





Feb. 26, 1900.

Measures of X 8729 & Scarpia to
identify lines near H β .

H β	0	17.4	16.3
	2.3	17.2	14.2
4668	17.3	16.3	0

$$\begin{array}{r}
 11.8 \\
 2.2 \\
 \hline
 236 \\
 236 \\
 \hline
 25.96
 \end{array}$$

$$\begin{array}{r}
 4861.5 \\
 4668.0 \\
 \hline
 193.5 \\
 16.3 \big) 193.5 \quad (11.8 \\
 \underline{163} \\
 305 \\
 \underline{163} \\
 1420 \\
 1304
 \end{array}$$

$$\begin{array}{r}
 4861.5 \\
 260 \\
 \hline
 4835.5
 \end{array}$$

Feb. 26, 1901.

Approx. λ dark line of
H. I. than H β in Nova
Percii on C

By superposing on C 11808 & Cr.
& Orionis, this dark line in the
nova is seen to have wave length
about 4829

Friday, Feb. 28, 1901 22

Spectrum of Nova Percii phot.
Feb. 28. C 13187

Changes.

Band (dark) bet H γ & H δ has
disappeared.

Changes in light band
on side of fr. & of b. dark.

The dark brightest part of this
light band which appears
like a distinct br. line has
wave length 5207 referring to
the broad dark H δ & K bands
or in other words, superposing
C 13187 on λ Orionis C 11803
so that the dark line in nova
at extreme red end matches
the double δ line in λ Orionis.

This br. band extends from 5172.9
to 5226, or nearly to line 5227.9.
From 5226 to 5206.7, the band
is much fainter than from 5172 to
5206.7

Feb. 28, 1901

Next Band (bright) of sh. I than
5206 has approx. centre
at 5040

Feb. 28, 1901

Examination of all the plates of
Nova Persei, not already examined
in detail as recorded in Bk 10.

C 13153 Nova Persei

C 11809 δ Orionis (comparison spectrum)
(These plates are of the same dispersion)

C 13153 is poor, thin and faint.
The region of pr. δ is visible but
no lines are seen. Region bet.
5466 and 5700 approx. is
rather bright. The presence of two
lines at near 5700 is suspected
but I can not see them when this
plate is superposed on another
plate, so, it is difficult to say
whether they are the same ones
visible in C 13152 + 13151.

Region of H β is very thin, so that
H β is almost cut out.

It is assumed to be of intensity 40
lines seen when Nova Per is superposed
on δ Orionis

H β

4661

2

Fewer indistinct lines bet 4661 + 4681

Feb. 28, 1901
Cont. of preceding.

4481	15-20
4387	5
#1	40
+ 267	2
458	20
#5	40
#	
- (104)	1
4026	1
H ₂	45 or 50
K	30
H ₃	20

Unknown bands
bet #4 & #7 } 25

Estimates all uncertain, made
in general with naked eye, as they
are much better seen thus than
with glass.

Feb. 28, 1901
C ——— Norma Pucci.

Companion's spectrum C131⁵⁸ Norma Pucci.

This plate is a good one, taken
Feb. 24, 1901.

I will first estimate the intensities
of the lines + bands on this plate,
and then compare the others with
this. The other plates have papers
pasted over the paper numbers and
are lettered A, B, C, etc.

The wave lengths and identifications
are referred to the broad dark
bands H₂ and K Comp. spectrum
& Drums C11804.

D(1) dark, so, very faint beginning
tired.

(2) 2

(3)

2 in on front?
(2) & (3) look more like peaks
or edges of bands than like lines

(4) A hazy dark line or band.

4

Feb. 28, 1901

- (5) Cont. of preceding
A decided dark band, br. on
edge of fr. l. This dyph band
is at about 5535. This l.
is estimated from line 5446;
therefore is guess-work.
Sub = 8

- (6) $\frac{2}{1.5}$ space br.
(7) $\frac{1.5}{1.5}$ space like a br. band
(8) space like a br. band
(9) $\frac{15}{15}$

- 10 Bright band bet (9) and l. line.
This band is decidedly the most
intense bet H β and H γ .
Sub = 30. The centre of this band
appears like a distinct fr. line.
It may be 2 faint dark lines
superposed on the br. band, the
edge of fr. l. of the one irr. id
behind bright.

