KG
1/365
856

1888phae.proj..857F

HENRY DRAPER MEMORIAL

Description of Spectra

No. 32.

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KG11365.856

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10 20.8-634 Wheeler Lyrae K and ?

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Adopted notation Feb 28th to 1888

I	A
Ib	B
Id	C
I pec	D (Lines narrow Ic, Ibc)
II	E
IIa	F
II pec	G (IIb, IIc, IIac, IIbc, IIabc)
III	H
IIIb	I
IIIbc	K
III pec	L (IIIa, IIIc, IIIab,)
III true	M
IV	N
B	O
Pec	P

p. 114 l.8 165 What letter?

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1000phot.proj.857F

IG 26H 402.2 IIII

448.2 1

402.2, 453.2 1

HB 453.2 IIII

443.2 1

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1960phae.proj..85T

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June 4, 1888.

Plate 931

Book F.9, Page 44

	V	H	Type	No. Rem.	Description of Lines on Spectra.
✓	22.9	11.0	F II a	3355	G+h=.3. Goldb. Lines below K.
✓	21.5	21.0	F II a	3356	G+h=.2
✓	20.4	9.3	F II a	3357	G+h=.3. 3 lines below K.
✓	20.0	21.7	F II a	3358	G+h=.5
✓	19.1	15.0	F? II a?	3359	G+h=.5
✓	18.8	16.6	B Ib	3360	h & H=.2.
✓	17.2	10.4	K IIIbc	3361	F3G=.1B, F3½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F7G=.3, Lines bet. G+H. 1 line below K.
✓	16.9	15.2	F? II a?	3362	G+h=.5
✓	16.4	12.7	B Ib	3363	F7G=.2
✓	15.3	14.5	F II a?	3364	G+h=.5? 3 lines below K.
✓	15.0	16.5	K IIIbc	3365	F3G=.1B, F3½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F7G=.3. Lines bet. G+H.
✓	14.7	21.9	K IIIbc	3366	F2½G=.1, F3G=.1B, F3½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F6G=.1, F7G=.3. F8G=.1B, F9G=.1, Lines bet. G+H. 3 lines below K.
✓	12.1	13.7	K IIIbc	3367	F3G=.1B, F3½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F7G=.3, F8G=.1B, F9G=.1. Lines bet. G+H.
✓	10.6	22.6	F? II a?	3368	G+h=.5

June 5, 1888.

Plate 931.

✓	8.8	11.2	K IIIbc	3369	F2½G=.1, F3G=.2B, F3½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F7G=.3, F8G=.1B, F9G=.1. Lines bet. G+H. 2 lines below K.

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1888phae.proj - 857F

aK ; h3 ; 𝄞d3
h2 , 𝄞v
3aK ; h3 𝄞3
h5 𝄞5
h5 𝄞5
408 , 2
1aK ; Ha𝄞 ; 448,3 ; 456 .1 ; 458 .2 ; 461 , 2 ; 466 .1 ; 468 .1

h5 𝄞5
448 , 2
3aK ; h5 ? 𝄞5 ?
Ha𝄞 ; 448,3 ; 456 .1 ; 458 .2 ; 461 , 2 ; 466 .1 ; 468 .1

3aK ; Ha𝄞 ; 438,1 ; 443 .1 ; 448 .3 ; 453 .1 ; 456 .1 ; 458 .2 ; 461 .2 ; 466 , 1 ;
468 .1 ; 471 .1

Ha𝄞 ; 438 .1 ; 443 .1 ; 448 .3 ; 456 .1 ; 458 .2 ; 461 .2 ; 466 .1 ; 468 .1

h5 ; G5

2aK ; Ha𝄞 ; 438 .1 ; 443 .1 ; 448 .3 ; 456 .1 ; 458 .2 ; 461 .2 ; 466 .1 ; 468 .2
471 .1

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Book, F. Page 48	V.	H.	Type.	Wav.	Description of Lines on Spectra.
	3.5	14.5	B I b	3370	G b h = .2
	3.2	11.1	F? II a?	3371	G + h = .3. G dbl. 3 lines below K.
					Other lines.
	F. m. to c. = 8.1	7.2			F. ch. = 7.3

Plate 930

50	16.6	10.5	F? II a?	3372	G + h = .5
	15.5	12.6	K III bc	3373	F 3 G = .1 B, F 4½ G = .2, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3. Lines let. G + H. 2 lines below K.
	7.8	15.2	F II a	3374	G + h = .5. 3 lines below K.
	6.0	21.5	I III b	3375	F 7 G = .3. Lines let. G + H.
	4.0	22.1	I III b	3376	F 7 G = .3
	F. m. to c. 8.0	7.3			F. ch. 7.3

Plate 933.

52	20.8	20.8	F II a	3377	G + h = .5
	16.6	20.3	F II a	3378	G + h = .3, 2 lines below K.
	15.7	13.6	B I b	3379	F 6 G = .2, h 6 H = .2.
	15.7	22.6	F II a	3380	G + h = .5
	15.8	23.2	F? II a?	3381	G + h dbl. = .3
	12.9	12.8	F II a	3382	G + h = .5. 1 line below K.
	9.9	11.3	F II a	3383	G + h = .5. G dbl. 3 lines below K.
54	7.7	15.4	K III bd	3384	F 2½ G = .1, F 3 G = .1 B, F 3½ G = .1, F 4½ G = .2, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3. Lines let. G + H. 1 line below K.
	4.6	10.6	F II a	3385	G + h dbl. = .5. 3 lines below K.
	F. m. to c. 8.0	7.2			F. ch. 7.3

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402.2

5aK; h3 ; Gd3 Other lines

L5, G5.

2aK; HaG; 448.3; 456.1; 458.2; 461.2; 468.1

3aK; h5 G5

HaG; 448,3

448.3

h5 G5

2aK h3 G3

402.2; 453.2

h5 G5

hd3 Gd3

1aK; h5 G5

3aK; h5 Gd5

1aK; HaG; 448,3; 456.1; 458.2; 461.2; 466.1; 468.1; 471.1

3aK; hd5 ; Gd5

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June 5. 1888.

Plate 934

Book 9 F. Page 86	V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
✓	16.0	7.9	I IIIb	3386	F7G=.3. Lewis Jet. G & H.
✓	15.8	13.9	I IIIb	3387	F7G=.3
✓	15.5	10.8	I IIIb	3388	F4½G=.2, F5½G=.1, F7G=.3
✓	14.8	16.7	F IIa	3389	G+h=.5. 2 lines below K.
✓	12.1	14.3	F IIa	3389a	G and h=.3
✓	11.7	13.3	F? IIa?	3390	G+h=.5. 2 lines below K.
✓	11.4	14.8	F? IIa?	3391	G+h=.5. 1 line below K. (G+h=.5)
✓	10.5	19.2	F IIa	3392	G+h=.3
✓	9.5	14.3	F? IIa?	3393	G+h=.5. 6 lines below K.
✓	9.3	13.1	F? IIa?	3394	G+h=.5 4 lines below K.
✓	8.6	19.7	F IIa	3395	G+h=.3. 1 line below K.
✓	8.3	8.6	I? IIIb?	3396	F7G=.3. 1 line above F?
✓	7.8	16.7	F IIa	3397	G+h=.3. G dbl. 5 lines below K.
✓	6.7	8.6	F IIa	3398	G+h=.3. 3 lines below K.
✓	5.7	17.6	F? IIa?	3399	G+h=.3. 2 lines below K.

F. m. & c. 7.9 6.9 F ch. 7.1

Plate 976.

✓	19.5	22.0	B Ib	3400	h & H=.2
✓	15.1	22.6	B Ib	3401	h & H=.2
✓	14.1	21.1	B Ib	3402	h & H=.2
✓	6.8	6.2	13.6 B? Ib?	3403	F6G=.2

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Plate 976 3 G+h=.5

✓	5.3	7.5	F IIa	3404	
✓	3.2	22.1	K IIIbc	3405	F4½G=.1, F5G=.1 B, F7G=.3, Lewis Jet. G & H. Lines below K.

F. m. & c. 8.1 7.5 F ch. 7.6

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Hα l_3; 448,3

448,3

448,3; 456,1; 461,2)

2 aK; h_3 l_3 h_5 l_5

2 aK; h_5 l_5

1 aK; h_5 l_5 (h_5 l_5)

h_3 l_3

6 aK; h_5 l_5

4 aK; h_5 l_5

1 aK; h_3 l_3

~~l_3~~ 448,3; F1a

5 aK; h_3 l_3

3 aK; h_3 l_3

2 aK h_3 l_3

403,2)

403,2)

403,2)

453,2)

h_5 l_5

aK; Hα l_3; 448,3; 458,1; 461,1

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Plate 999

Book 9 F. Page 68	V.	H.	Type.	Rem.		Description of Lines on Spectra.
	20.0	10.6?	F II a		3406	G + h = .5?
	18.8	16.5	F II a		3406a	G and h = .5
	16.6	12.9	F: II a?		3407	G + h = .2, 8 lines below K.
70	15.8	17.6	F II a		3408	G + h = .3, G dbl.?
	14.4	23.5	F II a		3408a	G and h = .2?
	13.6	9.7	F: II a?		3409	G + h = .5 (G + h = .3?)
	13.5	15.4	F: II a?		3409a	G and h = .5
	11.4	14.1	F II a		3410	G + h = .5. 2 lines below K. (G + h = .2, h dbl.?)
	10.8	16.6	F: II a?		3411	G + h = .5. 2 lines below K. (G + h = .2)
	10.6	14.8	F II a		3412	G + h = .3. 2 lines below K. (G + h = .2, 2 lines below K.)
	8.8	6.3	K III bc		3413	F 3 G = .1 B, F 4½ G = .1, F 5 G = .2 B, F 5½ G = .1. F 7 G = .3, F 8 G = .1 B, F 9 G = .1. Lines bet. G + H. Lines below K.

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Plate 999.

	8.8	10.6	F: II a?		3414	G + h = .5? 5 lines below K.
	6.6	13.6	F II a		3414a	G and h = .5
72	5.5	17.3	B I b		3415	F 8 G = .2
	4.2	6.6	F: II a?		3416	G + h = .5
	3.9	8.1	F: II a?		3417	G + h = .5
	F w + c. 7.0	6.9				F ch. 7.9

Plate 881.

74	18.6	11.2	B I b		3418	F 8 G = .2
	18.0	11.6	F: II a?		3419	G + h dbl. = .3, 2 lines below K.
	F w + c. 8.2	7.5				F ch. 7.5

Plate 882.

	19.8	17.2	I III b		3420	F 7 G = .3
	15.9	15.3	P	?	3421	Peculiar spectrum. Several lines bet. F + H. Several lines below K. F dbl.? 1 line above F, and 1 line below F?

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h5 ? l5 ?
h5 l5
8 aK ; h2 l2
h3 ; l d? 3
h2? l2?
h5 l5 (h3 ? l3 ?)
h5 l5
2 aK h5 l5 (hd2 ; l2)
2 aK h5 l5 (h2 l2)
2 aK h3 l3 ~~2~~aK ; h2 ; l2)
aK ; Ha ; 438.1 ; 443.1 ; 448.3 ; 456.1 ; 458.2 ; 461.1 ; 468.1

5 aK ; h5 ? l5 ?
h5 l5
443.2
h5 l5
h5 l5

443.2
2 aK ; hd3 ; ld3

448.3
~~aF~~ ; ~~Fe~~ ; ~~Fd~~? aK ; Ha ; Peculiar spectrum Fd? F. a17 ; 71a ; Secchi Jansen
A star superposed.

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June 8, 1888.

Plate 882

Book 9 F Page 74	V.	H.	Type.	Int.	Description of Lines on Spectra.
✓	12.6	8.1	K IIIbc	3422	F2½ G=.1, F3 G=.2B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1 F7 G=.3, F8 G=.1B, F9 G=.1. Spectra superposed Lines bet G & H. 3 lines below K.
	F. on. + c. 8.2	7.4			F ch. 7.4

Dark Plate. Hard to measure. Plate 920.

✓ 76	18.2	11.7	F? IIa?	3423	G & h = .5. G dbl.
✓	16.4	18.6	F? IIa?	3424	G + h = .5 (G and h = .5)
✓	16.2	14.1	F IIa	3425	G & h = .2. F dbl.?
✓✓	16.4	13.1	B Ib	3426	F6 G = .2
✓ 78	15.5	21.1	F IIa	3427	G & h = .3? 1 line below K.
✓	13.7	21.4	F? IIa?	3428	G & h = .5. 2 lines below K.
~~13.0~~	~~21.5~~	~~F IIa~~	~~3429~~	~~G & h = .3, 3 lines below K.~~	
✓	12.5	14.7	I? IIIb?	3430	F7 G = .3
✓	10.2	10.7	F? IIa?	3431	G & h = .3
✓	9.0	24.0	K? IIIbc?	3432	Lines bet. F & G. Lines bet. G & H. Lines below K.
✓ 80	7.6	19.1	F? IIa?	3433	G + h = .3, 3 lines below K.
✓	7.2	12.2	F? IIa?	3434	G + h = .5 (G and h = .5)
✓	6.6	10.4	F? IIa?	3435	G + h = .5. 1 line below K.
✓	6.0	20.0	F IIa	3436	G + h = .3. 2 lines below K.
✓	5.5	13.4	F? IIa?	3437	G & h = .5. 3 lines below K.
	F. on. + c. 5.5	5.5			F ch. 7.9

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3aK; Hδ; 438.1; 443.1; 448.3; 456.1; 458.2; 461.2; 466.1; 468.2; 471.1
Spectrum of A star superposed

h5 δ5
h5 δ5 (h5 δ5)
h2; δ2 ?

v53.2
1aK; h3 ? δ3 ?
2aK; h5; δ5
3aK; h3 δ3

v48.3
h3 δ3
aK; Hδ; δa

3aK; h3; δ3
h5 δ5 (h5 δ5)
1aK; h5 δ5
2aK; h3 δ3
3aK; h5 δ5

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Plate 921

Book 9 F. Page 82.	V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
✓	21.0	19.2	F II a	3438.	G & h dbl. =.5
✓	20.7	10.1	F? II a?	3439	G & h =.5 (G and h =.5)
✓	20.5	10.4	F? II a?	3440	G & h =.5
✓	19.6	16.2	F? II a?	3441	G & h =.5
✓	19.6	14.7	F? II a?	3442	G & h =.5
✓	19.6	14.0	F? II a?	3443	G & h =.5
✓	18.6	11.0	F II a	3444	G & h =.3
✓	18.5	14.4	F? II a?	3445	G & h =.5 (G and h =.5)
✓	18.4	17.3	F? II a?	3446	G & h =.2. 2 lines below K.
✓	18.2	10.6	F? II a?	3447	G & h =.5 (G and h =.5)
✓ 84	18.0	6.4	F? II a?	3448	G & h =.5. 1 line below K.
✓	17.6	9.3	F II a b	3449	G & h =.3. Lines below K. G1 h =.5.
✓	17.5	15.9	F? II a?	3450	G & h =.5 (G and h =.5)
✓	16.8	15.6	I? III b?	3451	F 4½ G =.2, F 7 G =.3
✓	15.7	9.0	F II a	3452	3 lines below K.
✓	15.8	15.2	K III bc	3453	F 2½ G =.1, F 3 G =.1B, F 3½ G =.1, F 4½ G =.2, F 5 G =.2B, F 5½ G =.1, F 7 G =.3. Lines bet. G & H.
✓	15.2	14.7	F? II a?	3454	G & h =.3. 8 lines below K.
✓ 86	14.6	17.9	F? II a?	3455	G & h =.5
✓	14.2	7.7	F? II a?	3456	G & h =.5
✓	14.1	19.0	H III ?	3457	1 line below K, 1 line above F?
✓	12.7	22.1	F? II a?	3458	G & h =.5
✓ 88	11.5	23.4	K? III bc?	3459	F 3 G =.2B, F 4½ G =.1, F 5 G =.2B, F 5½ G =.1, F 7 G =.3. Lines bet. G & H. Lines below K.
✓	11.2	7.7	F II a	3460	G & h =.5
✓	10.3	6.7	F? II a?	3461	G & h =.3. G dbl? Lines below K. Other lines.

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1888phae.proj..857F

hd 5 ; Hd 5

h 5 ; H 5 (h 5 H 5)

h 5 H 5

h 5 H 5

h 5 H 5

h 5 H 5

h 3 H 3

h 5 H 5 (h 5 H 5)

2aK He He

h 5 H 5 (h 5 H 3)

1aK h 5 H 5

h 3 H 3 (aK ; 431,5)

h 5 H 5 (h 5 H 5)

448,3 ; 461,2

3 aK

Ha H ; 448,3 ; 456,1 ; 458,2 ; 461,2 ; 466,1 ; 468,1 ; 471,1

3aK ; h 3 H 3

h 5 H 5

h 5 H 5

~~Ha~~ ; aK ; Fla

h 5 H 5

aK ; Ha H ; 448,3 ; 456,1 ; 458,2 ; 461,1 ; 468,2

h 5 H 5

aK ; h 3 Hd 3 Other lines

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Plate 921.

Book 9 F Page 88.

	V.	H.	Type.	Rem.	Description of Lines on Spectra.
	9.8	23.9	F½ II a?	3462	G and h = .5
	7.5	7.6	F II a	3462a	G and h = .5
90	7.5	8.8	F II a	3463	G & h = .2
90	7.8	9.2	F II a	3464	G & h = .5
	7.9	19.8	I III b	3465	F 7 G = .3
	7.4	16.5	F II a	3466	G & h = .3
	6.0	10.4	B I b	3467	F 6 G = .2
	6.7	15.8	F II a	3468	G & h = .3
	5.6	18.4	F II a	3468a	G and h = .5
	6.4	13.6	F½ II a?	3469	G & h = .3. 3 lines below K.
	4.7	16.2	F½ II a?	3470	G & h = .5. Several lines below K.
	4.2	8.3	K III bc	3471	F 3 G = .1B, F 4½ G = .1, F 5 G = .1B, F 6 G = .1, F 7 G = .3. Lines det. G & K. 1 line below K.
	3.9	19.2	F½ II a?	3472	G & h = .5 (G and h = .5)
	3.2	15.4	F½ II a?	3473	G & h = .5
92	2.9	19.1	F½ II a?	3474	G & h = .5
	F. on. & c. 5.6, 5.5				F. ch. 8.0

Plate 987.

	21.1	10.0	F½ II a?	3475	G & h = .5
	18.5	15.6	F½ II a?	3476	G & h = .5. 2 lines below K. F 4½ G = .2, F 7 G = .3. Lines det. G & K.
	16.5	21.0	I III b	3477	2 lines below K.
	15.0	12.9	K III bc	3478	F 3 G = .1B, F 4½ G = .1, F 5 G = .2B, F 7 G = .3, F 9 G = .1. Lines det. G & K. 3 lines below K. F dbl.? ~~F dbl.?~~
	12.7	8.9	I III b	3479	F 7 G = .3
	10.0	6.5	F½ II a?	3480	G & h = .3
94	8.6	15.8	F½ II a?	3481	G & h = .5
	8.3	17.6	I III b	3482	F 7 G = .3

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1888phae.proj..857F

h5 ; k5
h5 k5
h2 k2
h5 k5

448.3
h3 k3

453.2
h3 k3
h5 k5
3ak ; h3 k3
ak ; h5 k5
/ak ; Hak ; 448,3 ; 453,1 ; 458,1 ; 461,1 ; 468,1

h5 ; k5 (h5 k5)
h5 k5
h5 k5

h5 k5
ak ; h5 k5
ak ; Hak ; 448,3 ; 461,2
zak
3ak ; ~~Hak~~ 438,1 ; 448,3 ; 458,2 ; 461,1 ; 468,1 Fd ;

448,3
h3 ; k3
h5 k5
448,3

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1888phae.proj..857F

June 9, 1888.

Plate. 987

Book 9 F, Page 94	V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
	7.4	15.4	F II a	3483	G & h = .5. 5 lines below K.
	7.3	15.2	I III b	3484	F7G = .3
	5.5	21.6	I III b	3485	F7G = .3. Lines bet. G & H.
	5.0	7.7	F? II a?	3486	G & h = .5
	2.8	21.8	F? II a?	3487	G & h = .5? 2 lines below K.
	F. m. & c.	7.2	7.0		F. ch. 7.8

June 11, 1888.

Plate 1000

	98 21.8	21.4	F? II a?	3488	G & h = .5
	21.2	14.3	F? II a?	3489	G & h = .5
	20.4	15.0	B I b	3490	F6G = .2
	19.0	18.6	K III bc	3491	F2½G = .1, F3G = .1B, F3½G = .1, F4½G = .2, F5G = .2B, F5½G = .1, F7G = .3, F8G = .1B, F9G = .1 Lines bet. G & H. 4 lines below K.
	18.7	10.5	F? II a?	3492	G & h = .5
	100 17.1	11.5	F? II a?	3493	G & h = .5
	13.7	7.4	I? III b?	3494	F7G = .2
	13.4	11.6	F II a	3494a	G and h = .5
	13.3	13.9	B? I b?	3495	h & 26 = .2
	102 13.4	19.5	F? II a?	3496	G & h = .2. Lines below K.
	12.6	14.3	F? II a?	3497	G & h = .5 (G and L = .5)
	12.4	14.5	F? II a?	3498	G & h = .2, 3 lines below K.
	11.5	9.5	K III bc	3499	Several bright and faint lines below K.
	11.5	23.8	F? II a?	3500	G & h = .5
	11.1	17.6	E? II?	3501	Lines below K.
	9.1	23.2	F II a	3502	G & h = .2. Lines below K.

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1888phae.proj..857F

5aK; h5 ℓ5
448,3
Haℓ; 448,3
h5 ℓ5
2aK h5? ℓ5?

h5 ℓ5
h5 ℓ5
453,2
4aK; Haℓ; 438,1; 443.1; 448,3; 456,1; 458,2; 461,2; 466,1; 468.1; 471,1

h5 ℓ5
h5 ℓ5
448,2
h5 ℓ5
402,2
aK h2 ℓ2
h5 ℓ5 (h5 ℓ5)
3aK; h2 ℓ2
Several bright + faint lines below K

h5 ℓ5
äK
aK h2 ℓ2

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1888phae.proj..857F

June 11, 1888.

Plate 1005

Book, F. Page 104		V.	H.	Type.	Rem. No.	Description of Lines on Spectra.
✓		7.6	18.4	I III b	3503	F7 G=.3. Lines Ict. G & H. 2 lines below K.
✓		6.6	10.8	F? II a?	3504	G & h = .5. (G and h = .3)
✓		6.6	23.1	F? II a?	3505	G & h = .5
✓		6.0	14.2	B I b	3506	F6 G=.2, h & H=.2, H & α=.2. β & γ=.4
✓		5.4	22.5	F? II a?	3507	G & h = .5, 2 lines below K.
✓	106	4.6	17.6	F? II a?	3508	G & h = .5
✓		3.9	5.6	F? II a?	3509	G & h = .5
		F. m. & c.	6.8	6.7		F. ch. 7.4

June 12, 1888.

Plate 1006

✓	108	20.6	16.1	B I b	3510	h & H = .2
✓		19.1	15.9	K III bc	3511	F2½ G=.1, F3 G=.2 B, F3½ G=.1, F4½ G=.2, F5 G=.2 B, F5½ G=.2, F6 G=.1, F6½ G=.1, F7 G=.3, F8 G=.1 B, F9 G=.1. Lines Ict. G & H. Lines below K.
✓		15.9	12.1	F II a	3512	G & h = .2. F dbl.?
✓		14.4	12.1	F II a	3513	G & h = .5
✓		14.2	14.9	F? II a?	3514	G & h = .5, 4 lines below K.
✓		14.2	17.5	F II a	3515	G & h = .3, 3 lines below K.
✓		11.6	14.9	F? II a?	3516	G & h = .3
✓	110	10.4	20.6	F? II a?	3517	G & h = .3
✓		6.9	22.0	F? II a?	3518	G & h = .3. Lines below K.
✓		6.2	10.8	B I b	3519	h & H = .1
✓		3.6	13.4	F II a	3520	G & h = .3. 3 lines below K.
		F. m & c.	7.5	7.3		F. ch. 8.1

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1888phae.proj..857F

aK; Hα; 448,3
h5 l5 (h3 l3)
h5 l5 ~~(h3 l3)~~

? 382,4; 392,2; 402,2; 453,2
2aK h5 l5
h5 l5
h5 l5

401,2
aK; Hα; 438,1; 443,1; 448,3; 451,1; 453,1; 456,2; 458,2; 461,2; 466,1; 468,2; 471,1

h2 l2 Hd?
h5 l5
4aK h5 l5
3aK h3 l3
h3 l3
h3 l3
aK; h3 l3
402,1
3aK; h3 l3

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June 12, 1888.

Plate 1007

Book 9 Page		V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
		22.4	19.0	F IIa?	3521	G+h=.5
		21.4	16.7	K IIIbc	3522	F2½G=.1, F3G=.2B, F3½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F7G=.3, F8G=.1B, F9G=.1. Lines lt. G+H. Lines below K.
	112	17.6	11.7	F IIa	3523	G+h=.2. 2 lines below K.
		17.6	13.5	I IIIb	3524	F7G=.2
		14.7	7.7	F? IIa?	3525	G+h=.2?
		13.5	22.3	F? IIa?	3526	G+h=.3
		11.2	13.4	F? IIa?	3527	G+h=.2. 2 lines below K.
		8.4	16.0	F? IIa?	3527a	G and h=.5
	114	8.2	11.7	F? IIa?	3528	G+h=.5
		7.9	18.5	I IIIb	3529	F7G=.3
		6.0	10.1	I IIIb	3530	F7G=.3. Lines lt. G+H.
		5.5	9.8	I IIIb	3531	F7G=.2
		4.8	9.1	F IIa	3532	G+h=.5
		4.6	23.1	F? IIa?	3533	G+h=.5? Lines below K.
		~~4.1~~	~~11.6~~	~~F? IIa?~~	~~3533a~~	~~G and h=.5~~
		4.0	13.7	I IIIb	3534	F7G=.3
		F. mv. + c.	7.0	6.9		F. cl. 7.9

Plate 1027

	116	16.4	20.2	F? IIa?	3535	G+h=.5
		12.6	12.7	F? IIa?	3536	G+h=.5
	118	9.5	11.2	F? IIa?	3537	G+h=.5
		7.4	15.3	I IIIb?	3538	F7G=.3
		F. mv. + c.	8.0	7.4		F cl. 7.5

Plate 1008

	120	20.7	13.3	B? Ib?	3539	F6G=.2
		19.5	15.4	A? I?	3540	Lines narrow.
		19.2	20.7	F IIa	3541	G+h=.2. 2 lines below K.

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1888phae.proj..857F

h5 l5

ak; Hal; 438,1; 443,1; 448,3; 456,1; 458,2; 461,2; 466,1; 468,2; 471,1

2 ak; h2 l2

448,2

h2 l2

h3 l3

2 ak h2 l2

h5 l5

h5 l5

448,3

Hal 448,3

448,2

h5 l5

ak h5 ? l5 ?

448,3

h5 l5

h5 l5

h5 l5

448,3

453,2

Lines narrower

2 ak h2 l2

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1888phae.proj..857F

June 12, 1888.

Plate 1008

Book 9 F Page	V.	H.	Type	No. Rem.	Description of Lines on Spectra.
	17.7	7.8	B Ib	3542	h 6 H = .2
	17.2	9.8	K? IIIbc?	3543	F 4½ G = .2, F 5 G = .1B, F 5½ G = .1, F 7 G = .3. Lines bet. G & H.
122	16.6	23.9	I IIIb	3544	F 7 G = .3
	16.0	18.5	K IIIbc	3545	F 3 G = .1B, F 4½ G = .1, F 5 G = .1B, F 7 G = .3. Lines bet. G & H. 2 lines below K.
	14.4	15.6	F? IIa?	3546	G & h = .5 (G and h = .5)
	14.1	19.7	F IIa	3547	G & h = .2. 2 lines below K.
	13.1	11.1	F IIa	3548	G & h = .3
	12.0	21.4	F IIa	3549	G & h = .5
124	10.6	18.0	F? IIa?	3550	G & h = .5
	9.7	12.0	F? IIa?	3551	G & h = .3. 3 lines below K.
	7.0	10.8	K IIIbc	3552	F 3 G = .1B, F 4½ G = .1, F 5 G = .1B, F 5½ G = .1, F 7 G = .3. Lines bet. G & H. 2 lines below K.
	5.2	18.9	K? IIIbc?	3553	F 3 G = .1B, F 4½ G = .2, F 5 G = .1B, F 5½ G = .1, F 7 G = .3. Lines bet. G & H.
	5.4	22.0	I IIIb	3554	F 7 G = .3
	F. nw. & c. 6.3	6.3			F. ch. 7.6

Wednesday, June 13, '88.

Plate 1009

128	21.5	8.1	F? IIa?	3555	G & h = .5
	19.4	7.9	F? IIa?	3556	G & h = .5
	18.2	16.4	K? IIIbc?	3557	F 2 G = .2, F 2½ G = .1, F 3 G = .2B, F 3½ G = .1, F 4½ G = .2, F 6½ G = .1B, F 7 G = .3, Lines bet. G & H. F dbl. ?
	18.9	20.9	F IIa	3558	G & h = .3. 2 lines below K.

