1891phae.proj..443n

KG
11365
442

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KA 11365.442

1891phae.proj..443D

STELLAR MAGNITUDES.

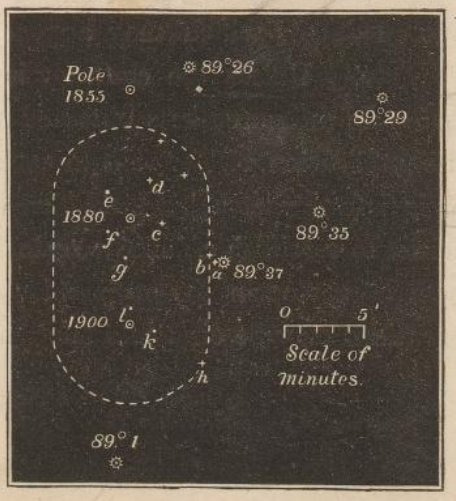
A REQUEST TO ASTRONOMERS.

THE scales adopted by different observers in their estimates of stellar magnitudes differ considerably from each other, as is well known. As regards the brighter stars, these differences, indeed, are comparatively unimportant; but they become larger and more perplexing when the objects observed are faint. Variations of three or four magnitudes may be expected between the estimates made of the brightness of minute companions seen near a brilliant star. It is needless to point out the inconvenience of this state of affairs, which at times nearly deprives the estimated magnitudes, found in catalogues, of their meaning and consequently of their value.

In the hope of providing a partial remedy for this defect, a series of Photometric Observations of Stars of various magnitudes, situated near the north pole, has been undertaken at the Harvard College Observatory. The region has been selected as one which may always be conveniently observed in the northern hemisphere, so that the brightness of a star observed in another part of the sky can readily be compared by estimate with any standard polar stars the relative brightness of which may have been determined by photometric measurements.

The table and chart given below are designed to serve as guides in finding the stars which are, as has been said, in course of photometric measurement at the Harvard College Observatory. The stars given in the table are arranged approximately in the order of their brightness, the first being *a* Ursæ Minoris, which is taken in all cases as the standard of comparison, and the next three, δ Ursæ Minoris, 51 Cephei, and λ Ursæ Minoris. The chart is a copy of a sketch showing the approximate relative position of ten faint stars very near the pole, which are denoted by the Italic letters *a*, *b*, *c*, *d*, *e*,

DM.	α 1880.	δ 1880.
	h *m*	
88° 8	1 14	88° 40′
86° 269	18 11	86° 37′
87° 51	6 44	87° 14′
88° 112	19 44	88° 57′
88° 4	0 51	88° 23′
88° 9	2 3	88° 36′
89° 3	2 28	89° 36′
89° 35	17 50	89° 48′
89° 37	19 28	89° 54′
89° 1	0 19	89° 45′
89° 26	13 23	89° 49′



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f, *g*, *h*, *k*, *l*. The places of the pole for 1855, 1880, and 1900, and of five stars from the Durchmusterung, four of which occur in the table, are also indicated upon the chart, to facilitate the identification of the faint stars. The objects called *c* and *e* are nearly in the prolongation of the line through DM. 89° 37 and *b*. Between these last, and more nearly in the same line than it appears to be in the chart, lies the star *a*.

The value and interest of the photometric results to be obtained at the Harvard College Observatory may be greatly increased by the co-operation of astronomers elsewhere. All who are desirous of improving the present system of comparing the brightness of stars are therefore requested to make estimates of the magnitude of as many as may be convenient of the stars above mentioned. It is desirable that the estimate should be made, for each star which may be observed, on five different nights, and that each estimate should be, if possible, entirely independent of those previously made. It will add to the value of the work if, on every occasion when the fainter stars are looked for, a record is made of such of them as can then be seen, even if no estimate of their magnitudes is attempted.

Observers are also requested to note the approximate places of any stars not represented upon the chart, but within five minutes of the place of the pole at any time between 1880 and 1900. The boundary of this region is represented on the chart by a dotted line. The stars not shown within it have been omitted as unnecessary for the purpose of finding the others, and several of these omitted stars are inconveniently faint for photometric observation; but records of their visibility at any time and place will be valuable as evidence of the state of the atmosphere and character of the instrument employed in the observations.

All astronomers who may be induced by this request to make any observations of the kind just described will confer a favor upon the Harvard College Observatory by sending to it a copy of their records, accompanied by a statement of any modification of the proposed method of observation which they may have adopted, as well as any additional details which may appear desirable, with regard to the instruments employed, etc. Unless the contrary is requested, the results will be published with the photometric measurements obtained at the Harvard College Observatory; and a copy of the publication will be sent to each observer who has co-operated in the work.

It is hoped that a large number of those astronomers whose experience has been sufficient to establish a definite scale for their estimates of stellar magnitude will consent to take part in the proposed observations, in order that the published series of observations may be complete enough to be of general utility.

EDWARD C. PICKERING,
Director of the Harvard College Observatory.

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16h 37m +36° 41'



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Variable unreachable.

~~ζ Aquarii.~~
~~R Vir. Var.~~
~~ζ " "~~
~~R Cancri.~~
~~ζ Ceti.~~ 23 r0 -9.2
~~U Librae.~~
~~X " "~~
~~X Scorpii.~~
~~S. " "~~
~~S Ophiuchi.~~

July 17.
~~R Coronae~~
~~R Serpentis.~~
~~ζ " "~~
~~ζ Herculis.~~

July 20.
~~ζ Aquarii.~~

~~Z Sagittarii.~~ 19 11 -21°
~~ζ Capricorni.~~ 21 26 -14.6

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1891phae.proj..443D

Feb. 5, 1891

7 35 ○ Ceti invisible fainter than 6.0
Sky covered with light invisible cloud. Seeing very poor

T Monocerotis

7 47 T = f

7 51 S Monocerotis

S = b

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nasa.plate.proj.1430

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Feb. 6, 1891

8 5 — ○ beta invisible — J. obs.

8 25 — T Monocerotis
f 2 T 239

S Monocerotis

8 26 — b 1 S 2 d

8 45 — ~~U Monocerotis~~
ξ Geminorum
α d(2) 1 ξ 2 e(N)
Mr. Readis comp. stars adopted.

U Monocerotis

8 50 — U = α d some haze

R before

9 17 — R not seen. Fainter than 7.5
Comp. stars selected.

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Feb. 10, 1891

T Monocerotis

7 15 f 2 T 3 g

7 17 e bété invisible

7 19 S Monocerotis
S = b

7 23 U Monocerotis
U 3 c U 1 d

S Canis minoris
8 2 S = d

R Leporis
8 8 R not seen. Fainter than 7.5

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Feb. 11, 1891.

T Monocerotis

7 24 f 2 T 2g

S Monocerotis

7 30 b 2 S 2d S distinctly a little ftr. than b

U Monocerotis

8 15 c 1 U 2d

o Ceti invisible ftr. than 7.0

10 55 R Leporis

R not visible ftr. than 20, rather lower

ξ Geminorum

11 10 b 3 ξ 1 c

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Feb. 13, 1891.

T Monocerotis

7 58 f 2 T 2 q

S Monocerotis

8 24 S = b

δ

8 40 ε Geminorum

c 2 ε 4 d - ε seems much brighter than d.

R Leporis

9 00 R not seen. ftr. than 6ᵐ. moonlight strong

U Monocerotis

9 10 d 1 U Moonlight strong & stars at about limit of visiblity

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March 1. 1891.

T Monocerotis

q 15 f 1 T 29 half weight

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1891phae.proj..443D

Mar. 30 1891

U Monocerotis

7 50 d 2 J 3 e

& Geminorum

9 00 e 2 ζ

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1891phae.proj..443D

April 8, 1891.

7 50 τ Monocerotis
f 2 τ 3 g

8 15 u Monocerotis
d 3 τ 1 e

9 30 ξ Geminorum
c 2 ξ 1 d (naked eye)

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1891phae.proj..443D

April 9, 1891.

7 55 — F Monocerotis
F = g

8 05 — U Monocerotis
d 3 U 2 e

8 30 — ζ Geminorum
e 2 5 4 f

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1891phae.proj..443D

April 25, 1891.

8 00 T Monocerotis
f 2 Trig

U Monocerotis
Too low

9 10 ζ Geminorum
C 2 5 1 d

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1891phae.proj..443D

Apr. 27, 1891.

U Coronae

U thought certainly to be seen but is very

9 10 faint. U +

U 1 f Limit of visibility. No other comps. seen.

Comparison stars used from Chandler's chart and in that notation.

This equals U 1 b

δ Librae

10 59 δ found. To the north pointing northwards is a pair which pair points to another star about equidistant vars and pair. Single star (last mentioned) is 1 grade ⅓ than var. & brighter star of pair is 2 brighter.

δ 1 b

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1891phae.proj..443D

Apr. 28, 1891.

ξ Geminorum

8 29 d 1 & 2 e

U Coronae

~~9 18~~ ~~b 2 U 1 c~~

9 30 ~~a~~ c 1 U 2 d

a 2 U 3 d. This Star d not used. Reject this obs.

d Librae

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Apr. 29, 1891.

	U Coronae
8 28	δ^c 2 U 2 or 3 δ^d
	c just glimpsed and rather uncertain.
8 45	ξ Geminorum
	e 2 ξ 3 f ~~(no star ftn)~~
	σ Librae
9 50	a 2 σ 2 b
	U Coronae
10 55	δ^c 3 U 1 δ^d

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1891phae.proj..443D

Apr. 30, 1891.

9 40 U Coronae
fc 1 U 3 cd

ξ Geminorum
to low

10 00 δ Librae
a 2 δ 2 b

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May 1, 1891.

ζ Geminorum

9 10 d 3 ζ 2 e

α Coronae

9 15 α^b 2 α 1 f^c

σ Librae

9 25 a 2 σ 2 b

α Coronae

10 57 α^b = α

σ Librae

11 00 a 1 σ 3 b

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1891phae.proj..443D

May 2, 1891.

	ξ Geminorum
8 05	c 2 ξ 1 d
	U Coronae
8 21	a 2 U 3 b
	δ Librae
9 17	c 2 δ 3 d
	U Coronae
10 48	a 3 U 2 b
	δ Librae
10 55	c 2 δ 2 d

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1891phae.proj..443D

May 4, 1891.

α Coronae

8 36 a 2 M 3 b

ε Geminorum

8 47 b 3 S 2 c

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No.	Incorj.	Page			
103	T Andromedae	140			
112	R Andromedae	104	0^{h} 14 50		
114	S Ceti	98	0 16 41		
573	R Piscium	106	1 23 10		
782	R Arietis	108	2 7 53		
806	O Ceti	116	2 12 1		
845	R "	110	2 18 38		
893	U "	112	2 26 45		
1577	R Tauri	114	4 20.21		
2100	U Orionis	28	5.47 13		
2528	R Geminorum	118	6^{h} 58.37		
2684	S Canis Min.	34	7 24 51		
2946	R Canori	24	8 .8.34		
2976	V "	26	8.13.27		
3170	S Hydrae	22	8.46.0		
3184	T "	30	8 48.37		
3477	R Leo Min.	40	9.36.52		
3493	R Leonis	36	9.39.45		
4300	X Virginis	42	11.54.25		
4315	R Canum	44	11.56.49		
4377	T Virginis	38	12,7,10		
4407	R Corvi	46	12,12 8		
4492	Y Virginis	48	12,26,25		
4521	R Virginis	52	12^{h},31,9		
4596	U "	50	12^{h},43,45		
4816	V "	54	13,20,19		
4826	R Hydrae	58	13.21.48		
4847	S Virginis	56	13,25,26		
4948	R Can. Ven.	60	13,42,43		
5237	R Bootis	62	14, 30, 48		
5494	S Librae	84	15, 13, 4		
5501	S Serpentis	64	15, 14, 52		
5504	S Coronae	124	15, 15, 29		
5667	R "	72	15, 42, 36		
5770	R Herculis	66	15, 59 43		
5826	T Scorpii	74	16^{h}, 8, 25		
5889	U Herculis	70	16, 19. 23		
5950	W "	86	16, 30, 5		
6044	S "	128	16^{h}, 45, 18		
6132	R Ophiuchi	122	16,59 27		
6512	T Herculis	88	18, 3, 37		
6733	R Scuti	90	18. 39, 45		
6905	R Sagittarii	126	19, 5, 11		
7045	R Cygni	76	19, 32, 56		
7120	X "	120	19^{h}, 43, 0		

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7259	R	Cygni	132	20.5.7
7261	R	Delphini	78	20.7.55
7299	U	Cygni	82	20.15.7
7428	V	"	80	20.36.28
7468	T	Cygni	92	20.42.17
7560	R	Vulpec	130	20.57.56
8230	W	Cygni	96	22.49.20
8290	R	Cygni	94	22.59.20
8373	S	"	100	23.13.13
8572	R	Cygni	102	23.36.19
103	T	Androm	140	0.14.50

S R Cygni

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May. 13, 1891.

U Coronae

8 44 U not visible stars a b & c visible but not d. Sky somewhat hazy.

δ Librae

~~f 3 2 6~~.

v-67 v V Coronae.
v-67 7 R Serpentis.
v-230 R Scorpii.
v-231 S "
v-247 V Ophiuchi
6043 — "
7-v7 R Sagittae.

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Index to Revised Lists of Comp. Stars.

Desig.	Page.	Desig.			
S Hydrae.	22.	3170	✓	+	+3°
R Cancri.	24.	2946	✓		+12
V Cancri.	26.	2976	✓		+18
U. Orionis.	28.	2100			+20
T Hydrae.	30.	3184	✓		-9
S Can. Min.	34.	2684	✓		+9
R Leonis.	36.	3493	✓		+12
T Virginis.	38.	4377	✓		-5
R Leo. Min.	40.	3477			+35
X Virginis.	42.	4300	✓		+10
R Comae.	44.	4315	✓		+20
R Corvi.	46.	4407	✓		-12
Y Virginis.	48.	4492	✓		-4
U Virginis.	50.	4596	✓		+6
R Virginis.	52.	4521	✓		+2
V Virginis.	54.	4816	✓		-2
S Virginis.	56.	4847	✓		-6
R Hydrae.	58.	4826	✓		-23
R Can. Ven.	60.	4948			+40
R Boötis.	62.	5237			+27
S Serpentis.	64.	5501	✓	+	+15
R Herculis.	66.	5770	✓	X	+19
U Herculis.	70.	5849	✓		+19
R Coronae.	72.	5667		X	+29
T Scorpii.	74.	5826	✓		-23
R Cygni.	76.	7045			+50
R Delphini.	78.	7261.	✓	X	+9
V Cygni.	80.	7528.		X	+48
U Cygni.	82.	7299.		X	+47

Desig.	Page.	Desig.		
S Librae.	84.	5494.	✓	-20°
R Herculis.	86.	5950.		+32 X
T Herculis.	88.	6512.		+31 F
R Scuti.	90.	6733.	✓	-6 X
T Aquarii.	92.	7468.	✓	-6 X
R Pegasi.	94.	8290.	✓	+10 X
S Aquarii.	96.	8230.	✓	-21 F
S Ceti.	98.	114.	✓	-10 F
S Pegasi.	100.	8373.	✓	+2 X
R Aquarii.	102.	8512.		-16 F
R Androm.	104.	112.		+32 X
R Piscium	106.	513.	✓	+2 X
R Arietis	108.	782.		+26
R Ceti	110	845.	✓	-1
U Ceti	112	893.		-14
R Tauri.	114	1577.	✓	+10
o Ceti	116	806.	✓	-6
R Gemini.	118	2528.		+23
χ Cygni	120	7120		+33
R Ophiuchi	122	6132	✓	-16
S Coronae	124	5505		+32
R Sagittarii.	126	6905	✓	-20
S Herculis	128	6044	✓	+17 X
R Vulpec.	130.	7560		+23 X
R S Cygni	132.	7259		+36 X
S S Cygni	134			

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Comp. Stars for Variables which have been revised. The following Comp. Stars, entered in this book are in the final order of letters and magnitudes, as far as they go.

S Hydrae.

Desig.	R.A. 1855	Dec. 1855	Sm. Magn.	Sm. No.	R.A. 1900.	Dec. 1900.
a	4h 50m 40.0s	+2° 6.′	7.5	2112	4h 50m 30	+1° 56.′
b	49 41.2	+3 5.0	7.3	2099	52.9	+2 55.
c	46 21.0	+2 22.3	7.4	2044	44.7	+2 12.
d	47 34.4	+3 11.2	8.1	2093	49.9	+3 1.
e	46 46.4	+3 39.9	8.7	2044	49.2	+3 30.
f	46 19.5	+3 3.1	8.6	2047	48.6	+2 53.
g	45 17.4	+3 34.0	9.0	2041	47.7	+3 24.
h	45 26.6	+3 55.1	9.3	2043	47.4	+3 45.
k	44 40.3	+3 17.0	9.5	2077	47.0	+3 7.
l	44 50.4	+3 29.1	9.5	2079	47.2	+3 19.
k′ m.	47 10.	+3 16				
k m.	47 10.	+3 -35				
~~47 0. +3 37~~						
l′ 0	46 4.	+3 30				
l	45 36.	+3 36	(Uncertain as to rel. brightness)			

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g_{n+1}/g_n	$\frac{11}{16}$	$\frac{g_2}{g_1}$	$\frac{g_3}{g_2}$	$\frac{g_4}{g_3}$	Σ / No.
•	•	3	3		3.0
4	2,	5	•	•	3.7
5,	6,	4	•	•	5.0
4,	5,	6	•	•	4.7
3,	3,	3	•	•	3.0
3,	3,	4	•	•	3.3
5,	6	5	•	•	5.3
•	4,	5,	3	•	4.0
•	5,	3	,3	•	3.7
•	5,	4,	5	•	4.7
•	5,	5,	5	•	5.0

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Sent Seagrave, chart of bt. & ft. stars.

R Cancri.

Desig.	R.A. 1892	Dec. 1892	Mag.	No.	R.A. 1900	Dec. 1900
a	7h 27m 0.s	+13° 32.′2	7.8	1831	7h 29.m 5	+13° 2 7′
b	7 28 46.	+16 9.9	6.0	1790	7 27.5	+16 3
c	8 15 29.	+11 6.3	6.7	1830	8 18.7	+10 58
d	8 9 40.7	+9 18.7	7.7	1921	8h 12.1	+9° 11′
e	8 12 37.1	+9 27.7	7.9	1934	8 15.0	+9 28
f	8 8 35.0	+11 29.7	7.8	1800	8 11.1	+11 22
g	8 9 8.8	+11 47.7	8.2	1806	8 11.6	+11 40
h	8 10 10.3	+12 6.2	8.7	1812	8 12.7	+11 58
K	8 1 7.7	+10 27.7	8.2	1738	8 3.6	+10 48
l	8 8 27.8	+10 28.7	8.7	1764	8 11.7	+10 27
m	8 9 6.1	+12 27.8	9.2	1806	8 11.6	+12 20
n	8 6 9.7	+12 23.8	9.4	1797	8 8.7	+12 16
o	8 7 49.7	+12 34.8	9.7	1801	8 10.3	+12 27
p	8 6 46.7	+12 29.3	9.7	1799	8 9.3	+12 21
q	8 40.3	+12 27.7	9.7	1807		
r	9 33.	+12 6.				
s	8 34.	+12 11.				
t	8 27.	+12 11.				
u	8 42.	+12 3.				
w	9 14.	+12 17.				
x	9 2.	+12 18.				
y	9 0.	+12 16.				
z	8 18.	+12 12.				
α	8 42.	+12 8.				
β	9 2.	+12 12.				

Positions read up from my small chart.

Sent Seagrave chart of faint stars from Q to β incl. (in finial notation, as above.)
Apr. 23. 1897.

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1891phae.proj.4430

Diff. (R)	Mean.	Resids.
7 5 5	.57	1 1 1
3 3 4	.33	0 0 1
7 4 3	.47	2 1 2
3 4 6	.43	1 0 2
3 3 4	.33	0 0 1
4 5 5 4	.45	0 1 1 0
3 4 3 4	.35	1 0 1 0
3 2 4 3	.30	0 1 1
3 3 3 3	.30	0 0 0 0
3 4 4 3	.35	1 0 0 1
5 5 6	.53	0 0 1
4 3 3 3	.32	1 0 0 0
5 4 5 6	.50	0 1 0 1
2 2 3	.23	0 0 1
4 4 5	.43	0 0 1

The above estimates of Mr. Reed correctly applied to revised list and notation of bst. and st. stars.

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Sent Leyrard.

V Cancri.

Descr.	R.A. 1900.	Dec. 1900.	Dm. Magn.	Dm. No.	R.A. 1900.	Dec. 1900.	Adopt. Magn.
a	8h 17m 37.7s	+17° 32′.1	6.2	1842.	8 20.2	+17° 24′	6.1
b	8 [illegible]	+16 [illegible]	6.6	1662	7.3	+16 49	6.4
c	8 19.6	+16 37.3	6.8	1908	8 16.9	+16° 29′	7.0
d	16 30.3	+17 39.7	7.0	1836	19.1	+17 32	7.4
e	14 [illegible]	+18 7.9	8.3	1927	17.3	+18 0	7.9
h X	12 33.3	+17 24.[illegible]	9.0	1823	[illegible].2	+17 16	8.2
f X	8 31.8	+18 [illegible].8	8.8	1926	17.1	+17 [illegible]7	8.5
g X	12 [illegible]	+18 19.1	8.7	1917	[illegible].[illegible]	+18 11	8.7
k	8 [illegible]3.3	+17 [illegible]0.6	9.0	1833	18.[illegible]	+17 33	9.1
l	13 10.8	+18 7.3	9.1	1921	[illegible].8	+17 [illegible]9	9.4
m	13 38.6	+17 [illegible]9.7	9.2	1826	16.2	+17 [illegible]2	9.8
n	8 [illegible]3	+18 1.8	9.8	1928	17.8	+17 [illegible]3	10.1
o	13 [illegible]2.3	+18 13.9	9.[illegible]	1928	16.[illegible]	+18 6	10.4
p	13 28.3	+18 7.0	9.[illegible]	1922	16.1	+17 [illegible]9	10.8
q	13 48	+17 46.0	11.5	Not Dm.			11.2
Var.	13 27.	+17 [illegible]	Var.		16.0	+17 36	

m 13 48. +17 46

x 14 32. +17 [illegible].

(x is 4th fol. of a double)

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1891phae.proj..443D

3	3	2	3	2.5	1001
6	7	4	4	5.2	121$\bar{1}$1
5	5	4	5	4.8	00$\bar{1}$0
6	6	7	6	6.2	0010
4	4	2	2	3.0	11$\bar{1}$1
1	3	2	2	2.0	$\bar{1}$100
4	2	4	3	3.2	1$\bar{1}$10
4	5	4	5	4.5	0101
3	3	3	4	3.2	0001
5	5	3	2	3.8	111$\bar{2}$
3	3	4	3	3.2	0010
5	5	4	6	5.0	00$\bar{1}$0
4	4	5	3	4.0	001$\bar{1}$
5	5	5	4	4.8	0001

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1891phae.proj..443D

Sept Eagrave. both. + pt. chart.

U Orionis.

Final Designation	R.A. 1875	Dec. 1875	Dm. magn.	Dm. No.	R.A. 1900.	Dec. 1900.
a	5h 47m 40.0	+20° 18.8	7.0	1162	5h 47.7	+20° 16′
b	47 14.7	+20 4.4	7.1	1233	47.0	+20 4
c	47 12.7	+19 41.3	7.6	1146	47.6	+19 41
d	46 22.0	+19 43.6	6.3	1126	46.1	+19 47.
e (e′)	43 44.7	+19 49.4	6.0	1110	46.7	+19 7.0
f (e)	44 42.3	+20 1.8	7.2	1176	47.4	+20 17
g (f)	43 14.7	+19 24.6	6.8	1106	46.0	+19 30
h (g)	43 7.2	+19 42.1	7.7	1113	46.6	+19 43
k (h)	46 27.0	+19 34.1	8.6	1128	47.1	+19 37
l (k)	46 34.8	+19 39.1	8.7	1131	47.3	+19 40
m	47 1.3	+20 7.2	9.2	1172	7.0	+20 6
* n	47 7.6	+20 3.2	9.3	1182		
~~n~~	~~44. 17.7~~	~~+20 7.0~~	~~9.4~~	~~1187~~	7.0	+20 6
o (n′)	48 41.0	+20 1.1	9.7	1184	7.4	+20 1
u	47 13.	+20 8.7			49.9	+20 10
p (φ)	47 43.9	+20 8.7	9.4	1179		
q (θ)	47 20.	+20 8.				
r (χ)	47 7.	+20 3.				
s	47 4.	+19 56.				
t	47 5.	+20 3.				
u	46 56.	+20 6.				
w	47 5.	+20 8.				
x	47 24.	+20 8.				
y	46 56.	+20 9.				

Read up from my small chart.

* New star n substituted for old star n Apr. 24. 1893.

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1891phae.proj..443D

Est. (R.)	Mean.	Resid.
3 2 3 2 3 2	.2	1 0 1 0 1 0
3 4 4 4 3 4	.3	1 0 0 0 1 0
5 3 3 5 6 4	.4	3 1 1 1 1 2 0
0 3 2 2	.1	4 2 1 0 0
7 5 5 5	.5	5 1 1 1 1
3 5 3 3 5 4 4	.3	4 0 1 1 1 0 0
6 4 5 6 5 5	.5	2 1 1 0 1 0 0
4 3 3 3 3 3	.3	2 1 0 0 0 0 0
3 2 4 3 5 3 3	.3	3 0 1 1 0 2 0 0
5 6 3 7 5 5 6	.5	3 0 1 2 2 0 0 1
5 4 6 6 6 6 5	.5	4 0 1 1 1 1 1 0
2 5 3 4	.3	2 1 0 1
2 3 3	.2	7 1 0 0
6 6 5	.5	7 0 0 1
2 2 3	.2	3 0 0 1

The above estimates of mn. R. correctly applied to revised list and notation of bt. + ft. stars.