Feb. 28, 1901

- (11) l. lines. At least this broad
dark band comes in the position
of the l. lines of α Orionis
Sub = 60
- (12) A combination of a br. & dark band.
Sub = 40, br. band to red = 8
- (13) Sub = 40, br. band to red = 6
- (14) H β - complete appearance
Sub = 50. Bright band to red = 35.
No absorption is seen on this band.
- (15) A well marked sharp dark line
Sub = 8. This line is better defined
than any line except the fr. l.
H γ & H δ .
- (16) ~~4~~ 3
- (17) 3
- (18) 2
- (19) $\frac{5}{5}$
fr. line bet (19) & (20). There may be a
dark line superposed on this br. band

Feb. 28, 1901

Cont. of preceding.

(20)

Space height = 5 Faint br. line superposed?

(21)

Space bet. (21) & (22) is like a br. band
Sub = 10

(22)

4 - a wide hazy dark band,
of which there appears to be a
decided dark line on the edge of
sh. 2 of this band.Space = 2

(23)

4 a wide hazy dark band
similar to (22) but having a
dark line on the edge of sh. 2.

(24)

2.

(25)

(481?) 25
Space = 2

(26)

20

Space = 10

(27)

4

Space = 10

March 1, 1901

21° 40'

Cont. of preceding.

(28)

8 very wide

29

Hf. The dark band matches
Hf in 5 and 2 times when
the wide dark H + K of this spectrum
are superposed on H + K of 5 + 2.
The dark band Hf does not
appear to mixture as H + K. This may
be due to greater density of the
spectrum at this point.

Dark Hf = 20

Br. band images red = 30

No reversal of this br. band as
seen.

Brightness bet. (29) & (30) = 1

(30)

1. A very faint though rather distinct
dark line appears superposed on
a hazy faint band.

From (30) to (31) appears dark.

(31)

10

(32)

(31) to (32) = 5

2

(33)

(32) to (33) = 8

A wide dark band extends from
(33) to (35). (33) is the edge of fr.
Sub = 4

(34)

5

March 1, 1901

- (35) $\frac{5}{(35) - (36) = 10}$
- (36) $\frac{15}{\text{wide dark band}}$
- (37) $\frac{8}{(37) \div (38) = \frac{10}{15}}$
- (38) $\frac{45}{\text{very wide}}$
- (39) $\frac{15}{\text{space} = 2}$
- (40) 4
- (41) 3
- (42) 3
- (43) H_2 of bright line spectrum?
This is a very narrow dark
line superposed on a bright band.
Con. $\frac{15}{\text{Dark line} = 4}$
- (44) H_2 ~~of bright line spectrum?~~ A wide
dark band, the most intense dark
band in the spectrum. Int = 150

March 1, 1901

- (45) $\frac{K}{\text{const. of preceding.}} \frac{1}{\text{bright line spectrum? very narrow}}$
Int = 5. Superposed on b. band which =
5. There is an appearance of a faint dark
line bet. this sharp line (45) band (44)
- (46) $\frac{K}{\text{wide, dark. Int} = 140}$
Space = $\frac{1}{2}$
- (47) $\frac{1}{\text{space} = \frac{1}{2}}$
- (48) 4
- (49) $\frac{50}{\text{hazy}}$
Space = $\frac{5}{2}$
- (50) unknown band bet H_2 & H_2
Int = 60
- (51) $H_2 = 150$
- (52) $\frac{3819?}{\text{sep. from } H_2, \text{ but the hyd. line}}$
25. Int seen clearly
looks very broad on this scale
- (53) $\frac{25}{\text{too hazy}}$
- (54) $\frac{25}{\text{too hazy}}$

Infrared 2, 1901

of red. X 6266. est. of intensity
from H_γ to violet.

H_β Fully equal if not a little
more intense than H_γ.

H_γ = 10

H_δ 12

3875- 16

H_η 15

3819 10

H_θ 15

H_ζ 12

Space bet H_ζ & H_η is bright.

H_γH 15

H_γ 8

Beyond H_γ there is a space
with no distinct lines and then
there appear the 2 broad
dark bands. The first is at
approx position of H_γ and the
next enters about 5 1/4 scale
measures (S 133) towards violet.
These lines are dimly seen on
X 4070 also.

March 3, 1901.

23^h

C 13158. Mira Persei.
The lines having distinct br. edges
towards red face.

(5) (7) (8) (9) (10) (11) (12) (13) (24)
(26) (29) (38) (44) (46)

The other br. lines appear to be
spaces or more separate bands.