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nonphae.proj.:0571

402,2

Hαℓ; 448,3; 456,1; 458,1; 461,2

448,3

2ak; Hαℓ; 448,3; 458,1; 461,1; 468,1

h5 ℓ5 (h5 ℓ5)

2ak h2 ℓ2

h3 ℓ3

h5 ℓ5

h5 ℓ5

3ak h3 ℓ3

2ak; Hαℓ; 448,3; 456,1; 458,1; 461,1; 468,1

Hαℓ; 448,3; 456,1; 458,1; 461,2; 468,1

448,3,

h5 ℓ5

h5 ℓ5

~~4d~~ Hαℓ; 448,3; 451,1; 461,2; 466,1; 468,2; 471,1, 474,2 - Zd?

2ak h3 ℓ3

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1888phae.proj..857F

June 13, 1888.

Plate 1009

Book 9F Page	V.	H.	Type.	No. Lines.	Description of Lines or Spectra.
	19.0	22.0	F? II a?	3559	G+h=.5? Lines below K.
	17.5	10.9	F II a	3560	G+h=.5
	17.1	23.2	F II a	3561	G+h dbl. =.3. Lines below K.
	16.0	10.2	F? II a?	3562	G+h=.3? Lines below K. 1 line above F?
	16.6	14.1	I? III b?	3563	F7G=.3. Lines bet. G+H.
	16.6	15.1	F II a	3564	G+=.5. h=.2. F9G=.2. F8G=.2. Lines below K.
132	15.6	12.1	B I b	3565	F6G=.2
	14.7	8.1	F? II a?	3566	G+h=.5
	14.3	9.0	E? II?	3567	G dbl.?
	14.0	11.6	F? II a?	3568	G+h=.3, 3 lines below K.
134	12.3	6.7	F? II a?	3569	G+h=.5
	12.5	19.9	F? II a?	3570	G+h=.5
	11.2	12.9	I III b	3571	F7G=.3
	10.7	19.6	F? II a?	3572	G=.3, h=.2, F9G=.2. Lines below K.
136	9.3	16.3	F II a	3573	G+h=.5. G dbl. Lines below K.
	8.9	22.9	K? III bc?	3574	F1G=.1B, F7G=.3,
	7.5	23.8	F? II a?	3575	G+h=.5
	7.0	24.0	F? II a?	3576	G+h=.5? (G and h=.2)
	6.4	14.9	K III bc	3577	F3G=.1B, F3½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F7G=.3. Lines bet. G+H. Lines below K. K dbl.?
	4.2	20.3	K III bc	3578	F3G=.1B, F3½G=.1, F4½G=.2. F5G=.2B, F5½G=.2, F7G=.3 F8G=.1B. Lines bet. G+H. 2 lines below K.
	3.4	6.8	F II a	3579	G+h=.5. 1 line below K.
	3.6	7.5	F? II a?	3580	G+h=.5? 1 line below K.

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1888phae.proj..8575

ak ; h5 ? ℓ5 ?
h5 ℓ5
ak ; hd3 ℓd3
~~Fa~~ ; ak ; h3 ℓ3 ; F1a
Ha ℓ ; 448.3
ak ; 443.2 ; h2 ; ℓ5

453.2
h5 ℓ5
ℓd ?
3ak ; h3 ℓ3
h5 ℓ5
h5 ℓ5
448.3
ak ; 438.2 ; h2 ; ℓ3
ak h5 ℓd5
448.3 ; 480.1
h5 ℓ5
h5 ? ℓ5 ? (h2 ℓ2)
ak ; kd? ; Ha ℓ ; 448.3 ; 456.1 ; 458.2 ; 461.2 ; 466.1 ; 468.1

2ak ; Ha ℓ ; 443.1 ; 448.3 ; 456.2 ; 458.2 ; 461.2 ; 466.1 ; 468.1

1ak ; h5 ℓ5
1ak h5 ? ℓ5 ?

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Plate 1009

Book 9 F Page 138	V.	H.	Type v.	Rem.	Description of Lines on Spectra.
	2.6	16.1	K2 III bc?	3581	F3 G=.1 B, F4½ G=.1, F5 G=.2 B, F5½ G=.1, F7 G=.3. Lines bet. G & H.
	F. nw. & c.	6.4	6.3		F. ch. 7.5

Dark plate. Very hard to measure. Plate 953.

✓	19.6	12.9	K2 III bc?	3582	F3 G=.1 B, F3½ G=.1, F4½ G=.2, F6½ G=.2, F7 G=.3. Lines bet. G & H.
✓	11.9	16.6	F2 II a?	3583	G & h=.5
✓ 140	8.2	14.9	F2 II a?	3584	G & h=.5
✓	7.8	17.7	K III bc	3585	F3 G=.1 B, F4½ G=.2, F5 G=.2 B, F5½ G=.1, F7 G=.3. Lines bet. G & H.
✓	4.2	16.0	B2 I b?	3586	h & H=.2?
✓	3.5	17.5	B2 I b	3587	F6 G=.2, h & H=.2.
	F. nw. & c.	8.0	6.0		F. ch. 6.0

Plate 1010.

✓	20.5	7.9	F2 II a?	3588	G & h=.5, 1 line below K.
✓ 142	20.2	9.9	F2 II a?	3589	G & h=.5, 5 lines below K.
✓	18.0	16.0	B I b	3590	F6 G=.2, h & H=.2.
✓	17.8	8.0	F2 II a?	3591	G & h=.5
✓ 144	16.9	20.1	K2 III bc?	3592	F3 G=.1 B, F4½ G=.2, F5 G=.1 B, F5½ G=.1, F7 G=.3
✓	15.3	8.5	F2 II a?	3593	G & h=.2?

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Plate 1010

✓	15.4	15.8	F2 II a?	3594.	G & h=.5. Lines below K.
✓	15.7	22.7	K2 III bc?	3595	F5 G=.1 B, F7 G=.3. Lines bet. G & H. 2 lines below K.

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1888phae.proj..857F

Ha h; 448,3; 456,1; 458,2; 461,1; 468,1

Ha h; 448,3; 451,2; 461,2; 466,1; 468,1

h3 h3

h3 h3

Ha h; 448,3; 456,1; 458,2; 461,2; 468,1

402,2 ?

402,2; 453,2

1aK; h3 h3

5aK; h3 h3

402,2; 453,2

h3 h3

448,3; 456,1; 458,1; 461,2; 468,1

h2 ? h2 ?

aK; h3 h3

2aK, Ha h; 448,3; 458,1

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June 14, 1888.

Plate. 1010

Book 9 F Page	V.	H.	Type.	Lines.	Description of Lines or Spectra.
	14.5	9.2	F II a	3596	G & h = .5
	13.5	14.7	F? II a?	3597	G & h = .3, 6 lines below K.
146	9.3	13.4	B? I b?	3598	F 6 G = .1, h 6 α = .1, β 4 γ = .3
	9.4	14.0	B? I b?	3599	F 9 G = .5
	9.7	14.4	F II a	3600	G & h = .3. 2 lines below K.
148	9.7	15.3	K? III b?	3601	F 3 G = .1 B, F 4 1/2 G = .1, F 5 G = .1 B, F 5 1/2 G = .1, F 7 G = .3.
	7.6	16.1	B I b	3602	F 6 G = .1, h 6 H = .1
	7.4	17.7	B I b	3603	F 6 G = .2, h 6 H = .1
	7.5	18.2	F II a	3604	G & h = .2, 1 line below K.
150	6.7	15.7	B I b	3605	F 6 G = .1, h 6 H = .2, β 4 γ = .3
	6.0	15.9	B I b	3606	h 6 H = .2
	6.1	17.3	F? II a?	3607	G & h = .2. Lines below K.
	6.3	22.4	F? II a?	3608	G & h = .2?
	3.9	7.1	F II a	3609	G & h = .5. 2 lines below K.
152	3.8	19.9	I? III b?	3610	F 7 G = .3
	F. m. & c.	6.5	6.4		F ch. 7.8

Dark plate. Hard to measure. Plate 926.

154	11.8	12.6	B? I b?	3611	G & h = .2
	8.8	14.9	B I b	3612	F 6 G = .2. h 6 H = .1
156	5.4	11.7	B I b	3613	h 6 H = .2
	5.9	14.3	F? II a?	3614	G & h = .5
	F. m. & c.	5.5	5.4		F ch. 7.7

Plate 927 June 15, '88. Dark plate. Very hard to measure.

160	21.5	21.6	F? II a?	3615	G & h = .5
	19.0	7.1	F? II a?	3616	G & h = .5
	19.6	14.5	B I b?	3617	F 6 G = .2, h 6 H = .2

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1888phae.proj..857F

h5 l5

ak h3 l3

382,3 ; 402,1 ; 453,1

438,5

2ak ; h3 l3

448,3 ; 456,1 ; 458,1 ; 461,1 ; 468,1

402,1 ; 453,1

402,1 ; 453,2

1ak ; h2 l2

382,3 ; 402,2 ; 453,1

402,2

ak ; h2 l2

h2 ? l2 ?

2ak ; h5 ; l5

448,3

~~h2 l2~~ 414 2.

402,1 ; 453,2

402,2

h5 l5

h5 l5

h5 l5

402,2 ; 453,2

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June 15, 1888.

Plate 927

Book 9 F Page 150	V.	H.	Type.	No. Lines.	Description of Lines on Spectra.
✓	19.4	20.2	I III b	3618	F7 G=.3
✓	18.2	6.4	K? III bc?	3619	F3 G=.1B, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3
✓	18.1	13.5	I? III b?	3620	F7 G=.3
✓	18.3	20.2	F? II a?	3621	G & h=.5 (G and h=.5)
✓ 162	17.0	23.9	F? II a?	3622	G & h=.5
✓	16.9	23.4	F? II a?	3623	G & h=.5. Lines below K.
✓	15.9	22.4	F? II a?	3624	G & h=.5
✓	15.6	22.9	F? II a?	3625	G & h=.3? Lines below K.

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✓ 164	14.1	12.6	F II a	3626	G & h=.2. 2 lines below K.
✓	13.2	17.8	F? II a?	3627	G & h=.5 (G and h=.5)
✓	11.0	21.5	F? II a?	3628	G & h=.3
✓	10.5	16.2	F? II a?	3629	G & h=.5 (G and h=.5)
✓	10.5	16.2	F? II a?	3630	G & h=.3. Several lines below K. Bright lines.
✓	10.5	18.4	F? II a?	3631	G & h=.5
✓ 166	9.7	19.7	F? II a?	3632	G & h=.5
✓	9.4	21.6	F? II a?	3633	G & h=.5
✓	7.5	9.5	F? II a?	3634	G & h=.5 (G and h=.5)
✓	5.7	9.2	F? II a?	3635	G & h=.5
✓	4.9	15.1	F? II a?	3636	G & h=.5?
✓ 168	3.5	20.6	F? II a?	3637	G & h=.5, 2 lines below K.

F. m. & c. 5.4, 5.3 F. ch. 7.8

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1888phae.proj..857F

448.3

448.3 ; 456,1 ; 458.2 ; 461.2 ; 468.1

448.3

h5 k5 (h5 k5)

h5 k5

aK ; h5 k5

h5 k5

aK ; h3 ? k3 ?

2 aK ; h2 ; k2

h5 k5 (h5 k5)

h3 k3

h5 k5 (h5 k5)

aK ; h3 k3 Bright lines

h5 k5

h5 k5

h5 k5

h5 k5 (h5 k5)

h5 k5

h5 ? k5 ?

2 aK ; h5 k5

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Plate 1011

Book 9 F Page 170	V.	H.	Types.	No. Rim.	Description of Lines on Spectra.
✓	21.1	16.7	K? III bc?	3638	F4½ G=.1, F5 G=.1B, F5½ G=.2, F7 G=.3 Lines bet. G & H. 2 lines below K.
✓	20.3	18.7	B I b	3639	F6 G=.2, h & H=.2
✓	19.0	14.9	F? II a?	3640	G & h=.3
✓	18.9	18.5	B? I b?	3641	F6 G=.2, h & H=.2
✓	17.4	9.0	F? II a?	3642	G & h=.5
✓ 172	16.5	8.1	F? II a?	3643	G & h=.5?
✓	15.6	6.2	F? II a?	3644	G & h=.2
✓	14.0	9.6	K? III bc?	3645	F3 G=.1B, F4½ G=.1, F5 G=.1B, F5½ G=.1, F7 G=.3. Lines bt. G & H, 4 lines below K.
✓	14.4	11.5	F II a	3646	G & h=.5. F dbl.? 2 lines below K.
✓ 174	13.2	6.8	F? II a?	3647	G & h=.5
✓	12.5	14.2	F? II a?	3648	G & h=.5. 3 lines below K. F dbl.?
✓	12.2	15.2	F? II a?	3649	G & h=.5 (G and h=.5?)

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✓	10.3	5.9	F? II b?	3650	(G and h=.5, 2 Lines below K. (G and h=.5, 2 Lines below K.)
✓	10.1	8.2	I III b?	3651	F7 G=.2, Lines between G & H, 2 Lines below K.
✓	10.7	14.9	F? II a?	3652.	G and h=.3, 1 Line below K.
✓	9.6	18.6	F II a	3653	(G and h=.5) G and h=.5, 3 Lines below K.
✓ 176	7.8	9.4	F II a	3654	G and h=.5
	7.6	15.7	F II a	3655	G and h=.5, 4 lines below K.
✓	6.8	5.5	I? III b?	3656	F7 G=.3 Lines between G & K. 2 Lines below K.
✓	6.3	14.8	I? III b?	3657	F7 G=.3.

Fog Moon & clouds.

6.0 5.9

F. Chem.

7.8

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2 aK ; Ha ℓ ; 448.3 ; 458.2 ; 458.1 ; 461.1

402.2 ; 453.2
h3 ℓ3
402.3 ; 453.2
h5 ℓ5
h5 ? ℓ5 ?
h2 ℓ2
4 aK ; Ha ℓ ; 448.3 ; 458.1 ; 458.1 ; 461.1 ; 468.1

2 aK ; Fd ? h5 ; ℓ5
h5 ℓ5
~~Fd ?~~ 3aK ; h5 ; ℓ5 ; Fd ?
h5 ℓ5 (h5 ? ℓ5 ?)

aK ; h5 ℓ5 (aK ; h5 ℓ5)
2aK ; h5 ; ℓ5 ; ~~x~~
2 aK ; Ha ℓ ; 448.2 ~~(2aK ; h5 , ℓ5~~

1 aK ; h3 ; ℓ3 (aK ; h3 ℓ3)
3 aK ; h5 ℓ5 (~~h5 ; ℓ5~~)
h5 ℓ5
4 aK ; h5 ℓ5
2aK ; Ha ℓ ; 448.3
448.3 (4483)

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June 18.

Plate 1012.

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	V.	H.	Type.	No.	Description of Lines or Spectra.
	20.4	15.6	F? II^{a}?	3658	G and h=.5, 1 Line below K.
	20.1	16.4	F? II^{a}?	3659	G and h=.3?
	20.0	23.6	F? II^{a}?	3660	G and h=.3, 4 Lines below K.
	18.9	6.0	F II^{a}	3661	G and h=.5, 1 Line below K.
	18.3	14.0	I? III^{b}?	3662	F7 G=.3. (F7 G=.3)
	17.3	8.3	F? II^{a}?	3663	G and h=.5
	17.0	16.1	F? II^{a}?	3664	G and h=.3, 2 Lines below K.
	17.5	22.0	F? II^{a}?	3665	G and h=.5, 3 Lines below K.
	15.3	19.8	B I^{b}	3666	F6 G=.1, h6 H=.1,
	15.5	21.5	F? II^{a}?	3667	G and h=.2.
	14.5	6.6	F? II^{a}?	3668	G and h=.5, (G and L=.5)
180	13.6	16.5	F? II^{a}?	3669	G and h=.5?
	13.9	18.8	A I	3670	Lines narrow
	12.5	19.3	F? II^{a}?	3671	G and h=.5
	9.4	10.7	F II^{a}	3672	G and h=.5, 1 Line below K. (G&L=.3)
	9.5	15.0	F II^{a}	3673	G and h=.2, 4 Lines below K.
	9.6	22.2	F? II^{a}?	3674	G and h=.5?
	5.8	10.0	F? II^{a}?	3674a	G and h=.2
	8.6	12.8	F? II^{a}?	3675	G and h=.2? (G and L=.2?)
	8.8	13.0	K III$^{b.a.}$	3676	F3 G=.1 B, F4½ G=.1 F5 G=.1 B F5½ G=.2, F7 G=.3, F8 G=.1 B, F9 G=.1, Lines between G & H, Lines below K.
182	7.0	14.3	F? II^{a}?	3677	G and h=.2.
	5.1	6.3	F? II^{a}?	3678	G and h=.5, 2 lines below K.
	5.4	17.7	F? II^{a}?	3679	G and h=.5
	4.6	12.7	K? III$^{b.c}$?	3680	F3 G=.1 B, F4½ G=.1, F5 G=.1 B, F5½ G=.1, F7 G=.2, Lines between G & K, 2 Lines below K.
	4.3	18.9	F? II^{a}?	3681	G and h.5? 3 Lines below K.

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1 aK; h_5 g_5
h_3 ? g_3 ?
4 aK; h_3; g_3
1 aK; h_5 g_5
448,3 (448,3)
h_5 g_5
2 aK; h_3 g_3
3 aK; h_5 g_5
402,1 ; 453,1
h_2; g_2
h_5 g_5 (h_5 g_5)
h_5 ? g_5 ?
lines narrow
h_5 g_5
1 aK; h_5 g_5 (h_3; g_3)
4 aK; h_2 g_2
h_5 ? g_5 ?
h_2; g_2
h_2 ? g_2 ? (h_2 ? g_2 ?)
aK; Ha g_5; 438,1; 443.1; 448,3; 456,2; 458.1; 461.1; 468.1

h_2 g_2
2 aK; h_5 g_5
h_5 g_5
2 aK; Ha g_5; 448,2; 456,1; 458,1; 461,1; 468,1

3 aK; h_5 ? g_5 ?

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Plate 1012.

Book 9 Page 182	V.	H.	Type.	No.	Descriptions of Lines on Spectra.
✓	3.7	11.5	F? II$^{a?}$	3682	G and h=.5, 3 lines below K.

Amt. Fog. moon & clouds. 58 - 5-7

Amt. Fog. due to chemicals. 6.9

Plate 1055.

✓	184 22.5	12.0	K III$^{b.c.}$	3683	Fdbl.?, F2½ G=.2, F3 G=.2 B, F3½ G=.1, F4½ G=.2, F5 G=.2 B, F5½ G=.2, F6 G=.1, F6½ G=.1, F7 G=.3, F8 G=.1 B F9 G=.1, F9½ G=.1, Gdbl.?, Lines between G & H, lines below K.
✓	20.4	18.2	I?III$^{b?}$	3684	F4½ G=.1, F7 G=.3, Lines between G & H
✓	17.3	15.5	K III$^{b.c.}$	3685	F2½ G=.1, F3 G=.1 B, F3½ G=.1, F4½ G=.2, F5 G=.2 B, F5½ G=.1, F7 G=.3, Lines between G & H, 1 Line below K.
✓	13.7	17.9	B I$^{b.}$	3686	h 6 H=.2,
✓	10.8	14.9	B I^{b}	3687	F6 G=.2, h 6 H=.2
✓	10.2	7.0	B I^{b}	3688	G 6 h=.5, h 5 H=.5
✓	9.7	9.4	B I^{b}	3689	F6 G=.1, h 6 H=.1, H 6 a=.1.
✓	9.8	16.2	B?I$^{b?}$	3690	h 6 H=.2
✓	7.9	17.4	F? II$^{a?}$	3691	G and h=.5 (G and L=5)
✓	7.5	17.5	B?I$^{b?}$	3692	F6 G=.1, h 8 H=.2
✓	6.6	19.1	I?III$^{b?}$	3693	F7 G=.3

Amt. of Fog. due to m. & cl. 82 6.9

Amt. Fog. ch. 6.9

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1888phae.proj..857F

3aK; h5 g5

aK; HaS; Sd? 436.1; 438.1; 443.1; 448.3; 451.1; 453.1; 456.2; 458.2; 461.2; 466.1; 468.2; 471.2; Sd?

HaS; 448.3; 461.1

1aK; HaS; 448.3; 456.1; 458.2; 461.2; 466.1; 468.1; 471.1

402.2)

402.2; 453.2)

403.5; 419.5

?

392)1; 402,1; 453,1

402.2)

h5, g5 (h5 g5)

402.2; 453.1

448.3

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June 18.

Plate 1056

Book 9 Page 186	V.	H.	Type.	No.	Description of Lines on Spectra.
	19.9	22.5	B? I b?	3694	h 6 H = .2
	18.6	20.3	K III b.c.	3695	F 4½ G = .1, F 5 G = .1 B, F 5½ G = .1, F 6½ G = .2, F 7 G = .2, Lines between G & H, 1 Line below K.
	13.2	12.8	K III b.c.	3696	F 2½ G = .1, F 3 G = .1 B, F 4½ G = .2, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3, F 8 G = .1 B, F 9 G = .1, Lines between G & H.
	13.8	18.4	B? I b?	3697	h 6 H = .2, H 6 α = .2.
	9.4	12.4	I III b.	3698	F 7 G = .3
188	7.9	14.8	B I b	3699	F 6 G = .2, h 6 H = .2.
	2.7	18.2	B I b.	3700	F 6 G = .2, h 6 H = .2

Frog. m. & cl. 7.6 – 6.8 Frog. ch. 6.9

Plate 955

	19.5	17.2	B I b.	3701	F 6 G = .1, h 6 H = .1
	18.3	10.4	K? III b.c?	3702	F 4½ G = .2 F 5 G = .1 B, F 5½ G = .1, F 7 G = .3, Lines between G & H.
	18.0	15.6	B? I b?	3703	h 6 H = .2.
	16.1	10.9	F II a	3704	G & h = .3 (G and h = .2)
190	14.0	23.1	F? II a?	3705	G & h = .5 ? 1 Line below K. Several bright and faint lines,
	12.6	20.3	K? III b.c?	3706	Lines below K.
	11.6	18.9	F? II a?	3707	G and h = .5
	9.6	12.6	F? II a?	3708	G and h = .5, 2 lines below K.
	7.2	23.7	I? III b?	3709	F 7 G = .3, Lines between G & H.

Amt. of Frog. m. & clouds. 7.8 – 5.8 Frog ch. 5.8

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1888phae.proj...857F

402,2
aK; Hδ; 448,2; 451,2; 456,1; 458,1; 461,1

Hδ; 438,1; 443,1; 448,3; 456,1; 458,2; 461,2; 468,1; 471,1

392,2; 402,2
448,3
402,2; 453,2
402,2; 453,2

402,1; 453,1
Hδ; 448,3; 456,1; 458,1; 461,2

403,2
h3 δ3 (h2 δ2)
aK h5? δ5? Several bright + faint lines

aK
h5 δ5
aK h5 δ5
Hδ; 448,3

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1888phae.proj..857F

June 18.

Plate 956

Book 9 F Page 92	V.	Ho.	Type.	No. Rem.	Description of Lines on Spectra.
	19.0	11.2	K III b.c.	3710	F3 G=.2 h, F3½ G=.1, F4½ G=.2, F5 G=.2 h, F5½ G=.1, F7 G=.3, G dbl.? Lines between G & H.
	17.5	10.1	F? II a?	3711	G & h=.2 Lines below K
	12.1	13.2	K III b.c.	3712	F4½ G=.2, F5 G=.1 h, F5½ G=.1, F7 G=.3, G dbl.?
	11.0	7.4	F? II a?	3713	G & h=.3
	10.5	14.3	I III b.	3714	F4½ G=.1, F7 G=.3
	8.9	17.4	F II a	3715	G and h=.2.
194	6.5	10.3	F? II a?	3716	G and h=.5?
	3.2	9.6	I III b.	3717	F7 G=.3, Lines between G & H, 2 Lines below K.
	3.0	19.3	I III b.	3718	F3½ G=.2, F4½ G=.2, F7 G=.3, Lines between G & K.

Fog. moon & clouds. 8.0 – 6.1

Fog. ck. 6.1

Plate 1013

~~G and h=.2?~~

	20.2	7.7	F? II a?	3719	G and h=.2? (G & h=.5)
	19.2	22.2	F? II a?	3720	G and h=.3
196	16.5	6.2	F? II a?	3721	G and h=.2
	16.5	18.6	F II a	3722	G and h=.3
	16.2	21.7	F? II a?	3723	G and h=.5
	15.0	11.5	F? II a?	3724	G and h=.2, Lines below K.
	15.5	15.0	F II a	3725	G and h=.2 (G & h=.5)
	14.5	7.4	F II a	3726	G and h=.5, 4 Lines below K.
	14.3	13.0	F II a	3727	G and h=.5, 1 Line below K. (G & h=.5)
	13.3	17.8	F II a	3728	G and h=.2, 3 Lines below K.
	10.3	16.2	F? II a?	3729	G and h=.3?

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Ha ℓ; ℓd ? 448,3; 456,1; 458,2; 461,2; 466,1; 468,2

ak; h2 ℓ2
ℓd ? 448,3; 456,1; 458,1; 461,2

h3 ℓ3
448,3; 461,1
h2; ℓ2
h5 ? ℓ5 ?
2 ak; Ha ℓ; 448,3

Ha ℓ; 448,3; 461,2; 466,2

h2 ? ℓ2 ? (h5, ℓ5)
h3, ℓ3
h2 ℓ2
h3 ℓ3
h5 ℓ5
2 ak h2 ℓ2
h2 ℓ2 (h5 ℓ5)
4 ak h5 ℓ5
1 ak h5 ℓ5 (h5 ℓ5)
3 ak h2 ℓ2
h3 ? ℓ3 ?

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Plate 1013

Book	Page	V.	H.	Type	Obs.	Description of Lines on Spectra.
	198	10.6	17.0	F? II a?	3730	G and h = .5, 3 Lines below K.
		9.5	10.7	F? II a?	3731	G and h = 2, 1 Line below K.
		9.0	16.2	F? II a?	3732	G and h = .5
		9.1	16.7	F? II a?	3733	G and h = .5, 1 Line below K.
		9.1	20.2	K III b.c.	3734	F_3 G = .2 B, $F_3\frac{1}{2}$ G = .1, $F_4\frac{1}{2}$ G = .1, F_5 G = .2 B, $F_5\frac{1}{2}$ G = .1, F_7 G = .3, F_8 G = .1 B, Lines between G & K, 3 lines below K.
		8.5	11.5	K III	l.c.	3735	$F_4\frac{1}{2}$ G = .2, F_5 G = .1 B, F_7 G = .3, Lines between G and K.

Plate 1013. June 19.'88.

8.0	18.0	F II a	3736	G & h = .3.	Several lines below K.
7.3	11.0	F II a	3737	G & h = .2.	2 lines below K.
200 6.1	7.6	I III b	3738	F. 7 G = .3	
3.5	12.8	F? II a?	3739	G & h = .2.	Several lines below K. 1 line above F?
3.0	20.4	F? II a?	3740	G & h = .5?	
2.5	16.6	F II a	3741	G & h = .5	

F. m. & c. 5.8 5.7 F. ch. 7.5

Plate 1091.

202 18.2	20.1	F? II a?	3742	G & h = .2?	Several lines below K.
11.0	22.1	F? II a?	3743	G & h = .5	
10.9	21.8	F? II a?	3744	G & h = .5	
6.5	7.0	I III b	3745	F. 7 G = .3	
5.0	19.6	F II a	3746	G & h = .5?	

F. m. & c. 8.0 7.0 F. ch. 7.0

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3 aK ; h_5 g_5
1 aK h_2 g_2
h_5 g_5
1 aK h_5 g_5
3 aK ; Ha g ; 443.1 ; 448.3 ; 456.1 ; 458.2 ; 461.1 ; 466.1 ; 468.2

Ha g ; 448.3 ; 458.1 ; 461.2

aK ; h_3 g_3
2 aK h_2 g_2
448.3
~~Ha~~ aK ; h_2 ; g_2 ; 7.a

h_5 ? g_5 ?
h_5 g_5

aK ; h_2 ? g_2 ?
h_5 g_5
h_5 g_5
448.3
h_5 ? g_5 ?

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Plate 1025

Book 9F Page 204

	V.	H.	Type	Wav.	Description of Lines on Spectra.
✓		17.8	22.1 F II a	3747	G+h=.5. 2 lines below K.
✓		14.6	7.8 E½ II ?	3748	Lines below K.
✓		14.5	12.3 F II a	3749	G+h=.3. 4 lines below K.
✓	206	10.7	21.8 F½ II a?	3750	G+h=.5? 2 lines below K.
✓		8.8	17.4 B I b	3751	F 7 G=.2. h 6 H=.2.
✓		8.0	16.6 F½ II a?	3752	G+h=.5 (G+h=.5 l)
✓		6.1	14.9 I III b	3753	F 7 G=.3
		F. m. & c.	7.6	7.0	F ch. 7.8

Plate 1026.