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1891phae.proj..443D

Sent Leyrard. chart of tot. obs. with letters but faint chart at bottom not lettered.

T Hydrae.

Desig.	R.A. 1875.	Dec. 1875.	Dur. hgm.	Dm. No.	R.A. 1900.	Dec. 1900.
a	4h 42m 36.6s	−4° 6.2′	6.4	2.00	4h 44.4s	−4° 16′
b	47 10.7	−4 12.4	7.0	2.14	49.4	−4 23
c	44 16.9	−4 3.2	7.2	2.04	46.2	−4 42
d	23 16.2	−4 33.4	7.2	2.49	22.2	−4 43
e	42 26.9	−9 22.2	7.2	2693	20.6	−9 32
f	20 22.9	−4 21.4	4.2	2.36	22.6	−9 1
g	47 19.9	−4 40.0	4.3	2.20	49.2	−4 20
h	20 3.7	−4 12.4	4.6	2.34	22.4	−4 23
k	49 42.4	−4 30.7	4.4	2.32	21.9	−4 41
l	44 21.4	−4 21.0	9.1	2.24	21.1	−9 1
m	49 14.2	−4 44.9	9.6	2.29	21.4	−4 29
n	44 42.6	−4 32.7	10	2.27	20.9	−4 43
o k						
p l						
q m′						
(R) m						
(S) m						

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1891phae.proj..4430

91 (13/11)	91 (13/1)	91 (13/19)	91 (13/25)	92 (3/29)	92 (3/30)	92 (12/20)	92 (12/22)	95 1 19	95 2 2	95 2 5	95 2 11	No.	Mean.
				4,	6,	6		3	7	5	6	7	5.3
		4,	3,		1,	6		7	5	3	2	4	3.9
				2,	3,	3		1	1	2	5	7	2.4
				5,	4,	5		3	.	.	.	4	4.2
4,	5,	3,	5,	4,	6			6	.	.	.	7	4.7
				5,	5,	5		7	4	2	0	7	4.0
					3,	4,	4	.	2	1	4	6	3.0
					4,	6,	5	.	.	6	4	5	5.0
4,	4,	4,			3,	4		.	5.5	.	7	7	4.5
	4,	3,						.	.	.	4	3	5.0
					3								3.0
			5		4	3							
					2	3							
					5	4							
			2		3								

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ν Hydrae.

Descr.	R.A. 1875.	Dec. 1875.	Mag.	Ref.	R.A. 1900.	Dec. 1900.
a	4h 5m 40.5s	+2° 6.0	7.5	2112	4h 5m 3.0	+1° 56′
b	49 41.2	+3 5.0	7.3	2099	52.0	+2 55
c	46 21.0	+2 22.3	7.4	2044	44.7	+2 12
d	47 34.4	+3 11.2	8.1	2093	49.9	+3 1
e	46 46.2	+3 39.9	8.7	2044	49.2	+3 30
f	46 19.5	+3 3.1	8.6	2049	44.6	+2 53.
g	45 17.4	+3 34.0	9.0	2041	47.7	+3 24.
h	45 26.6	+3 55.1	9.3	2043	47.4	+3 45.
k	44 40.2	+3 17.0	9.5	2077	47.0	+3 7
l	44 50.2	+3 29.1	9.5	2079	47.2	+3 19

(Already copied in p. 22.)

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Sent Seagrave. chart. with bot. & ft. stars lettered.

S Canis Minoris.

Desig.	R.A. 1875.	Dec. 1875.	Mag.	No.	R.A. 1900.	Dec. 1900.	
a	7h 27m 36.4s	+7° 2' 3	7.3	1773	7h 30m 0	+7° 46'	4
b	23 3.2	+8 1.2	7.8	1791	2.6	+8 46	4
c	21 42.2	+8 8.2	8.0	1747	24.2	+8 3	3
d	22 37.7	+8 0.8	8.0	1769	2.0	+7 56	4
e	24 53.4	+8 7.8	8.5	1801	27.4	+8 3	5
f	25 21.2	+8 16.7	8.8	1807	27.8	+8 12	3
g	26 5.9	+8 32.8	9.0	1811	28.5	+8 27	4
h	26 4.1	+8 13.4	9.0	1810	28.5	+8 7	4
K	25 10.2	+8 42.2	9.5	1805	27.6	+8 37	4
l	24 25.7	+8 40.9	9.3	1799	26.8	+8 36	4

m α

n β

o γ

p δ

q ε

r ζ

s

t

u

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1891phae.proj..443D

'91	(3/10)	'92	(1/5)	(12/5)	Mean.	
4,	4,	5	4.3		0 0 1	
4,	4,	6	4.7		1 1 1	
3,	3,	3	3.0		0 0 0	
4,	4,	5 (9/2, 6)	4.3		0 0 1	
5,	5,	5	5.0		0 0 0	
3,	4,	3	3.3		0 1 0	
4,	5,	6	5.0		1 0 1	
4,	3,	4	3.7		0 1 0	
4,	3,	6	4.3		0 1 2	
4,	4,	5	4.3		0 0 1	
3,	3,	3	3.0		0 0 0	
3,	5,	6	4.7		2 0 1	
3,	5,	4	4.0		1 1 0	
	5,	5	5.0		0 0	
	3,	4	3.5		1 0	

The above estimates of Mr. R. correctly applied to second list and notes on bt. and ft. stars.

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1891phae.proj..443D

Lent Leyrare.

R Leonis.

Desig.		R.A. 1875.	Dec. 1875.	Ann. Prec.	Ann. Var.	R.A. 1900.	Dec. 1900.	
a		10h 0m 12.3s	+10° K3.K	ν.0	2112	10h 2.6m	+10° 30ν	4
b		9 ν2 32.9	+ε KK3	ν.0	2301	9 νK9	+ε 31	4
c		9 2K 4.0	+11 νν.7	ν.3	20ν3	9 26ν	+11 KK	3
d		9 ν0 26.9	+13 7.2	ν.ν	21ε3	9 ν2ε	+12 νK	2
e		9 3ν Kθ.6	+1K Kε.ν	6.0	2136	9 3ε.3	+1K 2ε	3
f		9 3ε 3K.3	+12 29.2	6.2	2090	9 K1.0	+12 17	4
g		9 27 ν7.7	+1ν 1.K	6.ε	2077	9 30.ν	+1K Kθ	4
h		9 39 3ε.θ	+12 1ν.0	7.0	209ν	9 K2.0	+12 3	2
k		9 K3 1.9	+12 30.7	6.ε	210ν	9 KνK	+12 19	3
l		9 3ν Kε.2	+11 11.0	ε.0	20ε7	9 3ε.2	+10 νθ	5
m		9 K2 K.7	+11 K6ν	7.ε	210ε	9 KK.ν	+11 3θ	3
n		9 39 K2.1	+11 30.ν	7.ε	2102	9 K2.1	+11 1ε	2
o		9 39 ννε	+11 3.1	ε.0	210K	9 K2.3	+10 ν1	5
p		9 K3 10.θ	+11 3K.0	ε.2	2112	9 Kν.6	+11 22	1
q		9 K1 12.1	+12 K6.6	ε.ν	2099	9 K3.6	+12 3ν	3
r		9 K1 1.ε	+13 11.3	ε.ε	2160	9 K3.K	+12 νθ	3
s	s'	9 37 13.2	+11 27.6	ε.7	209K	9 39.6	+11 16	.
t	s	9 K1 Kε.θ	+12 K6.7	θ.0	2101	9 KK.2	+12 3ν	2
u	t	9 39 27.0	+12 ν.6	θ.K	2093	9 K1.ε	+11 νν	.
w	u'	9 K1 3.θ	+11 13.ε	θ.0	2107	9 K3.ν	+11 2	.
x	w	9 K0 33.ν	+11 νε.6	θ.3	210ν	9 K3.0	+11 K7	2
y	x	9 39 32.θ	+12 2.θ	θ.ν	209K	9 K1.θ	+11 ν1	5
z	y	9 3ε θ.θ	+12 θ.ε	θ.ν	2089	9 K0.6	+11 νε	3
∠	z	9 3ε K1.7	+11 νε.θ	θ.ν	209ε	9 K1.1	+11 K7	3
β	y ∠	9 3ε K2.	+11 νθ.			9		3
γ	z β	9 3θ K6.	+11 K1.					.

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192 (3/28)	(3/30)	(12/23)	195 (1/19)	E/No.
4	3	·	3	3.3
4	4	·	3	3.7
3	5	·	3	3.7
2	2	·	4	2.7
3	3	·	2	2.7
4	5	·	3	4.0
4	5	·	4	4.3
2	3	3	·	2.7
3	4	4	·	3.7
5	4	5	·	4.7
3	3	4	·	3.3
2	3	3	·	2.7
5	3	6	·	4.7
1	3	3	·	2.3
3	3	3	·	3.0
3	·	·	3	4 3.3
·	·	·	·	· 3 2 3 .27
2	3	3	0	· 2.0
·	4	·	1.5	2 2.5
·	3	·	7	6 5.3
2	1	·	2	· 1.7
5	4	·	3	· 4.0
3	3	·	3	· 3.0
4	3	5	3	· 3.8
3	3	3	·	· 3.0
·	·	·	·	·

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1891phae.proj..443D

Lent Cayuse Apr. 29. 1897. chart of brt. comp.
also Lent Cayuse. May 11. 1897. faint comp. stars.

7 Virginis.

Desig.		1900 R.A.	1900 Dec.	Mag.	Sm. No.	1900 R.A.	1900 Dec.	
a	a	12h 2m 22.2s	−0° 24.4′	6.4	3219	12h 47m	−0° 40′	
b	b	4 17.9	−1 1.9	4.1	3466	11.2	−1 17	
c	c	10 27.1	−1 36.9	4.2	3464	12.4	−1 12	
d	d	3 13.4	−1 6.4	4.0	3444	6.2	−1 22	
e	e	4 7.2	−1 7.6	4.1	3419	10.4	−1 23	
f	f	12 17.2	−1 44.9	4.7	3476	1.3	−6 0	
g	g	7 12.2	−1 12.6	4.4	3417	9.1	−6 4	
h	h	4 40.2	−0 22.1	9.0	3239	11.0	−0 37	
k	k	6 22.4	−1 41.0	9.1	3413	4.7	−1 16	
l	l	4 14.7	−1 32.0	9.2	3410	7.3	−1 07	
m	m	6 20.1	−1 24.1	9.1	3412	4.6	−1 03	
n	n	6 07.0	−1 01.0	10.	3414	9.1	−1 16	
p	o					10m 4.1s	−1 25.9′	m
(q)	p					9 21.	−1 27.1	m
(r)	q					9 42.	−1 27.1	m
	r					9 31.	−1 27.0	m
	s					10 2.	−1 24.6	m
Position from faint star chart.	t	6 47.1	−1 6.1			9 6.	−1 21.	m
	u	6 38.1	−1 10.1			4 17.	−1 33.	m
	w	6 36.1	−1 11.1			4 11.	−1 26.	
	x	7 27.1	−1 9.1			9 46.	−1 24.	
	y	7 12.1	−1 6.1			9 31.	−1 21.	

The above sequence finial and the places in red obtained from Father Hagen's chart. Stars of finial sequence and in finial notation copied on Hagen's chart. when plotted there.

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1891phae.proj..443D

$91\frac{2}{14}$	$92\frac{3}{20}$	$9\sqrt{\frac{1}{19}}$	Nasau.	
5	3	$\sqrt{}$	K.3	1 1 1
4	4	$\sqrt{}$	K.3	0 0 1
$\frac{9\sqrt{\frac{1}{19}}}{2}$	$\frac{9\sqrt{\frac{1}{30}}}{3}$	$\frac{9\sqrt{\frac{2}{21}}}{3}$	2.7	1 0 0
7	6	K	$\sqrt{}$.7	1 0 2
$\sqrt{}$	4	$\sqrt{}$	K.7	0 1 0
0	2	$1.\sqrt{}$	1.2	1 1 0
$\frac{91\frac{2}{14}}{3}$	$\frac{92\frac{3}{20}}{4}$	$\frac{9\sqrt{\frac{1}{19}}}{6}$	K.3	1 0 2
4	4	3	3.7	0 0 1
5	4	K	K.3	1 0 0
4	4	K	K.0	0 0 0
4	$\frac{9\sqrt{\frac{1}{19}}}{6}$	$\frac{9\sqrt{\frac{2}{2}}}{3}$	K.3	0 2 1
4	3	.	$3.\sqrt{}$	0 1

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1891phae.proj..443D

Lewt Seagrave.

R Leonis Minoris.

Desig.	R.A. 1900.	Dec. 1900.	Stel. magn.	Stel. type	R.A. 1900.	Dec. 1900.	
a	9h 22m 43.2s	+35° 41.1'	7.7	20 Is	9h 25m 5s	+35° 33'	3
b	33 52.2	+35 44.0	6.5	20 K2	36.7	+35 32	5
c	24 36.0	+37 7.8	6.8	19 P8	27.4	+36 56	
d	40 23.9	+34 46.7	6.3	20 35	43.1	+34 35	
e	35 1.9	+34 41.9	7.2	20 22	37.7	+34 34	
f	28 57.2	+36 15.4	7.7	19 P2	30.8	+36 3	
g	35 32.3	+35 21.8	7.7	20 K6	38.2	+35 10	6
h	33 41.7	+35 39.1	8.0	20 K1	36.5	+35 27	
k	36 1.4	+35 37.6	8.4	20 K8	38.7	+35 26	
l	38 15.9	+34 26.4	8.5	20 29	41.0	+34 12	
m	38 20.7	+35 1.9	9.0	20 59	41.0	+34 50	
n	39 27.6	+35 53	8.9	20 59	42.2	+34 53	
o	38 22.2	+35 33.6	9.0	20 56	41.1	+35 22	
p	37 27.4	+35 32.6	9.1	20 51	40.2	+35 21	
q	38 20.4	+35 19.4	9.5	20 53	41.0	+35 7	
r							
s							

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191 (3/9)	192 (11/16)	(11/9)	4/12 (12/12)	193 (1/19)	(6/20)	(6/28)	195 (1/19)	195 (1/30)		Means.	
3	.	.	.	.			3	3	3	3.0	0 0 0 0
5	4	3	.	3			.	.	√	3.A	0 1 1 1
2	4	5	.	5			.	.	2	4.0	0 1 1 2
.	2	2	.	0			.	.	3	1.A	0 0 2 1
.	3	3	.	3			.	.	3	3.0	0 0 0 0
.	3	3	.	4			.	.	3	3.2	0 0 1 0
6	.	.	5	5			.	.	4	√.0	1 0 0 1
.	4	4	3 (12/12)	4			.	.	.	3.A	0 0 1 0
.	.	.	.	3			5	4	3	2.A	1 1 0 1
.	.	.	.	4			1	3	3	2.A	1 2 0 0
.	.	.	.	6			3	2.5	√	4.0	2 1 2 1
.	.	3	4	.			.	4	3	3.√	1 0 0 1
.	.	3	.	3			.	3	3	3.0	0 0 0 0
.	.	5	.	5			.	5	√	√.0	0 0 0 0
.	.	2	.	3			.	3	2	2.√	0 1 1 0
.	.	5	.	5			.	√		√.0	0 0 0 .

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1891phae.proj..443D

Sent Seaprise Mear. 19. '97. the fol. comp. stars from a to k incl. only, with tracing from Dun. chart.

χ Virginis.

Descrip.	R.A. 1900	Dec. 1900	Mag.	Obs.
a	11h 43m 09.5s	+12° 37.2′	7.2	2384
b	49 46.1	+10 24.4	7.7	2381
c	55 10.0	+2 53.0	8.2	2562
d	54 38.5	+10 3.2	8.2	2375
e	55 32.5	+9 30.1	8.6	2576
f	52 13.8	+9 26.2	9.0	2571
g	55 31.4	+9 36.4	9.4	2575
h	56 25.8	+9 26.1	9.3	2578
k	54 35.2	+9 49.3	9.5	2574

Var. 1 56 44.5 +9 ---.3

Var. 11 54 2.5 +9 52.7 11 56.7 +9 32.5

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Sent Seagrave chart for bright and faint stars a to u inclusive, all in field rotation

R. Coronae.

Desig.	R.A. 1875.	Dec. 1875.	Mag.	Sp.	R.A. 1900.	Dec. 1900.	
a	11h 52m 46.6	+20° 13.9	6.9	26Bk	11h 55m.0	+19° 59'	
b	11 56 38.3	+19 38.1	7.5	2B26	11 58.9	+19 23	2
c	11 53 12.9	+19 A.0	7.9	2B21	11 55.5	+18 53	3
d	11 59 58.9	+20 10.1	7.A	26A3	12 2.3	+19 55	
e	11 59 31.2	+21 19.0	A.6	2392	12 1.A	+21 K	
f	11 56 2K.6	+20 11.A	8.3	2676	11 58.7	+19 57	
g	12 0 7.K	+1A 32.0	A.5	2B70	12 2.K	+1K 17	
h	11 55 9.1	+19 20.K	A.A	2B2K	11 57.5	+19 5	4
K	11 57 KK.3	+20 21.A	A.A	267A	12 0.0	+20 7	
l	11 5A A.1	+19 23.6	9.3	2B29	12 0.K	+19 9	
m	11 55 1K.5	+19 3A.3	9.1	2B2B	11 57.5	+19 23	
n	11 57 11.5	+19 16.7	9.K	2B2A	11 59.5	+19 2	
Var.					11 59.1	+19 21	
o	d'						
p	t						
q	ε						
r	ξ						
s	η						
t	θ						
u	K						

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'92 (3/26)	(3/30)	(4/19)	(5/7)	'93 (5/6)	'95 (1/19)	Σ/No.	
·	5	5	·	5		5.0 ✓	0 0 0
2	3	2	3	2		2.4 ✓	0 1 0 1 0
3	3	4	2	4		3.2 ✓	0 0 1 1 1
·	·	·	3	5	5	4.3 ✓	1 1 1
·	·	·	3	1	2	2.0 ✓	1 1 0
·	·	3	4	2	2	2.8 ✓	0 1 1 1
·	·	4	·	4	5	4.3 ✓	0 0 1
4	·	3	4	4	·	3.8 ✓	0 1 0 0
·	·	4	3	4	·	3.7 ✓	0 1 0
·	·	5	4	4	·	4.3 ✓	1 0 0
·	·	2	3	3	·	2.7 ✓	1 0 0
·	·	5	· (m 6/p?)	5	7	5.7 ✓	1 1 1
·	·	·	·	·			
·	·	3	·	3	1	2.3 ✓	1 1 1
·	·	4	5	·	7	5.3 ✓	1 0 2
·	·	3	3	·	0	2.0 ✓	1 1 2

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R Corvi.

Desig.		1895 R.A.	1895 Dec.	1900 hour.	1900 dec.	1900 R.A.	1900 Dec.	
a'	a	12h 12m 46.6	−21° 21.9	6.5	3511	12h 15.0	−21° 37'	
a	b	12 8 7.9	−19 43.3	7.2	3442	10.4	−19 58	
b	c	12 16 31.0	−18 45.9	7.0	3380	18.8	−19 1	
c	d	12 17 57.3	−18 33.2	7.1	3384	20.3	−18 48	
d	e	12 12 13.7	−18 23.6	7.8	3368	14.5	−18 39	
e	f	12 12 25.6	−18 24.5	8.3	3369	14.7	−18 43	
f	g	12 10 47.0	−17 58.5	8.3	3396	13.1	−18 9	
g	h	12 15 47.5	−18 17.3	9.0	3378	18.1	−18 32	
h	k	12 13 29.1	−18 23.9	9.1	3373	15.8	−18 39	
Var.		12 12 8.	−18 26.9	Var.	3367	14.5	−18 42	
k	l	12 11 14.3	−18 28.1	9.4	3364	13.6	−18 32	
l	m	12 12 28.5	−18 6.0	9.5	3370	18.8	−18 21	
α	n	12 12 49.6	−18 29.9	9.3	3372			m
β	o	12 12 4.0	−18 26.8	9.9	3366			m
	p	12 12 55.	−18 27.0	..	..	12 15 14.	−18 42.1	m
γ	q	12 12 26.	−18 29.1	..	..	12 14 55.	−18 44.2	
	r	12 13 20.	−18 30.4	..	..	12 15 39.	−18 45.5	m
	s	12 12 52.	−18 26.4	..	..	12 15 11.	−18 41.5	m
	t	12 11 58.	−18 18.6	..	..	12 14 13.	−18 33.7	X
	u	12 12 18.	−18 24.7	..	..	12 14 29	−18 39.8	

~~+ 12 12 26. −18 30.5~~

~~l 12 12 21. −18~~

~~— 12 12 3. −18 27.~~

~~m 12 12 49. −18 21.~~

Above Positions of p, q, r, s, t, u determined from Hagen list, and u from interpolation on chart.

~~The 1895 positions of stars n, o, p, q, r, s, t, u obtained by applying precession with reversed sign to the 1900 places of same above.~~

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$\frac{3}{21}$

4 4

6^{x} 3

2 4

5^{x} 4

4 6

5 3

4 3

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γ Virginis.

Scott Seaman. Mar. 23. 1897. chart of bot. comps. stars for γ Virginis.

Desig.		1875. R.A.	Dec.	dm. magn.	dm. dec.	1900. R.A.	Dec.	
a	a	12h 22m 36.0	−5° 12′.9	7.5	3′13	12h 24m.9	−5° 24′	.
b	b	24 1.4	−2 44.7	8.0	3′50	30.3	−3 0	.
c	c	27 26.0	−4 21.2	8.1	3307	29.7	−4 36	.
d	d	26 44.1	−3 34.4	8.0	3313	29.0	−3 54	.
e	e	24 46.8	−3 21.4	8.5	3310	27.1	−3 36	.
f	f	27 54.3	−3 15.9	8.7	3315	30.2	−3 31	.
g	g	29 42.2	−3 50.9	8.4	3322	32.0	−4 6	.
h	h	30 49.4	−3 10.2	9.0	3324	33.1	−3 25	.
k	k	27 25.3	−3 37.0	9.2	3314	29.7	−3 52	.
l	l	25 52.1	−3 31.4	9.4	3312	28.2	−3 46	m
						28.7	−3 52	.
Var.	m					12 29 16.	−3 53.1	.
	n					12 28 13.	−4 2.7	m
	o					12 28 27.	−4 0.0	m
	p					12 29 1.	−4 6.3	m
	q					12 28 50.	−3 50.0	m
	r							m
	s					12 28 52.	−3 59.4	m
	t					12 29 6.	−3 57.4	.
	u					12 28 46.	−3 55.3	.

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191 (5/28)	192 (4/23)	193 (6/29)
·	4	6
·	3	1
·	4	2
·	6	6
3	3	2
3	·	2.5
6	5	·
·	·	·
·	·	·
·	·	·
·	·	·

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Leiot Lesgrave chart of Dec. stars
May 3. 1897.

U Virginis.

Desig.	R.A. 1875.	Dec. 1875.	Mag.	Cat. No.	R.A. 1900.	Dec. 1900.
a	12 h 53 m 41 s	+11° 41′.3	7.3	2702	12h 56m.1	+14° 53′
b	43 0.7	+7 1.1	8.0	2780	57.3	+6 46
c	42 48	+5 54.3	8.2	2682	44.4	+5 43
d	46 19.5	+5 1.3	7.8	2690	48.6	+4 46
e	46 36.7	+7 32.3	8.2	2786	48.9	+7 17
f	39 54.6	+7 34.8	8.7	2776	42.3	+7 24
g	41 22.8	+7 42.8	8.7	2777	42.7	+7 26
h	47 5.2	+6 19.8	6.8	2672	49.4	+6 8
k	44 13.6	+6 19.8	9.0	2676	50.5	+6 8
l	44 27.2	+6 8.7	9.0	2666	46.8	+5 54
m	45 39.2	+6 34.8	9.3	2668	48.0	+6 24
n	43 32.4	+5 56.7	9.4	2687	45.9	+5 42
u			var.	2664	46.0	+6 6
o	43 52.2	+6 14.2	9.5	2665		

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Lick Seagrave chart of Bot. (D.M.) class
Dec. 3. 1897.

R. Virginis.

Desig.	R.A. 1900.	Dec.	Mag.	No.	R.A. 1900.	Dec.
a	12h 34m 36.4s	+7° 36′	6.0	2756	12h 36m.9	+7° 21′
b	23 59.5	23.7	6.5	2609	26.3	+4 9
c	29 47.4	9 36.3	7.0	2644	32.1	+9 21
d	27 49	4 31.6	7.1	2619	29.4	+4 17
e	26 12.4	4 24.4	7.1	2617	24.5	+4 13
f	26 3.5	4 44.9	7.5	2616	24.4	+4 30
g	33 14.1	4 30.3	8.5	2626	35.5	+4 17
h	36 24.0	4 21.7	8.3	2636	38.4	+4 7
k	37 0.2	7 39.6	8.7	2571	39.3	+7 25
l	29 24.0	4 43.7	8.5	2623	31.4	+4 29
m	29 57.6	7 39.1	9.1	2554	32.3	+7 24
n	32 19.7	7 52.2	9.3	2562	34.6	+7 37
o	34 29.5	7 50.0	9.4	2567	36.4	+7 35
p	30 34.6	7 58.1	9.5	2560	32.9	+7 43
q	24 23.9	+7 35.4	9.5	2556	30.7	+7 20
R			Var.	2561	33.4	+7 33

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4	5	3	6	4.5	0 1 1 2
5	3	4	4	4.0	1 1 0 0
5	3	3	3	3.5	1 1 1 1
3	2	2	2	2.2	1 0 0 0
6	4	4	4	4.5	2 0 0 0
2	3	4	4	3.2	1 0 1 1
4	2	4	4	3.5	0 2 0 0
4	4	4	6	4.5	0 0 0 2
5	5	3	4	4.2	1 1 1 0
2	5	6	5	4.5	2 1 2 1
3	4	3	3	3.2	0 1 0 0
4	3	3	2	3.0	1 0 0 1
3		4	3	3.3	0 1 0
3		3	3	3.0	0 0 0
2		5	3	3.3	1 2 0

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Lost Telegram Apr. 29. 1897. chart of bet. comp. stars.