March 3, 1901.
 Letter (A) C No number on plate.

Narrow maps.

Examination of specimen of Nova Perse
 and comparison with C 13158.

(1) D. This dark line has a br. band
 on the side of fr 1. This br. band
 is not seen on C 13158.

In general, the br. bands are stronger
 in this plate, and the dark lines
 less & more intense than on C 13158.

(5) Br. band to red more intense
 than on 13158. The edge of fr 2 of
 this band appears to show a dark
 line. A trace of reversal is also
 seen on the back.

(6) narrower than on C 13158. This may be
 due to narrow maps.

(10) more intense

(12) Br. band to red much better defined
 & more intense than on C 13158. It appears
 to extend farther towards the red.

March 3, 1901.

(13) Same remark applies as to (12)

(21) This dark band shows a br.
 line superposed which is not seen
 on C 13158.

(25) (44 & 1) Two dark lines? or
 several? The dark portion of fr
 1 is more intense.

(14) H₂. A dark line is here seen bet.
 (13) & (14) which may be a reversal
 of the 2 br. band.

(16) more intense

But (36) & (37) A fine dark line is seen Lat = 1002

(37) Fainter.

(39) "

(40) "

H₂ still more intense than H₂, and
 H₂ resembles H₂, while H₂ is rather
 narrow.

March 5th, 1901.

Letter B C

x 7505 of Tel.

It appears very faint on this plate.

Letter B

Plate of Nova Persei

C 13167

Compared with C 13158

Brightness on ~~side~~ edge of gr. 2 of D is more intense.

[When more or less are used, it is to be understood that it means more or less — than on C 13158]

- (2) Dark line is here more intense.
- (4) appears brighter, or to have a pinkish
there is another dark line near, and
of shorter λ .
- (6) There appears to be a dark line of
slightly gr. 2, not seen on C 13158

March 5, 1901

(10)

A decided change in this br. band.
Less distinct dark lines are superposed,
the one of gr. 2 being more intense, and
the brightness on the edge of gr. 2 of this
line appears stronger than the rest of
the band.

(11)

This dark band is narrower
than on 13158.

(12)

Br. band to red much more distinct
and brighter, and twice as wide.

(13)

Br. band to red as at (12)
Dark line superposed.

(14)

H β . Whole space bet. (13) & dark
H β is bright, divided by a dark
line in center, and an appearance
of a dark line bet. the red.
Dark H β is narrower.

(15)

More intense.

(17)

Appears like a narrow bi. line, super-
posed on dark line.

(18)

Narrower bright line

(19)

Narrower, dark

March 5, 1901

B

(cont.)

20-21 There seems to be a narrow dark line superposed on this bright space.

(22) This dark band appears to be split up into several dark lines.

(23) Several dark lines.

(p. 4)

(23)-(24) Between these two lines, two distinct dark lines are seen of equal intensity with (24) and this plate. All the spaces appear bright.

24-25 A dark line is seen of same intensity as those bet 23 & 24

(25) 4481. Reversed or divided into 2 portions of which the one of gr. 2 is nearly if not quite twice as intense as that of shorter.

(26) Reversed or divided into 2 portions about equally intense although the one of gr. 2 may be slightly stronger.

March 5, 1901

(27)

Reversed? This appears like a faint central bright line

(28)

This wide dark band appears to be indistinctly split up into dark lines

(29)

Hf. The bright band to red appears like two extremely faint dark lines superposed.
Hf dark is narrower than on 3158.

(30)

Fainter

(31)

Much wider, twice as wide.

(32)

More intense.

(33)

The aspect here is quite different from C 3158. On the latter plate, from 33-34 appears like a dark very dark band. On this plate, there are several narrow dark lines and 34 has a distinct bright edge of gr. 2.
More distinct

(34)

(35)

(36)

"
Reversed or divided into 2 dark lines.

March 5, 1901

Cont. of preceding

(37)

Two dark lines?

(38)

H δ The λ band to red may have an indistinct dark line superposed, but this is not clearly seen.

H δ dark is narrower. The cutting B appears blue from the edge of λ zone.

(39)

Two dark lines.

(40)

" " "

(41)

This appears like a fine dark line

(42)-(43)

On this bright band, there is superposed a narrower dark line resembling the fine H ϵ , but fainter narrower.