	V.	H.	Type	Wav.	Description of Lines on Spectra.
✓	208	19.4	19.3 F II a	3754	G+h=.5
✓		17.8	8.2 F II a	3755	G+h=.2
✓		16.8	14.2 K III bc	3756	F 3 G=.1 B, F 4½ G=.1, F 5 G=.1 B, F 5½ G=.1, F 7 G=.3. Lines bet. G+H. 2 lines below K.
✓		16.8	15.1 K III bc	3757	F 4½ G=.1, F 5 G=.1 B, F 7 G=.2 Lines bet. G+H.
✓		14.2	13.5 F½ II a?	3757a	G+h=.5
✓		12.4	12.6 F½ II a?	3758	G+h=.5, 1 line below K. (G+h=.5, 1 line below K)
✓	210	9.0	17.6 F½ II a?	3759	G+h=.5? (G+h=.5 l)
✓		6.6	12.3 K III bc	3760	F 3 G=.1 B, F 3½ G=.1, F 4½ G=.2, F 5 G=.2 B, F 5½ G=.1, F 7 G=.3. Lines bet. G+H. 4 lines below K.
✓	212	3.3	11.5 I III b?	3761	F 4½ G=.2, F 7 G=.3
✓		2.5	18.1 F½ II a?	3762	G+h=.3
		F. m. & c.	6.3	6.2	F ch. 7.3

Plate 1042

✓		21.1	15.3 B I b	3763	h 6 H=.2
✓		16.9	11.8 B I b	3764	h 6 H=.2

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2 aK ; h5 ℓ5

aK

4 aK h3 ℓ3

2 aK h5 ? ℓ5 ?

402,2 ; 448,2

h5 ℓ5 (h5 ? ℓ5 ?)

448,3

h5 ℓ5

h2 ℓ2

2 aK ; Hα ℓ ; 448,3 ; 456,1 ; 458,1 ; 461,1 ; 468,1

Hα ℓ ; 448,3 ; 458,1 ; 461,1

h5 ℓ5

1 aK ; h5 ℓ5 (aK ; h5 ℓ5)

h5 ? ℓ5 ? (h5 ? ℓ5 ?)

4 aK ; Hα ℓ ; 448,3 ; 456,1 ; 458,2 ; 461,2 ; 466,1 ; 468,1

448,3 ; 461,2

h3 ; ℓ3

402,2

402,2

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June 19, 1887

Plate 1042

Book 9 F. Page 312	V.	H.	Type.	No. Rev.	Description of Lines on Spectra.
	16.5	12.2	B I b	3765	F 6 G = .2, h 6 H = .2
214	12.0	8.7	B I b	3766	F 6 G = .1, h 6 H = .2
	11.7	15.9	F² II a ?	3767	G & h = .5
	10.5	16.7	F II a	3768	G & h = .2
	9.3	15.4	B I b	3769	h 6 H = .2
	4.8	15.5	F II a	3770	G & h = .5
	F. m. & c.	8.0	7.2		F. ch. 7.2

Book 13 F. Page 4

Plate 1014

	23.0	12.9	F² II a ?	3771	G & h = .2 ? Several lines below K.
	21.2	13.9	B I b	3772	h 6 H = .2
	21.3	14.7 (15.0)	F² II a ?	3773	G & h = .5 2 lines below K.
	20.3	7.7	F² II a ?	3774	G & h = .5 (G & h = .5)
	17.7	17.9	F² II a ?	3775	G & h = .2 (G & h = .5 ?)
6	17.8	21.3	I III b	3776	F 7 G = .3. Lines bet. G & H.

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	16.7	18.7	F II a	3777	G & h = .2, 2 lines below K.
	15.2	11.6	F II a	3778	G & h = .2. 3 lines below K.
	13.4 (15.0)	17.8 (24.4)	F II a ?	3779	G & h = .3, 4 lines below K. Peculiar.
8	12.5	23.6	F² II a ?	3780	G & h = .5
	11.5	9.7	F² II a ?	3781	G & h = .5 ?
	11.5	18.4	F² II a ?	3782	G & h = .5 (G & h = .5)
	11.7	19.6	B² I b ?	3783	h 6 H = .2
	10.5	22.8	B² I b ?	3784	F 6 G = .1, h 6 H = .1
	10.5	23.7	F² II a ?	3785	G & h = .5 ? (G & h = .5)

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1888phae.proj..857F

402,2 ; 453,2

403,2 ; 453,1

h5 ; K5

h2 ; K2

402,2

h5 K5

aK ; h2 ? K2 ?

402,2

2aK ; h5 K5

H5 K5 (h5 K5)

h2 K2 (h5 ? K5 ?)

HaK ; 448,3

2aK h2 K2

3aK ; h2 K2

4aK h3 K3 Peculiar. ~~Spectrum of A superposed?~~

h5 K5

h5 ? K5 ?

h5 K5 (h5 K5

402,2

402,1 ; 453,1

h5 K5 (h5 K5)

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Plate 1014

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	V.	H.	Type.	Rem. No.	Description of Lines on Spectra.
	9.2	16.2	F¹ II a?	3786	G & h = .2, 2 lines below K.
	9.1	18.3	I III b	3787	F 7 G = .3
	9.0	21.8	F¹ II a?	3788.	G & h = .5? (G & h = .5)
	8.6	14.7	F¹ II a?	3788a	G & h = .5
10	8.0	17.9	F II a	3789	G & h = .2. Several lines below K. (G & h = .3, 2 lines below K.)
	8.6	21.8	F¹ II a?	3790	G & h = .5. 2 lines below K.
	9.0	24.2	F II a	3791	G & h = .3
	7.7	6.0	I III b	3792	F 7 G = .3
	8.7	16.9	F¹ II a?	3793	G & h = .5 (G & h = .5)
	4.3	15.9	F¹ II a?	3794	G & h = .2. (G & h = .3)
12	3.6	12.8	F¹ II a?	3795	G & h = .2? Several lines below K.

F. m. & c. 6.3 6.2 F. ch. 7.5

Plate 1117.

	16.3	14.2	K¹ III bc?	3796	F 3 G = .1 B, F 4½ G = .2, F 5 G = .1 B, F 5½ G = .1, F 7 G = .3, Lines lt. G & H.
	16.3	15.0	I III b	3797	F 5½ G = .2, F 7 G = .3
	10.9	13.1	F¹ II a?	3798	G & h = .5
	10.2	20.9	F¹ II a?	3799	G & h = .5
	6.0	12.2	K III bc	3800	F 3 G = .1 B, F 3½ G = .1, F 4½ G = .2, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3 F 9½ G = .1, Lines lt. G & H. 2 lines below K.

F. m. & c. 8.0 7.7 F. ch. 7.7

Plate 1093.

14	19.0	8.2	K¹ III bc?	3801	F 2½ G = .1, F 3 G .5 B, F 4 G = .3, F 7 G = .2 Lines lt. G & H.
	19.2	12.0	K¹ III bc?	3802	F 2½ G = .1, F 3 G = .1 B, F 3½ G = .1, F 4½ G = .2, F 5 G = .1 B, F 5½ G = .1, F 7 G = .3 G dbl.? Lines lt. G & H.

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2 aK ; h2 ; g2

448,3

h5 ; g5 (h5 g5)

h5 ; g5

aK ; h2 g2 ~~(aK ; h3 ; l3)~~

2 aK ; h5 g5 (~~X~~ 2 aK ; h3 ; G3)

h2 g3

448,3

h5 g5 (h5 ; g5)

h2 g2 (h3 ; g3)

aK h2 ; g2

Ha g ; 448,3 ; 456,1 ; 458,1 ; 461,2 ; 468,1

448,3 ; 456,2

h5 g5

h5 g5

2 aK ; Ha g ; 438,1 ; 448,3 ; 456,1 ; 458,2 ; 461,2 ; 466,1 ; 468,1

Ha g ; 448,2 ; 463,3 ; 468,5 ; 471,1

Ha g ; gd ; 448,3 ; 456,1 ; 458,1 ; 461,2 ; 466,1 ; 468,1 ; 471,1

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Plate 1093

Book 13 Page 14	V.	K.	Type.	Rev. No.	Description of Lines on Spectra.
✓	18.9	11.2	B I b	3803	F 3 G = .5, h 6 K = .2
✓	17.7	16.9	I? III b?	3804	F 7 G = .3
✓	15.7	13.1	B I b	3805	F 6 G = .1, h 6 K = .2
✓	14.6	15.1	B I b	3806	F 6 G = .2 h 6 K = .2, K 6 α = .2, β 4 γ = .3
✓ 16	11.9	13.1	B I b	3807	F 6 G = .2, h 6 K = .2
✓	5.4	12.0	K? III bc?	3808	F 4½ G = .1, F 5 G = .1 B, F 5½ G = .1, F 7 G = .3
✓	4.1	17.0	F? II a?	3809	G & h = .5 2 lines below K.
✓	8.7	21.4	F? II a?	3810	G & h = .3
	F. m. & c. 8.0	7.1			F. ch. 7.2

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✓ 18	12.5	18.3	K? III bc?	3811	F 3 G = .1 B, F 4½ G = .1, F 5½ G = .2, F 7 G = .2, F 8 G = .1 B,
✓	10.0	18.7	B I b	3812	F 7 G = .2
✓	6.1	21.8	I? III b?	3813	F 4½ G = .2, F 7 G = .3 Lines bet. G & K.
	F. m. & c. 7.9	7.0			F. ch. 7.0

Plate 1095.

✓ 20	16.3	21.0	F II a	3814	G & h = .5
✓	15.6	20.5	K III bc	3815	F 3 G = .1 B, F 3½ G = .1, F 4½ G = .2, F 5 G = .2 B, F 5½ G = .2, F 7 G = .3, F 8 G = .1 B, F 9 G = .1 Lines bet. G & K. 1 line below K.
✓	13.6	14.8	F II a	3816	G & h = .3 2 lines below K.
✓	9.7	17.2	K III bc	3817	F 2½ G = .1, F 3 G = .2 B, F 3½ G = .1, F 4½ G = .2, F 5 G = .2 B, F 5½ G = .1, F 6½ G = .1, F 7 G = .3, F 8 G = .1 B, F 9 G = .1 Lines bet. G & K.
✓	9.7	20.9	K III bc	3818	F 2½ G = .1, F 3 G = .1 B, F 3½ G = .1, F 4½ G = .2, F 5 G = .1 B F 5½ G = .1, F 6½ G = .1, F 7 G = .3. Gobbl? Lines bet. G & K.

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402,2; 468,5

448,3

402,2; 453,1

382,3; 392,2; 402,2; 453,2

402,2; 453,2

448,3; 456,1; 458,1; 461,1

2aK; h5 ℓ5

h3 ℓ3

443,1; 448,2; 456,2; 461,1; 468,1

448,2

Hαℓ; 448,3; 461,2

h5 ℓ5

1aK; Hαℓ; 438,1; 443,1; 448,3; 456,2; 458,2; 461,2; 466,1; 468,1

2aK h3 ℓ3

Hαℓ; 438,1; 443,1; 448,3; 451,1; 456,1; 458,2; 461,2; 466,1; 468,2; 471,1

Hαℓ; ℓd; 448,3; 451,1; 456,1; 458,1; 461,2; 466,1; 468,1; 471,1

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Plate 1095

Book 13F Page 20

	V.	H.	Type.	Rem.	Description of Lines on Spectra.
✓	4.3	7.7	K III bc	3819	F2½ G=.1, F3 G=.2B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1, F6½ G=.1, F7 G=.3. Gdtl.? Lines bet. G & H.
	F. m. & c. 8.0	7.3			F. ch. 7.3

Plate 1096.

✓	22	10.0	11.0 I III b	3820	F7 G=.3
✓		8.2	17.2 F? II a?	3821	G & h=.5. 2 lines below K.
✓		8.8	23.6 F II a	3822	G & h=.5
✓		7.6	8.4 F II a	3823	G & h=.5
✓		6.2	23.8 F? II a?	3824	G & h=.3?
	F. m. & c. 7.9	6.9			F. ch. 7.0

Plate 1104.

✓		19.1	16.5 F II a	3825	G & h=.5: Gdtl.? 4 lines below K.
✓	24	14.7	17.2 K III bc	3826	F3 G=.2B, F3½ G=.2, F4½ G=.2, F5 G=.2B, F5½ G=.2, F7 G=.3. F8 G=.1B, F9 G=.1, F9½ G=.1. Lines bt. G & H. 1 line below K.
✓		8.6	15.5 F? II a?	3827	G & h=.5
✓		3.7	7.8 I? III b?	3828	F7 G=.2
	F. m. & c. 8.0	7.0			F. ch. 7.0

Plate 1105.

✓	26	9.8	6.0 F? II a?	3829	G & h=.5?
✓		5.0	18.8 B I b	3830	G 4h=.2, h 6H=.2, H 6α=.2
	F. m. & c. 8.0	6.8			F. ch. 6.8

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Ha h_5; g_d ? 448,3; 451,1; 456,1; 458,v; 461,v; 466,1; 468,v; 471,1

448,3

2aK; h_5 g_5

h_5 g_5

h_5 g_5

h_3 ? g_3 ?

4aK; g_d ? h_5 g_5

1aK; Ha h_5; 436,1; 438,1; 443,1; 448,3; 456,v; 458,v; 461,v; 466,v; 468,v

h_5 g_5

448,v

h_5 ? g_5 ?

9 392,2; 402,2; 424,2

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Plate 1062.

Book 13 F. Page 28	V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
✓	22.4	15.1	F? II a?	3831	G+h=.5
✓	22.0	19.5	F II a	3832	G+h=.5
✓	19.8	13.3	F? II a?	3833	G+h=.5 (G+h=.5)
✓	18.5	7.5	K? III bc?	3834	F3G=.1B, F4½G=.1, F5G=.1B, F5½G=.1, F7G=.3, Lines bet. G+H. 2 lines below K.
✓	18.5	20.2	F? II a?	3835	G+h=.5? 1 line below K. (G+h=.3)
✓	17.9	10.0	F II a	3836	G+h=.5 (G+h=.5)
✓ 30	16.5	12.9	F? II a?	3837	G+h=.5? F dbl.? (G+h=.5)
✓	16.6	20.9	F II a	3838	G+h=.5 (G+h=.5)
✓	15.1	6.6	F? II a?	3839	G+h=.5 (G+h=.5)
✓	14.6	21.1	F II a	3839a	G+h=.5
✓	13.5	8.9	I III b	3840	F7G=.3
✓	18.1	81.4	F? II a?	3839b	G+h=.5
✓	13.9	14.1	K III bc	3841	F3G=.1B, F5½G=.2, F4½G=.2, F6½G=.1, F7G=.3, Lines bet. G+H. 1 line below K.
✓	13.4	17.1	G II a c	3842	Several bright and faint lines. Several lines below K.
✓ 82	12.4	20.5	F II a	3843	G+h=.5 (G+h=.5)
✓	11.4	6.2	F II a	3844	G+h=.5. 2 lines below K.
✓	11.1	21.4	F II a	3845	G+h=.3. (G+h=.3, 2 lines below K.) 3 lines below K.
✓	10.4	10.3	E? II?	3846	Lines below K.
✓	9.6	18.2	F? II a?	3847	G+h=.5. (G+h=.5, 3 lines below K.) 2 lines below K.
✓	8.3	14.1	F II a	3847a	G+h=.5
✓ 34	4.5	20.7	F? II a?	3848	G+h=.5 (G+h=.5)
✓	3.4	16.8	F? II a?	3849	G+h=.5 (G+h=.5)
✓	3.8	21.1	F? II a?	3850	G+h=.3
	F. m. 7c.	6.2	6.1		F. ch. 6.9

Plate 1063

✓ 86	20.0	12.9	F II a	3851	G+h=.5
✓	20.3	18.8	F? II a?	3852	G+h=.5 (G+h=.5, 2 lines below K.)
✓	17.4	16.9	F? II a?	3853	G+h=.5 (G+h=.5.)

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h5 . g5

h5 . g5

h5 . g5 (h5 g5)

2aK ; Hag ; 448.3 ; 458.1 ; 458.1 ; 461.1 ; 468.1

1aK ; h5 ? g5 ? (h3 g3)

h5 g5 (h5 ; g5)

Hd ? h5 ? g5 ? (h5 g5)

h5 . g5 (h5 ; g5)

h5 g5 (h5 g5)

h5 g5

h3 ; g3

h5 g5

1aK ; Hag ; 448.3 ; 451.1 ; 461.2 ; 466.2 ; 468.1

aK ; Several bright & faint lines

h5 . g5 (h5 g5)

2aK ; h5 g5

~~h3 ; g3 aK~~

3aK ; h3 g3 (2aK ; h3 ; G3)

aK

3aK ; h5 g5

2aK ; h5 g5

h5 ; g5

h5 g5 (h5 g5)

h5 g5 (h5 g5)

h3 g3

h5 g5

h5 g5 ~~2aK~~ (h5 ; g5)

h5 g5 (h5 ; g5)

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Plate 1063

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		B.	H.	Type.	Rem.	Description of Lines on Spectra.
✓		17.5	12.5	F? II a?	3854	G+h=.5 (G+h=.5)
✓	38	16.7	11.7	I III b	3855	F7G=.3
✓		16.0	14.1	K III bc	3856	F2½G=.1, F3G=.1B, F3½G=.1, F4½G=.2, F5G=.1B, F5½G=.1, F7G=.3, F8G=.1B, F9G=.1, Lines lt. G+h.
✓		16.6	21.3	F II a	3857	G+h=.2. 2 lines below K.
✓		15.4	22.4	F? II a?	3858	G+h=.2
✓		14.9	8.5	F II a	3859	G+h=.5. 3 lines below K.
✓		13.2	9.4	I III b	3860	F7G=.3
✓		13.2	17.3	F II a	3860a	G+h=.5
✓	40	11.8	18.9	I? III b?	3861	F7G=.3
✓		12.6	20.7	F? II a?	3860+	G+h=.2?
✓		11.6	20.1	F II a	3862	G+h=.3
✓		11.4	21.5	F II a	3862a	G+h=.5
✓		11.0	21.8	I? III b?	3863	F4½G=.2, F5½G=.2, F7G=.3. Lines lt. G+h. 1 line below K.
✓		10.3	12.7	I III b	3864	F7G=.3

Plate 1063 June 22, '88.

		B.	H.	Type.	Rem.	Description of Lines on Spectra.
✓	42	7.4	23.2	F II a	3865	G+h=.2, 2 lines below K.
✓		6.2	15.1	F? II a?	3866	G+h=.5 (G+h=.5)
✓		3.0	17.5	B? I b?	3867	G6h=.2, h6H=.1.
✓		5.4	19.6	F? II a?	3868	G+h=.5 (G+h=.5)
✓		8.1	21.2	F II a	3869	G+h=.3

F. m.+c. 6.2 5.9 F. ch. 6.7

Plate 1110.

		B.	H.	Type.	Rem.	Description of Lines on Spectra.
✓	44	21.4	15.2	F II a	3870	G+h=.5. 1 line below K. Fdbl.?
✓		20.0	20.2	K? III bc?	3871	Lines below K.
✓		13.4	16.7	F? II a?	3872	G+h=.5
✓		10.5	10.7	F II a	3873	G+h=.5
✓		10.7	11.7	K? III bc?	3874	F2½G=.1, F3G=.1B, F3½G=.1, F4½G=.2, F5G=.1B, F5½G=.2, F7G=.3. Fdbl? Lines lt. G+H.

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h5 , ℓ5 (h5 ℓ5)
448.3
Ha ℓ; 438.1; 443.1; 448.3; 456.1; 458.1; 461.2; 466.1; 468.1; 471.1

2ak; h2 ℓ2
h2 ℓ2
3ak; h5 ℓ5
448.3
h5 ; ℓ5
448.3
h2? ℓ2?
h3 ; ℓ3
h5 ; ℓ5
1ak; Haℓ; 448.3; 456.2; 461.2

448.3

2ak; h2; ℓ2
h5 ; ℓ5 (h5 ℓ5)
403.1; 419.2
h5 ; ℓ5 (h5 ℓ5)
h3 ; ℓ3

~~Ha~~ 1ak; h5 ; ℓ5 ; Fd?
ak
h5 ; ℓ5
h5 ; ℓ5
Haℓ; Fd ? 448.3; 456.2; 458.1; 461.2; 466.1; 468.1; 471.1

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Plate 1110

Book 13 F. Page 44	V.	H.	Type.	No. Rmk.	Description of Lines or Spectra.
✓	9.0	16.1	K III bc	3875	F3G=.1B, F3½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F7G=.3. Lines bet. G & H. 2 lines below K.
✓	9.3	16.7	F½ II a?	3876	G & h = .5. 1 line below K.
✓	8.4	7.6	K III bc?	3877	Several bright and faint lines. Several lines below K. K line dbl.?
✓	6.6	8.6	I III b	3878	F7G=.3
✓	4.0	22.6	I½ III b?	3879	F7G=.3
	F. m. & c.	7.6	6.5		F. ch. 6.6

Plate 1111.

✓	46	20.2	10.5	F½ II a?	3879 80 G & h = .5 (G & h = .5)
✓		15.3	11.0	F½ II a?	3881 G & h dbl. = .5. 2 lines below K.
✓		14.3	11.3	I III b?	3882 F7G=.2
✓		11.0	22.9	F½ II a?	3883 G & h = .5
✓		9.1	20.5	F½ II a?	3884 G & h = .5
✓		8.7	23.2	F½ II a?	3885 G & h = .5
✓		5.3	15.0	F II a	3886 G & h = .5. 2 lines below K.
		F. m. & c.	8.0	6.8	F. ch. 6.8

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Plate 1153. 8

✓	48	18.4	8.7	H½ III?	3887 Lines below K.
✓		18.8	17.3	I III b	3888 F4½G=.2, F7G=.3. Lines bet. G & H.
✓		16.5	9.7	I III b	3889 F7G=.3
✓		13.9	16.9	F II a	3890 G & h = .5
✓		11.7	16.5	F½ II a?	3891 G & h = .5
✓		10.6	20.0	F½ II a?	3892 G & h dbl.? = .5. 3 lines below K.
✓		10.2	22.2	H½ III?	3893 Lines below K.
✓		5.7	9.0	K III bc	3894 F4½G=.1, F5G=.1B, F7G=.3. Lines bt. G & H.
		F. m. & c.	8.0	7.4.	F. ch. 7.4 1 line below K.

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2aK; Ha; 448.3; 456.1; 458.2; 461.2; 466.1; 468.1

1aK; h5; 5

aK, Kd; ~~d K~~; Several bright & faint lines

448.3

448.3

h5; 5 (h3 3)

2aK; hd5; d5

448.2

h5; 5

h5; 5

h5; 5

2aK; h5; 5

aK

Ha; 448.3; 461.2

448.3

h5; 5

h5; 5

3aK; hd'5; d?5

aK

1aK; Ha; 448.3; 456.1; 461.1

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Plate 1155

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V.	H.	Type.	Rem.	No.	Description of Lines on Spectra.
20.2	22.1	I III b		3895	F 7 G = .3
18.3	17.9	H² III ?		3896	Several lines below K.
16.5	9.0	F II a		3897	G + h = .5
16.5	18.8	I III b		3898	F 7 G = .3
5.8	18.4	K III bc		3899	F 3 G = .1, F 4 1/2 G = .2, F 5 G = .2, F 5 1/2 G = .2. F 7 G = .3, F 9 G = .1. Lines bet. G + h. 2 lines below K.

F. m. & c. 8.0 7.1 F. ch. 7.1

Plate 1156.

14.4	22.5	F² II a ?		3900	G + h = .5. 2 lines below K.

~~3900a G + h =~~

F. m. & c. 8.1 7.1 F. ch. 7.1

June 25 '88. Plate 1172

16.8	8.3	F II a		3900a	G + h = .5	
52 16.6	14.8	F² II a ?		3901	G + h = .5	(G + h = .5, 1 line below K.)
54 14.7	6.7	F II a	?	3902	G + h = .3	
13.1	14.1	F II a		3902a	G + h = .5	
12.3	20.3	I III b		3903	F 7 G = .3	
9.6	9.9	F II a		3904	G + h = .2. 3 lines below K.	
56 8.6	12.2	F² II a ?		3905	G + h = .3. 2 lines below K.	
8.8	13.1	F II a		3906	G + h = .3. 3 lines below K.	
8.6	17.2	I III b		3907	F 4 1/2 G = .2. F 7 G = .3.	

F. m. & c. 6.7 6.6 F. ch. 7.7

June 26 Plate 1173

21.5	17.8	F II a		3907a	G + h = .5 ?	
58 18.3	13.0	B I b		3908	h 6 H = .2.	
17.8	10.1	I III b ?		3909	F 7 G = .3.	
17.7	22.4	F² II a ?		3910	G + h = .5	
14.2	10.7	F II a		3910a	G + h = .5 ?	
60 11.8	16.1	F² II a ?		3911	G + h = .5	
7.2	15.4	F II a		3912a	G + h = .5	
9.2	19.9	I III b		3912	F 7 G = .3	

F. m. & c. 7.3 6.8. F ch. 7.4

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1888phae.proj..857F

448.3

aK

h_5 g_5

448.3

2aK; Ha g; 438.1; 448.3; 456.2; 458.2; 461.2; 468.1

2aK; h_5 g_5

h_5; g_5

h_5; g_5 (aK; h_5; g_5)

h_3; g_3

h_5 g_5

448.3

3aK; h_2; g_2

2aK; h_3; g_3

3aK; h_3; g_3

448.3; 461.2

h_5? g_5?

402.2

448.3

h_5; g_5

h_5? g_5?

h_5; g_5

h_5 g_5

448.3

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June 26, 1888

Plate 1150

Book 13 Page 60

	V.	H.	Type.	Arc. No.	Description of Lines on Spectra.
✓	19.5	17.6	F II a	3913	G & h = .3. 1 line below K.
✓	18.8	21.5	F II a	3914	G + h = .3. 2 lines below K.
✓	17.5	6.1	I III b	3915	F 4½ G = .2. F 7 G = .3. Lines det. G & H.
✓	16.2	6.0	I² III b?	3916	F 7 G = .2
62	~~14.4~~	~~8.1~~	~~II a?~~	~~3917~~	~~G & h = .5?~~

F. m. & c. 8.0 7.3 F. ch. 7.3

June 27, '88.

Plate 1194. Dark plate. Hard to measure.

✓	62	32.0	10.0	I² III b?	3917 F 7 G = .2,
✓		21.0	12.3	F² II a?	3918 G + h = .5
✓	64	18.0	12.6	I III b	3919 F 7 G = .3.
✓		17.4	19.4	F² II a?	3920 G & h = .5. 2 lines below K.
✓		16.0	8.8	F² II a?	3921 G + h = .5?
✓		16.3	14.1	F II a	3921a G + h = .5
✓		14.0	13.4	F II a	3922 G 5 h = .5 (G + h = .3)
✓		15.4	12.2	F II a	3921b G + h = .5
✓		14.6	14.5	F² II a?	3923 G & h = .5?
✓		15.4	13.6	F² II a?	3921c G + h = .5?
✓	66	8.0	6.5	F² II a?	3924 G + h = .5?

June 28, '88

Plate 1194

✓		8.6	8.8	F² II a?	3925 G & h = .5?
✓		8.9	11.5	F² II a?	3926 G + h = .5? (G + h dbl. = .5, 1 line below K.)
✓		7.3	11.6	I III b	3927 F 7 G = .3
✓		7.9	16.4	K² III bc?	3928 F 3 G = .1B, F 4½ G = .1, F 5½ G = .2, F 7 G = .3. Lines det. G & H. 1 line below K.
✓		6.3	5.9	I² III b?	3929 F 7 G = .3
✓	68	7.0	16.9	F II a	3930 G + h = .5. 2 lines below K.
✓		2.4	10.1	I III b	3931 F 7 G = .2

F. m. & c. 5.6 5.4 F. ch. 6.6

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1888phae.proj..857F

1 aK ; h3 ; l3

2 aK ; h3 ; l3

Ha l ; 448,3 ; 461,2

448,2

448,2

h5 ; l5

448,3

2 aK ; h5 ; l5

h5 ? l5 ?

h5 l5 ?

h5 l5 (h3 l3)

h5 l5

h5 ? l5 ?

h5 ? l5 ?

h5 ? l5 ?

h5 ? ; l5 ?

h5 ? l5 ?

h5 ? l5 ?

h5 ? l5 ? (aK ; hd5 ; ld5)

448,3

1 aK ; 448,3 ; 456,2 ; 461,1 ; 468,1

448,3

2 aK ; h5 ; l5

448,2

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June, 28, 1888.

Plate 1158

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V.	H.	Type.	Reno. No.	Description of Lines on Spectra.
18.9	18.5	F? II a?	3932	G+h=.5. 1 line below K.
70 8.0	17.8	K III bc	3933	F3½ G=.1, F4 G=.2, F5 G=.2 B, F5½ G=.1, F7 G=.3, Lines ret. G+H.
6.7	15.0	B? ~~III~~ I b?	3934	h 6 H=.3
6.9	16.8	K III bc	3935	F3 G=.1 B, F4½ G=.1, F5 G=.2 B, F5½ G=.1, F7 G=.3. Lines ret. G+H. 2 lines below K.