V Virginis.

Desig.		1875. R.A.	1875. Dec.	Dm. Magn.	Dm. No.	1900. R.A.	1900. Dec.
a	a	13h 23m 22.7	−2° 18′.2	7.3	3695	13h 24m.7	−2° 32′
b	b	14 39.4	−2 54.1	8.0	3684	41.0	−3 8
c	c	24 19.4	−1 34.5	7.5	2832	26.6	−1 48
d	d	22 48.0	−1 8.1	7.8	2827	24.1	−1 22
e	e	21 11.7	−3 42.7	8.0	3476	23.5	−3 57
f	f	24 47.0	−2 49.0	8.5	3703	27.1	−3 3
g	g	23 32.9	−2 3.9	8.5	3698	24.8	−2 18
h	h	23 30.7	−2 44.7	8.9	3697	24.8	−3 0
k	k	21 48.8	−2 12.6	9.0	3689	24.1	−2 27
l	l	21 33.0	−3 44.2	9.3	3478	23.9	−3 54
m	m	20 27.1	−2 41.0	9.4	3684	22.8	−2 55
Var.		20 19.2	−2 24.1	Var.	3646	22.6	−2 39
n		20 43.0	−2 55.0	9.5	3688		
o							
p							
q							
r							
s							
t							
u							
w							

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Lieut Seaver Navy E. 1897. chart of Dec. Comp. Class I

N Virginis.

Desig.	R.A. 1875	Dec. 1875	Magn.	Sta.	R.A. 1900.	Dec. 1900.
a	13h 2k 26.1	-5° 30.2	5.5	3716	13h 26.7	-5° 44'
b	27 59.3	-4 39.1	6.5	3515	13 30.3	-4 53
c	22 52.9	-5 43.3	6.6	3706	25.2	-5 57
d	25 50.3	-6 52.7	7.0	3439	24.1	-7 7
e	26 42.2	-7 52.5	7.0	3643	29.1	-4 6
f	25 52.0	-7 41.3	7.5	3642	24.3	-7 55
g	23 19.2	-7 6.7	8.1	3633	25.6	-7 21
h	24 45.4	-6 41.1	8.5	3434	27.1	-6 55
k	23 55.6	-7 15.2	8.2	3635	26.2	-7 29
l	26 15.4	-6 32.1	9.1	3440	24.6	-6 46
m	29 14.4	-7 30.6	8.4	3659	31.6	-7 45
n	24 42.2	-6 29.5	9.3	3433	27.0	-6 44
o	25 44.4	-7 25.5	9.6	3641	24.1	-7 40
p	25 47.4	-6 10.9	9.7	3438	24.1	-6 25
q	24 8.4	-6 15.2	9.7	3430	26.4	-6 29
r						
s	24 11.6	-6 53 9.9		3431	26.5	-7 7
t						
S			Var.	3437	27.4	-6 41

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3 6 4 4.3 1 2 0

3 3 3 3.0 0 0 0

3 6 7 5.3 1 1 2

5 6 5 5.3 0 1 0

5 4 3 4.0 1 0 1

4 2 2 2.7 1 1 1

5 5 6 5.3 0 0 1

3 3 1 2.3 1 1 1

5 4 5 4.7 0 1 0

3 4 3.5 1 0

6 3 3 4.0 2 1 1

3 2 2 2.3 1 0 0

4 3 2 3.0 1 0 1

3 2 3 2.7 0 1 0

4 3 3 3.3 1 0 0

3 3 2 2.7 0 0 1

3 3 3.0 0 0

3 4 3.5 1 0

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R Hydrae.

Descr.	R.A.	H.P. for 1900 Dec.	H.P. mag.	H.P. No.	R.A. 1900.	Dec.	
a	(1440) 13h 12.4v	−22° 32′ v	3.3v	(2249) v	13h 13.5v	−22° 39′.	=
b	" 13 59.5v	−26 6 v	3.5v	(2378) v	14 0.7	−26 12	=
c	" 14 40.2v	+2 24 v	3.72v	(2468) v	14 41.2	+2 19	=
d	" 14 36.7v	−5 8 v	3.92v	(2457) v	14 37.8	−5 17	=
e	" 14 9.7v	−5 26 v	4.23v	(2398) v	14 10.8	−5 31	=
f	" 13 3.7v	−4 54 v	4.37v	(2224) v	13 4.8	−5 0	=
g	" 13 12.1v	−17 39 v	4.82v	(2247) v	13 13.2	−17 45	=
h	" 13 2.6v	−22 29 v	5.13v	(2222) v	13 3.6	−22 35	=
k	" 13 9.5v	−19 18 v	5.41v	(2240) v	13 10.5	−19 25	=
l	" 12 57.4v	−19 57 v	5.56v	(2210) v	12 58.4	−20 3	=
m	" 13 25.6v	−18 7 v	5.98v	(2282) v	13 26.6	−18 13	=
n	1845 13 33 30.3	−22 42.8	6.7	3645	13 36.0	−22 57	
o	" 12 51 18.1	−20 45.4	6.8	3757	12 53.6	−21 0	
p	" 13 29 11.5	−22 52.3	7.0	3630	13 31.7	−23 6	
q	" 13 12 52.5	−23 0.1	7.0	270	13 15.3	−23 15	
r	" 13 22 32.9	−22 53.8	7.7	3604	13 25.0	−23 8	
s	" 13 19 14.5	−21 36.5	8.2	3714	13 21.6	−21 50	
t	" 13 18 20.8	−22 29.3	8.1	3549	13 20.7	−22 43	
u	" 13 21 18.7	−22 25.0	9.0	3600	13 23.7	−22 39	
w	" 13 22 29.5	−22 44.7	9.0	3603	13 24.9	−22 59	
x	. 13 22 26.9	−22 29.9	9.0	3602	13 24.9	−22 44	
y	. 13 20 0.3	−22 45.7	9.4	3595	13 22.5	−23 0	
z	. 13 20 53.5	−22 45.4	9.5	3598	13 23.4	−22 59	
α	. 13 20 53.5	−22 34.0	9.6	3596	13 23.4	−22 48	

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	Desig	R.A. 1855	Dec.	Dm. Magn	N.P. No.
γ Hydrae.	a	13h 11m 01.5s	−22° 24.0	3	3554
π "	b	13 58 07.6	−25 58.9	3.6	1009
109 Virginis.	c	14 38 56.2	+2 29.6	4.0	2862
μ "	d	14 35 25.6	−5 01.5	4.2	3936
ν "	e	14 08 25.1	−5 18.4	4.5	3843
θ "	f	13 02 26.6	−4 45.8	4.3	3430
61 "	g	13 10 47.9	−17 30.6	5.0	3813
ψ Hydrae.	h	13 01 14.1	−22 20.3	5.0	3515
57 Virginis.	k	13 08 08.9	−19 10.1	6.1	3633
— Corvi	l	12 56 00.9	−19 47.8	6.1	3629
73 Virginis.	m	13 24 14.1	−17 58.7	6.4	3847

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R Can. Ven.

Sm. comp. elem. sent to Seagrave May 10. 1897.

Desig.			1875 R.A.	1875 Dec.	Sm. mag.	Sm. No.	1900 R.A.	1900 Dec.
a	a		13h 41m 59.8	+42° 46.1	6.5	2440	13h 43.9m	+42° 32′
b	b		41 14.5	+38 37.3	6.8	2479	43.2	38 23
c	c		48 21.9	+37 47.6	7.0	2467	50.4	37 35
d	d		39 43.4	+38 16.5	7.3	2477	41.7	38 2
e	e		42 22.3	+40 59.2	8.0	2693	44.3	40 45
f	f		36 54.1	+38 59.1	7.4	2473	38.9	38 45
g	g		38 44.4	+39 32.1	8.4	2676	40.1	39 18
h	h		41′ 29.3	+39 36.1	8.5	2683	43.5	39 22
k	k		43 46.7	+40 6.9	8.9	2695	45.7	39 53
l	l	Rá Sist.	42 8.6	+39 14.2	8.8	2686	44.1	39 0
m	m	0	41 49.3	+40 21.4	9.1	2691	43.7	40 7
n	n	p	42 42	+39 54.8	9.0	2685	44.0	39 41
o	o	q	41 47.5	+40 9.5	9.2	2690	43.7	39 56
	p	R	39 16.4	+40 12.6	9.0	2684	41.3	39 59
	q	S	37 21.9	+40 30.9	9.4	2686	39.4	40 17
p	r	T	41 59.0	+40 11.8	9.4	2692	43.9	39 58
	Var.		42 43.	+40 15.9	9.2	2694	44.6	+40 2
q	s	u						
r	t	w						

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4	2	3	3	3.2
4	4	3	2	4.0
3	2	4	6	4.2
4	4	3	6	4.2
2	6	4	4	4.2
2	4	2	2	3.2
2	6	2	4	2.0
4	6	4	6	2.0
3	4	3	2	3.0
4	3	3	2	3.2
3	3		3	3.0
4	6		3	4.3
3	3			3.0
4	3			3.2
3	3	4		3.3
4	2	3	2	3.2
2	2	3	3	4.0
4	6	4		4.7
2	6			2.2
3	6			4.2
2	2	4		3.7

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1891phae.proj..443D

R Boötis.

Last Sequence May 15. 1897. 3 Var. Comp. Class. and list for above.

Seq.	1900. R.A.	1900. Dec.	Var.	Var. Mag.	Var. No.	1900. R.A.	1900. Dec.	
a	1K 2r rr.3	+27° 19.9	6.2	2384	1K 27.9	+27° 8′		4
b	16 37.6	+2r r9.6	6.1	2370	1A.6	+2r KA		5
c	30 3.r	+2A 7.r	7.0	23KA	32.1	+27 r6		
d	1K 3.9	+27 1K.K	7.6	2367	16.1	+27 1		3
e	29 22.7	+2r 32.K	8.0	2A0r	31.K	+2r 20		
f	3r 2K.r	+26 3r.1	7.9	2r92	37.K	+26 23		
g	32 r6.K	+27 26.K	8.2	2K0K	3K.9	+27 1K		
h	29 39.K	+27 2.r	8.3	2396	31.7	+26 r0		
k	3K 1r.0	+2A 0.A	8.6	23r6	36.2	+27 KA		
l	32 Kr.y	+27 1.3	8.r	2K03	3K.A	+26 Kg		
m	27 rry	+27 K.r	9.1	239K	29.9	+26 r2		
n	32 1.6	+27 0.2	9.3	2K01	3K.0	+26 KA		
o	2A r8.3	+27 16.1	9.r	239r	31.0	+27 K		
p	29 r9.0	+27 21.1	9.K	239A	32.0	+27 9		
q	30 36.0	+27 22.1	9.r	2399	1K 32.6	+27 10		
Var.				2K00	1K 32.A	+27 10		
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4	3	3	2				3.0 ✓	1 0 0 1
5	5	5	5				5.0 ✓	0 0 0 0
·	·	4	4	5	5		4.5 ✓	0 0 1 1
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·	·	·	4	3	2	1	2.5 ✓	2 1 0 1
·	·	·	2	3	6	7	4.5 ✓	2 1 2 3
·	·	·	4	2	2	3	2.2 ✓	1 1 1 0
·	·	·	4	3	4	4	3.2 ✓	0 1 0 0
·	·	·	3	4	6	5	4.5 ✓	1 0 2 1
·	·	·	3	3	3	5	3.5 ✓	1 1 1 1
·	·	·	4	4	2	2	3.0 ✓	1 1 1 1
·	·	·	3	4	2	5	3.5 ✓	1 0 2 1
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·	·	·	4	3	3	4	3.5 ✓	0 1 1 0
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ν Serpentis.

Sent Seagrave May 13. 1897. Dun. comp. class.

Desig.	R.A. 1855.	Dec. 1855.	Dm. Mag.	Dm. No.	R.A. 1900.	Dec. 1900.
a	15h 22m 19.2s	+13° 33′ 3	6.4	2973	15h 24m.4	+13° 23′
b	13 19.5	+15 4.6	7.3	2879	17.4	+15 55
c	14 30.2	+14 2.4	7.4	2863	16.6	+13 53
d	16 32.6	+14 33.6	7.9	2866	18.6	+15 24
e	20 22.2	+15 4.9	8.4	2864	22.5	+14 55
f	17 33.1	+14 36.3	8.5	2862	19.7	+14 26
g	18 48.5	+14 55.5	8.8	2873	20.9	+14 48
h	13 46.2	+15 21.2	9.0	2846	17.9	+15 11
k	14 50.4	+15 20.6	9.1	2850	16.9	+15 16
l	14 17.1	+14 48.8	9.3	2862	16.4	+14 32
m	14 17.2	+15 18.3	9.5	2848	16.4	+15 8
n					17.0	+14 50
p						
q						
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1891phae.proj..443D

Sent Seagrave Thurs 13.1897. Diff. comp. charts for R Hercules.

R Hercules.

Desig.	R.A. 1895.	Dec. 1895.	Diff. mag.	Diff. No.	R.A. 1900.	Dec. 1900.	
a	15h 56m 7.4	+18° 31′.1	7.3	3104	15h 58m.1	+18° 23′	3
b	15 52 32.4	+18 44.5	7.2	3095	15 54.5	+18 36	5
c	16 2 34.2	+17 46.1	8.0	2969	16 4.6	+17 39	3
d	16 4 40.7	+18 14.9	7.7	3132	16 6.7	+18 12	3
e	16 3 12.4	+18 49.4	8.0	3125	16 5.2	+18 42	3
f	15 59 4.0	+18 54.4	9.0	3113	16 1.1	+18 50	3
g	15 59 46.9	+19 33.0	8.8	3053	16 1.8	+19 25	5
h	15 59 11.7	+18 56.3	9.0	3114	16 1.2	+18 48	3
k	15 58 11.7	+18 28.7	8.9	3110	16 0.2	+18 21	4
l	16 0 10.0	+18 44.3	9.1	3124	16 2.3	+18 36	3
m	16 1 3.5	+18 46.6	9.5	3122	16 3.1	+18 40	5
n	15 59 48.2	+18 38.8	9.5	3118	16 1.7	+18 28	4
o	15 59 41.5	+18 33.2	9.5	3116	16 1.7	+18 27	5
p	16 0 0	+18 37			16 2.0	+18 29	3

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1891phae.proj..443D

1891 (7/9)	(9/9)	1893 (8/3)	Mean.
3	4	2	3.0
5	4	3	4.0
3	2	2	2.3
3	4	3	3.3
3	5	4	4.0
3	4	3	3.3
5	5	2	4.0
3	5	5	4.3
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5	5	6	5.3
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R Coronæ.

Desig.	R.A. 1875.	Dec. 1875.	Mag.	1900. R.A.	1900. Dec.
a	15h 16m 0.5s	+33° 26.5′	5.5	15 21	
b	15 34 16.5	+32 59.0	6.2	26 21	
c	16 10 55.5	+29 30.9	5.7	20 03	
d	16 9 53.1	+27 44.4	6.5	26 13	
e	15 42 16.7	+32 11.2	7.1	26 31	
f	15 41 43.0	+28 55.1	7.4	24 57	
g	15 46 36.0	+29 20.6	7.2	27 30	
h	15 39 10.4	+28 55.2	7.9	24 69	
k	15 47 10.1	+28 16.3	8.2	24 47	
l	15 41 12.7	+29 33.0	8.3	27 13	
m	15 39 43.3	+29 21.1	8.5	27 07	
n	15 46 4.5	+28 2.1	9.1	24 22	
o	15 46 40.0	+28 32.5	8.9	24 26	
p	15 41 12.3	+28 43.5	9.2	24 73	
q	15 41 20.9	+28 55.6	9.4	24 74	
r	15 42 21.1	+28 51.5	9.5	24 76	

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Lent Seagrave Apr. 30. 8 in. comp. stars (chart and list) ruby.

U Herculis.

Desig.	R.A. 1875	Dec. 1875	8 in. mag.	8 in. No.	R.A. 1900	Dec. 1900
a	16h 24m 16.0s	+20° 44.6	6.0	3243	16h 26.3m	+20° 42
b	9 3.2	+19 11.8	6.0	3075	11.1	+19 5
c	13 44.4	+21 29.1	6.5	2900	15.7	+21 22
d	6 51.9	+21 56.1	6.8	2846	8.9	+21 49
e	22 30.5	+18 44.2	7.0	3142	24.5	+18 38
f	22 14.1	+19 19.9	7.0	~~3005~~ 3107	24.2	+19 18
g	16 42.5	+19 51.3	7.2	3049	18.7	+19 44
h	24 16.1	+18 57.1	7.9	3147	26.3	+18 51
k	17 39.6	+19 54.1	7.7	3092	19.7	+19 52
l	20 49.2	+19 19.9	7.6	~~3002~~ 3102	22.2	+19 18
m	20 5.2	+18 44.6	8.1	3175	22.1	+18 39
n	18 15.6	+19 50.0	8.3	3094	20.3	+19 44
o	17 35.1	+19 31.5	8.2	3091	19.6	+19 25
p	19 12.0	+19 16.1	9.1	3097	21.2	+19 10
q	16 46.6	+19 28.4	9.2	3090	18.2	+19 16
r	19 50.0	+19 42	9.5	3099	21.8	+18 58
s	18 39.1	+19 13.7	9.5	3095	20.7	+19 8
U	19 23.	+19 13.6			21.4	+19 7
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1891phae.proj..443D

R Coronae.

Sent Seagrave Apr. 29. 1897. chart of last comp. stars.

Desig.	R.A. 1855.	Dec. 1855.	Mag.	No.	R.A. 1900.	Dec. 1900.
a	15h 16m 0.4s	+33° 26.7	5.5	2584	15h 17.8s	+33° 17.
b	15 38 16.4	+32 59.0	6.2	2621	15 40.1	+32 50
c	16 10 55.7	+29 30.9	5.7	2803	16 12.7	+29 24
d	16 9 53.1	+27 44.4	6.5	2613	16 11.7	+27 41
e	15 42 16.7	+32 11.2	7.1	2631	15 44.1	+32 2
f	15 41 43.0	+28 55.1	7.4	2795	15 43.6	+28 46
g	15 46 36.0	+29 20.6	7.8	2730	15 48.4	+29 13
h	15 39 10.4	+28 55.8	7.9	2669	15 41.1	+28 44
k	15 47 10.1	+28 18.3	8.2	2687	15 49.1	+28 6
l	15 41 12.7	+29 33.0	8.3	2713	15 43.0	+29 24
m	15 39 48.3	+29 25.1	8.5	2707	15 41.6	+29 16
n	15 46 4.5	+28 2.1	9.1	2684	15 48.0	+27 54
o	15 46 20.0	+28 32.5	8.9	2686	15 48.2	+28 24
p	15 41 18.3	+28 43.5	9.2	2673	15 43.2	+28 35
q	15 41 20.9	+28 47.6	9.4	2674	15 43.2	+28 37
r	15 42 24.1	+28 15.5	9.5	2676	15 44.3	+28 23
R	15 42 36.	+28 36.3	Var.		15 44.4	+28 28

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1891phae.proj..443D

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1891phae.proj..443D

T. R. S. Scorpii.

Desig.	R.A. 1855	Dec. 1855	Mag.	Dm. No. U.S.C.	R.A. 1900	Dec. 1900	
a	16h 17m 3.1s	−24° 41′	(6.7	21976	16h 7.7	−24° 10′	4
b	7 47.1	−23 17.1	6.9)	22039	10.4	−24 2	4
c	6 17.4	−22 0.3	7.3	K127	9.0	−22 7	3
d	9 44.7	−22 17.7	7.3	K144	12.1	−23 2	4
e	1 44.0	−22 42.4	8.0	K106	4.1	−22 10	92 6/17 1 3
f	0 47.3	−22 34.3	8.1	K101			
g	2 36.1	−22 33.1	8.0	K136	11.3	−22 40	1
h	2 14.3	−22 44.4	8.1	K133	10.9	−22 17.2	3
k	2 47.2	−22 17.4	8.4	K137	11.1	−23 6	2
l	1 21.4	−22 3.4	8.4	K120	8.1	−22 11	92 6/16 (2)
m	10 13.0	−22 24.1	8.9	K149	12.9	−22 31	(4)
n	7 20.3	−22 47.1	9.1	K130	10.0	−22 11	92 6/16 4
o	4 13.0	−22 42.1	9.2	K139	11.6	−22 49	2
p	2 49.3	−22 10.7	9.3	K134	11.1	−22 14	3
q	10 1.	−22 46.	—	—	12.4	−22 12	
r	9 3.9	−22 10.0	9.4	K142	11.4	−22 21	
					11.1	−22 40	
s	2 20.1	−22 24.4	9.4	K134			

Rá d' is probably SD −22° K101 (8.1) and has been inserted in sequence above and his estimate used.

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1891phae.proj..443D

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1891phae.proj..443D

Lieut. Seagrave first class July 30. 1897.

R Cygni.

Descrip.			R.A.	Dec.	Diam. Magn.	Diam. No.	1900. R.A.	1900. Dec.	
a			19h 46m 59.0s	+52° 37.3	5.3	2547	19h 48m.1	+52° 44'	6
b			30 34.1	50 55.9	6.0	2815	31.8	+51 2	4
c			29 42.5	48 55.5	6.5	2914	30.9	+49 2	4
d			33 56.9	48 55.8	6.6	2922	35.1	+49 2	3
e			30 34.9	47 50.9	6.5	2870	31.9	+47 57	4
f			32 31.9	48 11.0	6.8	2912	33.8	+48 17	2
g			34 24.8	50 47.7	7.7	2829	35.6	+51 1	3
h			39 57.0	49 26.1	7.5	3092	41.2	+49 32	5
k			35 15.2	50 46.1	8.0	2833	36.5	+50 52	3
l	m		37 52.5	49 39.0	8.2	3083	39.1	+49 45	4
m	n		38 39.8	49 37.9	8.8	3086	39.9	+49 44	2
n	o	p	34 43.4	49 52.5	9.0	3073	35.9	+49 58	5
o	p	q	34 16.7	49 45.4	9.1	3072	35.5	+49 51	
R			32. 56.	49 52.5	var.	3064	34.1	+49 58	
p			34 29.0	50 8.5	9.5	2831			
q									4
r			33 38.0	49 55.6	9.5	3068	34.8	+50 2	3
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Lieut. sent me sketch sheet. found not on the print sheet

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1891phae.proj..443D

6 ν ν				ν.3 ν	.1 0 0	
4 4 6	3		6	4.6 ν	1 1 1 2 1	
4 3 3	3		1 ν	2.4 ν	1 0 0 0 2	
3 4 4			4	3.4 ν	1 0 0 0	
4 4 3				3.7 ν	0 0 1	
2 3 3				2.7 ν	1 0 0	
3 4 3			ν	3.4 ν	1 0 1 1	
ν 6 ν			7	ν.4 ν	1 0 1 1	
3 3 3			ν	3.ν ν	1 1 1 1	
4 ν ν			4	4.ν ν	0 1 1 0	
2 2 2			3	2.2 ν	0 0 0 1	
ν 6 6 2			4	4.6 ν	0 1 1 3 1	
3 3 3		2	3	2.4 ν	0 0 0 1 0	
3 ν		3	4	3.4 ν	1 1 1 0	
4 3 ν		3	3	3.6 ν	0 1 1 1 1	
3 4 ν		3	ν	4.0 ν	1 0 1 1 1	
6		6	4	ν.3 ν	1 1 1	
3		3		3.0 ν	0 0	

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1891phae.proj..443D

78 x

Lost Seagrove Knight, comet, Nova July 14 1891.

R Delphini.

Desig.	1900. R.A.	1900. Dec.	Mag.	No.	R.A.	Dec.
a	20h 12m	+10° 2′	7.0	KV0A	20h 16m 30s	+9° V3.V
b	10.1	+10 11	7.0	K2K	7 VV.V	+10 2.A
c	10.6	+9 V1	7.V	KK61	A 26.K	9 K3.0
d	14.2	+9 KK	A.0	KKA1	12 1.1	9 36.0
e	A.A	+9 2V	9.0	KKK6	6 3V.3	9 17.0
f	9.K	+9 11	A.K	KKV2	7 13.9	9 3.2
g	13.V	+9 33	A.V	KK7V	11 16.A	9 2V.2
h	13.K	+9 2A	A.A	KK7K	11 1K.2	9 19.6
K	10.3	+9 12	9.2	KKV9	A A.V	9 K.0
l	11.0	+A K2	9.K	K390	A KV.1	A 3K.3
m	10.3	+A K2	9.V	K3AA	A V.A	A 33.6
n	9.3	+A 32	9.V	K3A2	7 K.V	A 23.9
R	10.V	+A K7				

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1991phae.proj..443D

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1891phae.proj..443D

80

Saut Lesgrare bright comp. class July 14. 1897.
V Cygni.
" " faint " " July 26. "

Desig.	R.A. 1875.	Dec. 1875.	Dec. mag.	Dec. no.	R.A. 1900	Dec. 1900
a	20 41 46.7	+45° 59.9	6.4	3270	20h 43.3	+46° 10′
b	39 49.6	+46 46.2	6.5	3033	41.3	+46 56
c	34 14.3	44 32.1	7.2	3145	39.7	+44 42
d	34 18.6	47 10.6	7.9	3157	35.7	+47 20
e	40 42.2	47 44.3	4.4	3140	42.2	+47 54
f	34 54.3	47 3.7	7.4	3159	36.5	+47 13
g	34 50.2	47 41.4	4.5	3154	36.2	+47 51
h	35 44.3	47 10.4	9.2	3163	37.2	+47 20
k	36 0.2	44 16.7	4.9	3146	37.4	+44 26
l	37 51.3	44 7.1	9.1	3191	34.5	+44 17
m	36 24.3	47 46.4	9.5	3167	34.0	+47 56
V					34.1	+47 47
n						
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1891phae.proj..443D

190 (11/18)	(11/19) 191 (8/66)	92 :1 16
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1891phae.proj..443D

82 X

Lost Seagrave bright comp. stars July 15. 1897.