49)

H γ (51) H γ

Much wider than H γ on both plates. No noticeable difference are seen from this point to violet end. Examining this plate without superposition there are noticed several differences with upon. H δ is narrower resembling H γ , but H ϵ is more resembling H η .

March 5, 1901.

Plate lettered C

C 13160,

No. 1. P. 100

When this plate is superposed upon C 13158, I see no differences whatever.

Plate lettered D C 13176

Very narrow image, rather faint too. violet. This spectrum is more banded than 13158, and appears on first glance to resemble the one lettered B. When this spectrum is superposed on on the one lettered B, I see no differences (except slight ones due to the narrow image of D) save in the region of H ϵ and H κ . The fine H ϵ and H κ , (43) & (45) are not seen as fine sharp dark lines as on B. I am not sure whether this is a real difference or is due to the focus. I am inclined to think the latter. This spectrum seems to exist about as far removed from B 13158 as B is.

50 appears to be a little fainter than on B.

39 also may be fainter.

March 5, 1901.

Platane lettered E. C 13168, taken Feb. 25, 1901

The contrast is much more striking than on any yet examined. Bright bands at b, H β , H γ and H δ very intense.

(1) 8 25 br. & red = 5

(2) 5

(3) Two extremely ft. dark lines

(4) 8. extends as far agains br. violet as on 13158

4-5 (4a) A dark line seen, not on 13158
but = 3

5. Dark line the same, but brightness to red is more marked

5a 2
5a-6 Several dark lines6-7 On this br. band, is superposed a dark line, nearer to γ than to b.7, 8, 9, very slightly narrower than on 13158.
The intensities are the same.

March 5, 1901.

(10) Two dark lines are superposed on this br. band, the edge of gr. 2 of the stronger dark line (br. red) is brighter than the other portion of the br. band and looks like a distinct bright line

(11) narrower.

(11a) 2. Space from 11 to 11a = 1

(12) Br. band to red, wider and more intense, with 2 dark lines superposed.

(13) Same remark as at (12)

(14) H β . Br. band extends to (13) and is about centrally divided by dark line. A fainter & indistinct dark line is also seen of sh. 2 than the central line.
H β dark is 0.7 as wide as on 13158.
H β dark = 40

(15) Almost as intense as H β dark, = 35

(16) narrower

(17) Several dark lines?

March 5, 1901

Cont. of preceding

- 18 1 bright narrow line
- 19 1 narrow dark line
- 20 Shows tendency to split up into narrow lines
- 21 Much sharper defined br. red.
- 22 a A sharp dark line
- 22, 23 A little more intense, and shows tendency to split up into dark lines.
- 23-24 2 distinct dark lines
- 24-25 1 dark line
- 25 (4451) 2 portions. The dark portion of λ is ~~now~~ rather narrow, and well defined. λ - 20.
The portion of λ is indistinct and extends farther br. violet than 4451 extends on 13158

March 5, 1901

289

H γ The light band has 2 distinct dark lines superposed, these lines are well seen, λ - 2.

(30)

1

30 a

1.5 just rather narrow

31

Rider so having a line of equal intensity on edge of λ .

32

4 or 5 (more intense than on 13158) probably divided into 2 lines.

33

33-35

On X C, 13158, this is like an almost cont. dark band. On Plate 2, it is different.

33 is entirely separate, divided by bright lines & spaces from 34 and from a faint haze lines not seen on 13158, marked 32 a

32 a

2

33

4

34

10

space = 2

35

6

36

Reversed or divided into 2 dark lines

March 5, 1901.
Same as (36)

(37)

(38) $H\delta$ Bright band has 1 dark line
superposed. Int = 2.5
 $H\gamma$ dark is narrower.

(39)

The edge of pr. λ of this dark band
has disappeared and there is
a rather narrow dark line at
the end of λ .

(40)

2 dark lines nearly equally intense.

(41)

Narrow

(42)

about the same

(42a)

In midtmost narrow line super-
posed on the bright band of
 $H\epsilon$, but having gr. λ than the
narrow $H\epsilon$, (43).

 $H\gamma$

narrower. Peculiar narrowing down of this line
 $H\gamma$ is here much narrower than $H\epsilon$.

Too faint in reflex of shorter λ .

March 5, 1901.

Plates B & E superposed.
The differences are very slight.
The reversals of the bright bands
are more marked on E.
On the whole I should say these
plates were taken very near
together.