F. m. & c. 8.0 7.0 F. ch. 7.0

Plate 1159

V.	H.	Type.	Reno. No.	Description of Lines on Spectra.
20.5	11.2	F II a	3936	G+h dbl. =.3. 8 lines below K.
72 11.0	21.8	F? II a?	3937	G+h=.5?
7.0	8.7	I? III b?	3938	F7 G=.3
7.1	10.1	F II a?	3939	G+h=.5, h dbl.? 2 lines below K.
4.6	10.7	F? II a?	3940	G+h=.5

F. m. & c. 8.0 7.2 F. ch. 7.2

Plate 1175

V.	H.	Type.	Reno. No.	Description of Lines on Spectra.
21.4	7.2	F? II a?	3940a	G+h=.5
74 21.8	14.3	F? II a?	3941	G+h=.5?
20.7	6.7	I III b	3942	F7 G=.3
20.0	13.9	F II a?	3943	G+h=.5?
19.9	7.7	F? II a?	3944	G+h=.5
19.4	21.9	F? II a?	3945	G+h=.5?
18.5	21.1	F? II a?	3946	G+h=.5 (G+h=.3?)
16.0	9.9	F II a	3946a	G+h=.5
76 16.8	21.4	F II a	3947	G+h=.5 h dbl.? 1 line below K. (G+h=.5)
15.1	8.2	F? II a?	3947a	G+h=.5?
15.7	10.2	F? II a?	3948	G+h=.2 (G+h=.5?)
15.6	23.5	I? III b?	3949	F7 G=.3. Lines below K. K dbl.?
14.2	14.3	I? III b?	3950	F7 G=.3. 1 line below K. K dbl.?
13.2	16.3	F? II a?	3950a	G+h=.5
12.3	20.1	I III b	3951	F7 G=.3
9.4	13.6	I? III b?	3952	Several bright and faint lines.

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aK; h5; g5

Ha g; 448.3; 456.1; 458.2; 463.2; 466.1

402.3

2 aK; Ha g; 448.3; 456.1; 458.2; 461.1; 468.1

3 aK; hd 3; gd 3

h5 ? g5 ?

448.3

2 aK; hd ? h5; g5

h5 g5

h5 g5

h5 ? g5 ?

448.3

h5 ? g5 ?

h5 ; g5

h5 ? g5 ?

h5 ; g5 (h3 ? g3 ?)

h5 ; g5

1 aK; hd ? h5; g5 (h5 ; g5)

h5 ? g5 ?

h2; g2 (h5 ? g5 ?)

Kd ? aK; 448, 3

Kd ? / aK; 448, 3

h5 g5

448.3

Several bright or faint lines

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Plate 1175.

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	V.	H.	Type.	Reg. No.	Description of Lines on Spectra.
	8.5	14.2	F IIa	3953	G+h=.3
	8.7	17.8	I IIIb	3954	F7G=.2
	8.0	19.7	F:2 IIa?	3955	G+h=.5 (G+h=.5)
	7.6	14.5	F:2 IIa?	3956	G+h=.5, 2 lines below K.
	6.9	21.6	F IIa	3957	G+h=.3
	5.8	14.0	F IIa	3958	G+h=.5, 2 lines below K. K dbl.?
80	14.7	8.9	K IIIbc	3959	F2½G=.1, F3G=.1B, F3½G=.1, F4½G=.2, F5G=.1B, F5½G=.1, F6½G=.1, F7G=.3, Lines bet. G+H.

F. nr. + c. 6.8. 6.3 F. ch. 6.8

Plate 1176

	22.4	7.4	I IIIb	3960	F7G=.3
	22.3	18.5	F:2 IIa?	3961	G+h=.5
	19.8	20.4	F:2 IIa?	3961a	G+h=.5?
82	19.1	23.3	F:2 IIa?	3962	G+h=.5
	17.3	6.3	F:2 IIa?	3962a	G+h=.5
	17.6	9.5	F IIa	3963	G+h=.3, 2 lines below K.
	17.7	10.4	F:2 IIa?	3963a	G+h=.5?
	17.6	15.0	F IIa	3964	G+h=.2, 2 lines below K.
	17.5	12.1	F IIa	3963t	G+h=.5
	17.3	15.1	K IIIbc	3965	F3G=.1B, F4½G=.1, F5G=.2B, F5½G=.1, F7G=.3, Lines bet. G+H. 2 lines below K.
	17.0	15.5	F IIa	3966	G+h=.5, G dbl, 2 lines below K.
	16.8	11.9	F IIa	3967	G+h=.2, 2 lines below K.
	14.6	9.5	F IIa	3967a	G+h=.5
84	14.7	16.9	F IIa	3968	G+h=.5? 4 lines below K.
	13.8	18.9	F IIa	3969	G+h=.5, 2 lines below K.
	12.5	15.5	F:2 IIa?	3970	2 lines below K. (G+h=.2, 2 lines below K.)
	12.3	17.0	F IIa	3971	G+h=.5 (G+h=.3)
	12.2	21.0	F IIa	3971a	G+h=.5

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86	11.5	10.7	F:2 IIa?	3972	G+h=.5, 2 lines below K.
	10.4	7.0	F IIa	3973	G+h=.5, 3 lines below K.
	10.8	15.0	F:2 IIa?	3974	G+h=.5 (G+h=.5)

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h 3 ; k 3

448 . 2

h 5 ; k 5 (h 5 k 5)

2 a K ; h 5 ; k 5

h 3 ; k 3

K d ? 2 a K ; h 5 ; k 5

H a k ; 448,3 ; 451,1 ; 456,1 ; 458,1 ; 461,2 ; 466,1 ; 468,1 ; 471,1

448,3

h 5 ; k 5

h 5 ; k 5 ?

h 5 ; k 5

h 5 ; k 5

2 a K ; h 3 ; k 3

h 5 ? ; k 5 ?

2 a K ; h 2 ; k 2

h 5 ; k 5

2 a K ; H a k ; 448,3 ; 456,1 ; 458,2 ; 461,1 ; 468,1

k d

2 a K ; h 5 ; k 5

2 a K ; h 2 ? k 2 ?

h 5 ; k 5

4 a K ; h 5 ? k 5 ?

2 a K ; h 5 ; k 5

2 a K , (2 a K ; h 2 ; k 2)

h 5 k 5 (h 3 k 3)

h 5 k 5

2 a K ; h 5 ; k 5

3 a K ; h 5 ; k 5

h 5 ; k 5 (h 5 ; k 5)

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Plate 1176

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	V.	H.	Type.	Ann.	Description of Lines on Spectra.
✓	10.6	17.3	F II a	3975	G+h=.3, 7 lines below K.
✓	9.4	14.0	F II a	3976	G+h=.5?
✓	7.0	6.5	F II a	3976a	G+h=.5
✓ 88	6.8	20.4	I? III b?	3977	F5½ G=.2, F7 G=.3
✓	14.2	14.1	F II a	3977a	G+h=.5?
✓	14.8	21.1	F? II a?	3978	G+h=.5 (G+h=.5)
✓	8.0	18.5	I III b	3979	F4½ G=.2, F5½ G=.2, F7 G=.3 Lines bt. G. & H.
✓ 90	2.7	7.4	I? III b?	3980	F7 G=.3
	F. nn. & c.	6.5	6.0		F. ch. 6.6

Dark plate. Very hard to measure. Plate 1197

✓ 92	21.0	12.5	F? II a?	3981	G+h=.5
✓	18.1	9.4	F? II a?	3981a	G+h=.5
✓	17.8	12.7	I III b	3982	F7 G=.3
✓	16.1	6.3	F? II	3983	Lines below K.
✓	14.9	9.5	F II a	3983a	G+h=.5
✓ 94	11.5	15.9	I III b	3984	F7 G=.3
✓	8.4	18.6	F? II a?	3985	G+h=.5
✓	8.8	19.0	F II a	3986	G+h=.5
✓	7.5	22.0	F? II a?	3987	G+h=.5
	F. nn. & c.	5.2	4.8		F. ch. 6.7

Dark plate. Hard to measure. June 30, '88.

Plate 1198

✓ 96	19.1	17.3	F? II a?	3988	G+h=.5?
✓	15.3	17.4	K? III bc?	3989	F2½ G=.1, F3 G=.1B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3 Lines bt. G+H. 2 lines below K.
✓	12.4	11.5	F II a	3990	G+h=.5
✓	11.2	12.2	I? III b?	3991	F7 G=.3, Lines bt. G+H, 2 lines below K.
✓ 98	7.0	12.2	F II a	3991a	G+h=.5 (G+h=.5)
	F. nn. & c.	5.5	5.3	3992	F. ch. 6.6

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7 aK; h3: ℓ3

h5 ? ℓ5 ?
h5 : ℓ5
448,3 : 456,2
h5 ? ℓ5 ?
h5 ; ℓ5 (h5 ; ℓ5)
Hαℓ; 448,3; 456,2; 461,2

448,3

h5 : ℓ5
h5 : ℓ5
448,3

aK
h5 : ℓ5
448,3
h5 ; ℓ5
h5 : ℓ5
h5 ; ℓ5

h5 ? ℓ5 ?
2 aK; Hαℓ: 448,3; 456,1; 458,2; 461,2; 466,1; 468,1; 471,1

h5 ; ℓ5
2 aK ; Hαℓ; 448,3
h5 : ℓ5 (h5 : ℓ5)

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June 30, 1888.

Plate. 1085

Book 13 Page 100	V.	H.	Type.	Rev.	Description of Lines on Spectra.
✓	21.8	13.8	K III bc	3992	F 2½ G=.2, F 3 G=.1B, F 3½ G=.1, F 4½ G=.2, F 5 G=.2 B, F 5½ G=.2, F 7 G=.3, P Lines Int. G + H.
✓	11.7	15.0	F? II a?	3992a	G+h=.5
✓	10.5	7.1	F? II a?	3993	G + h = .5 (G + h .5)
✓	9.1	12.1	F? II a?	3994	G + h = .5 (G + h = .5)
✓	8.0	23.1	I? III b?	3995	F 4½ G=.2, F 7 G=.3
✓	6.6	16.6	K III bc	3996	F 3 G=.1B, F 4½ G=.1, F 5 G=.2B, F 5½ G=.2, F 7 G=.3, F 8 G=.2B, F 9 G=.2, Lines Int. G + H. Several lines below K.
✓	2.1	13.6	K III bc	3997	F 2½ G=.2, F 3 G=.1B, F 3½ G=.1, F 4½ G=.2, F 5 G=.2B, F 5½ G=.2, F 7 G=.3, Lines Int. G & H.
	F. nw. + c.	8.0	7.1		F. ch. 7.2

Plate 1086.

✓	10.2	20.9	14.9	F II a	3998 G & h = .3
✓		20.3	20.5	I III b	3999 F 7 G=.3, 1 line below K.
✓		13.6	17.3	I? III b?	4000 F 7 G=.3
✓		13.8	19.9	F II a	4001 G & h=.2,
✓		13.1	19.8	F II a	4002 G & h=.3? F dbl.?
✓		11.0	11.4	F II a	4003 G + h=.5, G dbl.? 2 lines below K.
✓		10.3	23.6	F II a	4004 G + h = .3
✓		9.9	19.7	F II a	4005 G + h=.2, G dbl.? Several lines below K.
✓		9.8	22.3	K? III bc?	4006 F 2½ G=.1, F 3 G=.5B, F 3½ G=.1
✓		5.4	10.3	F II a	4007 G & h=.5, 2 lines below K.
✓	10.4	1.3	15.0	F II a	4008 G + h =.5
	F. nw. + c.	8.0	7.4		F. ch. 7.4

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Ha h_5; 448,3; 456,2; 458,2; 461,2; 466,1; 468,1; 471,2

h_5 : g_5

h_5; g_5 (h_5 ; g_5)

h_5; g_5 (h_5 ; g_5)

448,3; 461,2

ak; Ha g_5; 438,2; 443,2; 448,3; 456,2; 458,2; 461,1; 468,1

Ha h_5; 448,3; 456,1; 458,2; 461,2; 466,1; 468,1; 471,2

h_3; g_3

1 ak; 448,3

448,3

h_2; g_2

~~f_d~~ h_3? g_3? f_d?

2 ak; g_d ? h_5; g_5

h_3; g_3

ak; g_d ? h_2; g_2

466,1; 468,5; 471,1

2 ak; h_5; g_5

h_5; g_5

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Plate 1114

Book 13 F Page 104

	V.	H.	Type	Rev. No.	Description of Lines on Spectra.
✓	16.5	21.4	K III bc	4009	F 3 G = .1 B, F 4½ G = .1, F 5 G = .1 B, F 7 G = .3, Lines Ist. G & H.
✓	4.3	9.2	F₂ II a?	4010	G & h = .5
✓	8.6	9.1	K III bc	4011	F 2½ G = .1, F 3 G = .2 B, F 4½ G = .2, F 5 G = .2 B, F 7 G = .3, Lines Ist. G & H. 1 line below K. K dbl.?
	F. nv. & c. 8.0, 7.2				F. ch. 7.2

Plate 1115.

✓	106	21.8	18.5 F II a	4012	G & h = .3, 1 line below K.
✓		20.8	9.4 K III bc	4013	F 2½ G = .2, F 3 G = .2 B, F 4½ G = .2, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3, F 8 G = .1 B, Lines Ist. G & H.
✓		11.8	21.4 F II a	4014	G & h = .2, 1 line below K.
✓		10.5	6.8 I₂ III b?	4015	F 7 G = .3
	F. nv. & c. 8.0 7.4				F. ch. 7.4

Plate 1087.

✓	108	14.6	18.2 F II a	4016	G & h dbl. = .3, 2 lines below K.
✓		13.9	18.1 K III bc	4017	Several bright and faint lines. Lines below K.
✓		9.4	9.9 I₂ III b?	4018	F 7 G = .2
	F. nv. & c. 8.0 7.3				F. ch. 7.3

Plate 1088.

✓		20.4	14.6 I III b	4019	F 7 G = .3, G dbl.? Lines Ist. G & H.
✓		17.8	10.1 F₂ II a?	4020	G & h = .5
✓	110	12.7	19.1 F₂ II a?	4021	G & h = .5

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Ha 2; 448.3; 458.1; 461.1; 468.1

h 5; 2 5

Kd? 1aK; Ha 2; 448.3; 458.2; 461.2; 468.2; 471.1

aK; h 3; 2 3

Ha 2; 443.1; 448.3; 456.1; 458.2; 461.2; 468.2; 471.2

1aK; h 2; 2 2

448.3

2aK; hd 3; 2d 3

aK; several bright & faint lines

448.2

Ha 2; 2d? 448.3

h 5; 2 5

h 5; 2 5

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1888phae.proj..857F

June 30, 1888.

Plate. 1088

Book 13 Fl Page 110

	V.	H.	Type.	Cat.	Description of Lines on Spectra.
	11.0	16.6	K III bc	4022	F2½ G=.1, F3 G=.2 B, F3½ G=.1, F4½ G=.2, F5 G=.1 B, F5½ G=.2, F6½ G=.2, F7 G=.3, F8 G=.1 B, F9 G=.1, F9½ G=.1, G dbl.? Lines bc. G+H.
✓	7.8	10.7	F½ II a?	4023	G+h=.5
✓	6.0	21.6	F II a	4024	G+h=.3
✓	2.0	14.0	F½ II a?	4025	G+h=.5
	F. m. tc. 8.0	7.1			F. ch. 7.2

Plate 1123.

112	F. m. tc. 8.0	7.5			F. ch. 7.5

Plate 1124.

✓	20.6	23.9	K III bc	4026	F3 G=.1 B, F3½ G=.1, F4½ G=.2, F5 G=.2 B, F5½ G=.1, F7 G=.3,
✓	15.6	12.2	K½ III bc?	4027	F4½ G=.2, F5 G=.1 B, F5½ G=.1, F7 G=.3. Lines bc. G+H.
✓	14.8	6.6	K III bc	4028	F3 G=.1 B, F4½ G=.1, F5 G=.1 B, F5½ G=.1, F7 G=.3, Lines bc. G+H. 1 line below K.
✓	114 8.1	10.0	F II a	4029	G+h=.5
	F. m. tc. 8.0	7.4			F. ch. 7.4

Plate 1281.

✓	116 19.7	9.4	F½ II a?	4030	G+h=.5 (G+h=.5)
✓	12.6	12.1	F II a	4031	G+h=.5
✓	8.3 6	18.3	F II a	4031a	G+h=.5 ~~(G+h=.5 2 lines below K.)~~
✓	118 9.6	18.4	F½ II a?	4032	G+h=.5? 1 line below K.
✓	7.7	14.3	F II a	4033	G+h=.5
✓	7.4	18.2	F II a	4033a	G+h=.5?
✓	5.8	15.8	I III r	4034	F7 G=.3

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Hak; Gd ? 436.1; 438.1; 443.1; 448.3; 451.2; 456.2; 458.1; 461.2; 466.1; 468.2; 471.1

h5; G5
h3; G3
h5; G5

448.3; 456.1; 458.2; 461.2; 466.1; 468.1

Hak; 448.3; 456.1; 458.1; 461.2

1ak; Hak; 448.3; 456.1; 458.1; 461.1; 468.1

h5; G5

h5; G5 (h5 G5)
h5; G5 2ak
h5: G5 ~~h5. G5~~
1ak; h5? G5? (2ak G5?, G5?)
h5; G5
h5?; G5?
448.3

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Plate 1281

Book 13 F. Page 118

V.	No. Rem.	Type.	Wave Length.	Description of Lines or Spectra.
V	4.3	12.2 F? II a?	4035	G+h=.5
	F. nw. + c. 5.7	5.5	F. ch. 7.4	

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Plate 1136.

✓ 120	10.6	10.1 F II a	4036	G=.5, h=.2, 2 lines below K.
✓	7.6	10.1 K III bc	4037	F3 G=.1B, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3, Lines bt. G+H.
✓	5.4	20.5 I III b	4038	F7 G=.3
	F. nw. + c. 8.0	7.5	F. ch. 7.5	

Plate 1137.

✓	12.9	17.6 F II a	4039	G+h=.3
✓	4.9	13.8 K III bc	4040	F3 G=.2B, F3½ G=.2, F4½ G=.2, F5 G=.2B, F5½ G=.2, F7 G=.3, F8 G=.1B, F9 G=.1, Lines bt. G+K. 1 line below K.
	F. nw. + c. 8.0–7.5		F ch. 7.5	

Plate 1178.

✓ 122	22.6	20.2 F II a	4041	G+h=.5
✓	17.8	22.2 F II a	4042	G+h=.5
✓ 124	10.8	10.0 A? II a c	4043	G=.3, h=.2, 4 lines below K. Other lines seen.
✓	9.4	9.8 F? II a?	4043a	G+h=.5
✓	7.8	10.0 K III bc	4044	F2½ G=.2, F3 G=.2B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3, F8 G=.1B, F9 G=.1, Lines bt. G+K. 2 lines below K.
✓	6.9	19.4 I III b	4045	F7 G=.3

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h5; g5

2aK; h2; g5
HaG; 448,3; 456,1; 458,2; 461,2; 468,1

448,3

h3; g3
1aK; HaG; 438,1; 443,1; 448,3; 456,2; 458,2; 461,2; 466,2; 468,2

h5; g5
h5; g5
4aK; h2; g3; Other lines seen?

h5; g5
2aK; HaG; 438,1; 443,1; 448,3; 456,1; 458,2; 461,2; 466,1; 468,2; 471,2

448,3

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Plate 1178

Book 13F. Page 124 V. H. Type. Rem. No. Description of Lines on Spectra.

5.5 20.4 K III bc 4046 F4½ G=.2, F5 G=.2B, F5½ G=.2, F7 G=.3, Lines tet. G+h. 1 line below K.

2.9 10.0 F II a? 4047 G+h=.5

F. m. & c. 7.0 6.8 F. ch. 7.3

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Plate 1075

21.8 17.0 F² II a? 4048 G+h diffl. =.5, 4 lines below K.

20.2 9.0 F² II a? 4049 G+h=.5?

20.6 12.1 F² II a? 4050 G+h=.5 (G+h=.5)

16.7 20.7 I² III b? 4051 F7 G=.3

15.6 9.4 F² II a? 4052 G+h=.5

9.6 15.8 F II a, 4052a G+h=.5 (G+h=.5)

128 7.9 20.4 F² II a? 4053 G+h=.5

6.2 13.8 I III b 4054 F7 G=.3

5.4 5.9 F² II a? 4055 G+h=.5

8.1 15.8 F² II a? 4056 G+h=.5

F. m. & c. 7.0 6.6 F. ch. 7.0

Plate 1076.

20.0 19.1 F² II a 4057 G+h=.2, 4 lines below K.

19.5 9.2 F II a 4058 G+h=.5, 2 lines below K.

17.3 14.0 F² II a? 4059 G+h=.2, 2 lines below K.

17.0 18.9 K III bc 4060 F3 G=.1B, F3½ G=.2, F4½ G=.2, F5 G=.2B, F5½ G=.2, F7 G=.3, Lines tet. G+h. 3 lines below K.

130 16.6 16.7 I² III b? 4061 F7 G=.3

14.7 9.6 I² III b? 4062 F7 G=.3

14.4 21.3 K III bc 4063 F3 G=.2B, F4½ G=.1, F5 G=.2B, F5½ G=.1, F7 G=.3, Lines tet. G+h. 3 lines below K.

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1 ak ; Ha ; 448,3 ; 456,2 ; 458,2 ; 461,2

h5 ; g5

4 ak ; hd5 ; gd5

h5 ? g5 ?

h5 ; g5

448,3

h5 ; g5

h5 ; g5 (h5 ; g5)

h5 ; g5

448,3

h5 ; g5

h5 ; g5

4 ak ; h2 ; g2

2 ak ; h5 ; g5

2 ak ; h2 ; g2

3 ak ; Ha ; 448,3 ; 456,2 ; 458,2 ; 461,2 ; 466,2 ; 468,1

448,3

448,3

3 ak ; Ha ; 448,3 ; 456,1 ; 458,2 ; 461,1 ; 468,2

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July 3, 1888.

Plate 1076

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	V.	H.	Type.	Rev. No.	Description of Lines on Spectra.
✓	13.3	11.1	F? II a?	4064	G+h=.3
✓	13.5	17.4	F II a	4065	G+h=.5 (G+h=.5)
✓	13.1	6.1	F II a	4066	G+h=.2
✓	9.9	11.3	F II a	4067	G+h=.3, 3 lines below K.
✓	8.0	8.8	K III bc	4068	F3 G=.3 B, F4½ G=.2, F5 G=.3 B, F5½ G=.1, F7 G=.3 Lines bet. G+h. 2 lines below K.
✓	8.7	16.5	F? II a?	4068a	G+h=.5
	F. m. & c.	7.8	6.3		F. ch. 6.3

Plate 1125

✓	182	13.5	14.7	F II a	4069 G+h=.5, 2 lines below K.
✓		10.4	17.2	F II a	4070 G+h=.5
		F. m. & c.	8.0	7.5	F. ch. 7.5

Plate 1126.

✓		18.2	15.1	K III bc	4071 F3 G=.1 B, F4½ G=.2, F5 G=.2 B, F5½ G=.1, F7 G=.3, Lines bet. G+h. 1 line below K.
	F. m. & c.	8.0	7.5		F. ch. 7.5

Plate 1179

✓	134	19.6	21.2	B I b	4072 F6 G=.2, h 6 H=.2, H 6 K=.2,
✓		13.0	15.0	F II a	4073 G+h=.5, Gdbl., 3 lines below K.
✓		10.7	18.2	I? III b?	4074 F7 G=.3
✓		9.1	8.6	F? II a?	4075 G+h=.5 (G+h=.5)
✓		9.8	17.6	F II a	4076 G+h=.2, 2 lines below K.
✓		8.8	10.6	F? II a?	4077 G+h=.5?
✓	136	6.2	12.5	B? I b?	4078 h 6 H=.2
✓		6.7	13.6	F II a	4079 G+h=.5, 2 lines below K.
✓		6.3	23.9	F? II a?	4080 G+h=.5
✓		5.0	17.8	F II a	4081 G+h=.2 B? Lines betw. G & H

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h3 ; l3
h5 ; l5 (h5 ; l5)
h2 ; l2
3aK ; h3 ; l3
2aK ; Hal ; 448,3 ; 458,1 ; 458,3 ; 461,2 ; 468,2
h5 ; l5

2aK ; h5 ; l5
h5 ; l5

1aK ; Hal ; 448,3 ; 458,1 ; 458,2 ; 461,2 ; 468,1

* 392,2 ; 402,2 ; 453,2
3aK ; ld ; h5 ; l5
448,3
h5 ; l5 (h5 l5)
2aK ; h2 ; l2
h5 ? l5 ?
402,2
2aK ; h5 ; l5
h5 ; l5
HaG he ; l2

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Plate 1179.

Book 13 F. Page 136	V.	H.	Type.	Rem.	Description of Lines on Spectra.
	3.6	14.3	F II a	4082	G + h = .2, 2 lines below K.
	F. m. + c. 7.8	6.5		F. ch. 6.8	

Plate 1180.

	19.8	17.9	F II a	4083	G + h = .5, 2 lines below K.
	18.0	15.3	K III b c	4084	F 3 G = .2B, F 3½ G = .1, F 4½ G = .2, F 5 G = .3B, F 5½ G = .1, F 7 G = .3, Lines bet. G + H. 3 lines below K.
138	11.0	17.1	F II a	4085	G + h = .2
	~~10.7~~	~~21.2~~	~~F: II a?~~	~~4085a~~	~~G + h = .5?~~
	7.1	21.1	F II a	4086	G + h = .5, 2 lines below K.
	6.3	23.8	F II a	4087	G + h = .5
140	4.0	18.4	B: I b?	4088	G b h = .2, h b H = .2
	3.4	18.0	F II a	4089	G + h = .3
	2.5	15.0	I III b?	4090	F 4½ G = .2, F 5½ G = .2, F 7 G = .3, Lines bet. G + H.
	F. m. + c. 7.5 – 6.9			F. ch. 7.3	

Plate 1077.

	17.3	15.8	F: II a?	4091	G + h = .5? (G + h = .5)
	15.3	11.6	I: III b?	4092	F 7 G = .3 Lines bet. G + H.
	13.0	9.2	F: II a?	4092a	G + h = .5
	11.2	6.0	F II a	4093	G + h = .5
142	10.5	6.1	F II a	4094	G + h = .5
	9.9	8.7	F: II a?	4095	G + h = .5 (G + h = .3, 1 line below K.)
	9.0	9.7	F II a	4096	G + h = .3 (G + h = .2)
	7.9	9.3	I III b	4097	F 7 G = .3, G dbl.?
	6.6	6.9	I: III b?	4098	F 4½ G = .1, F 7 G = .3. Lines bet. G + H.
	6.8	10.2	F: II a?	4099	G + h = .5 (G + h = .5)
	6.2	18.5	F II a	4099a	G + h = .5
	F. m. + c. 7.5	6.8		F. ch. 7.1	

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2aK; h2; ℓ2

aK; h5; ℓ5

3aK, Hαℓ; 448.3; 456.1; 458.3; 461.2; 466.1; 468.2

h2; ℓ2

~~h5? ℓ5?~~

2aK; h5; ℓ5

h5; ℓ5

402.2; ~~402~~ 421.2

h3; ℓ3

Hαℓ; 448.3; 456.2; 461.2

h5? ℓ5? (h5 ℓ5)

Hαℓ: 448.3

h5; ℓ5

h5; ℓ5

h5; ℓ5

h5; ℓ5 (aK; h3; ℓ3)

h3; ℓ3 (h2; ℓ2)

ℓd? 448.3

Hαℓ; 448.3; 461.1

h5; ℓ5 (h5 ℓ5)

ℓ5, 46.

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July 3, 1888.

Plate 1078.

Book 13F Page 144

	V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
	18.4	9.4	F II a	4100	G + h = .5
	18.9	19.4	F II a	4101	G + h = .3
	16.6	22.2	F II a	4102	G + h = .2
	13.6	22.7	F II a	4103	G + h = .2, 2 lines below K.
	12.7	20.0	F II a	4104	G + h = .5, 1 line below K.
	12.8	20.1	F2 II a ?	4105	G + h = .5 ?
	11.6	17.8	I III b	4106	F 7 G = .3
	10.2	18.3	F2 II a ?	4107	G + h = .5
	9.4	13.0	F2 II a2	4107a	G + h = .5
	8.0	22.5	I2 III b ?	4108	F 7 G = .3, Lenses Ist. G + H.

Plate 1078. July 5, 1888.

146	5.6	8.4	I III b	4109	F 7 G = .3
	3.9	4.2	F2 II a ?	4110	G + h = .2

F. m. & c. 7.8 6.8 F. ch. 7.0

Plate 1209.

	18.0	9.3	F2 II a ?	4111	G + h = .5
	15.4	18.5	F2 II a ?	4112	G + h = .5
	12.6	19.9	F II a2	4113	G + h = .5
	12.6	20.0	F2 II a ?	4114	G + h = .5 ?
	11.5	17.7	I III b	4115	F 4½ G = .2, F 5½ G = .2, F 7 G = .3
	10.0	18.3	F2 II a ?	4116	G + h = .5
148	7.8	22.4	K2 III bc ?	4117	F 3 G = .1B, F 4½ G = .1, F 5 G = .2, F 7 G = .3, Lenses Ist. G + H. 2 lines below K.
	5.4	8.3	F III b	4118	F 7 G = .3, G dbl. ? Lenses Ist. G + H.

F. m. & c. 7.9 6.9 F. ch. 7.2.

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h5 ; 25
h3 23
h2 22
2ak ; h2 : 22
1ak ; h5 ; 25
h5 ? 25 ?