α Cygni.

" " Faint " " July 26. "

Desig	R.A. 1875.	Dec. 1875.	Mag.	No.	R.A. 1900.	Dec. 1900.
a	20h 11m 14.4s	+45° 2.1	6.2	3119	20h 12.2m	+45° 16′
b	14 11.2	52 12.2	6.6	3139	14.6	+46 0
c	7 37.7	47 17.9	7.5	3045	9.0	+47 26
d	10 16.7	47 0.2	7.4	3054	11.7	+47 8
e	14 12.5	47 27.4	8.3	3074	16.6	+47 35
f	14 25.1	47 1.7	8.7	3091	19.8	+47 14
g	11 28.7	47 44.8	8.8	3062	12.9	+47 53
h	16 16.5	47 34.8	9.2	3083	17.7	+47 43
k	16 3.8	46 52.4	9.4	2949	17.5	+47 6
l	15 46.6	47 17.4	9.5	3076	16.5	+47 25
21 (Var.)	15 7.	47 26.3	Var.		16.5	+47 35

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1891phae.proj..443D

84 X

S Librae.

Descr.	R.A. 1877.	Dec. 1877.	Mag.	Dm. do.	R.A. 1900.	Dec. 1900.
a	14h 11m 34.6	−19° 1.1	7.3	K076	14h 14.2	−19° 11′
b	11 10.2	18 38.7	8.2	K03K	13.7	−18 KA
c	16 10.7	19 26.6	8.2	K099	14.A	−19 37
d	9 59.K	20 19.3	8.2	K19A	12.6	−20 29
e	11 2A.3	20 20.0	8.1	K206	14.1	−20 30
f	7 26.K	20 23.7	8.7	K1A6	10.0	−20 3K
g	14 K9.2	20 19.0	8.6	K2-K	14.K	−20 29
h	11 A.3	19 27.6	9.0	K07 7	13.7	−19 36
k	10 K3.3	19 35.9	9.1	K072	13.3	−19 K6
l	13 16.9	20 6.6	9.3	K2A2	14.9	−20 17
m	12 K6.1	19 57.7	9.3	K0A2	14.K	−20 6
n	12 51.7	19 48.3	9.7	K0A3	14.7	−20 A
o	12 A.1	−19 59.6	9.7	K0A0	14.7	−20 10
r					14.6	−20 2
s						
t						
u						
v						
w						
x						
y						
(z)						
(A)						

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1891phae.proj..443D

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☆ Herculis.

Lewis Swift Comet 1st class July 30. 1897.

Design.	R. A. 1855.	Dec. 1855.	Diff. Magn.	Diff. No.	R. A.	Dec.	
a a	16 32 20.7	+37° 47.4	7.7	2774	16h 33.9	+37° 41′	5
b b	27 26.9	32 39.7	7.4	2747	27.0	+38 34	5
c c	30 14.4	37 12.6	4.2	2774	31.4	+37 7	3
d d	30 6.0	37 14.7	4.7	2772	31.7	+37 13	5
e e	37 16.0	37 14.3	4.7	2744	36.9	+37 13	6
f f	31 43.6	37 11.7	4.4	2777	33.3	+37 6	4
g g	33 44	37 24.7	4.4	2742	34.7	+37 19	5
h h	30 22.4	37 43.0	9.4	2774	32.0	+37 37	4
k k	28 1.9	37 44.7	9.2	2762	29.6	+37 38	4
l l	27 31.4	37 43.7	9.7	2767	29.1	+37 43	4
N (Var.)	30 7.	37 34.1	(Var.)		31.7	+37 32	

m m α α 5

n n β β 5

o o γ 3

p p δ γ 6

q q ε δ

r r

s s ζ

t

u

w

x

y

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1891phae.proj..443D

91	91	93	Σ/No.
7	9	5	
5	5	4	4.7
5	4	3	4.0
3	3	1	2.3
5	4	5⁻	4.7
6	5	5⁻	5.3
4	4	1	3.0
5	6	6	5.7
4	3	5⁻	4.0
4	4	4	4.0
4	4	6	4.7
5	4	5⁻	4.7
5⁻	5⁻		5.0
3	4	3	3.3
6	6	6	6.0

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1891phae.proj..443D

T Herculis.

Desig.		1875. R.A.	Dec.	2 Mag.	2 Mag. No.	1900. R.A.	Dec.
a	a	16 3 39.4	+30° 26.4	7.2	3128	16h 5.4	+30° 26'
	b	17 5.8	+30 24.1	6.7	3113	0.1	+30 24
	c	16 2 43.2	30 54.7	7.5	3133	4.4	+30 59
	d	16 5 43.4	30 54.8	7.9	3144	7.6	+30 6
	e	2 40.5	29 39.1	8.2	3127	4.4	+29 39
	e	16 33.8	30 49.2	8.0	3142	6.3	+30 49
	f	5 30.4	31 12.5	8.2	3156	7.2	+31 12
	g	2 35.7	31 29.4	8.8	3177	4.3	+31 29
	h	1 24.0	30 53.7	8.8	3127	3.1	+30 54
	K	0 56.6	31 3.6	9.0	3166	2.7	+31 4
	l	0 18.7	31 15.6	9.2	3163	2.0	+31 16
	m	3 45.9	30 39.9	9.5	3139	5.5	+30 40
	n	3 36.7	30 50.1	9.4	3136	5.3	+30 50
J		3 37.0	30 59.9			5.3	+31 0
	o	2 11.0	31 0.4	9.5	3171		
	p	3 34.1	31 0.8	9.5	3184		

Changes in red above, made Oct. 14. 1893.

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1891phae.proj..443D

a
b'
b
c
d'
e
f
g
h
k
l

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1891phae.proj..443D

R Scuti.

Desig.	R.A. 1877.	Dec. 1877.	Ann. Var.	Ann. No.	R.A. 1900.	Dec. 1900.
a	18h 39 28.9	−10° 13.2	10.1	1196	18h 41.9	−10° 11′
b	38 20.1	−9 11.2	11.0	1796	36.2	−9 9
c	19 18.0	−6 1.2	11.0	1976	11.7	−11 19
d	21 37.1	−2 25.1	11.1	1646	38.1	−2 23
e	11 16.1	−3 11.1	11.7	1160	17.7	−3 10
f	01 13.3	−6 10.1	6.2	1921	10.3	−6 1
g	00 11.2	−6 9.6	7.2	1913	03.3	−6 7
h	39 23.9	−6 2.2	7.0	1197	01.2	−6 0
k	11 0.0	−6 0.1	7.1	1951	07.0	−1 17
l	31 39.2	−1 10.0	7.2	1936	38.1	−1 02
m	32 16.0	−6 23.9	2.2	1211	00.7	−6 22
n	37 21.1	−1 32.6	2.3	1911	39.2	−1 37
o	32 16.9	−6 27.1	2.7	1226	00.7	−6 26
R					01.1	−1 09

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7	4			4	7.7	100
3	3			2	2.7	001
4	3			7	4.7	122
5	7			9	7.0	202
6	6			6	6.0	000
7	7	6	6	7	6.6	00110
3	4	4	4	0	3.0	01113
					4.4	R
					0.6	R
2	5	3	4	4	3.6	21100
4	4	3	4	4	3.4	00100
3	5	6	6	.	5.0	2011

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7 Aquarii.

Desig.		R.A. 1875	Dec. 1875	Mag.	No.	R.A. 1900	Dec. 1900	
–	a	20 44 29.3	−6° 2.4	6.0	5606	20 46.9	−5° 53′	·
–	b	43 44.8	−6 9.7	6.5	5604	46.1	−6 0	4
–	c	44 42.6	−4 6.4	6.9	5307	51.1	−3 57	3
–	d	46 26.6	−5 5.2	6.7	5410	44.4	−4 55	5
–	e	40 37.2	−5 9.9	7.5	5342	43.0	−5 0	4
–	f	49 9.5	−4 13.4	7.5	5311	51.6	−4 4	3
–	g	43 40.0	−5 19.7	8.0	5396	44.5	−5 10	·
–	h	44 40.1	−5 14.5	8.5	5402	47.1	−5 4	4
–	k	40 57.0	−5 14.4	8.4	5343	43.4	−5 4	4
–	l	44 10.0	−5 20.0	8.5	5401	46.6	−5 10	3
–	m	42 41.4	−5 39.1	8.3	5393	45.1	−5 29	5
2	2	m	45 41.6	−5 44.1	8.7	5407	48.1	−5 32	4
0	1		46 0.0	−5 31.0	9.3	5408	48.4	−5 21	
1	3	m	42 47.2	−5 47.7	9.4	5394	45.2	−5 38	·
	7						44.7	−5 31	
	β (d′)		42 40	−5 57					3
	ζ (α)		41 31	5 46					3
	ε (β)		43 3	5 48					3
	γ (γ)		43 35	5 48					3
	δ (δ)		43 36	5 34					
	ω (ε)		41 52	5 36					
	ψ (η)		42 30	5 54					
	χ (η′)		42 39	5 48					
	ψ (ϑ)		41 23	5 44					
	ξ (ϑ′)		42 18	5 38					
	ζ (μ)		41 25	5 39					
	β (ν)		41 17	−5 41					

This part of list revised as on p 93. (See also Book 7 5 p. 59 and R 92. p. 51.)

The stars 7 to Buick. have their positions obtained by direct from the small chart. These stars form a final sequence, following star 0.

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1891phae.proj..443D

'91	'91	92	92	
6	9	11	11	?
12	9	22	26	
.	.	.	.	.
4	4	4	.	.
3	5	3	.	.
5	4	6	.	.
4	4	3	3	2
.	.	5	5	6
.	.	2	3	4
4	6	5	.	.
4	4	3	.	.
3	4	5	.	.
5	4	3	.	.
4	6	4	.	.

		Sm. Ax.	R.A.		Dec.	Magn.
				$\frac{1}{4}(v-v)$		
q	χ	5346	20 41	43.0	−5 47.0	9.5
r	δ	5392	20 43	41.6	−5 35.8	9.7
s	β	5349	20 41	57.5	−5 37.2	10
t	η					
u	π′					
w	π					
x	π′					
y	ρ					
z	κ					
α	κ					

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1891phae.proj..443b

R Pegasi.

Desig.	R. A. 1875.	Dec. 1875.	Mag.	No.	R. A. 1900.	Dec. 1900.	
a	23 6 9.8	+10° 16.6′	6.2	K902	23h 8.8m	+10° 32′	3
b	22 K9 36.8	+11 K.0	6.9	K90K	22 V1.8	+11 19	3
c	22 V1 14.0	+8 3V.2	6.8	K973	22 V3.V	+8 V0	5
d	22 39 10.0	+6 K9.7	7.0	V060	22 K1.V	+7 V	.
e	23 1 31.1	+10 9.6	7.0	KK87	23 3.8	+10 2V	4
f	23 3 11.0	+10 1.6	7.7	K894	23 V.V	+10 17	5
g	23 V 19.7	+10 9.8	8.1	K899	23 7.6	+10 2V	5
h	23 1 3.1	+9 K8.V	8.V	V16K	23 3.K	+10 3	.
k	22 V7 3V.8	+9 28.8	8.V	V1VK	22 V9.9	+9 KK	.
l	22 VK 6.1	+9 V9.7	8.8	V1K9	22 V6.K	+10 1V	.
m	23 0 K1.8	+9 1V.V	9.0	V161	23 3.0	+9 31	.
n	22 V7 39.8	+9 2.V	9.1	V1VV	23 0.0	+9 17	.
o	23 1 2.3	+9 16.0	9.2	V163	23 3.3	+9 31	.
p	23 0 V6.3	+9 30.8	9.K	V162	23 3.2	+9 K6	

g
(R.)
(d.)
(T.)
v
w

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1891phae.proj..443b

	'91	'92	'92	'91	'91	'92	
	8	11	12	1	9	11	
	10	6	5	12	10	3	
3	5	4	·	·	5	6	.K6 v 20101
3	4	·	·	·	4	0	.2A v 0113
5	4	·	·	·	·	·	.Kv v 10
·	·	·	5	·	4	·	.Kv v 10
4	4	4	·	·	5	·	.K2 v 0001
5	4	2	·	·	4	·	.3A v 1020
5	5	6	·	·	5	·	.v2 v 0010
·	4	2	·	·	4	·	.33 v 111
·	4	6	·	·	4	·	.K7 v 111
·	4	3	·	·	4	·	.37 v 010
·	5	2	·	·	5	·	.K0 v 121
·	·	3	·	·	·	·	.30 v 1
·	3	·	·	·	3	·	.30 v 00
·	4	·	1	3	4	·	
·	3	3	·	·	3	·	
·	6	4	·	·	6	·	
·	3	·	·	1	3	·	
·	3	·	·	·	3	·	
·	3	·	·	·	3	·	
·	·	·	·	1	·	·	

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1891phae.proj..443D

96

22h 45m

−20.9

N Aquarii.

Descr.		1875. R.A.		1875. Dec.		Dm. magn.	Dm. No.	1900. R.A.		1900. Dec.	
a		22	57	57.0	−19°	19.3	7.0	63	44	22h	57m.3	−19°	57′
b			44	49.5		19	44.5	7.5	63	51		57.2		19	34
c	Chart.		42	7.1		21	2.9	7.3	63	10		44.5		20	49
d	d		49	50.4		21	2.6	7.5	63	34		52.2		20	49
e	e		49	23.5		20	19.3	4.0	6	51	1		51.4		20	5
f			50	14.1		19	44.6	4.7	63	74		52.7		19	31
g	g		49	43.4		21	26.5	4.3	6	33	3		52.1		21	12
h	h		44	7.9		21	14.4	4.5	63	25		50.5		21	4
k	.		47	10.5		20	44.4	4.6	6	50	4		49.6		19	51
l			51	4.6		21	39.4	4.9	63	41		53.5		21	26
m			54	41.7		21	14.6	9.0	63	53		57.1		21	5
n	n	n	52	50.2		20	40.6	9.1	6	52	1		55.2		20	27
o	o	o	50	0.9		20	24.2	9.9	6	51	2		52.4		20	14
p	p	p	44	10.4		21	7.2	9.4	63	26			50.6		20	53
q	q	q	49	24.9		21	11.7	9.7	63	32			51.9		20	54
r	r	r	49	53.3		−21	14.6	10.0	63	35			52.3		−21	5
s	s															
Var.			49	20.		−21	7.0		63	30			51.7		−20	53
t	t															

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1891phae..proj..443D

91	91	91	92	92
7	9	12	11	11
10	10	7	16	11
3	3	4	4	·
4	4	5	5	·
3	4	1	·	·
·	6	5	·	·
4	4	3	·	·
4	4	4	·	·
2	3	3	·	·
4	3	1	·	·
4	4	4	·	·
5	5	5	·	·
4	3	4	·	·
4	3	·	·	·
·	·	·	·	·
5	4x	·	·	·
·	·	·	·	2
·	·	·	·	3
·	·	·	·	·
·	·	·	·	·

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1891phae.proj..443D

N Cete.

Desig.	1875. R.A.	1875. Dec.	2m. mag.	2m. As.	1900. R.A.	1900. Dec.
a	0h 11m 14.4s	−8° 51.2′	6.5	38	0h 13.6 13.5	−8° 37 36′
b	23 36.3	−10 52.7	7.2	89	26.0 24.9	−10 38
c	19 [illegible]	−10 [illegible]	7.2	76	22.1	−10 26
d	19 52.1	−9 27.3	8.0	79	22.3	−9 12
e	15 19.7	−10 25.5	8.0	57	17.6	−10 11
f	21 17.1	−10 12.6	8.3	82	23.6	−9 58
g	15 25.4	−10 5.0	8.5	60	17.7	−9 50
h	14 34.5	−10 42.7	8.6	56	16.9	−10 28
k	13 47.2	−10 2.3	8.7	55	16.1	−9 47
l	16 55.7	−9 55.6	9.3	64	19.2	−9 41
l m	16 25.5	−10 16.1	9.4	62	18.7	−10 1
m o	16 6.0	−9 42.3	9.5	61	16.4	−9 30
m o	15 12.4	−10 02.5	9.8	70	20.5	−9 47
p	17 3.6	−9 56.6	10.	66	19.4	−9 44
Ver.	16 41.3	−10 8.1		65	19.0	−9 53
	16 36.9	−10 0.5	10	64		

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1991phae.proj..443D

$\log\left(\frac{12}{7}\frac{12}{11}\frac{12}{12}\frac{12}{15}\right)^{\frac{1}{3}}\left(\frac{1}{16}\right)$

3,	3	.30
4,	4	.40
6,	5	.55
5, 4, 3,		.50
4, 5, 4,		.53
3, 3, 3,		.30
6, 4, 4,		.47
5, 3, 3,		.37
5,	5	.50
4,	3	.35

(7)

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1891phae.proj..443D

373 Pegasi.

Desig.	1875. R.A.	1875. Dec.	Sm. mag.	Sm. No.	1900. R.A.	1900. Dec.	
a	23h 12m 24s.2	+7° 11′.7	7.3	0009	23h 14m	+7° 27′.	
b	19 .7	+7 1.8	7.1	0030	21.4	+8 7.	4
c	14 47.7	+8 7.6	7.3	0048	21.1	+8 23.	3
d	10 40.3	+8 42.7	8.2	0039	13.0	+8 48.	4
e	9 29.0	+9 48.7	8.0	0191	11.8	+10 4.	5
f	10 07.2	+7 2.9	8.1	0004	13.3	+7 18	5
g	13 36.0	+9 23.9	8.6	5204	17.9	+9 39	5
h	13 03.2	+8 37.7	8.7	0049	16.2	+8 03	4
k	12 19.0	+8 16.4	8.9	0042	14.6	+8 31	4
l	11 09.0	+8 12.0	9.0	0040	13.0	+8 27	3
m	12 39.3	+8 1.7	9.3	0047	17.0	+8 17	3
n	13 02	+8 18.9	9.4	0046	17.4	+8 34	3
o	12 30.	+8 13.	—	—	14.4	+8 28	4
p	14 27.4	+8 14.9	9.0	0000	16.8	+8 34	4
S	13 13.	+8 7.6	Var.		17.0	+8 22	
q	12 23.	+8 27					
r	14 14.	+8 17					
s	13 34.	+8 32					
t	14 02.	+8 13					
u	12 04.	+8 14					
w	13 6.	+8 12					
x	13 12.	+8 14					

Positions read up from my chart.

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1891phae.proj..443D

91 Y 27	92 10 26	92 10 29	92 11 6	96 12 7	Mean.
4	3	3	3	2	.30 10001
4	4	5	4	2	.3A 00102
3	4	3	2	3	.30 01010
4	5	5	4	7	.V0 10012
5	3	4	3	3	.36 11011
5	3	3	3		.3V 1111
5	2	3	3		.32 2100
4	4	4	4		.K0 0000
4	4	3	5		.K0 0011
3	4	3	3		.32 0100
3	3	3	2		.2A 0001
3	2	4	4		.32 0111
·	3	3	2		.27 001
·	4	5	6		.V0 101
·	·	·	·		
·	3	2	3		.27 010
·	·	5	·		.V0 ·
·	·	·	·		

The above estimates of Mr. Reed correctly applied to revised list and notation of bot. and ft. stars.

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R Aquarii.

Key.	Rec.	Orig.	1875. R.A.	1875. Dec.	Diff. mag.	Diff. No.	1900. R.A.	1900. Dec.	
a	a	a	23h 34m 56.0s	-16° 14'.0	5.3	6345	23h 37m.2	-16° 0'	
b	b	b'	43 44.3	-15 12.3	6.0	6507	47.4	-14 57.	
c	c	b	42 1.3	-16 39.7	6.3	6373	44.3	-16 2.	4
d	d	c	42 54.4	-15 23.1	7.3	6505	47.3	-15 4.	6
e	e	d	34 22.4	-15 33.6	7.4	6491	40.7	-15 19.	4
f	f	e	34 32.7	-15 56.2	4.3	6494	40.4	-15 41.	3
g	g	f	40 6.0	-16 43.1	4.2	6363	42.4	-16 32.	5
h	h	g	41 6.4	-16 0.7	4.4	6370	43.4	-15 46.	5
k	k	h	36 30.6	-16 24.0	4.7	6353	34.4	-16 13.	5
l	l	k	36 53.5	-15 46.7	9.0	6445	39.2	-15 32.	4
m	m	l	37 57.3	-16 4.7	9.0	6356	40.3	-15 54.	5
n	n	ne	35 44.3	-15 52.9	9.3	6479	34.0	-15 34.	3
o	o	n	36 51.5	-16 19.4	9.6	6354	39.2	-16 5	5
p		n'	35 47.2	-16 15.0	9.5	6350	34.1	-16 0	
q		o	37 24.4	-16 12.5	9.7	6355	39.4	-15 57.	5
R						6352	34.6	-15 50.	

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1891phae.proj..443D

'92 11	'92 12	92 12	Mean.
·	3	3	3.0
·	5	5	5.0
4	5	4	4.3
6	6	6	6.0
4	6	5	5.0
3	3	3	3.0
5	3	4	4.0
5	4	3	4.0
5	4	5	4.7
4	4	4	4.0
5	3	4	4.0
3	·	3	3.0
5	·	·	5.
5	·	·	5.

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1891phae.proj..443D

R Andromedae.

Desig.	1877. R.A.	1877. Dec.	Mag.	No.	1900. R.A.	1900. Dec.	
a	0h 15m 29.8s	+37° 9.6	5.7	47	0h 17m.8	+37° 21.1	3,4
b	17 19.4	+40 14.1	5.7	29	4.3	+40 29	5,6
c	21 17.2	+36 5.7	6.3	66	23.7	+36 21	3,5
d	17 19.8	+37 17.0	7.0	15	17.7	+38 12	3,4
e	12 27.2	+37 26.5	6.8	42	14.8	+37 41	4,3
f	18 38.2	+36 17.2	7.4	39	16.9	+37 12	5,4
g	17 14.6	+36 37.8	8.1	47	14.3	+36 13	3,2
h	17 27.7	+38 21.4	8.1	42	19.8	+36 36	4,4
k	17 27.6	+38 16.1	8.1	43	19.9	+38 31	4,4
l	19 48.1	+37 41.6	8.8	69	22.1	+37 17	3,3
m	18 30.3	+37 32.0	9.0	60	20.9	+37 47	3,5
n	16 49.0	+37 32.9	9.2	19	19.2	+37 48	3,3
o	17 9.8	+37 16.1	9.3	62	19.6	+38 11	46
p	17 13.4	+37 46.6	9.2	17	14.3	+38 2	4,3
q	18 46.1	+37 31.3	9.3	12	17.2	+37 10	4,3
r	17 3.9	+37 9.1	9.4	61	19.1	+37 24	5,5
s	17 29.0	+37 38.6	9.1	11	17.9	+37 14	5,5

t α

u γ

w β

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1891phae.proj..443D

1892 (11/12 | 11/20 | 12/23) Lick Cam.

3,4,4.	3.7	1 0 0
5,6,5.	5.3	0 1 0
3,5,5.	4.3	1 1 1
3,4,3.	3.3	0 1 0
4,3,3.	3.3	1 0 0
5,4,3.	4.0	1 0 1
3,2,1.	2.0	1 0 1
4,4,4.	4.0	0 0 0
4,4,4.	4.0	0 0 0
3,3,4.	3.3	0 0 1
3,5,5.	4.3	1 1 1
3,3,3.	3.0	0 0 0
~~4 6 4~~	4.7	1 1 1
4,3,3.	3.3	1 0 0
4,3,3.	3.3	1 0 0
5,5,3.	4.3	1 1 1
~~5,5,5~~	5.0	0 0 0
46 5 5	5.0	1 1 0 0
4 4	4.0	0 0

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1891phae.proj..443D

R Piscium.

Descig.	R.A. 1875	Dec. 1875	Dm. mag.	Dm. No.	R.A. 1900	Dec. 1900
a	1h 19m 24s.1	+2° 46′.5	7.0	211	1h 21m.5	+3° 0′
b	18 12.3	+2 12.1	7.5	207	20.5	+2 26
c	30 52.9	+1 50.7	7.4	293	33.2	+2 5
d	24 45.4	+2 46.3	7.4	227	27.1	+3 10
e	25 16.5	+2 17.5	8.3	229	27.6	+2 32
f	26 18.4	+3 1.0	8.2	215	28.5	+3 15
g	21 39.4	+3 3.2	8.3	205	24.0	+3 17
h	23 02	+2 12.4	8.8	221	25.3	+2 26
k	24 9.7	+1 50.6	8.4	271	26.5	+2 5
l	23 43.2	+2 8.3	9.0	224	26.0	+2 22
m	21 2.9	+2 52.7	8.8	216	23.3	+3 7
n	23 32.1	+2 35.7	9.2	223	25.8	+2 50
o	24 26.5	+2 35.9	9.5	226	26.7	+2 50
R					25.5	+2 22
l α	23 4	+1 50				
m β	24 10	+1 58				
n γ	23 56	+2 22				
o δ	23 24	+2 3				
p ε	23 25	+2 3				

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1891phae.proj..443D

92 (1/7)	(11/17)	(3/5)	(2/20)	93. (1/16)	(1/17)	Mean.
		4,		4, 4		4.0
		4		2, 3		3.0
4, 4		5				4.3
3, 5		6				4.7
3	3	3				3.0
		4	6	6		5.3
	3	2		2		2.3
	3	3		3		3.0
	5	3		4		4.0
	3	4		3		3.3
	4	3		4		3.7
	5	4		4		4.3
	3	3		2		2.7
	5	5		5		5.0
	3	4		3		3.3
	5	5				5.0
	5					5.0

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1891phae.proj..443D

R Arietis.

