	M	2	1	6	0·120	b_1	− 3·5	(− 44·2)	(− 40·9)

Date, 1890.		Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
									Measured.	Estimated.
β LIBRÆ. F line broad and diffused at the edges.										
April	22	M	2	1	6	0·192	F	− 4·7	− 16·6	− 20·6
	30	M	2	1	6	0·192	F	− 2·3	+ 6·7	+ 6·9
May	15	M	4	1	6	0·192	F	+ 2·2	− 38·0	− 40·3
	23	M	2	1	6	0·193	F	+ 4·5	− 22·9	− 22·4
	31	M	2	1	6	0·187	F	+ 6·8	− 53·4	− 47·4
June	6	M	2	1	6	0·164	F	+ 8·3	− 47·5	− 71·9
α CORONÆ BOREALIS. F line broad and diffused at the edges.										
April	22	M	4	1	6	0·192	F	− 1·8	+ 31·6	+ 36·3
May	15	M	2	1	6	0·192	F	+ 3·2	+ 35·1	+ 38·0
	22	M	2	1	6	0·174	F	+ 4·4	+ 18·7	+ 17·1
	23	M	2	1	6	0·193	F	+ 4·8	+ 25·3	+ 30·8
	31	M	2	1	6	0·187	F	+ 6·3	+ 8·6	+ 5·9
June	27	M	2	1	6	0·164	F	+ 10·5	− 10·9	− 6·3
July	3	M	2	1	6	0·164	F	+ 11·1	− 16·6	− 13·9
August	6	M	2	1	6	0·162	F	+ 12·8	− 78·4	− 63·7
September	8	M	2	1	6	0·198	F	+ 10·6	− 26·9	− 23·5
α OPHIUCHI. F line very ill-defined and nebulous.										
April	30	M	4	1	6	0·192	F	− 9·5	− 17·4	− 10·8
May	15	M	4	1	6	0·192	F	− 6·4	− 9·9	− 7·3
	22	M	2	1	6	0·174	F	− 5·0	− 6·1	− 7·9
	23	M	2	1	6	0·193	F	− 4·5	− 13·3	− 12·5
	31	M	2	1	6	0·187	F	− 2·6	− 19·2	− 17·7
June	6	M	2	1	6	0·164	F	− 1·2	− 10·8	− 10·2
	27	M	2	1	6	0·164	F	+ 3·8	− 26·0	− 20·6
July	3	M	2	1	6	0·164	F	+ 5·2	− 38·9	− 36·0
August	1	M	2	1	6	0·162	F	+ 10·9	− 46·3	− 32·1
	6	M	2	1	6	0·162	F	+ 11·6	− 47·5	− 43·4
September	8	M	2	1	6	0·198	F	+ 14·7	− 35·1	− 38·8

Date, 1890.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
α LYRÆ (*Vega*). F line broad and diffused.									
May 1	M	2	1	6	0·192	F	− 7·7	− 30·8	− 26·1
15	M	2	1	6	0·192	F	− 6·4	− 3·7	− 2·7
22	M	2	1	6	0·174	F	− 5·8	− 53·1	− 51·3
24	M	2	1	6	0·193	F	− 5·6	− 10·1	− 12·3
June 1	M	2	1	6	0·187	F	− 4·7	− 25·5	− 21·7
July 3	M	2	1	6	0·164	F	− 0·3	− 63·1	− 46·3
August 1	M	2	1	6	0·162	F	+ 3·7	− 8·0	− 8·6
6	M	2	1	6	0·162	F	+ 4·3	− 10·4	− 9·1
September 8	M	2	1	6	0·198	F	+ 7·6	− 26·0	− 18·3
13	M	2	1	6	0·188	F	+ 7·9	− 24·6	− 25·8
24	M	4	1	6	0·120	F	+ 8·5	− 34·8	− 34·4
October 1	M	2	1	6	0·168	F	+ 8·7	− 14·5	− 8·7
3	M	2	1	6	0·158	F	+ 8·7	− 21·0	− 23·5
9	M	2	1	6	0·159	F	+ 8·7	− 45·0	− 41·8
11	M	2	1	6	0·172	F	+ 8·7	− 41·5	− 34·9
16	M	4	1	6	0·198	F	+ 8·6	− 37·5	− 31·6
γ LYRÆ. F line broad and diffused.									
August 1	M	2	1	6	0·162	F	+ 3·4	+ 7·5	+ 11·3
6	M	2	1	6	0·162	F	+ 4·2	− 16·2	− 13·7
September 13	M	2	1	6	0·188	F	+ 9·1	− 29·8	− 15·9
ζ AQUILÆ. F line broad, nebulous, and faint.									
August 1	M	2	1	6	0·162	F	+ 5·2	− 7·7	− 5·2
6	M	2	1	6	0·162	F	+ 6·3	− 13·7	− 11·1
September 13	M	2	1	6	0·188	F	+ 13·0	+ 10·4	+ 10·0
δ CYGNI. F line broad, diffused, and faint.									
August 6	M	2	1	6	0·162	F	0·0	− 70·7	− 52·5
September 13	M	2	1	6	0·188	F	+ 4·6	+ 8·6	+ 22·6