Plate F C₁₃₆₁ Taken Feb. 24, 1901

Wife this image very little detail.
This spectrum is like that on 13158,
or very nearly like it.

$H\gamma$ seems the broad as on 13158.
The $H\epsilon$ bands are narrower as on
13158.

The image is evidently underexposed,
and it is impossible to compare
fine points. I should say however
that this plate was taken on
Feb. 24.

Plate G

March 5, 1901.

C 13187

Normal plate? Region of γ & δ than H β only visible as far as (9), or a little farther than for line.

Image is rather thin. Most noticeable change is the entire absence of line bet. H γ & H δ .

(9)

Too faint

(10)

The spectrum now presents an entirely diff. appearance in detail from 13158, and is nearer like that on E, but differs from E in not having line 50 present. H γ & H δ are still much weaker than H γ & H δ .

Dark lines are less intense than on E, and show less tendency to split up.

The bright bands appear slightly less intense than on E. Comp. of mid lines made while E is superposed on E.

(9)

Too indistinct

(10)

Image faint, does not show the distinct dark lines superposed as on E.

March 6, 1901

ok

(12)

Br. band of same width as on E. Dark lines ^{not} distinctly seen. This may be due to faintness of image.

(13)

Same remark as (12)

(14)

H β . Bright band shows one ^{distinct} dark line superposed, and probably another nearer dark H β . Dark H β is ^{more} less intense.

(15)

Less intense & wider.

Lines from 15 to 21 are fainter & hazier.

(19)

Two very faint dark lines?

21 a

not seen

25-28

Region of γ & δ . Almost like a cont. heavy dark band. Space bet 26 and 27 is much less light than on E or 13158.

29 H

Bright band shows 2 heavy dark lines superposed. H γ dark is weaker than on E.

March 6, 1901

30-32 An almost cont. dark band.
A slight space is seen bet. 31 & 32,
but not so bright as on E.

32a barely seen

34, 35 Continuous

If anything, the spectrum from
33-36 resembles 13158 more
nearly than E.

Comparison of G with 13158 from
Hf

29 Dark & more intense

30 Not seen.

31 Deep entrance & very hazy, not
a distinct line as on 13158.

(32) More intense and almost joined
to 31, so as to give an entirely
diff. appearance from 13158.

(33) 2 faint dark lines.

34⁴ - 34⁵ A dark band, almost continuous,
commencing at point of G & then
34 on 13158, and stopping at point of
G & that is, showing a slight br. red.

March 6, 1901.

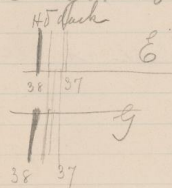
(36) about the same

(37) Very faint, this rather complex
dark band on 13158 appears to
be divided up into very faint
dark lines.

(38) Hf Two distinct dark lines are superposed
on the bright band, of which (37)
appears to be the one of G & D.
The br. band extends farther
towards red than on 13158.

G superposed on E
Appearance of Hf br. red is slightly
different.

on G 3 dark lines are superposed
on bright Hf.



Spaces represent brightness
Lines

39 very faint Int = 1

41 1

March 6, 1901

42

wide very dark band
The whole space from H δ
to the bright band on edge of
or I H ϵ appears like a
dark band with 2 bright
spaces, these being the spaces
bet 38 & 39, & 40 & 41.

H ϵ

Faint line superposed on b γ band,
having fr. l. than lines H ϵ (43)
This line is slightly less intense
than on C.

+3/H ϵ

Same as on C

other lines same as on C as far as I
H γ is perhaps slightly ~~narrower~~ wider
than on C.

50

No trace of this line is seen

H γ very wideH δ rather narrowH ϵ extremely wide.H η narrow H ζ appears dimly seen & wide.

March 6, 1901.

The space bet. H δ & H ϵ is
much brighter than that bet. H γ &
H δ .

Plate H C13162 taken Feb 24, 1901

Very thin image.

Image seen from line 4 - H δ ,
but the latter is very faint.Plate too poor to make accurate
comparisons.

As far as can be told, the spectrum
appears more nearly like 13158 than
C. Bright bands bet (12) & (13) not
seen.

March 6, 1901
 Plate I. I. C. 13165 taken Feb. 25, 1901.
 Very nearly like E.

Differences from E when E & I
 are superposed.

- (13) The two dark lines superposed on
 to band are not distinctly seen
 on I. The bright band appears
 slightly fainter than on E.