Desig.	R.A. 1875	Dec. 1875	Dm. mag.	Dm. No.	R.A. 1900	Dec. 1900	
a	2 2 57.9	+25° 14.4	6.A	362	2 4 5.5	+25° 27′	
b	1 56 9.0	+25 13.A	7.2	3K3	1 54.7	+25 27	
c	1 5A K1.2	+25 37.7	7.6	350	2 1.2	+25 51	
d	2 K 3,6	+23 17.1	A.1	296	2 6.6	+23 30	4,
e	2 2 3K.7	+2K 21.7	A.A	31A	2 5.1	+2K 35	5,
f	2 A 20.9	+23 55.A	9.1	306	2 10.A	+2K 9	4,
g	2 5 16.A	+2K 35.6	9.3	323	2 7.A	+2K K9	4,
h	2 9 3K.9	+2K 27.2	9.K	33K	2 12.1	+2K K0	5,
k	2 A 23.5	+2K K7.0	9.K	332	2 10.9	+25 0	3,
l	2 A 55.7	+2K 29.A	9.5	321	2 10.A	+2K K3	3,
R	2 7 53.	+24 22.A	Var.		2 10.4	+2K 35	

m ~~mm~~ (α)

n ~~n~~ (β)

o ~~o~~ (γ)

p ~~p~~ (δ)

q ~~q~~ (ε)

r ~~r~~ (ε')

s ~~s~~ (ζ)

t ~~t~~ (η)

u ~~u~~ (ν)

x ~~w~~ (ε)

~~2 7 7.6 +23 37.K 6.5 302~~ } ~~tabulated for clocks~~
~~2 2 K5.5 +23 7.0 A0 293~~ } ~~a. b. & c Dec. Dec. 31.~~
~~1 + 96.~~

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1891phae.proj..443D

$g_1(\frac{11}{20})\,g_3(\frac{1}{12})$

4, 4,

5, 4,

4, 4,

4, 3,

5, 3,

3, 3.

3, 3

5, 5

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5, 4

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4,

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1891phae.proj..443D

R Ceti.

Desig.	1877 R.A.	1877 Dec.	Dm. mag.	Dm. do.	1900 R.A.	1900 Dec.
a	2h 17m 38.9	−4° 33′.0	7.0	394	2h 19m.9	−4° 21′
b	20 7.4	−1 23.9	8.0	348	22.4	−1 12
c	14 17.5	−0 48.7	7.8	357	16.6	−0 36
d	24 44.9	−1 50.3	8.5	352	27.1	−1 38
e	21 2.0	−0 32.2	8.3	367	23.3	−0 41
f	20 30.0	−0 26.3	8.8	365	22.9	−0 14
g	16 5.3	−1 12.0	8.7	328	18.4	−1 0
h	19 54.9	−1 40.3	8.5	336	22.3	−1 28
k	19 44.0	−0 29.8	9.3	363	22.0	−0 18
l	12 ~~39.7~~ 42.3	−1 ~~9.6~~ 6.2	~~8.8~~ 9.2	~~493~~ 333	21.0	−0 ~~24~~ 4
m	16 50.9	−1 14.9	9.5	331	19.1	−1 4
R	18 38.	−0 50.1	Var.		20.9	−0 38

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U Ceti.

Desig.	R. A. 1885	Dec. 1885	Stm. magn.	Dm. obs.	R. A. 1900.	Dec. 1900.
a	2h 33m 47.5s	−10° 47′	6.2	52	2h 35m.3	−9° 52′
b	32 59	−10 27.3	6.4	522	34.3	−10 15
c	26 56.6	−12 57.9	7.0	541	29.1	−12 46
d	25 54.1	−12 35	7.5	549	28.0	−11 52
e	30 53.6	−13 47.4	7.3	549	33.1	−13 34
f	32 31.4	−13 57.4	8.1	502	34.7	−13 47
g	31 54.0	−13 37.7	7.4	500	34.2	−13 26
h	27 1.1	−13 35.2	8.5	541	29.2	−13 23
k	29 56.2	−13 51.9	8.4	493	32.1	−13 40
l	27 51.3	−14 9.5	8.9	479	29.5	−13 54
m	24 38.6	−14 14.2	9.2	472	26.4	−14 6
n	25 53.1	−13 56.5	9.5	47K	28.1	−13 44
o	25 44.5	−13 22.5	9.5	472	27.9	−13 10
p	26 24.4	−13 44.3	9.4	476	28.6	−13 32
q	26 33.4	−13 44.0	9.9	47A	28.4	−13 36
u	26 44.1	−13 47.2		479	28.9	−13 35

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1891phae.proj..443D

R Tauri.

Sent to Seagrave. Wrt. + Pt. clear.

Design.	1895 R.A.	1895 Dec.	Mag.	Sp.	1900 R.A.	1900 Dec.
a	4h 19m 24s.3	+10° 52'.6	6.4	M7	4h 22m.0	+10° 59'
b	22 44.4	+9 55.9	7.0	M0	24.6	+10 2
c	21 45.9	+10 11.7	7.0	M3	24.3	+10 18
d	22 52.2	+10 25.7	7.2	M4	25.5	+10 32
e	20 6.4	+9 44.5	7.2	M4	22.6	+9 50
f	25 49.7	+10 13.0	8.2	M5	24.3	+10 19
g	19 54.7	+9 40.6	8.3	M3	22.4	+9 47
h	17 47.2	+9 24.3	9.0	M5	20.3	+9 30
k	20 32.1	+10 39.9	9.0	M9	23.0	+10 46
l	18 49.0	+10 32.6	9.5	M6	21.3	+10 39
m	20 33.0	+10 53.7	9.5	M4	23.1	+11 0
n	20 52.4	+11 1.6	9.5	M7	23.4	+11 8
o	21 52.0	+9 37.5	9.5	M9	22.8	+9 56
R						
p	22 8.0	+9 43.9	9.5	M9		
l'	21 54.	+9 32.				
l	22 9.	+9 44.				
m	20 55.	+9 45.				
n	20 23.1	+9 52.				
o	20 55.	+9 50.				
p	21 0.	+9 41.				
q						
r						

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1891phae.proj..443D

5
2
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4

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1891phae.proj..443D

δ Ceti.

Desig.		R.A. 1875		Dec.		Ann.	Dm.	R.A. 1900		Dec.	
a	a = 4 Tauri	4	27	36.1	+16°	12.9	1.1	629	4h	30.2	+16° 19′
b	b = 4 Gem.	7	2V	20.7	+32	11.9	1.7	1V41	7	2A.2	+32 7
e	a = 4 Aurigae	1	V9	2.6	+22	K7.2	2.0	306	2	1.V	+23 0
f	d = β Ceti.	0	36	1A.1	−1A	K7.0	2	11V	0	3A.6	−1A 32
c	c = β Tauri	V	17	7.K	+2A	2A.9	2.0	79V	V	20.0	+2A 32
d	f = β Aurigae	V	KA	VK3	+KK	V6.0	2.0	132A	V	V2.2	+KK V7
g	g = α Ceti.	2	VK	K3.A	+3	31.1	2.V	K19	2	V7.1	+3 K2
h	h = β Arietis	1	K6	37.V	+20	V.A	2.V	306	1	K9.1	+20 19
k	k = γ Ceti.	2	3V	K9.V	+2	3A.2	3.V	K22	2	3A.1	+2 V0
l	l = 4 Piscium	1	VK	33.A	+2	37	3.V	317	1	V6.9	+2 16
m	m = δ Ceti.	2	32	3.2	−0	17.K	3.7	K06	2	3KK	−0 6
n	n = 73 ξ″ Ceti.	2	20	27.7	+7	KA.K	K.V	3AA	2	22.9	+A 0
o	o = 6 V ξ′	2	V	19.3	+A	9.A	K.6	3KV	2	7.7	+A 23
p	p = μ	2	37	6.0	+9	29.9	K.0	3V9	2	39.V	+9 K2
q	q = N	2	V1	V7.1	+A	19.7	K.A	KVV	2	V4.0	+A 31
r	r = V	2	2A	17.V	+K	V7.0	V.3	K1A	2	30.7	+V 9
s	s = 7V	2	2K	K6.0	−1	K0.3	V.6	3V3	2	27.1	−1 2A
t	t = 70	2	1K	V0.K	−1	33.1	V.A	322	2	17.1	−1 20
u	u = 69	2	1K	33.V	−0	16.V	V.V	3VV	2	16.9	−0 3
w	α	2	10	30.K	+1	K.0	V.A	K10	2	12.A	+1 17
x	β	2	23	20.A	−0	22.A	6.V	37A	2	2V.6	−0 11
y	γ = 71	2	17	39.2	−3	26.2	6.7	37K	2	20.0	−3 1K
z	δ m	2	12	2K.V	−V	0.6	7.0	K3A	2	1K7	−K KA
t	ε n	2	17	3.A	−3	KV.2	A.2	372	2	19.K	−3 33
β	ξ o	2	12	KA.0	−K	12.0	A.V	379	2	1V.1	−3 V9
γ	η h	2	16	21.V	−K	2.0	A.6	390	2	1A.7	−3 V0
δ	t. q	2	14	17.9	−3	37.6	A.9	363	2	16.6	−3 2V
ε	c R	2	12	11.K	−3	3A.2	9.0	3VV	2	1KV	−3 2V
	Var.	2	12	1.	−3	3A.3	Var.		2	1K.3	−3 26

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M. P. Mags.		Mean of Est.
2.4	3 4 2 3 3	.30 01100
2.79	7 6 7 7	.64 0100
3.41	3 2	.39 1111
3.40	6 6	1100
4.10	3 0 4 3 2	.24 12210
4.31	2 0 1	.21 0321
4.63	2 7 6 0	.34 2324
4.33	6 7 6	.60 0101
4.71	3 1	.31 1113
4.91	4 4	1010
4.94	3 1 3	.23 111
5.64	3 1 2	.20 110
5.73	4 3 1	.27 102
5.71	4 4 2	.31 001
5.93	4 1 6	.37 032
6.31	3 2	.33 012
6.56	6 7 6	.60 0101
7.19	6 6 7	.63 001
7.96	6 6 6	.57 0100
8.43	4 3 3 3	.33 1000
8.73	6 6 6	.60 000
9.74		

	Est.	Mean.
a 2 Tauri.	4 3	.40 011
b 2 Gemini.	1 2 3	.20 101
c β Tauri	2 1 2	.17 010
d β Aurigae.	2 2 1	.17 001
e 2 Arietis.	2 2 2	.20 000
f β Ceti	4 3 2	.30 101
g 2 Ceti		

The above order of sequence in ink, is the latest, and the one finally adopted. From 2 Ceti onwards, the two systems agree.

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1891phae.proj..443D

R Geminorum.

Desig.	R.A. 1875	Dec. 1875	Mag.	No.	R.A. 1900	Dec. 1900
a	6h 53m 34.0	+24° 25.0	5.4	1502	6h 56.3	+24° 22′
b	6 46 24.2	+25 32.6	6.2	1496	6 49.2	+25 30
c	6 56 35.7	+22 22.2	7.1	1566	6 59.3	+22 24
d	7 1 31.0	+21 29.4	7.0	1524	7 4.2	+21 25
e	6 54 27.2	+24 23.2	7.1	1531	7 1.2	+24 19
f	6 51 54.4	+23 39.7	4.0	1566	6 54.6	+23 37
g	6 49 2.1	+23 4.9	4.0	1544	6 51.7	+23 2
h	6 57 33.2	+22 53.3	4.5	1569	7 0.3	+22 50
k	6 54 34.0	+22 44.0	4.4	1576	7 1.3	+22 40
l	6 54 33.4	+22 36.5	4.4	1575	7 1.3	+22 32
m	6 54 42.0	+23 2.4	9.0	1604	7 1.4	+22 54
n	6 59 2.4	+22 54.4	9.1	1541	7 1.7	+22 51
o	6 59 33.3	+23 1.4	9.5	1609	7 2.4	+23 1
R				1577	7 1.3	+22 52
p						
q						
r						

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5	6	6		3	4.5	1201
5	6	3		2	4.0	1212
6	7	5		6	5.0	1201
6	6	2		5	3.4	0021
3	3	6		1	2.4	0012
6	6	5		6	4.4	1101
3	2	6		4	3.2	0111
3	4	3		3	3.2	0100
3	4	4		6	3.4	1000
	4	4	2	2	3.0	1111
	3	3	4	5	3.4	1101
	4		3	2	3.0	101
	6		4	7	5.0	112
			3	6	4.5	12
			3	3	3.0	00

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1891phae.proj..443D

X Cygni.

Desig.		1900 R.A.	1900 Dec.	Dec. hour	Dec. to.	1900. R.A.	1900. Dec.
a	γ Lyra	18h 57m 31.3	+32° 29′	3.2	32.6	18h 57m.2	+32° 32′
b	γ Herculis	17 52 11.5	29 16.4	4.0	31.6	17 53.9	+29 15
c	γ Cygni	19 50 51.4	34 44.9	4.2	37.9	19 52.6	+34 49
d	β Lyrae	18 11 21.1	37 52.2	4.6	33.9	18 13.0	+37 52
e	γ Lyrae	18 2 49.4	32 54.0	4.5	34.9	18 10.3	+32 52
f		19 40 16.3	33 23.6	5.4	35.7	19 42.6	+33 30
g		19 37 10.0	32 51	6.0	35.31	19 38.9	+32 11
h		19 32 25.3	33 54.6	6.7	35.72	19 40.1	+33 55
k		19 41 1.9	32 32.2	6.5	35.52	19 42.7	+32 32
l		19 43 16.7	33 45.6	6.9	3602	19 45.0	+33 12
m		19 43 19.2	34 56.2	7.0	3727	19 45.0	+35 44
n		19 42 20.3	34 12.1	6.2	3772	19 50.0	+34 19
o		19 40 40.1	31 45.6	7.2	3765	19 42.4	+31 52
p		19 43 24.2	32 26.3	8.2	3572	19 45.2	+32 33
q		19 46 49.0	31 13.6	7.6	3813	19 48.1	+31 21
r		19 44 27.2	32 16.6	8.0	3582	19 46.2	+32 24
s		19 44 9.6	32 54.9	8.5	3587	19 45.9	+33 2
t		19 45 54.0	32 43.3	8.9	3600	19 47.6	+32 50
u		19 46 29.7	32 34.2	9.0	3605	19 48.2	+32 42
w		19 44 33.5	32 46.2	9.1	3590	19 46.3	+32 53
x		19 45 10.6	32 53.3	9.4	3595	19 46.9	+32 59
y		19 44 6.5	32 31.4	9.2	3586	19 45.4	+32 38
z		19 43 59.2	32 46.0	9.3	3584	19 45.7	+32 53
χ		19 44 59.4	33 33.0	..	..	19 46.7	+32 50
ζ	χ′	19 45 1.	32 17.	..	..		
β	ψ′	19 45 22.	32 20.	..	..		
	z			..	..		
	γ	19 45 5.	32 32.				
	δ	19 45 8.	32 33.				

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1891phaeproj..4430

γ Lyrae
ξ Herculis
η Cygni.
δ Lyrae
η Lyrae

Con. from previous page. Sequence graded and finished d follows Z next in order. For Haint Hass see R.72.p.202. where the stars are in Yr's precis. notation; as at right of this page.

Réest.

a	6	6	8	⩽ .57	Reads δ
b	2	2	2	.20	" γ
c	⩽	4	3	.40	Yr's a
d	2	3	3	.27	" b
e	4	⩽	4	.43	" c
f	⩽	7	6	⩽	.52 " d
					" e
					" f
					" g
					" h
					" k
					" l

91 11	91 3	Desig.		Yr's Rel. East.			
				Rel. East.	Mean.	Resids.	
.	.	b		⩽	4.⩽	4.⩽	1 1 0
.	.	β		4	4	4.⩽	4.2	0 0 1
.	.	γ		4	3	4.	3.7	1 1 1
.	.	δ		3	4.⩽	3.⩽	3.7	1 1 0
.	.	ε		4	3.	3.	3.3	1 1 1
⩽	7	ζ		⩽	⩽	4.⩽	4.2	0 0 1
4	2	η		⩽	⩽	3.⩽	4.⩽	1 1 2
⩽	4	θ		3	3.⩽	4	3.⩽	1 0 1
6	4	ι						
4	2	κ						
3	⩽	λ						
⩽	⩽	μ						
4	2							
3	4							
⩽	4							
4	3							
4	4							
⩽	4							
4	4							
⩽	4							
⩽	⩽							
⩽	⩽							
4	⩽		Z	⩽				
.	.		ζ	2				
4			β	3.				
3	.		γ	3				
.	.		δ	3				
			ε	2				

'97 Jan 9. Read.

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R Ophiuchi.

Desig.	R.A. 1855	Dec. 1855	Mag.	Mag.	R.A. 1900	Dec. 1900
a	17h 9m 17.6	−16° 9.6	6.5	KK70	17h 12.6m	−16° 12′
b	17 5 19.2	−15 22.9	7.0	KKAA	17 7.9	−15 27
c	17 2 K0.0	−16 27.0	7.5	KK3K	17 5.3	−16 31
d	17 3 7.3	−16 1A.1	7.3	KK36	17 5.7	−16 22
e	17 0 3AK	−16 K2.3	7.7	KK25	17 3.2	−16 K6
f	17 K 1AA	−1K. 5AA	A.0	K56A	17 6.9	−15 3
g	17 1 52.3	−15 5A.5	A.0	KK66	17 K.5	−16 2
h	17 1 29.6	−16 6.9	A.0	KK26	17 K.1	−16 11
k	17 K 3K.1	−15 11.6	A.A	KKA5	17 7.2	−15 16
l	16 5A 3K5	−16 1K.6	A.9	KK16	17 1.2	−16 19
m	16 5A KAA	−16 11.7	9.0	KK20	17 1.K	−16 16
n	16 59 57.2	−16 20.6	9.3	KK21	17 2.6	−16 25
o	16 5A 7.3	−16 11.3	9.5	KK15	17 0.9	−16 15
R				Var.	17 2.0	−15 5A
p	17 0 39.6	−15 55.9	9.5	KK59	17 3.2	−16 0

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1991phae.proj..443D

91 7 12	93 7 49	93 7 27	93 10 5	Σ/No.
·	·	2	4	3.0
·	·	6	6	6.0
·	2	3	3	2.7
3	3	2	·	2.7
3	2	4	·	3.0
5	5	4	·	4.7
5	5	3	·	4.3
·	4	3	2	3.0
·	3	4	5	4.0
·	4	3	3	3.3
·	4	3	2	3.0
·	3	3	5	3.7
·	·	·	·	·

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S Coronae.

Desig.	R.A. 1885	Dec. 1885	Mag.	Mag. obs.	1900.
a	15h 17m 12.3	+30° 46.6	5.2	2653	15h 19.1 +30° 39′
b	14 11.3	30 7.6	6.0	2642	15 16.0 +29 59
c	13 34.5	33 3.5	6.8	2537	15 15.4 +32 54
d	12 6.4	34 4.0	7.3	2626	15 13.9 +33 50
e	14 59.8	31 56.6	7.3	2720	15 16.8 +31 49
f	3 53.3	33 49.2	7.8	2546	15 4.9 +33 39
g	17 30.0	32 20.3	7.8	2537	15 19.3 +32 10
h	16 32.2	32 31.5	8.1	2525	15 18.4 +32 22
k	16 57.6	32 3.7	8.1	2527	15 18.8 +31 54
l	18 7.9	31 12.3	9.0	2732	15 19.9 +31 2
m	15 49.2	31 25.5	8.9	2727	15 17.6 +31 14
n	14 52.3	31 27.2	8.9	2723	15 16.7 +31 17
o	10 30.8	32 24.1	9.2	2566	15 12.4 +32 14
p	15 45.	31 50.			
Var. S	15 29	31 53.5		2725	15 17.3 +31 44
q	16 8.5	+31 30.3		2728	

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4	6			6	3	4.0	1	1	1	2	
	6	3	4	6		4.0	1	2	1	1	
	3	4	3			3.0	1	0	1	1	
	3	3	4	3		3.2	0	0	1	0	
			2			4.0	1	2	1		
			6	2		4.3	1	2	2		
4	4		3	3		3.0	0	0	1	1	
3			4	3		3.0	1	1	0	1	
3	3			3		3.0	1	1	1	1	
				2		4.0	1	1	2		
			4			4.0	1	0			
3			3			3.0	0	0			
6			6			6.0	0	0			

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R Sagittarii.

Desig.	R.A. 1875.0	Dec. 1875.0	Dur. Exp.	Dur. No.	R.A. 1900.0	Dec. 1900.0
a	19h 13m 40.0	−19° 30′.6	6.5	5412	19h 15m.2	−19° 25′
b	14 56.6	−20 54.4	7.0	5516	19 16.2	−20 49
c	9 42.9	−19 7.0	8.0	5387	19 12.4	−19 3
d	10 2.6	−18 57.0	8.0	5298	19 12.6	−18 52
e	16 1.9	−19 12.2	8.2	5436	19 16.6	−19 7
f	10 14.4	−18 59.2	8.5	5299	19 12.8	−18 54
g	8 54.7	−18 50.5	8.7	5289	19 11.6	−18 46
* h	9 1.5	−19 16.9	9.0	5378	19 11.7	−19 14
K	8 54.6	−19 29.4	9.1	5375	19 11.5	−19 23
* l	8 58.8	−19 16.8	9.3	5369	19 11.1	−19 15
m	10 2.0	−19 19.6	9.2	5390	19 12.6	−19 18
n	12 54.6	−19 22.8	9.1	5408	19 15.6	−19 18
o	12 57.9	−19 25.5	9.5	5405	19 14.8	−19 21
p	8 34.0	−19 34.1	9.4	5371	19 11.2	−19 30
q	8 59.0	−19 37.0	9.9	5365	19 10.8	−19 32
r	8 11.4	−19 29.1	9.5	5366	19 10.8	−19 25
R (Var.)	8 11.9	−19 33.7	Var.	5367	19 10.8	−19 30

* Not observed with Meridian Photometer.

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1891phae.proj..443D

91 Aug 19	92 Nov 7	93 Oct 10	97 Oct 2	1900 Sept 3
ν	ν	6		6
4	ν	4		3
ν	4	4	4	2
.	3	4	6	4
.	ν	2	3	4
3	2	4	3	2
3	4	3?	3	ν
3	ν	3	3	3
3	3	1	3ν	1
ν	3	4		ν
4	2	2		2
4	ν	4	2	3
.	4	ν	ν	4
.	ν	3		ν
.	3	4	7	2
.	.	.		

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Cygnus. S Hercules.

Lent her, Asst Lt. class July 30. 1897.

Desig.	R.A. 1875	Dec. 1875	Mag.	Star No.	1900.
a	16h 42m 53.0	+13° 31' 3	5.6	3233	16h 45m.0 +13° 26'
b	45 24.7	+15 13.4	6.1	3066	16 47.5 +15 9
c	49 36.2	+15 36.9	6.5	3042	16 51.6 +15 32
d	43 24.1	+15 39.0	6.4	3052	16 45.4 +15 34
e	47 37.4	+15 53.0	7.3	3077	16 49.6 +15 46
f	46 47.5	+15 39.2	7.4	3072	16 48.4 +15 34
g	47 48.0	+15 23.4	4.2	3074	16 49.1 +15 18
h	46 24.5	+15 7.6	4.5	3070	16 48.5 +15 3
k	44 15.3	+15 5.7	4.9	3060	16 46.3 +15 1
l	43 48.2	+15 32.1	9.0	3057	16 45.1 +15 27
m	43 40.2	+15 44.4	9.3	3059	16 45.7 +15 39
* n	45 37.4	+16 30.1	9.4	3133	16 47.7 +16 25
* o	46 15.7	+15 13.2	9.5	3073	16 48.9 +15 8
* p	45 26.4	+15 9.9	9.5	3064	16 47.4 +15 5
q					
var. S	45 18.	+15 11.4		3063	16 47.4 +15 7
r					
s					
t					
u					

* Not observed with the meridian Photometer.

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1891phae.proj..443D

		3	6	4.7	0 1 1
3	3	2	3	2.4	0 0 1 0
3	3	3	2	2.4	0 0 0 1
4	3	3	2	3.0	1 0 0 1
5	5	4	6	5.0	0 0 1 1
4	6	7	7	6.0	1 0 1 1
2	5	2	2	2.4	1 2 1 1
6	6	7	5	6.0	0 0 1 1
4	6	5	3	4.5	0 2 1 1
3	2	3	3	2.4	0 1 0 0
4	5	5	6	5.0	1 0 0 1
5	2	3	3	3.2	2 1 0 0
4	4	4	6	4.5	0 0 0 2
		2	2	2.0	0 0
		5	3		
		4	4		
		7	6		
		3	3		

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R Vulpeculae.