Date, 1890.		Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
									Measured.	Estimated.
α AQUILÆ (*Altair*). F line very broad and nebulous.										
May	16	M	2	1	6	0·192	F	− 14·2	− 5·2	− 1·8
	24	M	2	1	6	0·193	F	− 13·2	− 20·7	− 19·0
June	1	M	2	1	6	0·187	F	− 11·9	− 10·0	− 8·4
	27	M	2	1	6	0·164	F	− 6·3	− 47·0	− 27·2
July	3	M	2	1	6	0·164	F	− 4·9	− 57·4	− 41·7
August	1	M	2	1	6	0·162	F	+ 2·5	− 45·2	− 46·5
	4	M	2	1	6	0·162	F	+ 3·3	− 44·2	− 39·2
	6	M	2	1	6	0·162	F	+ 3·8	− 72·9	− 70·6
September	8	M	2	1	6	0·198	F	+ 11·4	− 32·4	− 30·1
	13	M	2	1	6	0·188	F	+ 12·3	− 30·8	− 40·4
October	1	M	2	1	6	0·168	F	+ 14·9	− 35·3	− 31·5
	3	M	2	1	6	0·158	F	+ 15·1	− 56·4	− 51·3
	9	M	2	1	6	0·159	F	+ 15·6	− 44·0	− 38·1
	11	M	2	1	6	0·172	F	+ 15·8	− 76·6	− 55·1
	16	M	2	1	6	0·198	F	+ 16·1	− 45·0	− 37·6
γ CYGNI. F line narrow but faint.										
October	11	M	2	1	6	0·172	F	+ 8·2	− 51·2	− 41·5
α CYGNI. F line narrow and fairly dark.										
May	15	M	2	1	6	0·192	F	− 8·9	− 51·2	− 41·4
July	3	M	1	1	6	0·164	F	− 7·0	− 42·4	− 48·8
August	4	M	2	1	6	0·162	F	− 3·3	− 64·8	− 66·0
September	8	M	2	1	6	0·198	F	+ 1·9	− 47·8	− 42·0
	13	M	2	1	6	0·188	F	+ 2·7	− 28·5	− 41·0
October	1	M	2	1	6	0·168	F	+ 5·3	− 4·7	− 5·3
	3	M	2	1	6	0·158	F	+ 5·5	− 36·6	− 31·8
	9	M	2	1	6	0·159	F	+ 6·3	− 42·3	− 43·9
	11	M	2	1	6	0·172	F	+ 6·5	− 33·9	− 18·4

Date, 1890.	Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
								Measured.	Estimated.
α CEPHEI.									
F line broad, dark, and diffused at the edges.									
May 15	M	2	1	6	0·192	F	− 4·5	− 38·1	− 29·1
August 1	M	2	1	6	0·162	F	− 5·6	− 87·8	− 92·2
October 11	M	2	1	6	0·172	F	+ 0·8	− 26·6	− 19·9
16	M	2	1	6	0·198	F	+ 1·4	− 16·9	− 16·1
α PEGASI.									
F line broad and diffused at the edges.									
August 1	M	2	1	6	0·162	F	− 11·3	− 29·6	− 27·8
7	M	2	1	6	0·162	F	− 10·0	− 28·0	− 25·8
September 8	M	2	1	6	0·198	F	− 1·7	− 21·9	− 19·7
11	M	2	1	6	0·162	F	− 0·9	− 43·8	− 47·5
13	M	4	1	6	0·188	F	− 0·3	+ 22·1	+ 20·3
October 1	M	2	1	6	0·168	F	+ 5·0	− 24·6	− 23·0
9	M	2	1	6	0·159	F	+ 7·2	− 19·5	− 26·8
11	M	2	1	6	0·172	F	+ 7·8	− 27·4	− 23·3
GREAT NEBULA IN ORION.									
March 17	M	7	1	6	0·095	N	+ 16·2	− 7·4	...
Compared with Nitrogen. The motion given for the Nebula is corrected for the orbital motion of the earth, but requires a further correction for the difference in wavelength between the Nebular line and the line of Nitrogen.									
MARS.									
May 31	M	2	1	6	0·187	F	...	− 2·0	0·0
June 6	M	2	1	6	0·164	F	...	− 6·1	0·0
Calculated relative motion of Mars, May 31, − 0·8 miles per second; June 6, + 0·3.									

Date, 1890.		Observer.	Number of Measures.	Number of Prisms.	Position Circle.	Width of Slit.	Line.	Earth's Motion in Miles per Second.	Concluded Motion of Star in Miles per Second.	
									Measured.	Estimated.
MOON.										
March	3	M	5	1	6	0·210	F	...	− 2·3	...
	28	M	5	1	6	0·208	F	...	− 2·4	...
April	30	M	5	1	6	0·192	F	...	+ 1·1	...
May	5	M	5	1	6	0·192	F	...	+ 2·2	...
	23	M	5	1	6	0·193	F	...	− 1·3	...
	31	M	5	1	6	0·187	F	...	+ 1·7	...
June	27	M	5	1	6	0·164	F	...	+ 1·2	..
July	3	M	5	1	6	0·164	F	...	+ 2·6	...
August	2	M	5	1	6	0·162	F	...	+ 2·2	...
	7	M	5	1	6	0·162	F	...	− 2·2	...
SUN.										
May	16	M	5	1	6	0·192	F	...	+ 1·1	...
SKY.										
March	14	M	5	1	6	0·225	F	...	− 2·9	...
	18	M	5	1	6	0·095	b_1	...	+ 1·0	...
Sept.	10	M	5	1	6	0·198	F	...	+ 1·0	...
	15	M	5	1	6	0·188	F	...	+ 3·5	...
	17	M	5	1	6	0·120	b_1	...	(− 8·6)	...