These two spectra are almost
 exactly alike. The very slight
 differences appear to be purely
 photographic.

March 6, 1901
 Plate J. C. 13193 taken March 1, 1901.

Very thin and narrow image.
 Little seen except bright bands
 in H β , H γ , H δ & H ϵ .
 These bands are all wide
 as in E, but it is difficult
 to determine anything on such
 a plate. I think however, it
 is nearer to E than to 13158.

Plate K. " C. 13178

Nearly like G. Evidently a transition
 from E to G. Line 50, strong
 in E, absent in G, is here present
 but faint.

Line 39 very faint in G as here
 nearly as intense as in E.
 Line 15 is much fainter on G than
 on K.

March 7, 1901

0^h 15^m

Plate K. C

A

Superposed on C 13158.

striking differences

1. The right bands are ^{more} much more intense on K. They are more sharply bounded.

2. The dark H β much less intense. All other dark lines are ^{more} less intense. Band 1881 is split up.

3. Line 15 is more intense.

4. Line 50 very faint, barely seen.

Line Comparison of lines

1. About the same.
Dark line bet 1 and 2? Image off.
2. more intense

4. About same, with a dark band ~~on~~ adjacent on sides of the γ , slightly more intense than γ .

4-5 dark edge of γ or γ of light 5. Int = 3

4a. A bright band bet 2 dark lines, 5 & 4.
5 has same with as on 13158

March 7, 1901

Plate K

This spectrum is so much more nearly like C than 13158 that K is most superposed upon C, and comparison made with the latter spectrum.

(12) Dark band to violet appears slightly fainter.

14 H β Dark H β to violet is fainter.

15 Wider than on C

21 The edge of the γ of this dark band appears the separated into a line.

21a Not seen

24 Broadened out into a band on side of γ . The effect on C is of 2 lines, on K of a band.

25-26 Not separated as on C. Almost a cont. band on K

29 H γ H γ dark is as intense as on C

March 7, 1901

K cont.

36

Band 30-31 is not broken up as on E. ^{The same may be said of the ^{adjacent} dark bands bet. H_g & H_δ.}

39

Wider than on E, but not so wide as on 13158.

40

Less lines fainter than on E.

44-45

Wider H_ε to narrow K. On this K. band, a very dark line is superposed, much less intense than narrow K.

47

As on C 13158. Focus seems poorer.

48

48a

A well marked dark band seen on E, but more intense on K. Definitely the most intense dark line bet. K & H_γ on ^{plate}K.

This is about midway between 48 and

$$\begin{array}{rcl}
 \text{H}_\gamma & \text{gr. 2 edge of H}_\gamma & = 3897.5 \\
 48 & & = 3910.1 \\
 & & \quad \quad \quad 12.6 \\
 & & \quad \quad \quad \hline
 & & 3903.8
 \end{array}$$

March 7, 1901

H_γ

wider than on E, but much less intense narrower than H_γ on K

50

Similar. Lat = 5 wide & hazy.

H_η

very wide

H_δ

narrower like H_γ

H_ε

very wide like H_γ

H_ε

appears to be narrow.

one wide dark band C₆ seen far into violet. Identify if possible.

March 7, 1901

Plate K shows the violet as well as any so far examined except A. It is narrower and resembles K very much except that $\epsilon\gamma$ is fainter. "50" is about same on both plates. Violet end the same.

Oz des.

 ϵ

K

 α γ

March 7, 1901

Plate L C13187

Bright Bands are very dense. The one at $H\beta$ is the brightest. Nova Perseus

At first examination, this appears to be almost exactly like G. This spectrum is however, seen as far as D band while plate G stops at A b.

13 Three faint dark lines superposed on the band
 $H\beta$ 14. ~~the~~ dark lines are superposed on bright $H\beta$, but the one of γ is much more intense. This is the same on G + L both.

15
~~29~~

a little more intense than on G. This may be due to the density of this plate. Wide on both plates, as wide as dark $H\beta$

$H\beta$ bright has two dark lines superposed as in G. seen best on G.

No differences seen on these two plates (G + L)

50 about on both.

March 7, 1901
L cont.

H₅ Under band on E.

Comp. of violet end with R.

42 a Dark line seen on E situated on
the br. bayd. br. red. of H_ε.
Well marked on both E & R.

43 a A faint hazy dark line seen
on both plates bet. fine H_ε &
wide H_ε.

Line R has a hazy dark line
near it, and of sh. R which
is more intense on L than on R.