Lettet Seagrave bright comp. stars July 15. 1897.
" " faint " " July 26. "

Design.	R.A. 1875	Dec. 1875	Diff. Magn.	Diff. Clo.	R.A.	Dec.	
a	20h 41m 51.5s	+22° 29′	7.0	K2.5K	20h 43m 3.9s	+22° 39′	6
b	20 41 44.6	+22 25.5	7.3	K2.7K	20 43.9	+22 26	3
c	20 41 6.0	+23 2.9	7.5	K2.2	20 42.4	+23 3	4
d	20 41 29.0	+23 6.1	7.9	K2.6	20 43.5	+23 16	3
e	21 1 43.7	+23 31.7	8.2	K2.3	21 1.0	+23 43	4
f	21 0 49.4	+23 26.2	8.7	K2K2	21 3.0	+23 37	3
g	20 41 21.3	+22 47.4	8.7	K2.6	20 43.4	+22 58	
h	20 42 49.4	+23 1.0	8.9	K3.7	21 0.4	+23 12	4
K	20 41 26.3	+22 44.4	9.0	K2.4	20 43.5	+23 2	
l	20 41 42.0	+23 4.4	9.3	K2.9	20 43.9	+23 15	4
* m	20 42 2.0	+23 15.2	9.5	K3.1	21 0.0	+23 26	5

g α
(K) β

* Not observed with meridian Photometer.

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1891phae.proj..443D

92 10 24	92 10 26	92 11 6	95 1 4	Σ/N
6	6	5	·	5.7
3	·	4	2.5	3.2
4	·	3	4	3.7
3	3	3	·	3.0
4	4	5	·	4.3
3	4	4	·	3.7
·	4	5	5	4.7
4	3	3	·	3.3
·	4	4	3	3.7
4	4	5	·	4.3
5	5	·	·	5.0
·	4	·	·	4.
·	·	1	.	

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1891phae.proj..443D

R Cygni.

Design.		R.A. (Var.)	Dec.	Mag.	No.	1900.			
a	a	20h 10m 47.6	+34° 27.2	6.5	3977	20h 12.4m	+34° 3.5'		4
b	b	A 44.6	+34 42.9	7.5	3963	20 10.3	+34 51		3
c	c	A 7.3	+34 19.9	7.2	3956	20 9.7	+34 2A		3
d	d	6 24.1	+34 26.A	7.4	3940	20 A.0	+34 3.5		3
e	e	6 11.2	+34 23.4	7.5	3939	20 7.A	+34 31		4
f	k	7 44.0	+34 2.3	A.A	3952	20 9.4	+34 10		4
g	f	6 34.4	+34 (4.7)	A.3	3941	20 A.1	+34 23		
h	h	6 37.4	+34 16.0	A.2	3942	20 A.2	+34 24		
k	g	A 11.3	+34 2.6	A.4	3954	20 9.A	+34 11		
l	l	7 44.4	+34 32.3	A.A	3951	20 9.4	+34 40		3.5
m	m	A 20.4	+34 16.6	9.4	3960	20 9.9	+34 25		5
n	n	6 44.7	+34 24.2	9.4	3943	20 A.4	+34 32		3
o	o	A 3.6	+34 26.6	9.2	3955	20 9.7	+34 3.5		5

e
d
c
b
a

R S (Var.) A 7.4 +34 17.4 A.2 3957 20 9.7 +34 25

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1891phae.proj..443D

90	91	92	93	93	Σ / 188.
11	9	12	10	10	
14	4	22	5	24	
4	4	5	·	·	4.3
3	4	3	·	·	3.3
3	4	4	·	·	3.7
3	4	4	·	·	3.7
4	3	3	·	·	3.3
4	2	0	·	·	2.0
·	·	3	3	4	3.3
·	·	3	2	2	2.3
·	3	3	4	·	3.3
3.5	3	4	·	·	3.5
5	4	5	·	·	4.7
3	5	4	·	·	4.0
5	6	5	·	·	5.3

4501

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1891phae.proj..443D

U Camelop.

Desig.	R.A. 1885.0	Dec. 1885.0	Diff. mag.	Diff. No.
a	3h 27m 17s.	+63° 24.5	7.0	637
b	3 19 57.	+61 46.2	7.0	600
c	3 23 39.	+62 50.1	4.2	542
d	3 22 1.	+63 23.5	7.5	626
e	3 22 46.	+62 1.9	4.1	541
f	3 21 23.	+61 39.9	4.1	604
g	3 27 41.	+61 56.6	9.0	622
h	3 29 17.	+62 13.7	9.2	594

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U Persei.

Lent Lagrave chart.

Desig.	R. A. 1875		Dec.		Sm. No.	Sm. Mag.
a	1h	13m 47.7	+13° 9.7		40	7.9
b	1	11 0.6	+14 3.4		12	8.1
c	1	14 7.1	+14 2.0		4A	8.9
d	1	A 0.1	+13 13.9		2A	8.9
e	1	4A 3.3	+13 3A.1		27	A.A
f	1	4A 1.9	+14 39.1		24	9.2
g	1	12 2.6	+14 7.A		36	9.1
h	1	11 0.1	+14 6		31	9.1
k	1	10 14.	+13 9.		—	—
l	1	10 1A.	+14 1.		—	—
m	1	10 3 1.	+14 1A.		—	—
n	1	10 19.	+14 13.		—	—
Var.	1	49 9.7	+14 7.0		31	

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S Cygni.

Berg.

h	a
h'	b
k	c
l	d
m	e
n	f
o	g
o'	h
b	k
α	l
g	m
β	n
γ	o
δ	p

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1891phae.proj - 443D

96/10/7	96/10/9	97/11/4	97/11/23	97/11/27	97/12/16	97/12/18 Means						
			7	6	7	.67	·	·	·	0	1	0
			2	2	1	.17	·	·	·	0	0	1
3	2	2	1	2	3	.22	1	0	0	1	0	1
√	√	√	7	4	4	.√0	0	0	0	2	1	1
4.√	7	√	√	√	7	.√6	1	1	1	1	1	1
3	√	3	4	2	2	.32	0	2	0	1	1	1
		6	2.√	2	2	.31	·	·	3	1	1	1
		3	4	6	√	.4√	·	·	1	0	2	1
4	√	1.√		2	3	.31	1	2	3	·	1	0
4	4	1.		0	0	.1A	2	2	1	·	2	2
3	2	3			2	.2√	1	0	1	·	1	0
		3			3	3 3 .30	·	·	0	·	·	0 0
97.12.18/2	97.12.22/3	98.1.3./3				.27	1	0	0			

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1891phae.proj..443p

Andromedae.

Desig.		R.A.	Dec.	Dur.	No.	Mag.	Phot. mag.	
A	a	0 13 13.8	+27° 41.1	37	8.0 K			XLV
A'	b	11 50.5	+27 39.7	3K	7.3 K	7.67		7.67
Y	c	13 54.K	+26 8.7	K0	7.5K	8.08		8.20
G	d	1K 26.7	+26 23.K	K2	8.1 K	84		
E	e	15 13.0	+27 30	K7	8.5K			
J	f	13 32.5	+26 10.0	37	8.8K	9.01		
η	g	15 50.4	+26 18.K	K7	9.1B			
S	h	16 56.6	+26 3K.1	52	9.2			
ϑ	k	16 9.8	+26 12.1	K8	9.5			
θ	l	15 47.K	+26 22.9	K6	9.K			
K	m	~~1K 19.2~~	~~+27 58.3~~	~~K0~~	~~9.5~~			
K'	n							
a	o	14 19.2	+27 58.3	40	9.5			
ϕ	p							
Var.		1K 50.5	+26 11.K					

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	R.A. (1900)	Dec.
0	15.5	+ 25 56.
	15.1	25 55.
	16.3	26 25
	16.7	26 30
	17.5	27 10
	15.8	26 25
	14.1	26 33
	19.2	26 49
	14.5	26 27
	14.1	26 30
0	16.6	+ 26 13

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R Lextantis

(1855.)

Desig.		R.A.		Decl.		Dm No.	Dm. magn.	Phot magn.
		h	m	s.				
α	a	9	35	2.6	-7° 6.5	2567	8.2	
β	b		32	37.9	-7 28.1	2557	9.0	
γ	c		35	16.2	-7 25.2	2571	9.1	
δ	d		35	9.2	-7 21.9	2568A	9.1	
ε	e		37	35.7	-7 23.8	2579	9.3	
η	f		37	0	-7 30			
κ	g		35	29.2	-7 27.8	2572	9.6	
θ	h		34	40	-7 25			
λ	k		35	57	-7 28			
μ	l		35	45	-7 24			

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S Pyxidis.

(1875)

Desig.		R.A.		Decl.		C.D.M. No.	C.D.M. magn	Phot. magn.
α	a	9h	0m 30.7	-24°	35′9	7707	7.9	
β	b		1 47.0		28.9	7729	8.4	
γ	c		0 21.7		15.3	7703	8.7	
δ	d		0 38.9		20.2	7710	9.0	
ε	e	8	55 4.0		44.3	7669	9.2	
η	f		57 57.2		19.5	7667	9.4	
θ	g		59 32.2		42.6	7692	9.6	
κ	h		59 19.4		39.3	7687	9.8	
λ	k		59 45.0		39.4	7697	9.8	
μ	l		59 36.0		37.			

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1891phae.proj..443D

– Puppis.

Desig		R.A. (1855.)	Decl.	Dm. No.	Dm. magn	Phot. magn.
a'	a	8h 0m 2.3s	-21° 44.5'	2262	8.2	
a	b	3 28.0	-22 23.5	2172	8.5	
b	c	0 20.1	22.1	2153	8.7	
c	d	0 19.6	30.9	2152	8.9	
d	e	1 39.9	14.7	2161	9.1	
e	f	7 59 58.2	26.9	2150	9.3	
f	g	8 0 39.8	25.2	2156	9.7	
h	h					
k	k					
l	l					
m	m					
n	n					
o	o					

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1891phae.proj.4436

R.A. (1875)	Decl.	C.D.M. Magn	C.D.M No.
8 1 13.9	-22 25.3	8.6	
8 1 11.0	39.0	8.6	
1 30.3	28.9	9.4	
1 41.5	30.8	9.6	
2 1.4	35.2	9.7	
2 24.9	38.4	10	
2 27.7	25.6	10	
2 25	27.8		
2 19	33.2		

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1891phae.proj..443D

S S Cygni.

Desig.		1875			Bm. Dm. Magn.	Bm. Dm. No.	R.A. 1900.		Dec.	
h	a	21h 39m 3.8s	+42°	46.6'	8.5	4197	21h 40m 0.0s	+42°	5'	4.9
h'	b	21 37 40.0	+43	40.7	8.1	4024	21 39 25.	+43	3	0
k	c	21 37 26.8	+42	57.3	8.3	4190	21 39 12.	+43	7	.6
l	d	21 39 41.9	+43	16.0	8.2	4037	21 41 28.	+43	28	.3
m	e	21 38 40.7	+43	8.6	8.6	4030	21 40 26.	+43	20	.9
n	f	21 37 1.2	+43	3.4	9.2	4020	21 38 47.	+43	17	.6
o	g	21 36 39.1	+42	57.4	9.2	4186	21 38 25.	+43	6	.6
o'	h						21 38 19.	+43	20	.2
p	k						21 38 57.	+43	21	.2
r	l						21 38 32.	+43	6	.2
q	m						21 39 5.	+43	13	.8
p	n						21 39 24.	+43	8	.9
x	o						21 38 40.	+43	11	.8
d	p						21 38 50.	+43	12	.9

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1891phae.proj..4430

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1891phae.proj..443D

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List of Variable Stars. in the Harvard Coll. Obs.
Stars are to be observed with Phot. T.
see P. 174

Variable.	R. A. (1875.)	Dec.	Max.	Min.		Sequence Nos. Photometrically Both. & Rep.		
T Cassiop.	0h 15m 25s	+54°	5.3	7.0 – 8.0	11.0 – 11.2	a b c d e f	T. V. 22.	g h k	H III.
S "	1 9 4	+71°	5.8	6.7 – 8.6	< 13.5	a b c d e f	T. V. 10. 12. 14	g h k	H III
T Persei.	2 9 0	+58°	16.7	8.2	9.3	a b c d e f	T. V. 52.	g h k	H III
S Persei.	2 12 29	+57°	55.2	8.5	13.	a b c d e f	T. V. 52.	g h k	H III
R Camelop.	5 5 36	+53°	25.0	6.5 – 7.8	12.5 – 12.7	a b c d e f	T. V. 36.	g h k	H III
R Lyncis.	6 49 20	+55°	31.6	7.8 – 8.0	< 13.	a b c d e f	T. V. 34.	g h k	H III
R Mon. Maj.	10 34 19	+69°	32.1	6.0 – 8.2	13.2	a b c d e f	T. V. 44.	g h k	H III
T " "	12 29 47	+60°	17.2	6.0 – 8.5	12.2 – 13.0	a b c d e f	T. V. 46.	g h k	H III
S " "	12 37 35	+61°	53.3	6.7 – 8.2	10.2 – 11.5	a b c d e f	T. V. 42	g h k	H III
S Boötis.	14 18 1	+54°	28.3	7.7 – 8.5	12.5 – 13.2	a b c d e f	T. V. 38	g h k	H III
R Camel.	14 28 54	+84°	29.2	7.2 – 8.6	11.8 – 13.5	a b c d e f	T. V. 50	g h k	H III
R Mon. Min.	16 31 57	+72°	34.4	8.6 – 9.0	10.5	a b c d e f	T. V. 30.	g h k	
R Draconis.	16 32 17	+67°	3.5	6.5 – 8.7	12 – 13	a b c d e f	T. V. 32.	g h k	H III
S Cygni.	20 2 28	+57°	34.2	8.8 – 11.3	< 14.5	a b c d e f	T. V. 40.	g h k	
T Cephei.	21 7 33	+67°	54.4	5.2 – 6.8	9.5 – 9.9	a b c d e f	T. V. 44	g h k	
S Cephei.	21 36 57	+77°	58.2	7.4 – 9.2	11.5	a b c d e f	T. V. 24.	g h k	H III
R Cassiop.	23 51 4	+50°	34.9	4.8 – 7.0	9.7 – 12	a b c d e f	T. V. 16.	g h k	
R Androm.	0 16 20	+37°	46.4	5.6 – 8.6	< 12.8	a b c d e f		g h k	H III
S Ceti	0 16 41	−10°	7.9	7.0 – 8.0	12	a b c d e f		g h k	K I
R Piscium	1 23 10	+2°	7.9	7 – 8.8	< 13	a b c d e f		g h k	H II
R Arietis.	2 7 53	+24°	22.8	7.6 – 9.0	11.7 – 13.0	a b c d e f		g h k	H II
O Ceti.	2 12 1	−3°	38.3	1.7 – 5.2	8 – 9.	a b c – e –		– – –	
R "	2 18 38	−0°	50.1	7.5 – 8.8	13.5	a b c d e f		g h k	K I
U "	2 26 45	−13°	47.2	6.8 – 7.3	10.5	< a b c d e f		g h k	
R Tauri	4 20 21	+9°	50.1	7.4 – 9.0	12.8 – 13.5	a b c d e f		g h k	H III
U Orionis	5 47 13	+20°	8.7	6.4 – 7.5	< 12	a b c d e f		g h k	H II
R Gemin.	6 58 37	+22°	55.4	6.6 – 7.8	< 13.5	a b c d e f		g h k	H II
S Can. Min.	7 24 51	+8°	37.4	7.2 – 8.0	10.5 – 12.7	a b c d e f		g h k	H II

a = Sequence adopted. for
b = Intervals estimated in grades. for
c = Obs. with Rep. "
d = " " Phot. T.
e = Single Intervals obtained.

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1891phae..proj..443D

Variable	RA 1891	Dec	Max	Min	Range		Sequence observed Photometrically Book & Page
R Cancri	8h 8m 34s	+12°	10.1	6.0 – 8.3	< 11.7	a b c d e f	g h k H II.
V "	8 13 27	+17°	44.5	6.8 – 7.7	< 12	a b c d e f	g h k H II
S Hydrae	8 46 0	+3°	36.8	7.5 – 8.7	< 12.2	a b c d f	g h k H II
T "	8 48 37	−8°	30.4	7.0 – 8.1	< 13	a b c d e f	g h k H. I
R Leo. Min.	9 36 52	+35°	10.6	6.1 – 7.8	13	a b c d e f	g h k H III
R Leonis.	9 39 40	+12°	5.9	5.2 – 6.7	9.4 – 10.0	a b c d e f	g h k
X Virginis	11 54 25	+9°	52.7	8 – 10	12	a b c d f	g h k
R Comae	11 56 49	+19°	30.4	7.4 – 8.0	< 13.5	a b c d e f	g h k H II
T Virginis	12 7 10	−5°	13.8	8.0 – 8.8	10 – < 13.5	a b c d e f	g h k H. I
R Corvi	12 12 8	−18°	26.9	6.8 – 7.7	< 11.5	a b c d	h k H. I
Y Virginis	12 26 25	−3°	37.3	8 – 9.4	11.5 – 13	a b c d f	g h k H. I
R "	12 31 9	+7°	47.2	6.5 – 8.0	9.7 – 11.0	a b c d e f	g h k
U "	12 43 45	+6°	20.6	7.7 – 8.1	12.2 – 12.8	a b c d f	g h k H II
V "	13 20 19	−2°	25.2	8.0 – 9.0	< 13	a b c d	h k H. I
R Hydrae	13 21 48	−22°	31.8	3.5 – 4.5	9.7	a b c d e f	g h k
S Virginis	13 25 56	−6°	26.8	6.7 – 7.8	12.5	a b c d e f	g h k H. I
R Can. Ven.	13 42 43	+40°	15.9	6.7 – 7.0	11.5	a b c f	H III
R Bootis.	14 30 48	+27°	22.1	5.9 – 7.8	11.3 – 12.2	a b c d f	g h k H III
S Librae	15 13 4	−19°	51.7	7.6 – 8.3	< 13	a b c	h k H. I
S Serpentis	15 14 52	+14°	50.3	7.6 – 8.7	12.5?	a b c d f	g h k H II
S Coronae	15 15 29	+31°	53.5	6.1 – 7.8	11.9 – 12.5	a b d f	g h k H III
R "	15 42 36	+28°	36.3	5.8	13.0	a b c d	h k H III
R Herculis.	15 59 43	+18°	45.9	8.0 – 9.2	< 13.0	a b c d	h k H II
Z Scorpii.	16 8 25	−22°	36.7	7.0	< 12	a b c d	h k H. I
U Herculis.	16 19 23	+19°	13.6	6.6 – 7.8	11.4 – 12.7	a b c	H II
W "	16 30 1	+37°	38.1	8.0 – 8.4	11.5 – 14	a b c d f	7. 5. 6. g h k H III
S "	16 45 18	+15°	11.4	5.9 – 7.5	11.5 – 13	a b d f	g h k H II
R Ophiuchi	16 59 27	−15°	53.7	7.0 – 8.1	< 12	a b c f	H. I

8 m. stars. f = Sequence selected for tel. with 6 inch
" " " e = Sulevals estimated " " " " "
" " " g = Sequence selected " stars with 4 inch
" " " k = Sulevals estimated " " " " "

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1891phae.proj..443D

Variable	R.A. 1855	Dec	Max.	Min.		Sequence observed photometrically Book & Page		
T Herculis	18h 3m 37s	+30° 9.9	6.9 – 8.9	9.8 – 12.7	a b c			H. III
R Scuti	18 39 45	– 5° 57.4	4.7 – 8.7	6.0 – 9.0	a b c			
R Sagittarii	19 8 11	–19° 33.5	7.0 – 8.0	12.5	a b c d		h k	H I
P Cygni	19 32 56	+49° 2.5	7.9 – 8.0	< 14.0	a b c d	f	g h k	H III
X "	19 45 0	+32° 33.0	4.0 – 6.5	13.5	a b c d e	f V. V. V.	g h k	H III
R "	20 8 7	+38° 17.4	6.8	8.3 – 10	a b c d	f V. V. 70.	g h k	
R Delphini	20 7 55	+8° 39.1	7.6 – 9.0	11.1 – 12.8	a b c d	f V. V. 60.	g h k	H II
U Cygni	20 10 7	+47° 26.3	7.0 – 8.1	9.4 – 11.6	a b c d	f V. V. 62.	g h k	
Y "	20 36 28	+47° 37.5	6.8 – 9.5	13.5	a b c d	f V. V. 66	g h k	H III
T Aquarii	20 42 17	– 5° 40.9	6.7 – 8.7	12.4 – 13.0	a b c d e	f V. V. V.	g h k	H I
R Vulpec	20 57 56	+23° 149	7.5 – 8.5	12.5 – 13.6	a b c d	f V. V. 64	g h k	H II
N Aquarii	22 49 20	–21° 7.0	7.7 – 9.1	< 12.5	a b c d	f	g h k	H I
R Pegasi	22 59 22	+9° 45.7	6.9 – 7.9	< 13	a b c d e	f V. V. 68	g h k	H II
S "	23 13 13	+8° 7.6	7.3 – 8.0	< 13	a b c d e	f	g h k	H II
R Aquarii	23 36 19	–16° 43.3	7.8 – 8.5	11?	a b c d	f	g h k	H. I
U Persei	1 50 0	+54° 7.0	7.2 – 8.2	11.6	a b c	f	g	(H6) H III
X Ceti	3 12 03	– 1° 36.0	9.3	< 12.5				(H6)
U Camelop	3 29 23	+62° 10.4	7.3	8.8	a b c			
U Orionis	4 49 55	+ 0° 88.0	6	7				
U Can. Min.	6 59 05	+ 9° 5.4	10.3	< 13.7				(H6)
U Puppis	7 54 02	–12° 26.6	8.5 – 9.0	< 14	a b			(H6) H II
U Cancri	9 1 21	+25° 50.	9.6	< 13				(H6)
W Hydrae	13 40 51	–27° 38.5	6.7	8.0				Sawyer Rec Prop 151
T Librae	15 13 04	–14° 51.7	7.6 – 8.3	< 13				
R "	15 20 14	–14° 50	8.5	< 12				(H6)
U Ursæ Min.	15 35 19	+79° 7.2	7.4	11.5				(H6)
Z Ophiuchi	17 12 12	+1° 40.3	7.5 – 8.2	11.8 – 12.5				(H6)
U Aquilæ	18 56 40	– 5° 3.7	6.5	8.0	a b			(H6)

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1891phae.proj.-443D

Variable 1855	R.A.	Dec.	Max	Min	Sequence observed photometrically Books & Page	
R T Cygni	19 39 33	+48°	25.5	7.0-7.5	10.0-11.5 a b f g	(H)
X Aquilae	19 44 17	+4°	5.9	8.4-8.8	<12	(H)
R S "	19 51 16	−8°	17.	10.0	<12.4	(H)
~~W Delphini~~	~~20 31 4~~	~~+17°~~	~~46.6~~	~~9.5~~	~~<12 a b c d e k k~~	
W Aquarii	20 38 48	−4°	36.6	8.0	9.6? −	(H)
V Delphini	20 41 11	+18°	48.3	8.9-9.1	12?	(H)
R U Cygni	21 35 46	+53°	40.0	7.5	9.2 a b - - - - -	Espin.
V Pegasi	21 53 47	~~+5°~~ +4°	25.6	8.2	<13	(H)
S Lacertae	22 22 40	+39°	34.3	7.6-8.2	<12 a b	(H) ~~H III~~
U Cassiop.	0 32 16.	+47	27.8	8.0-8.8	<12 a b c k k	Espin. H III
T Camelop.	4 25 59.	+65	70.9	7.0 8.2	<12 a b	Espin. H III
R S. Librae.	14 14 53.	−22	276.2	8.2	13 a	(H)
T Androm.	0 14 50. 1900	+26	11.4	7.7-8.4	13? a b c d e f g h k	Anderson H III
S S Cygni.	21 38.8	+43	07.	7.2	<11.2 a b c d e f g h k	(H)
R Trianguli	2 31.0	+33	50	5.8-7.1	11.7	(H) H III
~~X Ceti~~	~~3 14.3~~	~~−1~~	~~26~~	~~9.3~~	~~<12.5~~	
T Eridani	3 51.0	−24	20	7.2	11.0	(H)
− Eridani	3 59.8	−16	0	8.3	9.4	(H)
− Eridani	4 7.3	−25	24	8.1	<12.5	(H)
T Leporis	5 0.6	−22	2	8.1	10.9	(H)
R Columbae	5 46.7	−29	13	7.9	11.4<	(H)
− Monocerotis	6 52.5	−8	56	8.1	10.3	(H)
− Can. Min.	7 43.4	+5	40	10.3	11.3	(H)
− Puppis	8 3.1	−22	38	9.4	11.6	(H)
− Hydrae	8 24.7	−5	59	8.0	9.6	(H)
S Pyxidis.	9 0.7	−24	41	8.9	11.1	Thome? (H)
R Sextantis	9 37.7	−7	38	9.7	10.6	(H)
Y Hydrae	9 46.4	−22	32	8.2	10.1	(H)
− Virginis	12 2.1	−6	12			(H)

Continued on page 158

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Father Hagen's List.