448,3
h5 25
h5 25
Hak ; 448,3

448,3
h2 ; 22

h5 ; 25
h5 25
h5 25
h5 ? 25 ?
448,3 ; 458,2 ; 461,2
h5 25
2ak ; Hak ; 448.3 ; 458,2 ; 461,1 ; 468,1

Hak ; 2d ? 448,3

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Plate 1127

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	V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
	17.8	17.5	I? III b?	4119	F7G=.3
	16.7	10.7	I III b	4120	F7G=.3
	5.4	13.3	F II a	4121	G+h=.5
	F. m. & c.	8.0	7.8		F. ch. 7.9

Plate 1128

152	21.6	9.6	F? II a?	4122	G+h=.5
	14.3	11.1	F? II a?	4123	G+h=.5
	10.8	15.3	K III bc	4124	F4½G=.1, F5G=.1B, F7G=.3, F9G=.1, Lines bet. G+H.
	F. m. & c.	8.0	7.3		F. ch. 7.3

Plate 1079.

	21.4	8.2	K III bc	4125	F4½G=.2, F5G=.2B, F6½G=.2, F6G=.2, F7G=.3, Lines bet. G+H. 1 line below K.
154	14.8	23.3	F II a	4126	G+h=.5
	12.0	16.8	F? II a?	4127	G+h=.5?
	11.1	17.0	F? II a?	4128	G+h=.5
	11.5	23.5	F II a?	4128a	G+h=.5
156	8.1	6.4	K? III bc?	4129	F3G=.1B, F3½G=.2, F4½G=.2, F5G=.1B, F7G=.3
	8.8	9.8	K III bc	4130	F3G=.1B, F3½G=.1, F4½G=.2, F5G=.1B, F7G=.3
	8.5	13.3	E II	4131	8 lines below K.
	6.8	9.0	F II a	4132	G+h=.5
	6.8	24.1	I III b	4133	F7G=.3, Lines bet. G+H.
	F. m. & c.	7.6	6.5		F. ch. 6.8

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448,3
448,3
h5 ; g5

h5 g5
h5 g5
Hag; 438,1; 448,3; 458,1; 461,1

1ak; Hag; 448,3; 453,2; 456,2; 458,2; 461,2

h5 g5
h5 ? g5 ?
h5 g5
448,3 ; 458,1; 461,2; 466,2; 468,1

448,3; 458,1; 461,2; 466,1; 468,1

3ak
h5 g5
Hag; 448,3

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Plate 1080

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	V.	H.	Type	No. Rec.	Description of Lines on Spectra.
	20.2	19.7	F II a	4134	G+h=.5, 2 lines below K.
	17.4	23.3	F2 II a?	4135	G+h=.5
	16.3	20.4	F2 II a?	4136	G+h=.5 (G+h=.5?)
158	4.6	15.4	F II a	4137	G+h=.5
	F. m. + c.	8.0	7.2		F. ch. 7.4

Plate 1338.

160	19.5	20.7	F2 II a?	4138	G+h=.5?
	16.8	6.9	F2 II a?	4139	G+h=.5
	13.0	11.7	I III b	4140	F+4½ G=.2, F+7G=.3
	7.5	15.2	F II a	4141	G+h=.5
	6.5	23.7	I III b	4142	F+7G=.3
	F. m. + c.	8.0	6.8		F. ch. 6.9

Dark Plate: 19.8 16.8 F2 II a? Plate 1204 4142a G+h=.5 Heard to measure.

162	18.9	8.4	F II a	4143	G+h=.2, 3 lines below K.
	11.8	10.3	F II a	4144	G+h=.5
	F. m. + c.	5.3	5.0		F. ch. 7.0

Plate 1141

164	18.0	17.0	F II a	4145	G=.5, h=.2, 2 lines below K.
	18.7	18.3	F II a	4146	G+h dbl.=.5, 2 lines below K.
	3.6	14.0	F2 II a?	4147	G+h=.5?
	F. m. + c.	8.0	7.3		F. ch. 7.3

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18.0	13.8	F2 II a?	4148	G=.5, h=.2. Other bright and faint lines. Lines below K.
18.8	14.8	F II a	4149	G+h=.3, G dbl. Lines below K.

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2 aK ; h_5 l_5
h_5 l_5
h_5 l_5 (h_5 ? l_5 ?)
h_5 l_5

h_5 ? l_5 ?
h_5 l_5
448.3 ; 461.2
h_5 l_5
448.3

h_5 l_5
3 aK ; h_2 l_2
h_5 l_5

2 aK h_2 l_5
2 aK hd_5 ld_5
h_5 ? l_5 ?

aK h_2 l_5 Other bright or faint lines

aK ; ld ; h_3 l_3

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Plate 1243

Book 13 F Page 164 V. No. Type No. Riw. Description of Lines on Spectra.

✓		18.5	15.8	I III b	4150	F 7 G = .3
✓	166	18.4	22.7	F II a	4151	G + h = .3
✓		12.2	18.7	I III b	4152	F 4½ G = .2, F 8½ G = .2, F 7 G = .3.
✓		11.4	14.4	F? II a?	4153	G + h = .5
✓		11.5	16.3	F? II a?	4154	G + h = .5, 1 line below K.
		F. m. & c.	8.0	7.3		F. ch. 7.3

Plate 1142.

✓	168	16.6	18.7	F? II a?	4155	G + h = .5
✓		13.5	12.1	I? III b?	4156	F 7 G = .3
		F. m. & c.	8.0	7.4		F. ch. 7.4

Plate 1182.

✓		20.7	20.3	F? II a?	4157	G + h = .5 (G + h = .5)
✓	169	16.4	20.1	I? III b?	4158	F 7 G = .3
✓		14.0	17.4	F II a	4158a	G + h = .5
✓	170	12.4	6.4	F II a	4159	G + h = .5
✓		11.0	13.4	F II a	4160	G + h = .5
✓		8.9	5.6	F II a	4161	G + h dbl. = .3,
✓		8.2	21.7	F II a	4162	G ± .5, h = .2, Lines below K.
✓		8.8	23.4	F II a	4163	G + h = .5, 4 lines below K.
✓		8.4	23.9	I? III b?	4164	F 7 G = .3
		F. m. & c.	7.9	7.0		F. ch. 7.3

Plate 1183.

✓	172	17.8	19.8	F II a	4165	G + h = .5
✓		15.4	16.7	F II a	4166	G + h = .5
✓		14.9	11.7	F? II a?	4167	G + h = .5
✓		13.6	12.5	F? II a?	4168	G + h = .5
✓		12.6	21.9	I III b	4169	F 7 G = .3

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1888phae.proj..857F

448.3
h3 g3
448.3 ; 455b.2; 461.2
h5 g5
1 ak h5 g5

h5 g5
448.3

h5 g5 (h5 g5)
448.3
h5 g5
h5 g5
hd3 gd3
2 ak he g5
4 ak h5 g5
448.3

h5 g5
h5 g5
h5 g5
h5 g5
448.3

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Plate 1183 ~~1243~~

Book 13 Page 172

	V.	H	Type	Wav.	Description of Lines on Spectra.
	9.4	11.7	F ~~II~~ a	4170	G+h=.5, 3 lines below K.
174	3.4	19.8	I ~~III~~ b	4171	F 7 G=.3, Lines bet. G+H.
	2.3	10.3	F ~~II~~ a	4172	G+h=.5
	2.0	4.0	F ~~II~~ a	4173	G+h=.5
	2.3	14.2	F ~~II~~ a	4174	G+h=.5 G+h=.5
	F. m. & c.	7.8	7.0		F. ch. 7.3

July 7, '88.

Plate 1211

	22.6	20.4	I ~~III~~ b	4175	F 7 G=.3
176	15.2	17.5	F ~~II~~ a	4176	G+h=.5, 2 lines below K.
	12.0	18.0	F ~~II~~ a	4177	G+h=.2
	11.4	11.4	F2 ~~II~~ a?	4178	G+h=.5, 4 lines below K.
	10.4	6.5	F2 ~~II~~ a?	4179	G+h=.5? Lines below K.
	9.6	12.5	F2 ~~II~~ a?	4180	G+h=.5? 4 lines below K.
178	7.4	11.2	F2 ~~II~~ a?	4181	G+h=.5 (G+h=.5)
	7.6	14.7	F ~~II~~ a	4182	G+h=.3
	2.2	11.0	F2 ~~II~~ a?	4183	G+h=.5
	F. m. & c.	7.4	6.4		F. ch. 6.8

Plate 1143.

	18.6	14.6	F ~~II~~ a	4184	G+h=.3, 1 line below K.
180	16.8	11.1	F2 ~~II~~ a?	4185	G=.5, h=.2, Several lines below K. Bright lines?
	F. m. & c.	8.0	7.8		F. ch. 7.8

Dark Plate. Hard to measure. Plate 1205.

	22.3	14.3	I ~~III~~ b	4186	F 7 G=.3
	22.2	15.3	F2 ~~II~~ a?	4187	G+h=.5

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5 ak ; h_5 ; g_5
Hale ; 448,3
h_5 ; g_5
h_5 ; g_5
h_5 ; g_5 (h_5. g_5)

448,3
2 ak ; h_5 ; g_5
h_2 g_2
4 ak ; h_5 ; g_5
ak ; h_5 ; g_5
4 ak ; h_5 ; g_5 .
h_5 g_5 (h_5 g_5)
h_3 g_3
h_5 g_5

1 ak ; h_3 g_3
ak ; h_2 g_5 Bright lines ?

448.3
h_5 g_5

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Plate 1205.

Book 18 F Page 180

	V.	H.	Type	No. Rem.	Description of Lines on Spectra.
	19.0	15.2	F II a	4188	G+h=.2, Gdbl. 3 lines below K.
	18.6	16.4	F II a	4189	G+h=.5
	17.1	11.8	F II a.	4190	G+h=.2, 5 lines below K. Bright lines seen?
182	14.0	12.0	F:2 II a?	4191	G+h=.5? (G+h=.5)
	9.0	7.8	F II a	4192	G+h=.3
	F. m. + c. 5.6		5.3		F. ch. 6.8

Plate 1144.

184	6.3	11.9	B I b	4193	F6 G=.2, h 6 H=.2, 2H 6 K=.2
	F. m. + c. 8.0		7.5		F. ch. 7.5

Plate 1184.

	19.8	10.8	F:2 II a?	4194	G+h=.5
	17.8	8.6	F:2 II a?	4195	G+h=.5
	17.8	11.2	F:2 II a?	4196	G+h=.2
	15.5	19.9	F:2 II a?	4196a	G+h=.5?
	18.6	12.8	F II a	4197	G+h=.2, 3 lines below K.
186	8.7	23.8	F II a	4198	G+h=.3, 2 lines below K.
	7.0	20.2	F II a	4199	G+.3, h=.2, Several lines below K.
	6.6	10.4	E:2 II ?	4200	Hdbl. Several bright and faint lines below K.
	F. m. + c. 7.9		6.7		F. ch. 6.7

Plate 1185.

	12.8	9.7	I III b?	4201	F H½ G=.2, F 7 G=.3
	F. m. + c. 7.8		6.5		F. ch. 6.5

Plate 1146.

188	19.4	6.4	K:2 III b	4202	F H½ G=.1, F 5 G=.1B, F 5½ G=.1, F 7 G=.3. Lines det. G + H. 2 lines below K.

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a K; Kd h_2 K_2

h_5 K_5

5 a K; h_2 K_2 Bright lines seen?

h_5 ? K_5 ? (h_5 K_5)

h_3 K_3

392,2, 402,2, 453,3.

h_5 K_5

h_5 K_5

h_2 K_2

h_5 ? K_5 ?

3 a K; h_2 K_2

2 a K h_3 K_3

a K h_2 K_3

Kd: Several bright & faint lines below K

448,3; 461,3

2 a K; Ha D; 448,3; 456,1; 458,1; 461,1

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July 7, 1888.

Plate 1146

Book 13 F. Page 188 V. H. Type. Disp. Description of Lines on Spectra.

✓ 15.4 19.8 F² II a? 4203 G=.2, h=.1, Several hight and faint lines below K.

✓ 14.4 11.1 F II a 4204 G & h dtl. =.5

✓ 13.1 12.4 I III b 4205 F & G=.3

✓ 3.5 22.0 F II a 4206 G & h=.5

F. m. & c. 8.0 7.5 F. ch. 7.5

~~Dark Plate.~~ ~~Plate 1048~~

~~13.4 9.4 II a? 4207 G & h=.5?~~

July 10.

Book 10. G. Page. Plate 940.

✓ 6 22.5 8.9 I III b. 4208 F 4½ G=.2, F 7 G=.3.

✓ 22.4 11.9 B² I b? 4209 h & H=.3

✓ 22.0 14.2 F II a 4210 G & h=.3, 2 Lines below K.

✓ 21.4 10.7 F II a 4211 G & h=.3, 2 Lines below K.

✓ 19.0 6.0 F² II a? 4212 G & h=.5.

✓ 15.4 16.2 I III b 4213 F & G=.3, Lines between G & H. 2 Lines below K.

✓ 15.0 19.5 F II a 4214 G=.5 h=.2, 2 Lines below K.

✓ 14.8 16.9 F² II a? 4215 G & h=.5.

✓ 14.7 8.2 F II a 4216 G & h=.5.

✓ 14.7 21.2 K III b.c. 4217 F 4½ G=.1, F 5 G=.2 B, F 5½ G=.1, Lines between G & H 2 Lines below K

✓ 10.0 22.4 K III b.c. 4218 F 4½ G=.1, F 5 G=.1 B, F 5½ G=.1, F 7 G=.3 Lines between G & H, 1 Line below K

✓ 7.8 5.8 F II a 4219 G & h=.3

✓ 7.8 6.7 F² II a? 4220 G & h=.5?

✓ 2.7 9.0 K III b.c 4221 F 4½ G=.1, F 5 G=.1 B, F 5½ G=.1, F 7 G=.3, Lines between G & H.

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aK ; h1 ; ℓ2

hd5 ℓd5

448,3

h5 ℓ5

448,3 ; 461.2

403,3

2 aK h3 ℓ3

2 aK h3 ℓ3

h5 ℓ5

2 aK ; Haℓ ; 448,3

2 aK h2 ℓ5

h5 ℓ5

h5 ℓ5

2 aK ; Haℓ ; 456.1 ; 458.2 ; 461.1

1 aK ; Haℓ ; 448,3 ; 456.1 ; 458.1 ; 461.1

h2 ℓ3

h5 ? ℓ5 ?

Haℓ ; 448,3 ; 456.1 ; 458.1 ; 461.1

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Dark Plate. July, 10, 1888.

Plate 1213

F.
Book 13, Page 188 V. H. Type Rem. Description of Lines or Spectra.

✓ 13.4 9.4 F? II a? 4207 G and h = .5?
F. m. & c. 7.9 6.5 F. ch. 6.7

Plate 1258.

✓ 190 15.6 16.7 K III bc 4222 F 3 G = .1 B, F 3½ G = .1, F 4½ G = .2, F 5 G = .2 B,
F 5½ G = .1, F 7 G = .3, Lines bet. G & H.
Several lines below K.

✓ 15.6 17.2 F II a 4222a G + h = .5 (G + h = .5)

✓ 14.4 8.2 F II a 4223 G + h = .5, 3 lines below K.

✓ 13.2 9.4 K III bc 4224 F 3 G = .1 B, F 3½ G = .1, F 4½ G = .2,
F 5 G = .2 B, F 5½ G = .2, F 7 G = .3.
Lines bet. G & H.

✓ 9.4 8.9 F II a 4225 G + h = .3

✓ 192 3.0 15.3 I III b 4226 F 7 G = .3, Lines bet. G & H.

✓ 3.8 19.0 F II a 4227 G + h = .2, 2 lines below K.
F. m. & c. 8.0 6.8 F. ch. 6.8

Plate 1339.

✓ 20.0 6.7 I III b 4228 F 7 G = .3
Several bright & and faint lines.

✓ 19.8 7.2 K? III bc? 4229 Lines below K.

✓ 15.4 20.6 K? III bc? 4230 Several bright & and faint lines
below K.

✓ 14.6 11.8 F II a 4231 G + h = .5, 3 lines below K.

✓ 13.4 13.0 K III bc 4232 F 3 G = .2 B, F 3½ G = .1, F 4½ G = .1,
F 5 G = .2 B, F 5½ G = .1, F 7 G = .3.
F 8 G = .1 B, F 9 G = .1. Lines bet. G & H.

✓ 10.1 9.1 F II a 4233 G + h = .5

✓ 9.5 12.7 F II a 4234 G + h = .5

✓ 3.7 22.6 F II a 4235 G + h = .3

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h 5 ? g 5 ?

Ha g ; 448,3 ; 456,1 ; 458,2 ; 461,2 ; 466,1 ; 468,1

a K
h 5 g 5 (h 5 g 5)
3 a K h 5 g 5
Ha g ; 448,3 ; 456,2 ; 458,2 ; 461,2 ; 466,1 ; 468,1

h 3 g 3
Ha g ; 448,3
2 a K h 2 g 2

448,3 several bright & faint lines

a K
several bright (?) & faint lines below K

3 a K h 5 g 5
Ha g ; 438,1 ; 443,1 ; 448,3 ; 456,1 ; 458,2 ; 461,1 ; 466,1 ; 468,2

h 5 g 5
h 5 g 5
h 3 g 3

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Plate 1339

Book 13 Page 192

	V.	H.	Type.	Wave Length	Remarks. Description of Lines or Spectra.
✓	3.0	18.5	I III b?	4236	F 7 G = .3. Lines bet. G & H.
	F. m. & c.	8.0	6.5		F. ch. 6.5

Plate 1147.

✓	194	10.4	14.4 F II a	4237	G & h = .2, 2 lines below K.
	F. m. & c.	8.0	7.5		F. ch. 7.5

Plate 1259.

✓		22.7	18.2 I III b	4238	F 7 G = .3
✓		17.8	17.4 F½ II a?	4239	G & h = .3
✓		14.4	18.6 F II a	4240	G & h = .5
✓		11.9	14.5 F II a	4241	G & h = .5
✓	196	10.4	15.0 F II a	4242	G & h = .2, G dbl. 5 lines below K.
	F. m. & c.	8.0	7.2		F. ch. 7.2

Plate 1186.

✓		18.9	21.7 F½ II a?	4243	G & h = .5
✓	198	15.9	13.6 F II a	4244	G & h = .2, 1 line below K.
✓		14.4	17.2 F½ II a?	4245	G & h = .5 (G & h = .6)
✓		13.9	5.8 F II a	4246	G & h dbl. = .2, 2 lines below K.
✓		13.6	12.4 F½ II a?	4247	G & h = .5 (G & h dbl.? = .2)
✓		12.4	12.2 F II a	4248	G & h = .5 (G & h = .2)
✓		10.0	15.9 K½ III bc?	4249	F 5-G = .1B, F 5½ G = .1, F 7 G = .3. Lines bet. G & H.
✓		9.8	7.2 I½ III b?	4250	F 7 G = .3
✓		9.8	15.8 G½ II ac?	4251	G & h = .2, Several lines below K. Bright lines ? I Spectrum superposed
✓		5.8	13.1 K½ III bc?	4252	F 4½ G = .2, F 5 G = .2B, F 5½ G = .1, F 7 G = .3, Lines bet. G & H. 2 lines below K.

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1888phae.proj...857F

Hδ ; 448.3

zaK ; h2 ; G2

448.3
h3 δ3
h5⁻ δ5⁻
h5⁻ δ5⁻
5aK δd h2 δ2

h5⁻ δ5⁻
1aK h2 δ2
h5⁻ δ5⁻ (h5 δ5)
2aK hd2 δd2
h5 δ5⁻ (hd'2 ; δd'2)
h5⁻ δ5⁻ (h2 δ2)
Hδ ; 448.3 ; 456.1 ; 458.1

448.3
aK ; h2 , δ2 Bright lines ? Spectrum of A star superposed?

2aK ; Hδ ; 448.3 ; 456.1 ; 458.2 ; 461.2

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Plate 1186

Book 13 F Page 198 V. H. Type. Rem. Description of Lines on Spectra.

✓ 4.3 20.2 F I II a? 4253 G+h dbl. =.5? 2 lines below K.

✓ 200 3.0 21.4 K III bc 4254 F3 G=.1B, F4½ G=.1, F5 G=.1B, F5½ G=.1, F7 G=.3. Lines bet. G+H.

F. m. ⁊c. 8.0 6.3 F. ch. 6.3

Plate 1187.

✓ 22.7 8.9 K? III bc? 4255 Lines bet. G+H.

✓ 22.8 21.2 K III bc 4256 F4½ G=.1, F5 G=.2B, F5½ G=.1, F7 G=.3. Lines bet. G+H.

✓ 16.8 20.1 F? II a? 4257 G+h=.5?

✓ 11.8 13.7 F II a 4258 G+h=.2, 1 line below K.

✓ 9.4 13.2 I III b 4259 F7 G=.3

✓ 202 5.4 9.7 F? II a? 4260 G+h=.5

✓ 4.7 11.3 F II a 4261 G+h=.2

✓ 3.1 8.9 K III bc 4262 F3 G=.1B, F3½ G=.1, F4½ G=.1, F5 G=.2B, F5½ G=.1, F7 G=.3, Lines bet. G+H. 2 lines below K.

F. m. ⁊c. 7.9 5.9 F. ch. 5.9

Plate 1246

✓ 20.2 16.6 K? III bc? 4263 F4½ G=.1, F5 G=.1B, F5½ G=.1, F7 G=.3

✓ 13.6 8.5 F II a 4264 G=.5, h=.2,

✓ 7.8 11.8 K III bc 4265 F3 G=.1B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3, F8 G=.1B, F9 G=.1, Lines bet. G+H. 1 line below K.

✓ ~~4.6~~ 4.6 15.4 F II a 4266 G+h dbl. =.5, 2 lines below K.

F. m. ⁊c. 8.0 7.1 F. ch. 7.1

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2aK; hd5? gd5?
Ha g; 448.3; 456.1; 458.1; 461.1; 468.1

Ha g
Ha g; 448.3; 456.1; 458.2; 461.1

h5? g5?
1aK; h2; g2
448.3
h5 g5
h2 g2
2aK; Ha g; 448.3; 456.1; 458.2; 461.1; 466.1; 468.1

448.3; 456.1; 458.1; 461.1

h2 g5
1aK; Ha g; 438.1; 443.1; 448.3; 456.1; 458.2; 461.2; 466.1; 468.1

2aK; hd5 gd5

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Plate 1223

Book 13F. Page 204 V. H. Tyler. Rem. Description of Lines on Spectra.

F. m. & c. 8.0 6.7 F. ch. 6.7

Plate 1247

✓ 204 18.8 15.9 F II a 4267 G=.5, h=.2

✓ 16.4 20.5 F II a 4268 G+h=.3, 1 line below K.

✓ 13.6 17.0 K III bc 4269 F3 G=.2 B, F 3½ G=.1, F4½ G=.1, F5 G=.3 B, F 5½ G=.1, F7 G=.3, F8 G=.1 B, F9 G=.1, Lines Ist. G & H. 1 line below K.

✓ 11.1 20.2 F½ II a? 4270 G+h=.5

✓ 206 5.4 10.1 F½ II a? 4271 G+h=.5

✓ 5.2 14.9 I III b 4272 F7 G=.3

F. m. & c. 8.0 7.2 F. ch. 7.2

Plate 1261.

✓ 208 11.8 11.5 F½ II a? 4273 G+h=.5? 1 line below K.

✓ 3.5 17.2 F II a 4274 G+h=.3, 2 lines below K.

F. m. & c. 8.0 6.8 F. ch. 6.8

Plate 1352.

✓ 210 14.0 23.4 F½ II a? 4275 G+h dbl. =.5. 1 line below K.

✓ 12.0 10.3 F II a 4276 G+h=.5

✓ 8.6 16.0 F½ II a? 4277 G+h=.2, 2 lines below K.

F. m. & c. 8.0 6.7 F. ch. 6.7

Plate 1262.

✓ 21.5 12.9 B I b 4278 F6 G=.1, h & H=.1

✓ 212 17.6 20.0 K½ III bc? 4279 F3 G=.1 B, F4½ G=.1, F5 G=.2 B, F5½ G=.1, F7 G=.3, Lines Ist. G & H. 2 line below K.

✓ 14.4 23.2 F½ II a? 4280 G+h=.2

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h 2 g 5

1 a K ; h 3 g 3

1 a K ; Ha g ; 438.1 ; 443.1 ; 448.3 ; 456.1 ; 458.3 ; 461.1 ; 466.1 ; 468.2

h 5 g 5

h 5 g 5

448.3

1 aK ; h 5 ? g 5 ?

2 ak ; h 3 g 3

1 ak ; hd 5 ; gd 5

h 5 g 5

2 ak h 2 g 2

402.1 ; 453.1

2 a K ; Ha g ; 448,3 ; 456.1 ; 458.2 ; 461.1 ; ~~468.1~~

h 2 g 2

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July 11, 1888.

Plate 1262

Book 18 F. Page 212 V.

		H.	Types.	No. Rem.	Description of Lines on Spectra.
✓		9.8	16.1 F½ II a?	4281	G+h=.5? 5 lines below K.
✓		7.0	14.7 F½ II a?	4282	G+h=.5
✓	214	8.3	24.6 I½ III b?	4283	F7G=.3, Lines bet. G+H.
✓		4.2	24.4 F II a	4284	G+h=.3

F. nw. +c. 8.0 6.6 F. ch. 6.6

Plate 1224.

F. nw. +c. 8.0 6.6 F. ch. 6.4

Book 19 F. Page 4.

Book 19 F. Page 4

Plate 1341.

✓		22.9	11.0 F II a	4285	G+h=.3, G&H. 8 lines below K.
✓		20.6	10.4 I½ III b?	4286	F4½G=.2, F7G=.3
✓		18.2	14.6 K III bc	4287	F3G=.1B, F4½G=.1, F5G=.2B, F7G=.3
✓		12.6	13.4 I III b	4288	F7G=.3
✓		7.9	9.1 F II a	4289	G=.5, h=.2
✓	6	8.25	13.1 I III b	4290	F4½G=.1, F5½G=.1, F7G=.3, Lines bet. G+H.

F. nw. +c. 8.0 7.0 F. ch. 7.0

Plate 1342.

✓	8	21.0	17.7 B½ ~~K~~ I b?	4291	h & H =.2
✓		18.6	16.8 I III b	4292	F7G=.3
✓		9.8	12.5 F II a	4293	G=.5, h=.2, 2 lines below K.
✓	10	5.5	16.8 I III b	4294	F7G=.3

F. nw. +c. 8.0 6.8 F. ch. 6.8

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5aK; h5 ? ζ5
h5 ζ5
Haζ; 448.3
h3 ζ3

3aK; ζd; h3 ζ3
448.3; 461.2
448.3; 458.2; 461.1; 468.1

448.3
h2 ζ2
Haζ; 448.3; 458.1; 461.1

402.2
448.3
2aK h2 ζ2
448.3

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July 11, 1888.

Plate 1249 — Very dark plate. Hard to measure.

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V.	H.	Type.	Wave.	Description of Lewis on Spectra.
13.0	21.7	F II a	4295	G + h dtl. = .3. 2 lines below K.
10.5	20.3	I III b	4296	F 4½ G = .2, F 7 G = .3, Lewis lct. G + h.

F. m. + c. 8.0 5.8 F. cl. 5.8

Plate 1250.

19.1	20.8	F II a	4297	G = .5, h = .2, 2 lines below K.
12.6	22.2	I? III b?	4298	F 4½ G = .2, F 7 G = .3, Lewis lct. G + h.
11.4	15.1	K III bc	4299	F 4½ G = .1, F 5 G = .2B, F 7 G = .3 Lewis lct. G + h.
11.0	17.3	F II a	4300	G + h = .3, 1 line below K.
8.2	13.4	F? II a?	4300a	G + h = .5
5.0	10.8	F? II a?	4301	G + h dtl. = .5

F. m. + c. 8.0 7.0 F. cl. 7.0

July 12, 1888.

Plate 1329

16	22.9	19.8	F? II a?	4302	G + h dtl. = .5. 2 lines below K.
	20.4	7.9	F? II a?	4303	G + h = .5?
	13.5	11.6	F II a	4304	G + h = .5?
	13.7	13.1	I III b	4305	F 4½ G = .2, F 7 G = .3
	13.0	16.4	K III bc	4306	F 3 G = .1B, F 3½ G = .1, F 4½ G = .1, F 5 G = .1B, F 5½ G = .1, F 7 G = .3 Lewis lct. G + h.
	12.4	22.0	I III b	4307	F 7 G = .3
	11.5	8.3	F II a	4308	G + h = .2, several lines below K.
	11.8	13.2	K III bc	4309	F 3 G = .2B, F 3½ G = .1, F 4½ G = .2, F 5 G = .3B, F 5½ G = .1, F 7 G = .3, F 8 G = .1B, F 9 G = .1, F 9½ G = .1, Lewis lct. G + h. Several lines below K.
18	7.6	12.5	F? II a?	4310	G + h = .5 (G + h = .5)

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2 a K ; h d 3 ; g d 3
H a g ; 448.3 ; 461.2

2 a K ; h 2 ; g 5
H a g ; 448.3 ; 461.2
H a g ; 448.3 ; 458.2 ; 461.1

1 a K ; h 3 ; g 3
h d 5 ; g d 5

2 a K ; h d 3 ; g d 3
h 5 ? g 5 ?
h 5 ? g 5 ? (h 5 ? g 5 ?)
448.3 ; 461.2
H a g ; 448.3 ; 456.1 ; 458.1 ; 461.1 ; 466.1 ; 468.1

448.3
a K ; h 2 ; g 2
a K ; H a g ; 436.1 ; 438.1 ; 443.1 ; 448.3 ; 456.1 ; 458.3 ; 461.2 ; 466.1 ; 468.2

h 5 g 5 (h 5 g 5)

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Plate 1329

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V.	H.	Type	No. Rem.	Description of Lines on Spectra.
6.9	19.4	F² II a?	4311	G + h = .3
2.4	22.5	F² II a?	4312	G + h = .5

F. m. + c. 8.0 6.8 F. ch. 6.8

Plate 1481.

11.5	9.9	I² III b?	4313	F 7 G = .3, Lines bet. G + H. Lines below K.
11.8	14.8	K III bc	4314	F 8 G = .1 B, F 4½ G = .1, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3, F 8 G = .1 B, F 9 G = .1, Lines bet. G + H. 1 line below K.

F. m. + c. 8.0 6.5 F. ch. 6.6

Plate 1330.

20	16.8	7.9	K III bc	4315	F 3 G = .1 B, F 4½ G = .1, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3, Lines bet. G + H. 2 lines below K.
	15.3	16.7	F² II a?	4316	G + h = .2, 2 lines below K.
	14.6	8.8	F II a	4316a	(G + h = .5?)

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Plate 1330.

11.8	13.4	G² II bc?	4317	F 1 G = .2 B? F 7 G = .3, G 2 H = .1 B? G 3 H = .3
22	2.3	16.3	B I b	4318	F 6 G = .2, h 6 H = .2

F. m. + c. 8.0 7.0 F. ch. 7.0

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17.1	13.2	F² II a?	4319	G + h = .5 (G + h = .5)
15.0	21.8	F II a	4319a	G + h = .5
11.8	12.6	F¼ II a?	4319b	G + h = .5 (G + h = .5)

F. m. + c. 8.0 7.5 ~~4320~~ F. ch. 7.6

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h3 g3
h5 g5

aK; HaG; 448,3

1aK; HaG; 438,1; 443,1; 448,3; 456,1; 458,2; 461,1; 468,1

2aK; HaG; 448,3; 456,1; 458,2; 461,1; 468,1

2aK; h2; G2
h5? G5?

? 419,3; 424,1? 442,3; 480,2?

402,2; 453,2

h5; G5 (h5; G5)

h5; G5
h5; G5 (h5; G5)

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Plate 1355

Book 19 Page 24

	V.	H.	Type	Num.	Description of Lines on Spectra.
✓	21.4	22.0	K III hc?	4320	F 4½ G=.1, F 5 G=.2 B, F 5½ G=.1, F 7 G=.3, Series ht. G+H. 1 line below K.
✓	14.1	7.7	F II a	4321	G+h=.5
✓	1.8	16.5	?	4322	Bright and faint lines seen.

F. on. ♯c. 7.9. 7.0 F. ch. 7.0

Plate 1356.

✓	21.6	16.2	G II ac	4323	G=.5, h=.2, several bright and faint lines.
✓	26 7.1	15.2	K III hc	4324	F 4½ G=.2, F 5 G=.2 B, F 6½ G=.1, F 7 G=.3, Series ht. G+H. 2 lines below K.

F. on. ♯c. 8.0 6.8 F. ch. 6.8

Plate 1331.

✓	28 8.4	11.3	B I b	4325	F 6 G=.2, h & K=.2, K 6 α=.2, β & γ=.4

F. on. ♯c. 8.0 7.5 F. ch. 7.5

Plate 1332.

✓	30 21.0	12.2	K III hc	4326	F 3 G=.2 B, F 3½ G=.1 F 4 & 4½ G=.2, F 5 G=.2 B, F 5½ G=.1, F 7 G=.3, F 8 G=.1 B, F 9 G=.1, Series ht. G+H.
✓	16.3	24.5	G? II bc?	4327	Bright and faint lines seen.
✓	14.7	9.7	F II a	4328	G+h=.2
✓	13.2	14.3	I? III h?	4329	F 7 G=.3

F. on. ♯c. 8.0 7.1 F. ch. 7.1

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1 a K; H a δ; 448,3; 456,1; 458.2; 461,1

h 5 δ 5

Bright + faint lines seen.

h 2 δ 5; several bright + faint lines seen.

2 a K; H a δ; 448,3; 456,1; 458.2; 461,2

382,4; 392,2; 402,2; 453,2

H a δ; 438,1; 443,1; 448,3; 456,1; 458.2; 461.2; 466,1; 468.2

Bright + faint lines seen.

h 2 δ 2

448.3

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Plate 1393

Book 19 F. Page 30	V.	H.	Types.	No.	Remarks. Description of Lines on Spectra.
✓	21.2	10.9	K III bc	4330	F 2½ G=.1, F 3 G=.3 B, F 3½ G=.1, F 4½ G=.2, F 5 G=.2 B, F 5½ G=.1, F 7 G=.3 Lines Int. G & H. 1 line below K.
✓	16.6	23.4	K III bc	4331	F 4½ G=.1, F 5 G=.2 B, F 5½ G=.1, F 7 G=.3, Lines Int. G & H. 1 line below K.
✓	10.1	6.7	K III bc	4332	F 3 G=.1 B, F 4½ G=.1, F 5 G=.2 B, F 6½ G=.1, F 7 G=.3. Lines Int. G & H. 2 lines below K.
✓ 32	6.1	14.3	F II a	4333	G & h=.5, G & H. 2 lines below K, F. m. & c. 8.0 7.0 F. ch. 7.0

Plate 1344.

✓	15.8	22.1	G II ac	4334	Several bright and faint lines.
✓ 34	12.9	9.0	F II a	4335	G & h=.5, 1 line below K.
✓	12.8	14.1	K III bc	4336	F 3 G=.1 B, F 3½ G=.1, F 4½ G=.2, F 5 G=.1 B, F 5½ G=.1, F 7 G=.3, Lines Int. G & H.
✓	11.7	12.6	F II a	4337	G & h=.5
✓	9.4	7.1	K? III bc?	4338	F 4½ G=.1, F 5 G=.2 B, F 5½ G=.1, F 7 G=.3, Lines Int. G & H. 2 lines below K.
✓	6.3	13.1	F II a	4339	G & h=.3
✓	4.8	16.1	B I b	4340	F 6 G=.2, h 6 H=.2 F. m. & c. 8.0 7.0 F. ch. 7.0

Plate 1345.

✓ 36	18.6	19.2	B I b	4341	F 6 G=.2, h 6 H=.2, H 6 α=.1
✓	16.2	6.7	F? II a?	4342	G & h=.5

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1 aK ; Ha ℓ ; 448.3 ; 456.1 ; 458.2 ; 461.2 ; 466.1 ; 468.3 ; 471.1

1 aK ; Ha ℓ ; 448.3 ; 456 1 ; 458.2 ; 461.1

2 aK ; Ha ℓ ; 448.3 ; 456.1 ; 458.2 ; 461.1 ; 468.1

2 aK ; ℓd ; h5 ℓ5

several bright & faint lines

1 aK ; h5 ℓ5

Ha ℓ ; 448.3 ; 456.1 ; 458.1 ; 461.2 ; 466.1 ; 468.1

h5 ℓ5

2 aK Ha ℓ ; 448.3 ; 456.1 ; 458.2 ; 461.1

h3 ; ℓ3

402.2 ; 453.2

392.1 ; 402.2 ; 453.2

h5 ℓ5

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Plate 1345

Book 19 F. Pages 36	V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
✓	15.4	12.1	E II a	4343	G + h = .5
✓ 38	11.4	19.8	K III bc	4344	F 3 G = .2 B, F 4½ G = .1, F 5 G = .2 B, F 5½ G = .1, F 6½ G = .1, F 7 G = .3, F 8 G = .2 B, F 9 G = .1, Lines bet. G + H.
✓	5.0	17.0	F II a	4345	G + h = .3
	F. m. + c.	8.0	6.9		F ch. 6.9

Plate 1358.

✓	19.5 ~~14.5~~	14.5 ~~19.2~~	G II a c? ~~II a~~	4346	Several bright and faint lines. G = .5, h = .2,
✓ 40	16.4	9.6	K? III bc?	4347	F 3 G = .1 B, F 4½ G = .1, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3 Lines bet. G + H.
✓	16.2	20.9	F II a	4348	G + h = .3
	14.5	9.2	F II a	4349	G + h = .5, 2 lines below K. Poc.
✓	14.8	12.6	F? II a?	4350	G + h = .5
✓	13.2	7.3	B I b	4351	h & H = .2,
	9.0	7.3	F II a?	4352	G + h = .3
42	2.9	10.6	F II a	4353	G + h = .2
✓	2.7	21.7	I III b	4354	F 7 G = .3
	F. m. + c.	8.0	7.0		F ch. 7.0

Plate 1394.

✓ 44	19.6	15.3	K? III bc?	4355	F 3 G = .1 B, F 4½ G = .1, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3, Lines bet. G + H. 2 lines below K.
✓	16.6	10.4	K III bc	4356	F 3 G = .1 B, F 3½ G = .1, F 4½ G = .1, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3. Lines bet. G + H. 1 line below K.
✓	16.4	13.6	I III b	4357	F 7 G = .3

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h 5 K 5

Ha K; 438.1; 443.2; 448.3; 451.1; 456.1; 458.2; 461.1; 468.2

h 3 K 3

Several bright + faint lines h ν K 5

Ha K; 448.3; 456.1; 458.2; 461.1; 468.1

h 3 K 3

2 a K h 5 K 5 Rec. Spectrum of H star superposed?

h 5 K 5

402.2

h 3 K 3

h 2 K 2

448.3

2 a K; Ha K; 448.3; 456.1; 458.2; 461.1; 468.1

2 a K; Ha K; 448.3; 456.1; 458.2; 461.1; 466.1; 468.1

448.3

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Plate 1894

Book 19 F. Page 44	V.	H.	Type.	Rem.	Description of Lines on Spectra.
	16.3	21.8	F2 II a?	4358	G+h=.5
	14.6	10.1	F2 II a?	4359	~~G+h=.5~~, 2 lines below K.
	13.8	6.4	F II a	4360	G+h=.3
46	9.1	8.2	F2 II a?	4361	G+h=.5
	3.0	11.5	F II a	4362	G+h=.3
	F. m. & c.	7.9	6.8		F. ch. 6.8

Plate 1859.

	20.6	10.2	K III bc	4363	F2½ G=.1, F3 G=.1B, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3, Lines bet. G+H.
48	18.1	16.1	F2 II a?	4364	G+h=.5 (G+h=.5?)
	18.2	22.3	F II a	4365	G+h=.5
	15.1	11.5	I III b	4366	F7 G=.3

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Plate 1859.

50	13.1	19.2	F II a	4367	G+h=.5 (G+h=.5, 2 lines below K.)
	12.2	10.6	K III bc	4368	F2½ G=.1, F3 G=.2B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1, F6½ G=.1, F7 G=.3, F8 G=.1B, F9 G=.1, F9½ G=.1, Lines bet. G+H. 2 lines below K.
52	10.5	18.5	K2 III bc?	4369	F3 G=.2B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3, F8 G=.2B, F9 G=.1, Lines bet. G+H. Lines below K.
	8.0	18.6	F2 II a?	4370	G+h=.5 ~~(G+h=.5)~~
	6.2	23.4	F2 II a?	4371	G+h=.5
	F. m. & c.	7.8	6.7		F. ch. 7.1

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h5 g5

2ak ; h5 g5

h3 g3

h5 g5

h3 g3

Ha4 ; 448.3 ; 456.1 ; 458.2 ; 461.2 ; 468.1 ; 471.1

h5 g5 (h5? G5?)

h5 g5

448.3

h5 g5 (2ak ; h5 ; G5)

2ak ; Ha4 ; 436.1 ; 438.1 ; 443.1 ; 448.3 ; 451.1 ; 456.1 ; 458.2 ; 461.2 ;
466.1 ; 468.2 ; 471.1

ak ; Ha4 ; 438.1 ; 443.2 ; 448.3 ; 456.1 ; 458.2 ; 461.2 ; 466.1 ; 468.2

h5 g5 (h5 ; G5 ;

h5 g5

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Plate 1346

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No.	V.	H.	Type.	Rem.	Description of Lines on Spectra.
	21.5	6.6	K² III hc?	4872	F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3
	19.4	8.0	F² II a?	4873	G+h=.5
58	13.0	19.3	F² II a?	4874	G+h=.2, 2 lines below K.
	12.8	11.5	F² II a?	4874a	G+h=.5
	12.4	13.0	F² II a?	4875	G+h=.3?
	12.0	15.5	F² II a?	4875a	G+h=.5?
	11.9	17.7	K III hc	4876	F3 G=.1B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3, Lines bet. G & H.
	11.0	15.1	F² II a?	4875b	G+h=.5
	9.6	23.1	G² II b?	4877	F7 G=.2, K dbl.? 2 lines below K.
	11.8	21.3	F² II a?	4876a	G+h=.5
60	6.9	18.1	K III hc	4878	F3 G=.1B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3, F8 G=.1B, F9 G=.1, Lines bet. G & H. 3 lines below K.
	5.0	17.7	F² II a?	4879	G+h=.5? 6 lines below K.
	4.2	14.1	F² II a?	4880	G+h=.3, G dbl. 1 line below K.
	3.9	18.6	B I b	4881	F6 G=.2, h & H=.2, β+γ=.4
	F. m. & c.	8.0	6.8		F. ch. 6.8

Plate 1347

No.	V.	H.	Type.	Rem.	Description of Lines on Spectra.
	22.3	12.0	I III b	4382	F7 G=.3
	20.6	6.7	F² II a?	4882a	G+h=.5?
64	18.5	13.6	I III b?	4883	F7 G=.3, 2 lines below K.
	18.3	23.5	F² II a?	4884	G+h=.5
	17.3	6.1	F² II a?	4884a	G+h=.5
	16.8	15.3	F II a	4885	G+h=.3, 2 lines below K ~~(G+h=.3?)~~
66	15.0	9.8	F II a	4886	G+h=.5 (G+h=.5, 1 line below K.)
	15.0	10.7	F II a	4887	G+h=.2 (G ~~+5~~, h=.2, 1 line below K.)
	15.4	19.3	F² II a?	4888	G+h=.5
	14.8	8.1	F² II a?	4889	G+h=.5 (G+h=.5)
	14.9	12.6	F² II a?	4890	G+h=.3 (G+h=.2)
	14.5	16.2	I III b	4891	F7 G=.3
	14.6	17.3	H² III?	4891a	2 lines at or K
	13.2	8.8	K III hc	4892	F5 G=.1B, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3, Lines bet. G & H, Lines below K.

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448,3 ; 456,1 ; 458,2 ; 461,2

h5 g5

2 aK ; h2 g2

h5 ; g5

h3 ? g3 ?

h5 ? ; g5 ?

Ha 2 ; 448,3 ; 456,1 ; 458,2 ; 461,2 ; 466,1 ; 468,1

h5 ; g5

2 aK ; Kd ? 448,2

h5 ; g5

3 aK ; Ha2 ; 438,1 ; 443,1 ; 448,3 ; 456,1 ; 458,2 ; 461,2 ; 466,1 ; 468,1

6 aK ; h5 ? g5 ?

1 aK ; h3 ; gd3

382,4 ; 402,2 ; 453,2

448,3

h5 ? ; g5 ?

2 aK ; 448,3

h5 g5

h5 ; g5

2 aK ; h3 g3

h5 g5 (1 aK ; h5 , g5)

h2 g2 (1 aK ; h5 , g5)

h5 g5

h5 g5 (h5 ; g5)

h3 g3 (h2 ; g2)

448,3

2 aK

1 aK ; Ha2 ; 448,3 ; 456,1 ; 458,2 ; 461,2 ; 468,1

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Plate 1347

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	No.	V.	H.	Type.	Rem.	Description of Lines on Spectra.
✓		13.6	17.1	F² II a?	4393	G+h=.2, 1 line below K.
✓	68	13.0	21.7	F² II a?	4394	G+h=.5 (G+h=.5)
✓		12.6	8.2	F² II a?	4395	G+h=.5 (G+h=.5)
✓		12.5	12.8	I III b	4396	F7G=.3
✓		12.9	13.9	F II a*	4397	G+h=.3 (G+h=.3)
✓		12.0	18.8	I III b	4398	F7G=.3
✓		11.7	16.2	F² II a?	4398a	G+h=.5
✓		10.8	10.8	F II a	4399	G+h=.5 (G+h=.5)
✓		10.8	18.2	K III bc	4400	F2½G=.1, F3G=.2B, F3½G=.2, F4½G=.2, F5G=.3B, F5½G=.2, F6½G=.2, F7G=.3 ~~2B~~, F8G=.2B, F9G=.1, Series tot. G+H.
✓	70	8.5	5.8	F² II a?	4401	G+h=.5 (G+h=.5)
✓	72	6.5	14.0	F² II a?	4402	G+h=.5
✓		5.3	19.1	I III b	4403	F7G=.3
✓	74	5.1	20.7	F II a	4404	G+h=.3
✓		4.5	8.0	F² II a?	4404a	G+h=.5?
✓		3.9	18.7	I III b	4405	F7G=.3
✓		2.6	16.8	K III bc	4406	F2½G=.1, F3G=.2B, F3½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F6½G=.1, F7G=.3 F8G=.2B, F9G=.1, Series tot. G+H. 3 lines below K.

F. m. & c. 6.5 6.3 Fch. 7.3

Plate 1367.

	No.	V.	H.	Type.	Rem.	Description of Lines on Spectra.
✓	76	22.5	9.2	F² II a?	4407	G+h=.5
✓		21.5	6.7	I III b	4408	F7G=.3
✓		19.8	17.7	I III b	4409	F7G=.2
✓		18.5	12.0	F² II a?	4409a	G+h=.5
✓		17.0	17.9	F II a	4410	G+h=.5, 2 lines below K.
✓		18.0	18.4	F² II a?	4409t	G+h=.5
✓	78	16.5	20.4	F² II a?	4411	G+h=.3
~~✓~~		~~15.1~~	~~11.8~~	~~II a~~	~~4412~~	~~G+h=.5~~
✓		14.0	6.7	F II a	4413	G+h=.3, G dbl. 3 lines below K.

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1999phae.proj..857F

1 a K : h2 g2
h5 g5 (h5 g5)
h5 g5

448,3
h3 g3 (h3 g3)
448,3
h5 g5 (h5 g5)
Ha2; 438,1; 443,2; 448,3; 451,2; 456,2; 458,3; 461,2; 466,2; 468,2; 471,1

h5 g5 (h5 g5)
h5 g5

448,3
h3 g3
h5? g5?
448,3
ak; Ha2; 438,1; 443,2; 448,3; 451,1; 456,1; 458,2; 461,2; 466,1; 468,2; 471,1

h5 g5

448,3

448,2
h5 g5.
ak: h5 g5
h5, g5.
h3 g3

h5 g5

3 ak: h3 gd3

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Plate 1867

Book 19 F Page 78

No.	V.	H.	Type.	Rem.	Description of Lines on Spectra.
	14.2	16.7	F² II a?	4414	G+h=.5 (G+h=.5)
80	13.4	12.4	B I b	4415	F6 G=.2, h & H=.2
	13.6	23.6	F II a	4416	G+h=.2, 2 lines below K.
	12.1	17.8	F² II a?	4417	G+h=.5?
	11.5	6.2	F² II a?	4418	G+h=.2, 3 lines below K.
	11.0	6.8	F II a	4419	G+h=.5 F5½ G=.1
	11.8	16.9	K III bc	4420	F3 G=.1B, F4½ G=.2, F5 G=.2B. F5½ G=.1, F7 G=.3. Lines bet. G+H. 2 lines below K.
82	9.8	16.0	F² II a?	4421	G+h=.5, 2 lines below K.
	8.3	5.4	F² II a?	4422	G+h=.5, 3 lines below K.
	8.0	7.3	F² II a?	4422 a b	G+h=.5
84	5.0	7.8	F² II a?	4423	G+h=.5? 2 lines below K.
	3.1	17.8	K III bc	4424	F2½ G=.1, F3 G=.1B, F4½ G=.2, F5 G=.2B, F5½ G=.1, F7 G=.3, Lines bet. G+H.

F. m. & c. 7.0 6.5 F. ch. 7.3

Plate 1883

	13.8	5.8	I III b	4425	F7 G=.3
86	11.8	23.4	K III bc	4426	F3 G=.2B, F8½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.1, F6½ G=.1, F7 G=.3. Lines bet. G+H.
	10.8	12.0	I III b	4427	F7 G=.3

F. m. & c. 8.0 6.7 F. ch. 6.7

Plate 1925.

	15.3	9.2	I III b	4428	F7 G=.3
	4.4	15.6	F² II a?	4429	G+h=.3

F. m. & c. 8.0 7.0 F. ch. 7.0

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h5 g5 (h5 g5)

402.2 ; 453.2

ak ; h2 g2

h5 ? g5 ?

3 ak ; h2 g2

h5 g5

ak; Hag; 448.3; 456.1; 458.2; 461.2; 466.1; 468.1

2 ak h5 g5

3 ak h5 g5

2 ak h5? g5?

Hag; 448.3; 456.1; 458.2; 461.2; 468.1; 471.1

448.3

Hag; 448.3; 451.1; 456.1; 458.2; 461.2; 466.1; 468.2

448.3,

448.3

h3 g3

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July 16, 1888.

Plate 1445

Book 19F Page 88. V. 16. Type. Rem. Description of Lines on Spectra.

F. rw. & c. 7.8 5.8 F. ch. 6.1

Plate 1500.

13.8 17.9 F² IIa? 4430 G+h=.5?

8.6 12.7 I III b 4431 F+G=.3

F. rw. & c. 8.0 6.9 F. ch. 6.9

July 17, 1888.

Plate 1550

90 15.6 8.7 I² III b? 4432 F+G=.3

4.8 15.2 F IIa 4433 G+h=.5. G&h. 2 lines below K.

4.6 20.3 B Ib 4434 h & H=.2

F. rw. & c. 8.0 6.7 F. ch. 6.7

Plate 1551

19.8 18.0 F² IIa? 4435 G+h=.5?

18.9 12.9 F² IIa? 4436 G+h=.5, 7 lines below K.

92 12.5 18.3 F² IIa? 4437 G+h=.5

11.8 11.4 B Ib 4438 h & H=.2

7.0 13.6 F IIa 4439 G+h=.5

F. rw. & c. 8.0 6.4 F. ch. 6.4

Plate 1542.

94 19.4 8.0 I III b? 4440 F+G=.8. Lines bt. G & H.

12.7 16.1 F IIa 4441 G+h=.5

10.4 17.8 F² IIa? 4442 G+h=.5

6.5 7.8 B Ib? 4443 h & H=.2?

8.3 17.7 F² IIa? 4444 G+h=.5

2.9 10.2 F IIa 4445 G+h=.5

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h 5 ? g 5 ?
448.3

448.3
2 ak ; h 5 ; gd 5
402.2

h 5 ? g 5 ?
7 ak ; h 5 g 5
h 5 g 5
402.2
h 5 g 5

Hag ; 448.3
h 5 : g 5
h 5 g 5
402.2 ?
h 5 g 5
h 5 g 5

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July 17, 1888.

Plate 1542

Book 19 F Page 94

	V.	H.	Type.	Rev. No.	Description of Lines or Spectra.
✓	3.0	11.5	F2 II a?	4446	G+h=.5

F. m. & c. 8.0 7.2 F. ch. 7.2

Plate 1568

✓	18.0	20.4	F2 II a?	4447	G+h=.5?
✓	14.8	16.4	B I b?	4448	F6G=.2, h6H=.2.
✓	14.3	18.6	I III b	4449	F7G=.3
✓	9.1	11.2	K III c	4450	F8G=.1B, F8½G=.1, F4½G=.2, F5G=.2B, F5½G=.1, F6G=.2, F7G=.3, F8G=.1B, F9G=.1, F9½G=.1, Lines bt. G+H.

F. m. & c. 8.0 7.1 F. ch. 7.1

Plate 1622.

✓	98	16.0	7.2	B I b	4451	F6G=.2, h6H=.2
✓		10.1	21.7	B I b	4452	h6H=.2
✓		9.5	18.6	F2 II a?	4453	G+h=.5
✓		8.6	21.5	G II b?	4454	Several bright and faint lines.

F. m. & c. 8.0 6.7 F. ch. 6.7

Plate 1601

✓		21.8	9.0	B I b	4455	F6G=.2, h6H=.2
✓	100	20.1	12.1	F2 II a?	4456	G+h=.3
✓		15.6	15.9	F2 II a?	4457	G+h=.5
✓		15.7	17.1	F2 II a?	4458	G+h=.5? Gdbl. 2 lines below K.
✓		9.0	22.5	I III b	4459	F7G=.3. Lines bt. G+H.

F. m. & c. 8.0 6.7 F. ch. 6.7

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h 5 g 5

h 5 ? g 5 ?
402.2 ; 453.2
448.3
Ha g ; 438.1 ; 438.1 ; 443.1 ; 448.3 ; 453.2 ; 456.1 ; 458.2 ; 461.2 ; 466.1 ;
468.1

402.2 ; 453.2
402.2
h 5 g 5
Several bright + faint stars Spectrum of two stars superposed?

402.2 ; 453.2
h 3 g 3
h 5 g 5
2 ak . h 5 ? g d 5 ?
Ha g ; 448.3

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1888phae.proj..857F

July 17, 1888.

Plate 1569

Book 19 Fr Page 102	V.	H.	Types	No. Rem.	Description of Lines on Spectra.
✓	17.4	11.8	B? I b?	4460	h 6 H = .2
✓ 104	9.0	11.1	I III b	4461	F 7 G = .3
	F. m. & c.	8.0	6.9		F. ch. 6.9

Dark plate. Very hard to measure. Plate 1421

✓ 106	19.5	9.2	F? II a?	4462	G & h = .3, 2 lines below K.
✓	18.1	19.7	F? II a?	4463	G & h = .5?
✓	16.3	12.1	F? II a?	4464	G & h = .5
✓ 108	11.2	13.7	F II a	4465	G & h = .5
✓	10.7	6.2	F. II a	4465a	h 2 G = .3
✓	10.5	19.1	F? II a?	4466	G & h = .5?
✓ 110	9.6	15.1	F? II a?	4467	G & h = .5
✓	8.4	19.0	B? I b?	4468	h 6 H = .2
✓	2.9	22.5	F? II a?	4469	G & h = .5
	F. m. & c.	5.5	5.3		F ch. 7.4

Plate 1501

112	F. m. & c.	7.0	6.6		F. ch. 7.4

Plate 1548

✓	19.6	12.2	F? II a?	4470	G & h = .5. 2 lines below K.
✓	16.6	10.4	F? II a?	4471	G & h = .5. F obb.?
✓	15.0	12.9	F? II a?	4472	G & h = .5
✓ 114	15.0	14.7	F? II a?	4473	G & h = .5
✓	10.6	7.1	F II a	4474	G & h = .5
✓	10.4	9.7	F II a	4475	G & h = .5
✓	10.3	21.9	F? II a?	4476	G & h = .5?
✓	9.4	18.1	F II a	4477	G & h = .5, 2 lines below K.
✓ 116	8.1	15.7	B I b	4478	F 6 G = .2, h 6 H = .2
✓	3.3	21.6	F? II a?	4479	G & h = .5? 2 lines below K.
	F. m. & c.	6.3	6.0		F. ch. 7.0

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402, 2

448, 3

3 ak ; h3 l3
h5? l5?
h5 l5
h5 l5
h3. 6.3.
h5? l5?
h5 l5
402, 2
h5 l5

2 ak ; h5 l5
id? h5 l5
h5 l5
h5 l5
h5 l5
h5 l5
h5? l5?
2 ak ; h5 l5
402, 2 ; ~~402~~ 453, 2
2 ak ; h5? l5?

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Plate 1502

Book 19 F Page 118	V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
	16.4	11.3	I IIIb	4480	F7G=.3
	15.1	17.6	F IIa	4481	G+h=.2?
	14.6	9.8	F? IIa?	4482	G+h=.5
	11.4	6.1	F? IIa?	4483	G+h=.2
	9.3	19.0	I IIIb?	4484	F7G=.3
120	5.1	9.2	F IIa	4485	G+h=.3
	5.5	11.5	F? IIa?	4486	G+h=.5, 5 lines below K.
	5.2	15.6	F IIa	4487	G+h=.5
	F. m. & c.	8.0	7.0		F. cl. 7.0

Plate 1552

20.7	17.1	I IIIb?	4488	F7G=.3. Lines bet. G+H.
19.7	17.5	E? II?	4489	2 lines below K.
19.7	21.2	F? IIa?	4490	G+h=.5. 2 lines below K.
18.8	14.2	K? IIIbc?	4491	F3G=.1B, F4½G=.2, F5-G=.1B, F5½G=.2, F7G=.3, Lines bet. G+H.
16.9	8.8	K IIIbc	4492	F3G=.1B, F4½G=.2, F5-G=.1B, F5½G=.1, F7G=.3
16.8	19.3	F? IIa?	4493	G+h=.5
122 15.6	17.3	I IIIb	4494	F7G=.3
10.8	12.4	B Ib	4495	F6G=.2, h6H=.2
8.6	14.2	F IIa	4496	G+h=.3
7.0	20.2	B Ib	4497	F6G=.2, h6H=.2
5.9	10.1	K IIIbc	4498	F3G=.2B, F3½G=.1, F4½G=.2, F5-G=.2B, F5½G=.1, F7G=.3, Lines bet. G+H.
3.4	10.0	F IIa	4499	G+h=.5?
F. m. & c.	8.0	6.7		F. cl. 6.7

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448.3
h2; H2?
h5 H5
h2 H2

448.3
h3; H3
5 ak; h5 H5
h5 H5

Ha H; 448.3
2 ak
2 ak; h5 H5.
Ha H; 448.3; 456.2; 458.1; 461.2; 466.1

448.3; 456.1; 458.1; 461.2; 466.1

h5 H5
448.3
402.2; 453.2
h3 H3
402.2; 453.2
Ha H; 448.3; 456.1; 458.2; 461.2; 466.1; 468.2

h5? H5?