Omit

Desig.			R. A.	Dec.	Limiting Magn.	Period
1944	S	Arcuis	21.9	-4° 49'	9 - 13	416
1946	T	"	21.7	-5° 34'	10 - 13	?
5037	RR	Virginis.	13 57.2	-8° 30'	10 - <14	385
5070	Z	"	14 2.5	-12° 36'	10 - <14	302
5249	V	Librae	14 32.3	-15° 2'	9 - 12	?
5430	T	"	15 2.5	-19° 28'	10 - <14	723
5543	X	"	15 27.8	-20° 41'	<11 - <14	?
5593	Y	"	15 29.7	-15° 42'	11 - <14	?
5617	U	"	15 33.6	-20° 43'	9 - <14	?
5644	Z	"	15 38.1	-20° 40'	11 - <13	?
5682	R	"	15 45.4	-15° 48'	10 - <13	730?
5704	RR	"	15 48.1	-15° 03'	8.4 - 14	277
5761	Z	Scorpii.	15 57.5	-21° 20'	9 - 12?	365
5776	X	"	16 0.0	-21° 8'	>11 - <13	?
5795	Y	"	16 3.3	-19° 45'	10 - 14.5	224
5830	R	"	16 9.0	-22° 35'	10 - <13	224
5831	S	"	16 9.0	-22° 32'	10 - <13	176
5856	Y	Ophiuchi	16 13.6	-7° 21'	9 - <13.5	323
5903	Y	Scorpii.	16 21.2	-19° 7'	10? - 14	359
5928	T	Ophiuchi	16 25.4	-15° 49'	10 - 12½	361?
5931	S	"	16 26.9	-16° 51'	9 - <13	233
6900	Y	Aquilae	19 7.6	-7° 18'	7.5 - 11.2	490?
6903	T	Sagittarii	19 7.9	-17° 13'	8 - <11	384
6921	S	"	19 11.0	-19° 17'	10 - <13	230
6923	Z	"	19 11.1	-21° 11'	8½ - <12	?
7234	R	Capricorni	20 3.2	-14° 42'	9 - <13	347
7252	Y	"	20 6.0	-22° 25'	11? - 14?	425?
7255	U	"	20 40.1	-15° 19'	10 - <13	203
7271	V	"	20 59.1	-24° 30'	10 - 14?	310?

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Father Hagen's last com.

Orbit,

Yr	Desig.	R.A. 1875	Dec.	Limiting mags.	Period.
7v77	χ Capricorni.	21 0.2	−21° 56′	12 − <14	210?
76v9	ζ "	21 14.0	−15° 46′	9 − <13	269
7733	ψ "	21 26.4	−14° 37′	10? − 14?	406?
7907	ν Aquarii.	21 55.4	−17° 20′	10? − 14?	?
2v97	ν Ceti.	23 50.5	− 9° 46′	10 − 14?	273?

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Continued from page 153

Variable	R. A. 1900	Dec.	Max.	Min	Sequence obs Photometrically Book & Page.		
R Virginis	12 57.6	+5 43	8.8	9.7		(H)	26
- Bootis	14 1.7	+13 59				(H)	28
R S Virginis	14 22.3	+5 7	8.2	12 ?		(H)	29
Y Centauri.	14 25.1	-29 39	7.7	8.8		(H)	30
- Librae	14 30.3	-17 36	8.3	9.6		(H)	31
- Serpentis	16 2.5	+10 12	9.0	<11.9		(H)	36
R R Sagittarii	19 8.1	-19 2	9.7	11.1		(H)	39
R X "	19 8.7	-18 59	9.9	<13.3		(H)	40
- Cygni.	19 37.1	+32 23				(H)	41
R R Sagittarii	19 49.8	-29 27	7.5	<12.5		(H)	44
- Capricorni	20 11.3	-21 38	8.6	10.3	Surely Secchi found independent at (H.)		46
- Microscopii	20 21.8	-28 35	7.4	8.4		(H)	47
R "	20 34.0	-29 9	8.0	12.0		(H)	49
- Capricorni	21 1.7	-16 49	8.1	9.3		(H)	52
- Aquarii	21 7.3	-14 48	8.4	9.3		(H)	53
X "	22 13.2	-21 25	8.3	13.		(H)	57
Z "	23 47.1	-16 25	8.2	9.3		(H)	59
- Andromedae	23 50.3	+48 5	9.3	9.8		(H)	60
- Cassiopeiae	23 58.2	+55 7	9.8	<13.4		(H)	61

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1891phae.proj..443D

Variable	R. A.	Dec.	Max.	Min.		Sequence obs. Photometrically Book & Page.

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1891phae.proj..443D

Variable.	R.A.	Dec	Max	Min		
T Androm	0 14 50	+26 11.4	7.7-8.4	13 ?	a b c f g h k d e	1895 ✓
U Cassiop.	0 38 16	+47 27.5	5.0-5.8	15	a b c	H III
U Persei	1 50 00	+54 7.0	7.2-8.2	11.6	a b c f g - -	H III
R Trianguli	2 31.0	+33 50	5.8-7.1	11.7		H III
X Ceti	3 12 03	-1 36.0	9.3	12.6	a b . . h k d	
U Camelop	3 29 23	+62 10.4	7.3	8.8	a b c - - - - -	
T Eridani	3 51.0	-24 20	7.2	11.0		
- Eridani	3 39.8	-16 0	8.3	9.4		
- Eridani	4 7.3	-25 24	8.1	12.5		
T Camelop.	4 25 59	+65 50.9	7.0 8.2	12		H III
W Orionis	4 57 05	+0 58.5	6	7	- - - - -	
T Leporis	5 0.6	-22 2	8.1	10.9		
R Columbae	5 46.7	-29 13	7.9	11.4		
- Monocerotis	6 52.5	-8 56	8.1	10.3		
U Can. Min (1855)	6 59 05	+9 3.4	10.3	13.7	a . . h k d	(✓✓
- Can Min (1900)	7 43.4	+6 40	10.3	11.3	a . . h k d	✓
U Puppis (1855)	7 54 02	-12 26.6	8.5-9.0	14	a . . h k d	H. ✓
- Puppis (1900)	8 3.1	-22 38	9.4	11.6	a b h k d	Var = -22° 2160
- Hydrae (1900)	8 24.7	-5 0.9	8.0	9.6		
S Pyxidis (1899)	9 0.7	-24 41	8.9	11.1	a b h k	
U Cancri 1855	9 1 21	+26 50	9.6	13	a b h b d	✓
R Sextantis 1900	9 37.7	-7 38	9.7	10.6	a b h k d	Var. = -7° 2073
Y Hydrae 1900	9 46.4	-22 32	8.2	10.1	a b d	
U Virginis 1900	12 2.1	-6 12				
RT Virginis 1900	12 57.6	+5 43	8.8	9.7		
W Hydrae 1855	13 40 51	-27 38.5	6.7	8.0	- - - - -	
R Can Ven.	13 42 43	+40 15.9	6.7	7.0		H III
- Bootis	14 1.7	+13 59				
R Virginis 1900	14 22.3	+5 7	8.2	12 ?		

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Variable	R.A.	Dec.	Max	Min	a b c f g h k d e	
Y Centauri	14 25.1	-29 39	7.7	8.8		
- Librae	14 30.3	-17 36	8.3	9.6		
S Librae	15 13 04	-19 57.7	7.6-8.3	13		H.
RS Librae	15 16 53	-22 24.2	8.2	13		
RU Librae	15 25 10	-14 50.0	8.5	12		
SUrs. Min.	15 36 19	+79 7.2	7.4	11.5		
- Serpentis	16 2.5	+10 12	9.0	11.9		
R. Ophiuchi	16 59 27	-15 53.7	7.0	8.11		H.
Z Ophiuchi	17 12 12.	+1 40.3	7.5-8.2	11.5-12.5.		
T Herculis	17 3 37	+30 59.9	6.9-8.5	9.5-12.7		
V Aquilae	18 56 40	-5 53.7	6.5	8.0	a b - - - - -	
RW Sagittarii	19 8.1	-19 2	9.7	11.1		
RX Sagittarii	19 8.7	-18 59	9.9	13.3		
- Cygni	19 37.1	+32 23				
RT Cygni	19 39 33	+48 25.5	7.0-7.5	10.0-11.5	a b f g	H III
X Aquilae	19 44 17	+4 5.9	8.4-8.8	12		
RR Sagittarii	19 49.8	-29 27	7.5	12.5		
RS Aquilae	19 51 16	-8 17	10.0	12.4		
- Capricorni	20 11.3	-21 38	8.6	10.3		
- Microscopii	20 21.8	-28 35	7.4	8.4		
W Delphini	20 31 4	+17 46.6	9.5	12	a b c h k d e	
R Microscopii	20 34.0	-29 9	8.0	12.0		
W Aquarii	20 38 48	-4 36.6	8.0	9.6?		
V Delphini	20 41 11	+18 48.3	8.9-9.1	12?		
- Capricorni	21 1.7	-16 49	8.1	9.3		
- Aquarii	21 7.3	-14 48	8.4	9.3		
RU Cygni	21 35 46	+53 40.0	7.5	9.2	a b - - - - -	
V Pegasi	21 53 47	-15 25.6	8.2	13		
SS Cygni	21 38.8	+43 07	7.2	11.2	a b c f g h k d e	
X Aquarii	22 13.2	-21 25	8.3	13		

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Variable	R.A.		Dec.		Max	Min			
S Lacertae	22	22	40	+39	34.3	7.6-8.2	12	a	b
Z Aquarii	23	47.1	-16	25	8.2	9.3			
- Androm.	23	50.3	+48	5	9.3	9.8			
- Cassiop.	23	58.2	+55	7	9.8	13.4			

H III.

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Name.	B.D. or Gr.	R.A.	Dec.	Spect.	Epoch.	Period	Magns. max.	Magns. min.	Range.	Discoverer.
U Cephei	+81° 25	0h 53.4m	+81 20	A		2.49	7.1	9.2		Ceraski
β Persei	+40 673	3 1.7	+40 34			2.87	2.3	3.5		{Montanari Goodricke}
λ Tauri	+12 539	3 55.1	+12 12			3.95	3.4	4.2		Baxendell
R Can Maj	-16 1595	7 14.9	-16 12			1.14	5.9	6.7		Sawyer
S Cancri	+19 2090	8 38.2	+19 24	A		9.48	8.2	9.8		Hind
S Velorum	L.C. 13052	9 29.5	-44 46				7.8	9.3		Woods
δ Librae	-7° 3938	14 55.6	-8 7			2.33	5.0	6.2		Schmidt
R Arae		16 31.4	-56 48				6.9	8.0		Roberts
U Ophiuchi		17 11.4	+1 19			0.84	6.0	6.7		{Gould Sawyer}
ζ Herculis		17 53.6	+15 9				7.1	8.0		
RS Sagittarii		18 11.0	-34 8				6.4	7.5		
W Delphini	+17° 4367	20 33.1	+17 56	A			9.5	12		Wells
χ Cygni		20 48.1	+34 17			1.50	7.1	7.9		Chandler

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Date.	
1880	–
1669	
1782	
1848	
1887	
1848	–
1894	–
1859	
1891	–
1871	
1887	
1895	–
1886	–

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Name	B D no.	R.A.	Dec.	Epoch	Epoch	Period	Magn. Max	Magn. min	Range	Discoverer.
W Geminorum		6h 29.2	+15 24				6.8	7.6		Sawyer.
S Monocerotis	+10°1220	35.5	+9 59				4.9	5.4		Winnecke
Z Geminorum	+20 1687	58.2	+20 43			+10.15	3.7	4.5		Schmidt
~~Canis Min~~	~~+5 1797~~	~~7 43.4~~	~~+5 40~~							~~Fleming~~
V Puppis	A.G.C. 10534	8 55.4	-48 58			2.25	4.4	5.2		Williams
V Carinae	A.G.C. 11451	8 26.7	-59 47			6.66	7.2	8.0		Roberts
T Velorum	A.G.C. 11668	8 34.4	-47 1			4.6	7.5	8.5		"
W Carinae	A.G.C. 12793	9 19.2	-55 32			4.38	7.5	8.5		"
S Antliae	A.G.C. 13016	9 27.9	-28 11				6.7	7.3		Paul
N Velorum	A.G.C. 13030	9 28.2	-56 36				3.4	4.4		Gould
~~Y Hydrae~~	~~-22°2739 A.G.C. 13420~~	~~9 46.5~~	~~-22 33~~				~~6.5~~	~~11~~		~~Wells~~
U Carinae	A.G.C. 15004	10 53.7	-59 12			38.6	6.7	8.5		Roberts
S Muscae	A.G.C. 16671	12 7.4	-69 36			+9.66	6.5	7.3		"
T Crucis	A.G.C. 16832	12 15.9	-61 44			6.669	6.8	7.6		"
R Crucis	A.G.C. 16882	12 18.1	-61 4			+5.827	6.8	8.0		"
R Muscae	A.G.C. 17263	12 36.0	-68 52			0.89	6.6	7.4		Gould
S Crucis	A.G.C. 17531	12 48.4	-57 53			+4.692	6.6	7.8		Roberts
Y Boötis	+20°2970	14 17.4	+20 16			2.60	8.0	8.6		Parkhurst
V Centauri	A.G.C. 19641	25.4	-56 27			+5.543	6.7	7.6		Roberts
T Triang Austr	A.G.C. 20466	15 0.4	-68 20			0.98	6.9	7.4		
S Triang Austr	A.G.C. 21614	15 52.2	-63 30			6.3	6.5	7.5		
U Triang Austr		58.4	-62 38			+2.546	7.7	8.7		
S Normae	A.G.C. 22031	16 10.6	-57 39			9.75	6.5	7.4		
Y Herculis		16 32.0	+7 19			20.5	6.9	8.0		
R V Scorpii	Z.C. 16h 35m 72	16 51.8	-33 27			6.15	6.8	7.6		Roberts
~~= Scorpii~~	~~C.D. 33°11892~~	~~17 35.7~~	~~-33 12~~							~~Fleming~~
R Sagittar		17 41.3	-27 48			7.01185	4	6		Schmidt
Y Ophiuchi		17 47.3	-6 7			+17.1207	6.2	7.0		Sawyer
W Sagittarii		17 58.6	-29 35			+7.59460	4.8	5.8		Schmidt

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Date.		
1896	m	
1867	m	
1847	m	
~~1896~~		–
1886	s	–
1892	s	–
1892	s	–
1892	s	–
1888	m	–
1871	s	–
~~1896~~		–
1891	s	–
1891	s	–
1895	s	–
1891	s	–
1871	s	–
1891	s	–
1894	m	–
1894	s	–
	s	–
	s	–
	s	–
	s	–
	m	
1894	m	
~~1895~~		
1866	m	
1888	m	
1866	m	

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Name	B.D.No.	R.A.	Dec.	Precl.	Epoch	Period.	Magns Max	Magns Min	Range	Discoverer
Y Sagittarii		18 15.5	−18 54			+57.732	5.8	6.6		Sawyer
R Serpentis		18 22.1	+0 8			372	5.0	5.7		
U Sagittarii		18 26.0	−19 12			+6.7446	7.0	8.3		Schmidt
β Lyrae		18 46.4	+33 15			12.91	3.4	4.5		Goodricke
R Pavonis		18 46.6	−67 22			+9.102	4.0	5.5		Thome
S Cor. Aus.	+	18 54.4	−37 5			6	9.5	13		Schmidt
γ Aquilae		19 2.3	+10 55			+4.986	5.3	5.7		
U Aquilae		19 24.0	−7 15			+7.0240	6.4	7.1		Sawyer
η Aquilae		19 47.4	+0 45			+7.1764	3.5	4.7		Pigott
δ Sagittae		19 57.5	+16 22	G		+8.3532	5.6	6.4		Gore
χ Cygni		20 39.5	+35 14	D		+16.38855	6.4	7.2 7.7		Chandler
R Vulpeculae		20 47.2	+27 52				5.5	6.5		Sawyer
δ Cephei		22 25.4	+57 54			5.37	3.7	4.9		Goodricke
W Cephei.	+	22 32.6	+57 54			6.44	7.3	8.3		Espin.
U Pegasi		23 52.9	+15 24				9.0	9.7		
S Cygni.										
U Vulpec.										

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Date	
1886	m –
	m –
1866	m –
1784	m –
1872	S –
1866	–
	m –
1886	m
1784	m
1885	m
1886	m
1885	m
1784	m
1885	ε –
	ε –
	–
	–

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Variable	R.A. 1855 h m s	Dec. ° ′	Max.	Min.	Sequence obs. trigonometrically	Sequence obs. Book & Page			
T Cassiop.	0 15 25	+54 59.3	7.0-8.0	11.0-11.2	a b c d e f	T.5. 22	g h k	H. III	
S "	1 9 4	+71 50.8	6.7-8.6	<13.5	a b c d e f	T.5. 10.12.14	g h k	H. III	
T Persei.	2 9 0	+58 16.7	8.2	9.3	a b c d e f	T.5. 52	g h k	H. III	
S "	2 12 29	+57 55.2	8.5	13	a b c d e f	" "	g h k	H. III	
R Aurigae	5 5 36	+53 25.0	6.5-7.8	12.5-12.7	a b c d e f	T.5. 36	g h k	H. III	
R Lyncis	6 49 20	+55 31.6	7.8-8.0	<13	a b c d e f	T.5. 34	g h k	H. III	
R Urs. Maj.	10 34 19	+69 32.1	6.0-8.2	13.2	a b c d e f	T.5. 44	g h k	H. III	
T " "	12 29 47	+60 17.2	6.0-8.5	12.2-13.0	a b c d e f	T.5. 46	g h k	H. III	
S " "	12 37 35	+61 53.3	6.7-8.2	10.2-11.5	a b c d e f	T.5. 42	g h k	H. III	
S Bootis	14 18 1	+54 28.3	7.7-8.5	12.5-13.2	a b c d e f	T.5. 38	g h k	H. III	
R Camel.	14 28 54	+84 29.2	7.2-8.6	11.8-13.5	a b c d e f	T.5. 50	g h k	H. III	
R Urs. Min.	16 31 57	+72 34.4	8.6-9.0	10.5	a b c d e f	T.5. 30	g h k		
R Draconis	16 32 17	+67 3.5	6.5-8.7	12-13	a b c d e f	T.5. 32	g h k	H. III	
S Cygni	20 2 28	+57 34.2	8.8-11.3	<14.5	a b c d e f	T.5. 60	g h k		
T Cephei	21 7 33	+67 54.4	5.2-6.8	9.5-9.9	a b c d e f	T.5. 48	g h k		
S Cephei	21 36 57	+77 58.2	7.4-9.2	11.5	a b c d e f	T.5. 24	g h k	H III	
R Cassiop.	23 51 4	+50 34.9	4.8-7.0	9.7-12	a b c d e f	T.5. 16	g h k		
T Androm.	0 14 50	+26 11.4	7.7-8.4	13?	a b c d e f		g h k	H III	
R "	0 16 25	+37 46.4	5.6-8.6	<12.8	a b c d e f		g h k	H III	
S Ceti	0 16 41	-10 7.9	7.0-8.0	12	a b c d e f		g h k	H I	
U Cassiop.	0 38 16	+47 27.8	8.0-8.8	<15	a b c		h k	H III	
R Piscium	1 23 10	+2 7.9	7-8.8	<13	a b c d f		g h k	H II	
R Arietis	2 7 53	+24 22.8	7.6-9.0	11.7-13.0	a b c d e f		g h k	H II	
O Ceti	2 12 1	-3 38.3	1.7-5.2	8-9.5	a b c - e -		- - -	H	
R "	2 18 38	-0 50.1	7.5-8.8	13.5	a b c d f		g h k	H I	
U "	2 26 45	-13 47.2	6.8-7.3	10.5	a b c d f		g h k		
R & S Tauri	4 20 21	+9 50.1	7.4-9.0	12.8-13.5	a b c d f		g h k	H II	
U Orionis	5 47 13	+20 8.7	6.4-7.5	<12	a b c d e f		g h k	H II	

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Variable	R.A. 1855 h m s	Dec. °	Max.	Min.			Sequence obs. photometrically Boot & Page		
R Geminor.	6 58 37	+22	55.4	6.6-7.8	<13.5	a b c d e f		g h k	H II
S Can. Min.	7 24 51	+8	37.4	7.2-8.0	10.5-12.7	a b c d e f		g h k	H II
R Canori	8 8 34	+12	10.1	6.0-8.3	<11.7	a b c d e f		g h k	H II
V "	8 13 27	+17	44.5	6.8-7.7	<12	a b c d e f		g h k	H II
S Hydrae	8 46 0	+3	36.8	7.5-8.7	<12.2	a b c d f		g h k	H II
T "	8 48 37	-8	35.4	7.0-8.1	<13	a b c d e f		g h k	H I
R Lyn. Min.	9 36 52	+35	10.6	6.1-7.8	13	a b c d e f		g h k	H III
R Leonis	9 39 45	+12	5.9	5.2-6.7	9.4-10.0	a b c d e f		g h k	
X Virginis	11 54 25	+9	5.2.7	8-10	12	a b c d f		g h k	
R Corvae	11 56 49	+19	35.4	7.4-8.0	<13.5	a b c d e f		g h k	H II
T Virginis	12 7 10	-5	13.8	8.0-8.8	10-<13.5	a b c d e f		g h k	H I
R Corvi	12 12 8	-18	26.9	6.8-7.7	<11.5	a b c d		h k	H I
Y Virginis	12 26 25	-3	37.3	8-9.4	11.5-13	a b c d f		g h k	H I
R "	12 31 9	+7	47.2	6.5-8.0	9.7-11.0	a b c d e f		g h k	
U "	12 43 45	+6	20.6	7.7-8.1	12.2-12.8	a b c d f		g h k	H II
V "	13 20 19	-2	25.2	8.0-9.0	<13	a b c d		h k	H I
R Hydrae	13 21 48	-22	31.8	3.5-5.5	9.7	a b c d e f		g h k	H
S Virginis	13 25 56	-6	26.8	5.7-7.8	12.5	a b c d e f		g h k	H I
R Can. Ven.	13 42 43	+40	15.9	6.7-7.0	11.5	a b c f			H III
R Bootis	14 30 48	+27	22.1	5.9-7.8	11.3-12.2	a b c d f		g h k	H III
S Libras	15 13 4	-19	57.7	7.6-8.3	<13	a b c		h k	H I
S Serpentis	15 14 52	+14	50.3	7.6-8.7	12.5?	a b c d f		g h k	H II
S Coronae	15 15 29	+31	53.5	6.1-7.8	11.9-12.5	a b d f		g h k	H III
R Coronae	15 42 36	+28	36.3	5.8	13.0	a b c d		h k	H III
R Herculis	15 59 43	+18	45.9	8.0-9.2	<13.0	a b c d		k k	H II
T Scorpii	16 8 25	-22	36.7	7.0	<12	a b c d		k	H I
U Herculis	16 19 23	+19	13.6	6.6-7.8	11.4-12.7	a b c			H II
W "	16 30 5	+37	38.1	8.0-8.4	11.5-14	a b c d f	T.5. 56	g k	H III

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1855

Variable	R.A. h m	Dec. °	Max.	Min.		Sequence &c. Photometrically Book + Page				
S Herculis	16 45	18 +15	11.4	5.9-7.5	11.5-13	a b d f		g h k		H II
R Ophiuchi	16 59	27 -15	5.37	7.0-8.1	< 12	a b c f				H I
T Herculis	18 3	37 +30	5.99	6.9-8.5	9.8-12.7	a b c				H III
R Scuti	18 39	45 -5	5.14	4.7-5.7	6.0-9.0	a b c				H
R Sagittarii	19 8	11 -19	33.5	7.0-8.0	12.5	a b c d		k k		H I
R Cygni	19 32	56 +49	5.2.5	5.9-8.0	< 14.0	a b c d f		g h k		H III
X "	19 43	0 +32	33.0	6.0-6.5	13.5	a b c d e f	T5. 54	g h k		H III
R S "	20 8	7 +38	17.4	6.8	8.3-10	a b c d f	T5. 70	g h k		
R Delphini	20 7	55 +8	39.1	7.6-9.0	11.1-12.8	a b c d f	T5. 60	g h k		H II
U Cygni	20 15	7 +47	26.3	7.0-8.1	9.4-11.6	a b c d f	T5. 62	g h k		
V "	20 36	28 +47	3.75	6.8-9.5	13.5	a b c d f	T5. 66	g h k		H III
T Aquarii	20 42	17 -5	4.0.9	6.7-8.7	12.4-13.0	a b c d e f	T5. 58	g h k		H I
R Vulpec.	20 57	56 +23	14.9	7.5-8.5	12.5-13.6	a b c d f	T5. 64	g h k		H II
S S Cygni	21 37	4 +42	5.5.0	8.0	12.0	a b c d e f		g h k		
S Aquarii	22 49	20 -21	7.0	7.7-9.1	< 12.5	a b c d f		g h k		H I
R Pegasi	22 59	22 +9	4.5.7	6.9-7.9	< 13	a b c d e f	T5. 68	g h k		H II
S "	23 13	13 +8	7.6	7.3-8.0	< 13	a b c d e f		g h k		H II
R Aquarii	23 36	19 -16	5.3	5.8-8.5	11 ?	a b c d f		g h k		H I

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List of Father Kagui's New Charts.

	R.A. 1900	Decl. 1900	Ann. var. R.A.	Ann. var. Decl.
T Ceti.	0h 18m 58s	−9° 53.1′	+3.05s	+0.33′
R Ceti.	2h 20 55	−0 37.8	+3.06	+0.27
S Orionis.	5 24 5	−4 46.4	+2.96	+0.05
T Orionis.	5 30 56	−5 32.4	+2.94	+0.04
U Puppis.	7 56 8	−12 33.8	+2.81	−0.16
S Hydrae.	8 50 48	−8 45.6	+2.92	−0.23
T Virginis.				
R Corvi.				
Y Virginis.				
V Virginis.				
S Virginis.				
RR Virginis.				
Z Virginis.				
V Librae.				
T Librae.				
S Librae.				
X Librae.				
Y Librae.				
U Librae.				
Z Librae.				
RR Librae.				
Z Scorpii.				
X Scorpii.				
Y Scorpii.				
R+S Scorpii.				
T Ophiuchi.	16 25 1	−15° 55.2	+3.42	−0.13
S Ophiuchi.	16 25 30	−16 57.0	+3.45	−0.13
R Ophiuchi.	17 2 1	−15 57.6	+3.44	−0.02
T Sagittarii.	19 10 28	−17 8.7	+3.47	+0.10
R Sagittarii.	19 10 49	−19 29.0	+3.52	+0.10

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List of Father Hagen's Star Charts.