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Plate 1624.

Book 19 F. Page 124 V.	H.	Type.	No. Rem.	Description of Lines on Spectra.
	19.0	15.0 I III b	4500	F7 G=.3
	19.9	21.9 G2 II a c?	4501	G=.5, h=.2, bright and faint lines Pecz Pecz
	17.0	9.7 K III bc	4502	F5½ G=.1B, F4½ G=.2, F7 G=.3.
	15.7	18.0 I III b	4503	F7 G=.3
	11.0	13.2 B2 I b?	4504	F6 G=.2, h & H=.2
	8.7	14.9 F2 II a?	4505	G+h=.5. G diffl.?
126	7.1	20.8 B2 I b?	4506	h & H=.2
	6.5	8.3 F2 II a?	4507	G+h=.3
	6.0	10.8 K III bc	4508	F5 G=.1B, F4½ G=.1, F5 G=.2B, F5½ G=.1, F7 G=.3. Lines bet. G & H.

F. m. & c. 8.0 6.2 F. ch. 6.2

Plate 1503.

	19.4	18.7 F2 III a?	4509	G+h=.5
	18.6	15.2 B I b	4570	h & H=.3
	16.0	17.3 F2 II a?	4511	G+h=.5?
128	14.5	10.1 F2 II a?	4512	G+h=.3? (G+h=.5)
	14.7	11.4 B I b	4513	F6 G=.2, h & H=.2.
	13.1	14.3 F2 II a?	4513a	G+h=.5
	10.4	11.2 I III b?	4514	F4½ G=.2, F5½ G=.1, F7 G=.3
	12.3	13.0 F II a	4514a	G+h=.5 (G+h=.5) G+h=.3 (G+h=.3)
	8.8	16.6 F II a	4515	G+h=.5 (G+h=.5)
	7.1	13.5 F II a	4515a	G+h=.5
130	7.0	19.2 K III bc	4516	F5 G=.1B, F4½ G=.1, F5 G=.2B, F5½ G=.1, F7 G=.3, Lines bet. G & H.
	6.4	9.6 F II a	4517	G+h=.5? (G+h=.5)
	6.0	16.1 I III b	4518	F4½ G=.1, F7 G=.3 (F7 G=.3)
	6.1	17.9 F2 II a?	4518a	G+h=.5 (G+h=.5)
	4.4	13.3 F2 II a?	4519	G+h=.5 (G+h=.5)
	4.1	14.0 F2 II a?	4519a	G+h=.5
	3.6	17.2 F2 II a?	4520	G+h=.5

F. m. & c. 7.9 6.6 F. ch. 6.9

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448.3

h2 ; ℏ5 ; Bright & faint lines seen. Spectrum of A star superposed?

448.3 ; 461.2 ; 466.1

448.3

402.2 ; 433.2

~~ℏ4~~ h5 . ℏd5

402.2

h3 ℏ3

Hαℏ ; 448.3 ; 456.1 ; 458.2 ; 461.1 ; 468.1

h5 ℏ5

402.3

h5 ? ℏ5 ?

h3 ? ℏ3 ?

402.2 ; 433.2

448.3 ; 456.1 ; 461.2

h5 ℏ5

Hαℏ ; 448.3 ; 456.1 ; 458.2 ; 461.1 ; 468.1

h5 ? ℏ5 ?

448.3 ; 461.1 (4483)

h5 ℏ5

h5 ℏ5

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July 19 '88.

Plate 1504

Books 19 F Page 132 R.	H.	Type.	No. Rem.	Description of Lines on Spectra.
✓	15.8	10.0 F2 II a?	4521	G + h = .2
✓	15.7	19.0 K2 III bc?	4522	F3 G = .1B, F4½ G = .1, F5 G = .1B, F5½ G = .2, F7 G = .3 Lines bet. G & H.
✓	14.3	13.1 F2 II a?	4522a	G + h = .3 (G + h = .5)
✓	14.3	23.5 F2 II a?	4523	G & h dbl. = .5
✓	13.2	23.2 F2 II a?	4524	G + h = .5
✓	12.6	12.2 K III bc	4525	F2½ G = .1, F3 G = .2B, F4½ G = .1, F5 G = .2B, F5½ G = .1, F6 G = .2, F7 G = .2, F8 G = .1B, F9 G = .1, Lines bet. G & H. 1 line below K. Pec.
✓ 134	12.4	13.8 B I b	4526	F6 H = .2, h & H = .2, H & a = .2.
✓	11.8	17.5 B I b	4527	h & H = .2
✓	11.8	19.5 F2 II a?	4528	G + h = .3
✓	10.6	11.6 K III bc	4529	F3 G = .2B, F3½ G = .1, F4½ G = .2, F5 G = .2B, F5½ G = .1, F7 G = .3, F8 G = .1B, F9 G = .1, Lines bet. G & H.
✓	9.8	10.5 G2 II c?	4530	~~F5 H~~ G H = .2B?
✓	5.5	8.9 ~~F G III~~ bc	4531	Several bright and faint lines. K dbl.?
✓	4.1	17.5 F2 II a?	4532	G + h = .5
	F. m. & c.	8.0 6.8		F. ch. 6.8

Plate 1490?

✓ 136	15.2	8.2 F8 II a	4533	G + h = .5. 2 lines below K.
✓	9.0	8.6 F II a	4534	G & h = .5, G dbl. 2 lines below K.
✓	6.6	18.7 I2 III b?	4535	F7 G = .3
✓	6.0	22.0 K III bc	4536	F3 G = .2B, F4½ G = .1, F5 G = .2B, F7 G = .3, Lines bet. G. & H
✓	5.8	23.9 F2 II a?	4537	G + h = .5?
✓	2.2	15.4 F II a,	4538	G & h = .5?
	F. m. & c.	8.0 6.5		F. ch. 6.5

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h 2 ; g 2
Ha g ; 448,3 ; 456.2 ; 458.1 ; 461.1 ; 468.1

h d 5 g d 5
h 5 g 5
aK ; Ha g ; 438.1 ; 443.1 ; 448.2 ; 453.2 ; 456.1 ; 458.2 ; 461.1 ; 468.2 ; 471.1
Spectrum of A, Superposed? star

? 392,2, 402,2, 4532.
402.2
h 3 g 3
Ha g ; 435.1 ; 443.1 ; 448.3 ; 456.1 ; 458.2 ; 461.2 ; 466.1 ; 468.2

468.2 ?
Several bright & faint lines. K d ?

h 5 g 5

2 a K ; h 5 g 5
2 a K ; h 5 : g d 5
448.3
Ha g ; 448,3 ; 458.2 ; 461.1 ; 468.2

h 5 ? g 5 ?
h 5 ? g 5 ?

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Plate 1689

Book 19 F Page 138

V.	H.	Type.	Rem.	Description of Lines on Spectra.
9.9	13.8	K III bc	4539	Sereal bright and faint lines in Spectrum. As the spectra of a III and I star are superposed on plate it is impossible to describe the lines.
6.5	16.6	B I b	4540	h 6 H = .2
St. Lt. 5.5	F. m. & c.	8.0	7.5	F. ch. 7.5

Plate 1694.

16.3	15.0	I III b	4541	F 7 G = .3
9.8	14.1	K III bc	4542	Sereal bright and faint lines in Spectrum. As the spectra of a III and I star are superposed on plate, it is impossible to describe the lines.
6.5	16.8	B I b	4543	F 6 G = .2, h 6 H = .2
St. Lt. 5.3	F. m & c.	8.0	7.3	F. ch. 7.3

Plate 1488?

142	15.0	10.4	F? II a?	4544 G & h = .5
	15.8	17.0	G II a c?	4545 G = .3, h 6.2 H, Sereal bright and faint lines. Sereal lines below K. Rec.
F. m. & c.	8.0	6.2		F. ch. 6.2

Hard to measure. Plate 1635

144	19.5	20.8	F? II a?	4546 G & h = .5?
	16.4	14.3	F II a	4547 G & h = .3. 2 lines below K.
	12.7	16.5	I III b	4548 F 7 G = .3
	9.1	7.2	K III bc	4549 F 5 G = .2B, F 4h G = .1, F 5 G = .2B, F 5 1/2 e G = .1, F 7 G = .3. Lines bet. G & H.

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1888phae.proj..857F

Several bright & faint lines on spectrum. As the spectra of a III & I type stars are superposed on plate it is impossible to describe the lines.

402.2

448.3

Several bright & faint lines in spectrum. As the spectra of a III & I type stars are superposed on plate it is impossible to describe the lines

402.2; 453.2

h5 g5

aK; several bright & faint lines; 402.2; g3, Rec. Spect. of A Stars superposed

h5? g5?

2 aK; h3 g3

448.3

Hδ; 448.3; 456.1; 458.2; 461.1; 468.2

1888phae.proj..857F

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Plate 1635

Book 19 F Page 144	V.	H.	Type	Rem.	Description of Lines on Spectra.
	8.3	22.2	F? II a?	4550	G+h=.5?
St. Lt.	5.4	F.nw.+c.	8.0	6.3	F. ch. 6.3

Hard to measure. Plate 1636.

146	15.7	16.7	G? II a c?	4551	G=.3, h=.2, Several bright and faint lines. Lines below K. Rec?
St. Lt.	6.3	F.nw.+c.	8.0	6.5	F. ch. 6.5

Plate 1582.

	17.4	20.3	F II a	4552	G+h=.3, G dbl. 2 lines below K.
	15.8	16.4	I III b	4553	F7G=.3
	14.4	15.9	K III b c?	4554	F3G=.1B, F3½G=.1, F4½G=.1, F5G=.1B, F5½G=.1, F7G=.3, F8G=.1B, F9G=.1, Lines bet. G+H.
148	12.1	13.2	I III b	4555	F7G=.3
	5.0	15.9	I? III b?	4556	F4½G=.1, F5½G=.1, F7G=.3 Lines bet. G+H.
	5.4	23.0	F II a	4557	G+h dbl. =.5
	F.nw.+c.	8.0	6.7		F. ch. 6.7

Plate 1583.

	18.0	8.6	K? III b c?	4558	F3G=.1B, F4½G=.1, F5G=.1B, F5½G=.1, F7G=.3,
	18.2	15.7	K III b c	4559	F3G=.2B, F3½G=.1, F4½G=.2, F5G=.3B, F5½G=.1, F7G=.3 Lines bet. G+H. 2 lines below K.
150	18.1	15.1	B ~~II~~ I b	4560	F7G=.2, h 6 H=.2
	11.0	10.7	F? II a?	4561	G+h=.5, Lines below K.
	8.1	20.5	B I b	4562	h 6 H=.2
	5.2	11.3	B I b	4563	F6G=.2, h 6 H=.2.

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h5? g5?

aK; several bright + faint lines h2; g2? Spect. of A Star superpos.?

aK; h3; gd3

448.3

Hδ; 438.1; 443.1; 448.3; 456.1; 458.1; 461.1; 466.1; 468.1

448,3

Hδ; 448.3; 456.1; 461.1

hd5 gd5

448.3; 456.1; 458.1; 461.1; 468.1

2 aK; Hδ; 448,3; 456.1; 458.3; 461.2; 466.1; 468.2

402,2; 448.2

aK; h5 g5

402.2

402,2; 453,2

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Plate 1583.

Book 19 F. Page 150

V.	H.	Type	No. Rem.	Description of Lines in Spectra.
	5.6	16.4 B I b	4564	h & H = .2
	5.3	24.7 F II a	4565	G + h = .2, lines below K.
152	2.8	17.0 B I b	4566	F & G = .2, h & H = .2.
F. m. & c.	8.0	6.6		F. ch. 6.6

Plate 1584.

	13.7	7.4 F? II a?	4567	G + h = .5
154	6.6	8.5 I? III b?	4568	F 4½ G = .1, F 5½ G = .1, F 7 G = .3.
	6.0	12.7 K III bc	4569	F 3 G = .2 B, F 3½ G = .1, F 4½ G = .2, F 5 G = .2 B, F 5½ G = .2, F 7 G = .3. Lines bet. G + h. 1 line below K.
F. m. & c.	8.0	6.4		F. ch. 6.4

Plate 1587.

156	15.5	14.5 F II a	4570	G + h = .5. 2 lines below K.
	8.4	7.4 K III bc	4571	F 3 G = .2 B, F 4½ G = .2, F 5 G = .3 B, F 5½ G = .1, F 7 G = .3. Lines bet. G + H. 1 line below K.
	3.1	7.0 B? I b?	4572	h & H = .2
F. m. & c.	8.0	6.7		F. ch. 6.7

Plate 1626.

	16.6	7.3 I III b	4573	F 7 G = .3
	15.8	11.6 K III bc	4574	F 3 G = .2 B, F 3½ G = .1, F 4½ G = .2, F 5 G = .3 B, F 5½ G = .1, F 7 G = .3 Lines bet. G + H.
158	8.2	22.6 K III bc	4575	F 3 G = .2 B, F 4½ G = .1, F 5 G = .3 B, F 5½ G = .1, F 7 G = .3. Lines bet. G + H.
	6.6	9.6 B I b	4576	F & G = .2, h & H = .2, H & a = .2
F. m. & c.	8.0	6.3		F. ch. 6.3

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402.2
aK; h2 g2
402.2; 453.2

h5 g5
448.3; 456.1; 461.1
aK; HaS; 448.3; 456.2; 458.2; 461.2; 466.1; 468.2

2 aK; h5 g5
aK; HaS; 448.3; 456.1; 458.3; 461.2; 468.2

402.2

448.3
HaS; 448.3; 456.1; 458.3; 461.2; 466.1; 468.2

HaS; 448.3; 456.1; 458.3; 461.1; 468.2

? 392.2; 402.2, 453.2.

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Plate 1637

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16.5 8.3 K III bc 4577 F 4½ G=.1, F 5 G=.1B, F 5½ G=.1, F 7 G=.3

15.8 12.6 K III bc 4578 F 3 G=.2B, F 3½ G=.1, F 4½ G=.2,
F 5 G=.3B, F 5½ G=.1, F 7 G=.3, F 8 G=.1D,
F 9 G=.1. Lines bet. G & H.

13.8 15.2 F² II a? 4579 G & h=.5

12.0 9.3 F² II a? 4580 G & h=.5?

7.5 7.6 F² II a? 4581 G & h=.5?

8.1 23.6 K III bc 4582 F 3 G=.2B, F 4½ G=.2, F 5 G=.3B, F 5½ G=.1,
F 7 G=.3. Lines bet. G & H.

6.4 10.5 B I b 4583 F 6 G=.2, F 7 G=.1, G 9 h=.1, h 6 H=.2,
K h 6 α=.2

Stnd. 5.3 F. m. & c. 8.0 6.4 F. ch. 6.4

Plate 1555.

160 20.3 11.6 F II a 4584 G & h=.5? 3 lines below K.

14.8 19.3 F² II a? 4585 G & h=.5

162 8.5 10.4 B I b 4586 F 6 G=.2, h 6 H=.2, H 6 α=.2.

8.7 15.2 K III bc 4587 F 3 G=.2B, F 3½ G=.1, F 4½ G=.2,
F 5 G=.3B, F 5½ G=.2, F 7 G=.3, F 8 G=.1B,
F 9 G=.1 Lines bet. G & H.

7.6 19.4 B I b 4588 F 6 G=.2, h 6 H=.2

4.2 16.5 B I b 4589 F 6 G=.2, h 6 H=.2

4.1 20.7 F² II a? 4590 G & h=.5?

F. m. & c. 8.0 6.9 F. ch. 6.9

Plate 1627

164 20.9 15.9 F² II a? 4591 G & h=.3

20.1 10.7 F II a 4592 G & h=.5. 2 lines below K.

12.4 22.9 F² II a? 4593 G & h=.5?

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1888phae.proj..857r

448.3; 456.1; 458.1; 461.1

Hal: 438.1; 443.1; 448.3; 456.1; 458.3; 461.2; 466.1; 468.2

h_5 l_{g_5}

h_5 ? l_{g_5} ?

h_5 ? l_{g_5} ?

Hal: 448.3; 456.1; 458.3; 461.2; 468.2

? 392.2, 402.2, 412.1, 438.1, 453.2.

3 ak; h_5 ? l_{g_5} ?

h_5 l_{g_5}

? 392.2, 402.2, 453.2.

Hal: 438.1; 443.1; 448.3; 456.2; 458.3; 461.2; 466.1; 468.2

402.2; 453.2

402.2; 453.2

h_5 ? l_{g_5} ?

h_3 l_{g_3}

2 ak h_5 l_{g_5}

h_5 ? l_{g_5} ?

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Plate 1627

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8.6 14.4 K2 IIIb: 4594 F2½ G=.1, F3 G=.3B, F3½ G=.1, F4½ G=.2, F5 G=.2B, F5½ G=.2, F7 G=.3, F8 G=.1B, F9 G=.1

7.6 18.5 B Ib 4595 F6 G=.2, h 6 H=.2

F. m. & c. 8.0 6.5 F. ch. 6.5

Plate 1692.

166 15.0 8.2 F2 IIa? 4596 G+h=.6?

5.8 22.1 I IIIb 4597 F7 G=.2

St. Lt. 5.5 F. m. & c. 8.0 7.2 F. ch. 7.2

Hard to measure. Plate 1645

16.4 18.5 B Ib 4598 F7 G=.2, h 6 H=.2, H 6 K=.2.

15.2 12.0 I IIIb? 4599 F5½ G=.2, F7 G=.3

12.1 14.7 B Ib 4600 h 6 H=.2

10.2 19.5 F IIa 4601 G+h=.5. 2 lines below K.

10.8 23.5 F IIa 4602 G+h=.3

168 7.8 7.9 B Ib 4603 F6 G=.2, h 6 H=.2, H 6 K=.2

4.0 9.6 B Ib 4604 h 6 H=.2

St. Lt. 5.6 F. m. & c. 8.0 6.3 F. ch. 6.3

Hard to measure. Plate 1638.

20.0 11.9 F2 IIa? 4605 G+h=.5? 2 lines below K.

10.0 7.6 F2 IIa? 4606 G+h=.5?

170 10.2 8.6 F2 IIa? 4607 G+h=.5?

8.5 15.5 K IIIbc 4608 F5 G=.2B, F5½ G=.1, F6½ G=.2, F5 G=.2B, F5½ G=.2, F7 G=.3, F8 G=.1B, F9 G=.1

7.5 19.7 B Ib 4609 F6 G=.2

St. Lt. 5.6 F. m. & c. 8.0 6.5 F. ch. 6.5

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438.1 ; 443.1 ; 448.3 ; 456.2 ; 458.2 ; 461.2 ; 466.1 ; 468.3 ; 471.1

402.2 ; 453.2

h5 ? g5 ?
448.2

2 392.2, 402.2, 448.2
448.3 ; 456.2
402.2
2 ak ; h5 g5
h3 g3
? 392.2, 402.2, 453.2.
402.2

2 ak ; h5 ? g5 ?
h5 ? g5 ?
h5 ? g5 ?
438.1 ; 443.1 ; 448.3 ; 456.2 ; 458.2 ; 461.2 ; 466.1 ; 468.2

402.2

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Plate 1679?

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	V.	H.	Type	No. Rem.	Description of Lines on Spectra.
✓	14.5	7.5	F? II a?	4610	G & h = .2.
✓	6.5	17.9	I? III b?	4611	F 4½ G = .2, F 5½ G = .2, F 7 G = .3
✓	5.5	21.4	I III b	4612	F 7 G = .3
	St. Lot. 5.8		F. nw & e. 8.0	7.3	F. ch. 7.3

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Plate 1687

✓	172	14.5	6.4 F II a	4613	G & h = .5
✓		8.4	6.9 F? II a?	4614	G & h = .5
✓		5.6	20.4 I III b	4615	F 4½ G = .2, F 7 G = .3
	St. Lot. 5.5		F. nw. & e. 8.0	7.2	F. ch. 7.2

Plate 1674

✓		18.2	19.9 F? II a?	4616	G & h = .5?
✓		16.4	20.9 B I b	4617	F 6 G = .2, h 6 K = .2
✓		15.0	14.5 K? III b?	4618	F 4½ G = .1, F 5 G = .1 B, F 5½ G = .1, F 7 G = .3 Lines bet. G & K.
✓		12.0	17.0 B I b	4619	F 6 G = .2, h 6 K = .2
✓		10.2	21.9 F II a	4620	G & h = .5? 2 lines below K.
✓		7.6	10.4 B I b	4621	F 6 G = .2, F 7 G = .2, G & h = .2, h 6 K = .2
✓	174	8.9	12.1 B I b	4622	F 6 G = .2, h 6 K = .2
	St. Lot. 5.5		F. nw. & e. 8.0	6.5	F. ch. 6.5

Plate 1604

✓		18.6	16.1 F II a	4623	G & h = .5
✓		5.5	6.1 F II a	4624	G & h = .5, 1 line below K.
✓		5.0	16.1 F II a	4625	G & h = .5, 2 lines below K.
	F. nw & e	8.0	6.2		F. ch. 6.2

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h 2 , $\mathfrak{g}_2^2$

448,3 ; 456,2 ; 461,2

448,3

h 3 , $\mathfrak{g}_3$

h 3 $\mathfrak{g}_3$

448,3 ; 461,2

h 3 ? $\mathfrak{g}_3$?

402,2 ; 453,2

Ha $\mathfrak{g}$; 448,3 ; 456,1 ; 458,1 ; 461,1

402,2 ; 453,2

2 aK ; h 5 ? $\mathfrak{g}_3$?

402,2 ; 414,2 ; 438,2 ; 453,2

402,2 ; 453,2

h 3 $\mathfrak{g}_3$

1 aK ; h 3 $\mathfrak{g}_3$

2 aK ; h 3 $\mathfrak{g}_3$

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Plate 1675

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	V.	H.	Type.	Rem. No.	Description of Lines or Spectra.
✓	17.0	14.2	F II a	4626	G + h = .5
✓	10.0	7.4	F? II a?	4627	G + h = .5?
✓	5.9	8.1	F II a	4628	G + h = .5

St. Lt. 5.7 F. nw. & c. 8.0 7.0 F. ch. 7.0

Plate 1605

✓ 176	17.6	14.6	B I b	4629	F 6 G = .2, h 6 H = .2, H 6 α = .2
✓	13.9	15.7	B I b	4630	F 6 G = .2, G 9 h = .1, h 6 H = .2, H 6 α = .2, β + γ = .4
✓ 178	5.0	19.0	K III bc	4631	F 4½ G = .2, F 5 G = .2 B, F 5½ G = .1, F 7 G = .3, Lines bet. G + H.
✓	2.4	7.5	F? II a?	4632	G + h = .5?

F. nw. & c. 8.0 6.4 F. ch. 6.4

Plate 1556.

✓ 180	19.8	17.8	F? II a?	4633	G + h = 5?
✓	15.2	14.8	F II a	4634	G + h = .5, G dbl. 3 times below K.
✓	13.9	21.0	B I b	4635	F 6 G = .2, h 6 H = .2
✓	11.6	22.9	F? II a?	4636	G + h = .2

F. nw. & c. 8.0 6.8 ~~4637~~ F. ch. 6.8

Plate 1557

					G + h = .2, G dbl., 3 lines below K.
✓ 182	19.4	18.5	F II a	4637	G + h = .3, G dbl. 3 lines below K.
✓ 184	10.8	9.9	F? II a?	4638	G + h = .5?
✓	10.5	11.1	K? III bc?	4639	F 5 G = .1 B, F 5½ G = .2, F 7 G = .3,
✓	7.5	21.0	B? I b?	4640	F 6 G = .2, h 6 H = .2, H 6 α = .2
✓	6.7	20.7	F? II a?	4641	G + h = .5
✓	3.6	22.2	B I b	4642	h 6 H = .2

F. nw & c. 8.0 6.6 F. ch. 6.6

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h 5 g 5
h 5 ? g 5 ?
h 5 g 5

? 392.2, 402.2, 453.2
? 382.4, 392.2, 402.2, 412.1, 4532.

Ha g; 448.3; 456.1; 458.2; 461.2

h 5 ? g 5 ?

h 5 ? g 5 ?
3 a K; g d; h 5 g 5
402.2; 453.2
h 2 g 2

3 a K; h 3; g d 3 (3 a K h 2, g 2, G d h)
h 5 ? g 5 ?
448.3; 456.2; 458.1
? 392.2, 402.2, 453.2.
h 5 g 5
402.2

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Plate 1586

Book 19 F Page 186 V. H. Type. Rem. Description of Lines on Spectra.

10.2 22.0 F:III a? 4643 G+h=.5?

F. m. & c. 8.0 6.6 F. ch. 6.6

Plate 1666.

15.8 7.2 K III bc 4644 F5 G=.1B, F4½ G=.2, F5 G=.2B,
F5½ G=.1, F7 G=.3. Lines bet. G & K.
2 lines below K.

9.8 21.1 F II a 4645 G+h=.5. 2 lines below K.

~~6.7 12.7 F IIa 4645a G+h=.5?~~

5.6 23.2 F:II a? 4646 G+h dtb.?=.5. 2 lines below K.

St. Lt. 5.5 F. m. & c. 8.0 6.4 F. ch. 6.5

Plate 1640.

188 18.2 10.1 B I b 4647 h 6 K=.2

17.0 11.4 B? I b? 4648 F6 G=.2, h 6 K=.2

16.8 19.6 I III b 4649 F7 G=.3

15.8 9.3 B I b 4650 h 6 K=.2

12.7 8.4 I III b 4651 F7 G=.3

12.0 15.4 I III b 4652 F4½ G=.2, F7 G=.3

12.5 16.5 F? II a? 4653 G+h=.5?

12.2 6.2 F? II a? 4654 G+h=.5 (G+h=.5)

10.2 13.5 B I b 4655 F6 G=.2, h 6 K=.2, 2b 6 4=.2
β+γ=.4

7.4 8.1 F? II a? 4656 G+h=.5?

7.9 9.9 K? III bc? 4657 F4½ G=.1, F5 G=.1B, F5½ G=.1,
F7 G=.3

9.6 16.6 B I b 4658 F6 G=.2, h 6 K=.2

2.8 18.6 F? II a? 4659 G+h=.5?

St. Lt. 5.5 F. m. & c. 8.0 6.6 F. ch. 6.6

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h ? g ?

2 aK ; Ha g ; 448.3 ; 456.1 ; 458.2 ; 461.2 ; 468.1

2 aK ; h g
2 aK ; hd ? gd ?

402.2
402.2 ; 453.2
448.3
402.2
448.3
448.3 ; 461.2
h ? g ?
h g
382.4, 392.2, 402.2, 453.2.

h ? g ?
448.3 ; 456.1 ; 458.1 ; 461.1

402.2 ; 453.2
h ? g ?

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Plate 1665

Book 19 Page 190	V.	H.	Type.	Rem.	No.	Description of Lines on Spectra.
✓	19.8	19.6	B? I t?		4660	F6 G=.1, h 6 H=.1
✓	16.2	10.3	K III bc?		4661	F3 G=.1 B, F4½ G=.1, F5 G=.3 B, F5½ G=.1, F7 G=.3, F8 G=.1 B, F9 G=.1, Lines Ht. G & H. 1 line below K.
✓	14.4	8.5	K? III bc?		4662	F4½ G=.1, F5 G=.1 B, F5½ G=.1, F7 G=.3 Lines bet. G & H
✓	14.2	15.7	F? II a?		4663	G & h=.5
✓	12.4	7.0	I? III b?		4664	F7 G=.3
✓	12.0	16.8	F? II a?		4665	G & h=.5

St. bet. 5.7 F. nu. & c. 8.0 6.7 F. ch. 6.7

Hard to measure. Plate 1574

✓	21.9	15.7	F II a		4666	G & h=.5?
✓	17.2	14.1	K? III bc?		4667	F4½ G=.2, F5 G=.2 B, F5½ G=.1, F7 G=.3, Lines bet. G & H.
✓	10.4	8.0	K III bc		4668	Several bright and faint lines.
✓	6.2	17.0	K? III bc?		4669	F3 G=.1 B, F4½ G=.2, F5 G=.2 B, F5½ G=.1, F7 G=.3

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F. nu. & c. 8.0 6.3 F. ch. 6.3

Plate 1684

✓	21.8	16.6	F? II a?		4670	G & h=.5?
✓	19.2	16.4	K? III bc?		4671	F4½ G=.1, F5 G=.1 B, F5½ G=.1, F7 G=.3
✓	17.3	14.9	K? III bc?		4672	F4½ G=.2, F5 G=.2 B, F5½ G=.1, F7 G=.3, Lines bet. G & H.
✓	10.4	8.8	K III bc		4673	F2 G=.1, F2½ G=.1, F3 G=.2 B, F3½ G=.1, F4 G=.2 B, F4½ G=.2, F5 G=.3 B, F5½ G=.1, F6 G=.1, F6½ G=.2, F7 G=.3 F8 G=.1 B, F9 G=.1, F9½ G=.1, Gdlt. &

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1888phae..proj..857F

402.1 ; 453.1

CaK ; Ha Hδ ; 438.1 ; 443.1 ; 448.3 ; 456.1 ; 458.2 ; 461.1 ; 468.1

Ha Hδ ; 448.3 ; 456.1 ; 458.1 ; 461.1

h5 Hδ5

448.3

h5 Hδ5

h5 ? Hδ5 ?