	R.Ascn. 1900	Decl. 1900	Annual Var.	
	h m s	° ′	RA. s	Decl. ′
S Sagittarii	19 13 35	−19 12.4	+3.51	+0.11
Z Sagittarii	19 13 47	−21 6.6	+3.56	+0.17
R Capricorni	20 5 42	−14 33.8	+3.37	+0.17
W Capricorni	20 8 36	−22 16.8	+3.57	+0.15
U Capricorni	20 42 34	−15 9.1	+3.35	+0.22
T Aquarii	20 44 40	−5 31.1	+3.17	+0.22
V Capricorni	21 1 47	−24 19.3	+3.50	+0.24
X Capricorni	21 2 50	−21 45.1	+3.44	+0.24
T Capricorni	21 16 30	−15 35.0	+3.32	+0.25
Y Capricorni	21 28 55	−14 25.1	+3.28	+0.26
U Aquarii	21 57 52	−17 6.5	+3.28	+0.29
S Aquarii	22 51 45	−20 52.6	+3.22	+0.32
R Aquarii	23 38 39	−15 50.3	+3.11	+0.33
V Cet.	23 52 47	−9 31.1	+3.08	+0.33

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Hagen's List.

Class. I.

1855

Design.			R.A. h m	Dec. °	Limiting magn.	Period d	
1144	S	Ceti	0 16.7	-10 8	7.0-8.9	320.2	X
1944	S	Orionis	5 21.9	-4 49	9 - 13	416	x
1986	T	Orionis	5 28.7	-5 3	4 10 - 13	irreg	x
43777	T	Virginis	12 7.2	-5 13.8	(8.0-8.5)	10.0 (13)	339.5 x
5037	R.R.	Virginis	13 57.2	-8 36	10 - <14	383	x
5070	Z	Virginis	14 2.5	-12 36	10 - <14	302	x
5249	V	Librae	14 32.3	-17 2	9 - 12	360?	x
5430	T	"	15 2.5	-19 28	10 - <14	723	x
5583	X	"	15 27.8	-20 41	<11 - <14	1636	x
5593	W	"	15 29.7	-15 42	11 - <14	206	x
5617	U	"	15 33.6	-20 43	9 - <14	226.2	x
5644	Z	"	15 38.1	-20 40	11 - <13	290	x
5688	R	"	15 45.4	-15 48	10 - <13	730?	?
5704	RR	"	15 48.1	-17 53	8.4 - 14	277	x
5761	Z	Scorpii	15 57.5	-21 20	9 - 12	? 360	x
5776	X	"	16 0.0	-21 8	>11 - <13	199.0	x
5795	W	"	16 3.3	-19 45	10 - 14.5	224	x
5830	R	"	16 9.0	-22 35	10 - <13	224	x
5831	S	"	16 9.0	-22 32	10 - <13	176	x
5856	W	Ophiuchi	16 13.6	-7 21	9 - <13.5	323	?
5903	Y	Scorpii	16 22.1	-19 7	10? - 14	359	?
5928	T	Ophiuchi	16 25.4	-15 49	10 - 12.5	361?	x
5931	S	"	16 25.9	-16 51	9 - <13	233	x
6900	W	Aquilae	19 7.6	-7 18	7.5 - 12.2	490?	?
6903	T	Sagittarii	19 7.9	-17 13	8 - <11	384	x
6905	R	"	19 8.2	-19 34	(7.8-8.0) - 12.5	266.7	x
6921	S	"	19 11.0	-19 17	10 - <13	230	x
6923	Z	"	19 11.1	-21 11	8.5 - <12	452	x
7234	R	Capricorni	20 3.2	-14 42	9 - <13	347	x
7252	W	"	20 6.0	-22 25	11? - 14?	425?	x
7455	U	"	20 40.1	-15 19	10 - <13	203	+

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Hagen's List (Cont.)

1855

	Design.		R.A. h m	Decl. ° ′	Limiting Magn.	Period. d	
7468	T	Aquarii	20 42.3	-5 41	(6.7-8.7)(12.4-13.0)	203.3	×
7571	V	Capricorni	20 59.1	-24 30	10 - 14?	310?	×
7577	X	"	21 0.2	-21 56	12 - <14	210?	×
7659	T	"	21 14.0	-15 46	9 - <13	269	×
7733	Y	"	21 26.4	-14 37	10? - 14?	406?	×
7907	U	Aquarii	21 55.4	-17 20	10? - 14?	208	×
8230	S	"	22 49.3	-21 7	(9.7-9.1) < 12.5	279.7	×
	R	"	23 36.3	-16 5	(9.8-9.5) - 11?	387.16	×
8597	V	Ceti.	23 50.6	-9 46	10 - 14?	273?	×

Additional Stars in Hagen's Series I.

4405	R Ceti.	×
2807	U Ruffis.	×
3,845	T. Hydrae	×
4607	R Corvi	×
4692	Y Virginis	×
4816	V Virginis	×
4847	S Virginis	×
5494	S Librae	×
6132	R Ophiuchi	×

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Hagen's List. Class. II.

	Design		1855 R.A. h m	1855 Dec. ° ′	1900 R.A. h m	1900 Dec. ° ′	Limiting Magn	Period.	
161	T	Piscium	0 24.5	+13 48	0 26.8	+14 3	10–11	Irreg.	
434	S	"	1 10.0	8 10	1 12.4	8 24	8.5–<14	404.3	
466	U	"	1 16.3	12 6	1 17.7	12 21	10–<14	172.7	
513	R	"	1 23.2	2 8	1 25.5	2 22	8–<13	344.15	
710	S	Arietis	1 56.8	11 50	1 59.3	12 3	9.5–<13.5	292.2	
782	R	"	2 7.9	24 28	2 10.4	24 36	8–12	186.5	
1113	V	"	3 3.0	14 16	3 5.5	14 25	8–<11	361	
1537	T	Tauri.	4 13.6	19 11	4 16.2	19 18	10–13.5	Irreg.	
1574	W	"	4 19.7	16 43	4 22.2	16 49	8.5–12	Irreg.	
1577	R	"	4 20.4	9 50	4 22.8	9 56	8.5–13	325	
1582	S	"	4 21.3	9 37	4 23.7	9 44	9.5–<13	375.5	
1717	V	"	4 43.6	17 17	4 46.2	17 22	9–<13.5	170.1	
1761	R	Orionis	4 51.1	7 54	4 53.6	7 59	9–12.5	380.0	
1805	V	"	4 58.4	3 54	5 0.8	3 58	8.5–<13	266	
2100	U	"	5 47.2	20 9	5 49.9	20 10	7–<12	370	
2528	R	Geminorum	6 58.6	22 55	7 1.3	22 52	7–<13.5	370.2	
2625	V	"	7 15.0	13 22	7 17.6	13 17	8.5–13	276	
2684	S	Canis minoris	7 24.8	8 37	7 27.3	8 32	7.5–11.5	330.3	
2691	T	Canis minoris	7 25.9	12 3	7 28.4	11 58	9.5–<13	322.7	
2736	U	"	7 33.5	8 42	7 35.9	8 37	8.5–13	410	
2742	S	Geminorum	7 34.3	23 47	7 37.0	23 41	8.5–13.5	294	
2780	T	"	7 40.6	24 6	7 43.3	23 59	8.5–<13.5	288.1	
2816	U	"	7 46.5	22 23	7 49.2	22 16	9–13	86.8	
2946	R	Cancri.	8 8.6	12 10	8 11.0	12 2	7–<12	352.81	
2976	V	"	8 13.4	17 44	8 16.0	17 36	7–<12	272.1	
3060	U	"	8 27.5	19 24	8 30.0	19 14	9–<13	306.0	
3170	S	Hydrae	8 46.0	3 37	8 48.4	3 27	8–<12	207.0	
3567	V	Leonis.	9 52.0	21 57	9 54.5	21 44	8.5–<13.5	273.7	
3712	U	"	10 16.3	14 44	10 18.7	14 31	9.5–<13.5	—	(doubtful) ?
3890	W	"	10 46.0	14 29	10 48.4	14 16	9–<14	—	
3994	S	"	11 2.4	+6 16	11 5.7	+6 0	9.5–<13	190.0	

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Hagen's List. Class II (cont.)

Design.			1855 R.A. h m	1855 Decl. ° ′	1900 R.A. h m	1900 Decl. ° ′	Limit Magn.	Per.		
4160	T	Leonis.	11 31.0	+4 10	11 33.3	+3 56	10-<13.5	—	∪	?
4300	X	Virginis.	11 54.4	9 53	11 56.7	9 38	8-10)-12	—	×	?
4315	R	Corvae	11 56.8	19 35	11 59.1	19 20	7.5-<13	361.8	∧	
4596	U	Virginis	12 48.8	6 21	12 46.0	6 6	8-12.5	207.0	×	
5338	U	Bootis	14 47.6	18 17	14 49.7	18 6	9.5-13	176.7	×	
5501	S	Serpentis.	15 14.9	14 50	15 17.0	14 40	8-12.5?	365.4	∧	
5677	R	"	15 44.0	15 35	15 46.1	15 26	6.5-13	355.0	∧	
5770	R	Herculis.	15 59.7	18 46	16 1.7	18 38	8.5-<13	317.7	∧	
5889	U	"	16 19.4	19 14	16 21.4	19 7	7-12	409	×	
6044	S	"	16 45.3	15 11	16 47.4	15 7	6.5-12.5	304.1	×	
6624	T	Serpentis.	18 21.7	6 12	18 23.9	6 14	(9.1-10.5)<13.5	342.3	×	?
6849	R	Aquilae	18 59.4	8 1	19 1.6	8 5	6.5-11	350.6	×	
7242	S	"	20 5.0	15 12	20 7.0	15 19	(8.4-10.1)(10.7-11.8)	46.7	×	?
7261	R	Delphini	20 7.9	8 39	20 10.1	8 47	8-12	285.5	×	
7431	S	"	20 36.4	16 34	20 38.5	16 44	9-11	277.5	×	
7444	T	"	20 38.6	15 52	20 40.7	16 2	9-<13	331.2	×	
7458	V	"	20 41.2	18 48	20 43.2	18 58	(8.9-9.1)-12?	5.40	×	?
7560	R	Vulpeculae	20 57.9	23 15	20 59.9	23 26	8-13	136.9	×	
7944	T	Pegasi	22 1.8	11 50	22 4.0	12 3	9-<13	378	∧	
8290	R	"	22 59.4	9 46	23 1.6	10 0	7.5-<13	380.0	×	
8373	S	"	23 13.2	8 8	23 15.5	8 22	7.5-<13	317.5	×	

Additional stars in Hagens Series II

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Hagen's List. Class III.

	Design.		1855 R.A. h m	1855 Decl. ° ′	1900 R.A. h m	1900 Decl. ° ′	Variation	Period
107	T	Cassiopeiae	0 05.4	+54 59	0 17.8	+55 14	(7.0-8.0)(11.0-12.0)	446
112	R	Andromedae	0 16.4	37 46	0 18.8	38 1	(7.6-8.6)<12.8	410.7
243	U	Cassiopeiae	0 38.3	47 28	0 40.8	47 43	(8.0-8.8)<13	276.0
432	S	"	1 9.1	71 51	1 12.3	72 6	(6.7-8.6)<13.5	610.5
678	U	Persei	1 50.0	54 7	1 52.9	54 20	(7.2-8.2)-11.6	318
814	S	"	2 12.5	57 55	2 15.7	58 8	(8.3-8.6)(10.5-13)	Irreg.
906	R	Trianguli	2 28.3	33 38	2 31.0	33 50	(6.8-7.1)-11.7	268.0
1222	R	Persei	3 20.8	35 10	3 23.7	35 20	(7.7-9.2)(9.5-10.5)	——
1623	T	Camelopardi	4 26.0	65 51	4 30.4	65 57	(7.0-8.2)<12	370
1855	R	Aurigae	5 05.6	53 25	5 09.2	53 28	(6.8-8.7)(12.5-13.7)	460.2
1923	S	"	5 17.6	34 2	5 20.5	34 14	(9.4-11.0)<14.5	Irreg.
1981	S	Camelopardi	5 25.4	68 42	5 30.2	68 45	(8.2-8.9)(10.2-12)	313
2013	U	Aurigae	5 32.6	31 57	5 36.5	31 59	8.6 - 12	407
2258	V	"	6 12.9	47 44	6 16.3	47 42	(8.5-10)<11.5	313
2478	R	Lyncis	6 49.3	55 32	6 53.0	55 28	(7.8-8.0)<13	380.0
3477	R	Leonis minoris	9 36.9	35 11	9 39.6	34 58	(6.1-7.8) 13	370.5
3826	R	Ursae majoris	10 34.3	69 32	10 37.6	69 18	(6.0-8.3)(12.6-13.2)	302.1
4511	T	" "	12 29.8	60 17	12 31.8	60 2	(6.0-8.5)(12.2-13.0)	257.2
4057	S	" "	12 37.6	61 53	12 39.6	61 38	(6.7-8.2)(10.2-11.5)	226.1 ?
4948	R	Canum Venat.	13 42.7	40 16	13 44.6	40 2	(6.1-7.0) 11.5	898
5157	S	Bootis	14 18.0	54 28	14 19.5	54 16	(7.7-8.5)(12.5-13.2)	268.2
5190	R	Camelopard.	14 28.9	84 29	14 25.1	84 17	(7.2-8.6)(11.8-13.5)	269.5
5237	R	Bootis	14 30.8	27 22	14 32.8	27 10	(5.9-7.8)(11.3-12.2)	223.4
5304	S	Coronae	15 15.5	31 52	15 17.3	31 44	(6.1-7.8)(11.9-12.9)	360.8
5367	R	"	15 42.6	28 36	15 44.4	28 28	5.8 - 13.0	Irreg.
5375	V	"	15 44.4	40 1	15 46.0	39 52	(7.2-7.7)(10.3-12.0)	356.5
5948	R	Ursae minoris	16 32.0	72 34	16 36.3	72 28	(8.6-9.0)(10.0-10.5)	Irreg. ?
5950	W	Herculis	16 30.1	37 38	16 31.7	37 32	(8.0-8.4)(11.5-14)	280.0
5955	R	Draconis	16 32.3	67 4	16 32.4	66 58	(6.5-8.7)(12-13)	245.6

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Hagen's List. Class III (cont.)

	Design.		1855 R.A. h m	1855 Decl. ° ′	1900 R.A. h m	1900 Decl. ° ′	Variation	Period.	
6512	T.	Herculis	18 3.6	+31 0	18 5.3	+31 0	(6.9-8.5)(9.8-12.7)	164.85	
7045	R.	Cygni	19 32.9	49 52	19 34.1	49 58	(6.9-8.0) < 14	426.7	
7085	R.T.	Cygni	19 39.6	48 26	19 40.8	48 32	(7.0-7.5)(10.0-11.5)	191.4	
7120	X	Cygni	19 45.0	32 33	19 46.7	32 40	(4.0-6.5) 13.5	406.02	
7192	Z	"	19 57.4	49 38	19 58.6	49 46	(7.1-8.5)(11.5-12)	265	
7220	S	"	20 2.5	57 34	20 3.4	57 42	(8.8-11.3) < 14.5	322.8	?
7299	U	"	20 15.1	47 26	20 16.5	47 35	(7.0-8.1)(9.4-11.6)	463.5	?
7428	V	"	20 36.5	47 38	20 38.1	47 47	(6.8-9.5)(13.5)	418	
7779	S	Cephei	21 37.0	77 58	21 36.5	78 10	(7.4-9.3)(11.5-12.3)	487	
8068	S	Lacertae	22 22.7	39 34	22 24.6	39 48	(7.6-8.2) < 12	233	
8153	R	"	22 36.8	41 37	22 38.8	41 51	(8.3-9.3) < 13.5	299.8	
8600	R	Cassiopeiae	23 51.1	50 35	23 53.3	50 50	(4.8-7.9)(9.7-12)	429.5	?

Additional stars in Hagen's Series III

103	T.	Andromedae.		

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Series V.

	1855. R.A.	Dec.	1900. R.A.	Dec.	Variation. max. — min.	Period.
α Cassiop.	0h 32m.3	+55° 44′	0h 34m.2	+55° 59′	2.2 — 2.8	Irreg.
T Ceti	0 14.4	−20 52	0 16.7	−20 37	(5.1-5.3)(6.4-7.0)	Irreg.
o Ceti	2 12.0	−3 38	2 14.3	−3 26	(1.7-5.0) (8.-9.5)	331.6.
ρ Persei	2 55.9	+38 16	2 58.8	+38 27	3.4 — 4.2	Irreg.
β Persei	2 58.8	+40 24	3 1.7	+40 34	2.3 — 3.5	d 2 h 20 m 48 s 55
λ Tauri	3 52.6	+12 5	3 55.2	+12 12	3.4 — 4.2	d 3 h 22 m 52.2
ε Aurigae	4 57.6	+43 36	4 58.8	+43 40	3.0 — 4.5	Irreg.
ζ Orionis	4 57.9	+0 58	5 0.2	+1 2	6 — 7	—
η Geminorum.	6 6.1	+22 33	6 8.8	+22 32	3.2 — (3.7-4.2)	231.4
S Monocerotis.	6 33.0	+10 2	6 35.5	+9 59	4.9 — 5.4	—
ε Orionis	5 47.3	+7 23	5 49.8	+7 23	1 — 1.4	Irreg.
T Monocerotis	6 17.4	+7 10	6 19.8	+7 8	(5.8-6.4)(7.4-8.2)	27.01
ζ Geminorum	6 55.5	+20 47	6 58.2	+20 43	3.7 — 4.5	10.15
R Can. Maj.	7 12.9	−16 8	7 14.9	−16 12	5.9 — 6.7	d 1 h 3 m 15 s 46
U Hydrae	10 30.4	−12 38	10 32.6	−12 52	4.5 (6.1-6.2)	Irreg.
R "	13 21.8	−22 32	13 24.2	−22 46	(3.5-4.5) — 9.7	425.15
δ Librae	14 53.2	−7 56	14 55.6	−8 7	5.0 — 6.2	d 2 h 7 m 51 s 23
X Herculis	15 58.3	+47 38	15 59.6	+14 31	(4.9-6.3)(6.8-7.2)	92.5
Z "	16 23.9	+42 12	16 25.4	+42 6	(4.7-5.5)(5.4-6.0)	Irreg.
ζ "	17 8.0	+14 34	17 10.1	+14 30	3.1 — 3.9	Irreg.
ω "	17 12.0	+33 16	17 13.6	+33 12	4.6 — 5.4	Irreg.
U Ophiuchi	17 9.2	+1 28	17 11.4	+1 19	6.0 — 6.7	d 0 h 20 m 7 s 43
Y "	17 44.9	−6 6	17 47.3	−6 7	6.2 — 7.0	17.12
X Sagittarii.	17 38.4	−27 46	17 41.2	−27 48	4 — 6	7.01
R "	17 55.8	−29 35	17 58.6	−29 35	4.8 — 5.8	7.59
S "	18 12.8	−18 55	18 15.5	−18 54	5.8 — 6.6	5.77
β Lyrae.	18 44.7	+33 12	18 46.4	+33 15	3.4 — 4.5	d 12 h 21 m 47 s 24
R "	18 50.9	+43 46	18 52.3	+43 49	4.0 — 4.7	46.4
α Serpentis	18 19.8	+0 7	18 22.1	+0 8	2.0 — 3.7	8.72

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Series I.

	1890. R. A.	Dec.	1900. R. A.	Dec.	Variation	Period.
Seeliger's Algol.						
R Scuti.	18 39.8	-5° 51	18 42.2	-5° 49	(4.7-5.7)(6.0-9.0)	71.1
U Aquilae	19 21.6	-7 20	19 24.0	-7 18	6.4 - 7.1	7.02
η "	19 45.1	+0 38	19 47.4	+0 40	3.5 - 4.7	7.18
S Sagittae	19 49.4	+16 18	19 51.5	+16 22	5.6 - 6.4	8.38
X Cygni.	19 45.0	+32 38	19 46.7	+32 40	(4.0-6.5) - 13.5	406.02
T Vulpec.	20 45.3	+27 42	20 47.2	+27 52	5.5 - 6.5	4.44
W Cygni.	21 30.6	+44 44	21 32.2	+44 56	(5.0-6.3)-(6.1-6.7)	131.5
μ Cephei.	21 39.1	+58 7	21 40.4	+58 19	4? - 5?	Irreg.
δ "	22 23.8	+57 40	22 25.4	+57 54	3.7 - 4.9	5d 8h 47m 39s
β Pegasi.	22 56.8	+27 18	22 58.9	+27 32	2.2 - 2.7	Irreg.

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List of Variable Stars selected for observation, or being observed, at the H. C. O.

(p = one of 17 circumpolars) (a = additional to same)
(b = being observed with Iner. Phot.)

	Desig.
ab	T Cati.
p	T Cassiop.
ab	R Andr.
ab	S Cati.
b	B Cassiop.
b	U Cassiop.
pb	S "
b	S Piscium
b	R Sculp.
ab	R Piscium.
ab	R Arietis.
pb	T Persei.
ab	o Cati
pb	S Persei.
ab	R Cati.
ab	U "
b	T Arietis
b	R Persei.
ab	R Tauri.
b	V "
b	R Orionis
b	R Leporis.
pb	R Aurigae.
b	S Orionis.
ab	U "
b	V Monoc.

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List of Var. Stars selected, &c.

	Desig.
b	T Monoc.
b	S "
pb	R Lyncis.
ab	R Gemin.
b	R Can. Min.
b	L Puppis.
b	V Gemin.
b	U Monoc.
ab	S Can. Min.
b	T Can. Min.
b	U " "
b	S Gemin.
b	T "
b	U Puppis.
ab	R Cancri.
ab	V "
b	U "
ab	S Hydrae
ab	T "
b	T Cancri.
ab	R Leo. Min.
ab	R Leonis.
b	V "
b	R Antliae.
b	U Hydrae.
pb	R Urs. Maj.
b	V Hydrae.
b	R Crateris.
b	S Leonis.

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List of Var. Stars selected, &c.

ab	X	Virginis
ab	R	Comae.
ab	T	Virginis
ab	R	Corvi.
ab	Y	Virginis
pb	T	Urs. Maj.
ab	R	Virginis.
pb	S	Urs. Maj.
ab	U	Virginis
b	Y	"
ab	V	"
ab	R	Hydrae.
ab	S	Virginis
ab	R	Can. Ven.
b	T	Boötis.
b	X	"
pb	S	"
pb	R	Canelop.
b	V	Boötis.
ab	R	"
b	Y	"
b	Y	Librae.
ab	S	"
ab	S	Serpentis.
ab	S	Coronae.
b	U	Librae.
ab	R	Coronae.
ab	V	"
ab	R	Serpentis.
b	R	Lupi.

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List of Var. Stars selected, &c.

	Desig.
b	T Coronae
ab	R Herculis.
ab	T Scorpii.
b	Sr Ophiuchi.
b	U Scorpii.
ab	V Ophiuchi.
ab	U Herculis.
b	S Ophiuchi.
pb	R Urs. Min.
ab	Sr Herculis.
pb	R Draconis.
ab	S Herculis.
ab	— Ophiuchi.
ab	R Ophiuchi
b	— Serpent.
b	X Sagittar.
b	Sr "
ab	T Herculis.
b	Y Sagittar.
b	V "
b	U "
b	X Ophiuchi.
b	T Aquilae.
ab	R Lyrae.
b	R Aquilae.
b	T Sagittar.
ab	R "
b	U Aquilae.
ab	R Cygni.

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List of Var. Stars selected. &c.

Dec.

b 11 Vulpec.
b S "
ab X Cygni.
b S Sagittae.
b Z Cygni.
b R Cephei.
pb S Cygni.
b R Capric.
b S Aquilae.
ab R Sagittae.
ab R Delphini.
ab U Cygni.
ab V "
b S Delphini.
b X Cygni.
b T Delphini.
b R R Cygni.
b T "
ab T Aquarii.
b T Vulpec.
ab R "
pb T Cephei.
b T Capric.
b Y Cygni.
pb S Cephei.
b — Cygni.
b T Pegasi.
ab R Pis. Aust.
b R Lacertae.

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List of Var. Stars selected, etc.

Desig.

ab S Aquarii.
ab R Pegasi.
ab S "
ab R Aquarii.
pb R Cassiop.

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7. Mar. 11. Sent Mr. Leavitt chart for region about U Cephei, with stars d, s, f, g, h, k, n on it. These are respectively d. s. g. h. g. n in the preliminary notation used by Mr. Reed. and form an orderly sequence with a range of about two magnitudes. according to Mr. R.

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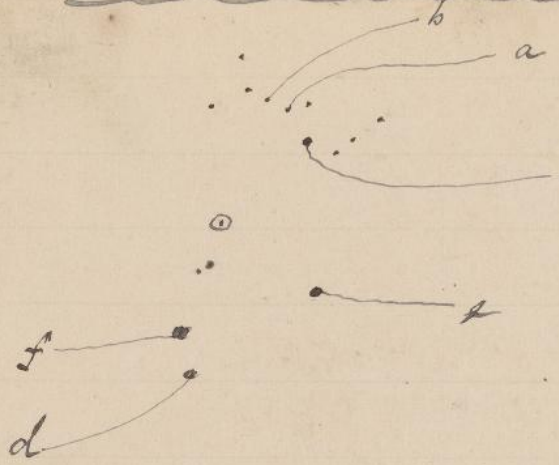
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7 Androm. and Comp. Stars.



d is 2 M. +26 37 8.8 magn.

e " " +26° 42 8.1 " e

f " " +26° 40 7.7 " a

c " " +26° 47 9.1 " b

" " 25 42 c

" " 25 40 d.

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