Ha Hδ ; 448.3 ; 456.1 ; 458.2 ; 461.2

Several bright & faint lines

448.3 ; 456.1 ; 458.2 ; 461.2 ; 468.1

h5 ? Hδ5 ?

448.3 ; 456.1 ; 458.1 ; 461.1

Ha Hδ ; 448.3 ; 456.1 ; 458.2 ; 461 2.

Ha Hδ ; 436.1 ; 438.1 ; 443.1 ; 448.3 ; 451.2 ; 453.1 ; 456.1 ; 458.2 ;
461.2 ; 463.2 ; 466.1 ; 468.2 ; 471.1 ; 474.1

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July 20, 1888.

Plate 1684.

Book 19F Page 192

	V.	H.	Type	Rem.	No.	Description of Lines on Spectra.
✓	6.2	17.8	K III bc		4674	F3 G=.2B, F3½ G=.1, F4½ G=.2, F5 G=.3B, F5½ G=.1, F7 G=.3, F8 G=.1B, F9 G=.1. Lines bt. G & H. 1 line below K.

St. Lbt. 5.8 F. m. & c. 8.0 7.0 F. ch. 7.0

Hard to measure. Plate 1575.

✓	21.9	9.2	B? I b?		4675	h 6 H=.1
✓	20.1	20.8	B I b		4676	h 6 H=.2
✓	18.1	17.0	I III b		4677	F7 G=.3
✓	13.8	11.5	B? I b?		4678	h 6 H=.2
✓	13.6	12.7	F? II a?	194	4679	G & h=.5 (G & h=.5)
✓	12.4	11.7	F? II a?		4680	G & h=.5? (G & h=.5)
✓	12.4	16.0	F? II a?		4681	G & h=.5 (G & h=.5)
✓	11.0	16.5	F II a		4682	G & h=.5 (G & h=.5)
✓	11.8	18.0	F? II a?		4683	G & h=5 (G & h=.5)
✓	9.4	11.4	B I b		4684	F6 G=.2, h 6 H=.2, H 6 K=.2
✓	8.6	17.9	B I b		4685	h 6 H=.2, H 6 K=.2.
✓	6.6	9.1	I III b		4686	F7 G=.3
✓	6.2	17.0	B I b		4687	F6 G=.2, h 6 H=.2

F. m. & c. 8.0 6.3 F. ch. 6.3

Hard to measure. Plate 1628.

✓	20.1	16.2	K III bc	196	4688	F2½ G=.2, F3 G=.2B, F3½ G=.2, F4 G=.2B, F4½ G=.3, F5 G=.3B, F5½ G=.2, F7 G=.3, F8 G=.1B, F9 G=.1
✓	7.0	22.6	I III b		4689	F7 G=.3, Lines bt. G & H.

F. m. & c. 8.0 5.8 F. ch. 5.8

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1 BK ; H α ℓ ; 438,1 ; 443.1 ; 448,3 ; 456.1 ; 458.3 ; 463,2 ; 466.1 ; 468.2

402,1

402,2

448.3

402,2

h5 ℓ5

h5 ? ℓ5 ?

h5 ℓ5

h5 ℓ5

h5 ℓ5

?. 392,2, 402,2, 453.2.

?. 392,2, 402,2.

448,3

402.2 ; 406.2

438.1 ; 443.1 ; 448.3 ; 456.2 ; 458.3 ; 461.3 ; 463.2 ; 466.2 ; 468.2 ; 471.2

H α ℓ ; 448,3

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July 20 1888.

Plate 1647 Hard to measure.

Book 19 F Page 196 V. H. Type Rem. No. Description of Lines on Spectra.

20.2 15.0 K III bc 4690 F2½ G=.1, F3 G=.1B, F3½ G=.2, F4 G=.2B, F4½ G=.3, F5 G=.3B, F5½ G=.2, F7 G=.3. Lines bet. G & H.

15.5 23.9 K III bc 4691 F4½ G=.2, F5 G=.1B, F5½ G=.1, F7 G=.3

7.2 21.5 I III b 4692 F4½ G=.2, F7 G=.3

St. Lt. 5.8 F. m. & c. 8.0 6.7 F. ch. 6.7

Hard to measure. Plate 1629

198 19.0 17.7 F? II a? 4693 G+h=.5?

13.1 18.6 F? II a? 4694 G+h=.3?

12.0 16.6 B? I b? 4695 F6 G=.2, h6 H=.2, B4 γ=.4

F. m. & c. 8.0 6.2 F. ch. 6.2

Plate 1685

20.0 10.5 F? II a? 4696 G+h=.5?

19.0 18.8 B I b 4697 F6 G=.2 h6 H=.1

17.6 14.8 F II a 4697a G+h=.5

16.5 16.5 I III b 4698 F7 G=.3

13.4 9.7 B? I b? 4699 h6 H=.2

F. m. & c. 8.0 7.2 F. ch. 7.2

Plate 1588.

202 19.5 16.1 F II a 4700 G=.5, h=.2

7.6 7.9 I III b 4701 F7 G=.3

5.0 17.5 F? II a? 4702 G+h=.5?

F. m. & c. 8.0 7.1 F. ch. 7.1

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Ha 2: 448.3; 45-6.2; 45-8.3; 461.3; 463.2; 466.2; 468.1; 47[illegible].1

448.3; 45-6.1; 45-8.1; 461.2

448.3; 461.2

h5- ? g5- ?
h3 ? g3 ?
382, 4, 4021, 2, 45-3. 2.

h5 ? g5 ?
402.1; 45-3.2
h5- g5-
448.3
402.2

h2 g5-
448.3
h5 ? g5?

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July 20, 1888.

Plate 1699

Book 19 F. Page 202

	V.	H.	Type.	Rev. No.	Description of Lines in Spectra.
✓	19.1	15.7	F II a	4703	G + h dbl. = .5
	St. Lt. 5.4	F. m. & c. 8.0	6.6	F. ch. 6.6	

Plate 1714.

✓ 204	19.8	16.6	F II a	4704	G + h = .3
	St. Lt. 5.6	F. m. + c. 8.0	7.2	F. ch. 7.2	

Plate 1609.

✓	20.0	10.9	B: I b?	4705	h 6 H = .2
✓	13.6	8.3	I III b	4706	F 7 G = .3
✓	13.8	11.3	K III bc	4707	F 8 G = .1 B, F 8 1/2 G = .1, F 4 1/2 G = .2, F 5 G = .2 B, F 5 1/2 G = .1, F 7 G = .3 Lines bet. G & H.
✓ 206	7.9	21.0	F: II a?	4708	G + h = .3
✓	3.0	18.2	F: II a?	4709	G + h = .3
	F. m. & c. 8.0	6.1	F. ch. 6.1		

Plate 1589

✓	22.8	17.2	B I b	4710	h 6 H = .2
✓ 208	16.4	12.9	F: II a?	4711	G + h = .5
✓	13.5	11.3	K: III bc?	4712	F 4 1/2 G = .2, F 5 G = .2 B, F 5 1/2 G = .1, F 7 G = .3, F 8 G = .1 B, F 9 G = .1, Lines bet. G & H.
✓	10.2	17.4	F: II a?	4713	G + h = .3?
✓	7.6	19.6	B I b	4714	h 6 H = .2
✓	6.2	22.2	I III b	4715	F 7 G = .3
	F. m. + c. 8.0	6.9	F. ch. 6.9		

Plate 1686.

210	St. Lt. 5.5	F. m + c. 8.0	7.2	F. ch. 7.2	

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hd₅ gd₅

h3 g3

4b2,2

448,3

Ha g; 448,3; 43b,1; 438,2; 4b1,2; 46b,1; 4b8,1

h3 g3

h3 g3

4b2,2

h5 g5

Ha g; 438,1; 443,1; 448,3; 43b,1; 438,2; 4b1,2

h3 ? g3 ?

4b2),2)

448,3

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Plate Nos.

D.C. No. 466. γ Cassiopeiae. Dm +59° 144

✓ 186	14.9 - 5.2	Class 2.	Too near edge of plate to measure add. lines
✓ 186	5.0 - 5.2	"	" " " " " " " " "
✓ 284	20.0 - 22.3		" dense to measure lines
✓ 829	6.0 - 7.3.	486 bright.	
✓ 835	15.9 - 12.4	486 bright.	
✓ 848	5.7 - 22.2	486 bright.	
✓ 875	15.3 - 7.2	486 bright.	
✓ 876	5.5 - 22.3	Image too dense to show any lines	
✓ 879	15.9 - 12.5	486 bright.	
✓ 914	4.5 - 22.4	486 bright.	
✓ 929.	14.7 - 12.8.	486 bright.	

Class G? D.C. 967. τ Ceti. H.P. 271 Dm -16° 295

✓ 159	8.8 - 14.8	434, 2; 426, 4; 424, 3; 414, 2; 410, 4; 406, 1; 405, 2; 402, 1.
✓ 160	18.5 - 23.9	Image too near edge of plate to measure lines between 434 and 397.
✓ 253	16.1 - 8.7	Image poor. Impossible to measure additional lines between 434 and 397.
✓ 830	9.4 - 15.8	424, 2; 419, 2; 410, 4; Image very poor.

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D.C. 721 D.M. +57° 260.

Plate Nos. V H.

✓ 284 5.6 17.0 443, 3; 438, 2; 426, 1, 419, 4; Limit B

✓ Enter as Class G in Draper Catalogue.

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April, 25, 1890.

Plate Nos. D.C. 967. ζ Ceti.

911 9.8 - 15.7 426, 3; 421, 1; 419, 1; 418, 1; 417, 3; 410, 4; 406, 2; 405, 1; 405, 1; 404, 1, 403, 1; 401, 2.

919 17.7 - 6.5 Image too poor to measure additional lines; near edge of plate.

988 18.2 - 6.1 Near edge of plate. Image too poor to measure additional lines.

Class G. D.C. 975. Dm +63° 238

173 8.6 - 20.9 Image too poor to measure additional lines.

284 14.0 - 10.4 Image too poor to measure additional lines

844 9.6 - 18.9 Image too poor to show additional lines

914 18.0 - 10.5 Focus bad. Image too poor to measure additional lines.

1019 8.1 - 19.3 Image too poor to measure additional lines.

2, changed from M. D.C. 1321 o Ceti. H.P. 370 Dm -3° 353

932 12.2 - 8.4 434. 3; 423. 1; 421, 4; 415, 1; 410, 8; 405, 1, 404, 1; 403, 1, 390, 1; 389, 3; 388, 1.

981 22.0 - 18.5 ~~410, bw. 434, 1; 410, 8; 389, 2; 424 faint, 410, strong; 389~~

981 2.4 - 18.6 Image too near edge of plate to measure additional lines.

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~~Book Page~~ Plate ~~No.~~ ~~Hr.~~ ~~Type~~ ~~Remarks~~ Description of Lines on Spectra.

April 25, 1890.

Plate Nos. Class G. D.C. 1563. ζ Persei. H.P. ~~429~~ 746 Dm +48° ~~746~~ 429

208 16.7 - 22.6 Too near edge of plate to measure additional lines

286 3.1 - 15.1 Limit S; 430,3; 419.1.

315 12.1 - 10.0 . Image too poor to measure additional lines.

921 17.6 - 9.3 430,5; Image too poor to show additional lines.

934 7.8 - 16.7 . 430,5; 421,2; 420,1; 419,1,

1009 17.1 - 23.2 . Too near edge of plate to measure additional lines

G. changed from F?; D.C. 1653 τ Persei. H.P. 454 Dm +52° 641

161 20.9 - 12.8 419,1; 409,2.

208 10.0 - 19.0 430,3; 421,1; 410,2; 405,1; 404,2; 402,1.

315 4.8 - 7.4 Near edge of plate. Image poor to measure additional lines.

877 21.2 - 12.5 Focus bad; image too poor to measure additional lines.

921 10.3 - 6.7 Bad focus. Image too near edge of plate to measure additional lines.

939 20.1 - 13.6. 419,2. Image poor.

1009 10.7 - 19.6 . 430,3; 419,1, Limit S.

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Book Page Plate Nos. Plate K. H. Fifth Rev. Description of Lines on Spectra

April, 25, 1890.

Class M. D.M. 1731. α Ceti H.P. 482 D.M. +3°419.

150	8.2	6.4	Too near edge of plate to measure additional lines.
292	13.7	6.4	Too near edge of plate to measure additional lines.
324	8.8	17.4	425,5; 410,2; 405,3.
897	18.6	6.1	Too near edge of plate to measure additional lines
952	7.9	17.3	431,3; 430,5; 429,2; 426,2; 425,2; 424,2; 423,2; 420,2; 410,3; 409,2; 405,3.

Class G. D.M. 1735. γ Persei. H.P. 483 D.M. +52°654.

161	19.3	9.8	430,3; 417,1;
208	8.6	15.8	Limit D; 433,1; 430,3; 418,2; 413,1; 412,1;
877	19.6	9.3	430,3; 419,1; Limit γ
939	18.6	10.5	430,3; Image too dense to show additional lines
1009	9.3	16.3	430,3, 419,1, Limit D.

Class G? D.M. 2114. γ Persei H.P. 602 D.M. +42°815.

163	11.6	17.5	Limit γ.
203	11.5	16.6	Limit γ

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April, 25, 1890.

Plate No.	V.	H.	
			D. C. 2114. ν Persei. Dm. +42° 815 H.P. 602
287	16.1	~~21.6~~ 8.7	Image too poor to measure additional lines.
295	7.3	13.8	Limit S. 417.3.
305	16.0	20.7	Image too poor to measure additional lines.
927	10.5	16.2	428, 1; 418, 1; 387, 1; Limit S.
1010	20.2	9.9	Image too poor to measure additional lines. Limit S.
1012	20.0	23.6	Image too near edge of plate to measure additional lines.
			Class D? D. C. 3163, 3164 } ι Orionis. H.P. 1023, 1024 } Dm. −5° 1315, −5° 1319 }
✓ 1092	15.8	11.2	Several bright bands; 431, bright band; 409 bright band; These bands are very lazy and do not resemble bright lines. They may be in nebulosity surrounding star.
	15.8	11.1	
✓ 1108	6.2	21.8	431; bright band; 409 bright band;
	6.2	20.9	
			Class C D. C. 3889. Canis Major. H.P. 1311.
311	8.5	9.8	Image too poor to measure additional lines
			Class G? D. C. 4026. δ Canis Majoris H.P. 1350
333	19.8	20.5	Image too poor to measure additional lines
1036	17.4	23.0	429, 4; 424, 1; 421, 3; 418, 2; 414, 2; 412, 2; 410, 3; 406, 1; 403, 2.
1228	17.1	22.1	Near edge of plate. Image too poor to measure additional lines.

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Plate

~~Border Page~~ ~~H. M. Typo. Rem. No. Description of Lines on Spectra.~~

April, 25, 1890.

Plate No. Class D? D. C. 4357. & Argus. H.P. 1474.

416. 13.9 - 20.7. Image too poor to measure additional lines

1120 13.8 - 22.4. Image too poor to measure additional lines

Class G? D. C. 4388 & Argus H.P. 1492 Dm. -22° 2087

400 20.0 - 15.9 431, 4. Image too faint to measure additional lines.

416 9.9 - 17.4 Image too poor to measure additional lines.

1101 20.3 - 11.4. Image too poor to measure additional lines.

1120 9.9 - 19.1 Image too poor to measure additional lines

Class G. D. C. 4471. & Argus. H.P. 1515

400 22.4 - 11.1 419, 2; Limit f.

401 23.0 - 20.2 Image too poor to measure additional lines.

416 12.7 - 12.4 429, 1; 424, 1; 420, 1; 419, 2; 413, 1; 403, 1; Limit b.

1101 23.1 - 6.5 Near edge of plate. Image too poor to measure additional lines

1120 12.6 - 14.3 429, 1; 428, 1; 421, 1; 418, 3; 414, 1; 413, 1; 410, 5; 409, 1; 404, 1; 403, 2; 402, 1. Limit d.

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April, 25, 1890.

Plate No. Class G. D.C. 4701 Hydra H.P. 1610 Dm. -13° 2673

418 20.8-22.2. Image too poor to measure additional lines; Limit B.

1121 11.3 - 15.2 430, 3; Image too poor to measure additional lines. Limit B.

Class D D.C 4876 ι Ursae Majoris. H.P. 1658 Dm. +64° 723

1441 ~~7.5-10.8~~ 17.0-17.3 468, 2; 458, 1; 448, 2; 425, 1; 402, 1:

458 7.5-10.8 461, 1; ~~449~~ 453, 2; ~~447~~ 448, 1; ~~444~~ 443, 1; 426, 2; 424, 1; 421, 1; 418, 2; 401, 1.

1065 6.5-23.4. Image too near edge of plate to measure additional lines.

1113 16.9-19.0 419. 2; 417. 1; 401, 1;

Class G? D.C. 5154. o Leonis. H.P. 1740 Dm. +10° 2044

449 14.8-18.0 431, 1; 429. 1; 421, 1; 412, 2; 407. 1; 401, 1.

1122 4.2-7.7 Image too poor to measure additional lines.

1160 14.2-18.7 430, 3; 418, 1; Limit 8.

Class G D.C. 5444. Leo Minor. H.P. 1872 Dm. +32° 2061

443 19.7-16.8 Image too poor to measure additional lines.

494 10.2-9.4 Image too poor to measure additional lines.

1087 9.4-9.9 Image too poor to measure additional lines.

1124 20.0-18.1 Image too poor to measure additional lines.

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Plate

~~Book Page~~ ~~V. H.~~ ~~Type~~ ~~Prism~~ to ~~Description of Lines on Spectra.~~

April, 25, 1890.

Plate Nos. Class G. D. C. 5684 } & Ursae Majoris H.P. 1959 } +32° 2132
5685 } 1960 }

V. H.

460 10.9 10.6 Image too poor to measure additional lines.

1076 20.0 19.1 Image too poor to measure additional lines

1136 10.6 10.1 424, 2; Image too poor to measure additional lines

1178 10.8 10.0 428, 1; 411, 1; 410.3; 409, 1; 408, 1; 402, 1.

Class G D. C. No. 5723. & Lyncis H.P. 1969 Dec +11° 2348

454 3.1 16.1 Near edge of plate. Image too poor to measure additional lines. Limit 5.

492 22.9 15.6 Near edge of plate. Image too poor to measure additional lines.

1075 21.8 17.0 Image too poor to measure additional lines Limit 3.

1138 12.6 7.1 Image too poor to measure additional lines

1217 2.6 17.6 Image too poor to measure additional lines

1385 3.0 16.4 Too near edge of plate to measure additional lines. Limit 7.

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April, 25, 1890.

Plate Nos.			
	Class G?	D. C. No. 5866 Ursa Major H.P. 2011 D.M. +35° 2270	
528	6.0	17.2	Image too poor to measure additional lines
1076	14.7	9.6	Image too poor to measure additional lines.
1125	5.6	17.3	Image too poor to measure additional lines
1179	5.0	17.8	Image too poor to measure additional lines
	Class G	D. C. No. 5914. β Virginis H.P. 2028. D.M. +2° 2489	
501	10.9	13.7	431, 2; 430, 2; 429. 1; 421, 1; 420, 1; Image poor.
529	20.6	22.5	Image too poor to measure additional lines.
1139	10.3	13.2	431, 1; 430, 3; 424, 1; 423, 1; 421, 1; 410, 4; 403, 1;
1181	19.9	22.9	Near edge of plate. Image too poor to measure additional lines.
	Class G	D. C. No. 6602 η Bootis H.P. 2360 D.M. +19° 2725	
549	8.4	20.1	421, 1; 420, 1; 419, 1; Limit j.
558	18.0	10.9	424, 1; 423, 1; 421, 1; 414, 1; 404, 1; 401, 1.
1143	16.8	11.1	430, 5; 424, 1; 423, 1; 421, 1; 417, 1; 414, 1, 412, 1; 410, 4; 403. 1; Limit j.
1184	7.0	20.2	Image too poor to measure additional lines.
1205	17.1	11.8	Image too dense to measure additional lines.

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~~Book Page~~ ~~Plate No. Rem. Description of Limits on Spectra~~

April, 25, 1890.

le Lacc G. D.C. 6734. ♀ Virginis H.P. 2428. DM-1°2957

570 19.3 14.1 . Image too poor to measure additional lines.

1188 18.9 14.2 Image too poor to measure additional lines

le Lacc 2.2. D. C. 6749. Ursa Minor. H.P. 2437. D.M.+76°527

536 12.5 6.4 . Near edge of plate. Image too poor to measure additional lines

555 13.5 16.2 431, 2; 430, 1; 429. 2; 426, 4; 424, 2; 421, 1; 410, 1; 409, 2; 405, 5.

560 22.6 20.7 . Near edge of plate image too poor to measure additional lines.

560 2.9 20.6 Near edge of plate; image too poor to measure additional lines.

1242 11.4 7.2 Image too near edge of plate to measure additional lines.

1245 22.1 11.9 Image too near edge of plate to measure additional lines

1260 12.5 16.4 433. 2; 430. 2; 428. 2; 425, 4; 421, 2; 419, 3; 418, 1; 417. 1; 414, 1; 410, 2; 409. 2; 407, 1; 406, 2; 404, 2; 403, 2; 401, 2; 400. 1.

1328 21.9 21.1 Too near edge of plate to measure additional lines

1328 2.2 21.2 Too near edge of plate to measure additional lines

1340 12.8 16.3 434, 2; 431, 4; 430, 2; 428, 3; 425, 3; 423, 5; 421, 3. ~~410, 3~~; 415 400, 2; 1; ~~399~~ 413 398. 1; 1; 416 398. 1; 410, 3; 409. 3; 407. 2, 406, 2; 405, 2; 403, 2; 401, 2;

1351 22.3 11.4 Image too near edge of plate to measure add. lines

1351 2.6 11.6 " " " " " " " " " " " "

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April 25, 1890.

Plate No 2. clear G? D.C. No. 6807. ε Bootis. H.P. 2467. D.M. +27° 2417

552 20.7 24.4. Near edge of plate. Image too poor to measure additional lines.

554 10.7 6.1 Near edge of plate. Image too poor to measure additional lines.

565 11.0 15.1. 430, 3; 421, 1; 419, 1; 410, 3; Limit D.

1146 19.4 6.4 Near edge of plate. Image too poor to measure additional lines.

1186 9.8 15.8. 430, 3; 429, 1; 428, ½; 426, 1; 423, 1; 421, ½; 420, 1; 417, 1; 414, ½; 410, 4; 409, 2; 408, 1; 407, 1; 406, 1; 405, 1; 403, ½; 401, ½; 392, 2; Limit D.

1339 19.8 7.2 Too near edge of plate to measure additional lines.

clear G D.C. No. 6843 ε Bootis. H.P. 2489 D.M. +19° 2870

552 17.0 22.3 Image too poor to measure additional lines.

565 6.9 12.3. Image too poor to measure additional lines.

1186 5.8 13.1. 418, 2; Image too poor to measure additional lines.

1246 15.8 23.1 Image too poor to measure additional lines.

clear L? D.C. No. 6860. β Ursae Minoris. H.P. 2500. D.M. +74° 595

550 6.1 7.7. Image too poor to measure additional lines.

555 16.8 13.3. 433, 1; 431, ½; 430, 2; 429, 2; 428, 1; 426, 3; 425, 3; 423, 2; 421, 1; 419, 1; 417, 1, 410, 1; 409, 3; 407, 2; 406, 2; 405, 3.

560 6.6 18.3, 430, 2; 429, 3; 428, 2; 426, 3; 424, 5; 423, 2; 420, 3; 418, 2; 417, 2; 410, 1, 409, 3; 406, 2; 405, 2, 403, 2, 400, 1.

1221 5.4 8.8 Image too poor to measure additional lines.

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April, 25, 1890.

Plate Nos.

D.M. +74°595

D.D. No. 6860. β Ursae Minoris · H.P. 2500.

1245 4.4 - 8.4 Image too near edge of plate to measure additional lines.

1260 15.6 13.6. 433, 2; 430, 2; 428, 2; 426, 3; 424. 4; 423, 2; 421, 3; 420, 2; 419, 1; 417, 1; 414, 1; 412, 1; 410, 2; 409, 4; 407. 2; 405, 2; 403, 2; 402, 2.

1328 6.0 18.9 Image too dense to measure additional lines

1340 15.9 13.5. 433, 1; 430, 2; 428, 2; 424, 4; 423, 2; 421, 2; 420, 2; 417. 2; 414. 2; 412, 2; 410. 3 409. 3; 407. 1; 406, 2; 405, 2; 403, 2, 402, 2, 401, 2, 400 2; 398, 1 Bright bands of Grating plate slightly thin 394.

1343 14.2 23.6 Near edge of plate. Image too dense to measure additional lines; 410?

1351 5.4 8.2. Image too dense to measure additional lines.

Class G?

D.D. No. 6886. Camelopardalis · H.P. 2516 D.M. +83°431

550 9.6 10.9 Image too poor to measure additional lines.

587 8.6 20.5 Image too poor to measure additional lines.

1245 8.6 11.5 Image too poor to measure additional lines

1256 6.4 6.9. Near edge of plate. Image too poor to measure additional lines.

1328 9.2 16.1 430, 4; 423, 2; 421, 1; 419. 1; 417. 1; 415, 1; 410, 3; 409. 1; 408, 1; 407, 1, 405, 2; 403, 3; 401, 1; 400, 1.

1351 8.8 11.1 ~~407. 1;~~ 429, 1; 426, 4; 417. 2; 410, 3; 409. 2; 407. 2. Image too poor to measure additional lines

1354 7.8 20.3 Image too poor to measure additional lines.

1450 5.1 24.2

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April, 25, 1890.

Plate Nos.	Class L?	D. C. No. 7082. ζ Ursae Minoris. H.P. 2616. D.M. +77°592
555	10.0 8.9	Image too poor to measure additional lines
560	20.3 12.9	Image too poor to measure additional lines.
1260	8.8 9.1	Image too poor to measure additional lines.
1328	19.6 13.4	Image too poor to measure additional lines.
1340	9.1 9.0	Image too poor to measure additional lines.
1343	9.3 17.2	433, 2; 430, 2; 428, 2; 424, 4; 417. 2; 410, 1; 409. 1; Image poor.
1354	18.5 21.3	Image too poor to measure additional lines.
		D? changed from M? D. C. No. 7321. g Herculis. H.P. 2772. D.M. +42°2714
1250	20.2 - 7.6	
1330	11.0 13.4	
		Class G. D. C. No. 7373 ζ Herculis H.P. 2807. D.M. +37°2884
598	2.5 17.2	Near edge of plate. Image too poor to measure additional lines.
599	22.5 17.1	
610	12.5 7.7	Image too poor to measure additional lines.
612	12.1 24.2	Image too near edge of plate to measure additional lines.
1329	11.5 - 8.3	Image too dense to measure additional lines.

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~~Book~~ ~~Page~~ Plate ~~V.~~ ~~No.~~ ~~Typo.~~ ~~Rem.~~ No. ~~Description of Lines on Spectra.~~

April, 25, 1890.

Plate Nos. D.C. No. 7373 ζ Herculis - H.P. 2807

1355 1.8 16.5 Near edge of plate, only a small portion of spectrum visible.

1356 21.6 16.2.

1481 11.5 9.9 424, 2; 421, 2; 419, 2; 417, 2; 413, 2; 410, 3; 405, 2; 401, 1.

Class G D.C. 7678. D.M. +69° 933

1333 5.9 12.3 Image too poor to measure additional lines.

1395 15.6 19.4 Image too poor to measure additional lines.

1450 15.8 18.5

G changed from K? D.C. 8073 Sagittarius. H.P. 3088. D.M. -18° 4926.

1377 13.0 17.9 Image too poor to measure additional lines.

Class G? D.C. 8243 d Draconis. H.P. 3136. D.M. +56° 2113

628 12.4 17.7 430, 5; 424, 2; 419, 3; 407, 2; Image poor

660 2.5 12.1 Image too near edge of plate to measure additional lines

1384 11.6 17.2 430, 3; 424, 2; 410, 2; 408, 2; 402, 2; 400, 1. Image poor.

1395 21.0 7.8 Image too near edge of plate to measure additional lines.

1450 20.8 6.7

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Class G. D.C. 8422 β Lyrae H.P. 3193.

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Plates
Missing.

1250

1330
1356

1450

599

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