Wide R appears to split
at edge of sh. R on L.

Region bet. line R & H_γ same

50 Barely seen on L, narrower
& fainter than on R.

H_γ Wide on both plates

March 7, 1901.
L cont.

H_γ & = 0.7 H_γ on both plates

H₁ This wide band does not appear
in exactly the right position for
H₁. It seems to come bet. H₁
and H_γ in J. W. M. C. 1880s.
This probably applies to preceding
plates where the band has
been identified as H₁.
When superposed on J. W. M. C.
there appears to be a cont. band
on L from H₁ to H_γ but hardly
extending as far to red or violet
as the high mag. The dispersion
is however not exactly the same.

H₂ faintly seen

Two wide bands of sh. R than
H₂ are seen

March 7, 1901
 Plate M C 13166 taken Feb. 25, 1901.
 Seen as far as L. Iso?
 This is like E.
 Definition not quite so good as
 on E.

Plate N C 13180 taken Feb. 28, 1901
 Resembling L, but shows some
 differences.
 It is narrower, and focus is poor.

15 very faint. fainter than on L.

Dark edges of bands b, 12, 13,
 4 + β all quite narrow.
 They are narrower than on L.

50 invisible.

Lines H + K are very faint. This may
 be due to focus.

D is fainter.

25 + 26 less intense.

39 not seen distinctly.

March 7, 1901. 21[✓]
 Plate O C 13169 taken Feb. 25, 1901.
 Poor plate
 50 seen, less intense than on 13158
 This is like E, as far as can
 be determined from this plate.

Plate P No number marked L C 13183
 This is like K.

C 13184
 Plate Q. No number on plate. Marked L.
 Very poor.
 There is a sort of reflection of the
 bright bands that obscures some of
 the lines.
 50 absent.
 Resembles N
 15 looks more intense than on N.
 Q looks very much like K, except
 that band 39 is diff. but a
 reflection from 38 appears over 39.

March 7, 1901.
Plate R C₁₃₁₅₂

Very like C.

Intermediate bet. E & 13158.

2 very much fainter than on E, and about like 13158.

50 $\frac{1}{2}$ E & < 13158.

39

< E

Br. bands as on E

H β narrower than on 13158.

Most nearer to E than to 13158.

No striking diff. bet. R & E

except in line 2:
Some of the fine sharp lines on E are not seen on R

Compare w. R.

Almost exactly alike, except that 2 is much fainter on R

39 "

" " "

50 "

" " "

Probably this comes after & not before E. Change in line 2 may not be proper.

March 7, 1901.
Plate S. C₁₃₁₉₅

Probably nearest to L.
Comparison with L.

1 D Region fainter than on L.
Dark D appears a little thinner and the br. band to red less intense.

2 Not seen on either plate

3

" " " " "

3-4 a well-marked br. band on both plates

4

absent.

5 A conspicuous band of br. and dark lines from 5 to red.
This band does not differ greatly from L, but is more conspicuous owing to the thinner image on S.
It consists of

r $\frac{5000}{11}$ 2

have br. from 4a-5.

4a is a distinct dark line not seen on L, but present on S.

4b is a dark line nearly centrally suppressed on the bright band.

4c more intense than on L

March 7, 1901

S cont.

Comp. w/ L.

8

But so narrow as on L.

10

This br. band is narrower to red than on L.
2 dark lines superposed. One to violet more intense?

12

Dark line to violet less intense than on L.

Hp

Bright band is narrower top, red. This makes dark 13 look broader. Dark Hp 6 times as intense as on L, and divided into two portions. Br. Hp has two dark lines superposed.

15

More intense than on L.

21

Very intense on both plates.
This line is no longer narrow.

March 7, 1901.

S cont.

Line near 25, (24-25) is more intense than on L, and looks on S like a dark line superposed on a br. band.

25-28

Almost a cont. dark band, more cont. than on L. br. spaces bet. 26, & 27 is less intense than on L.

Hp

Br. band narrowed down on side of fr. L. 2 dark lines superposed, the one to violet is sharp, the one to red may be double. Dark Hp much darker, very intense. The doubling is more distinct than at Hp.

30

Almost absent on L.
a broad line on S.

30-32

An almost cont. dark band on L. the band is narrow & extends only from 31-32.

March 7, 1901

Scout.

36 - H₅

Diff. from L

36 is wider br. violet, and makes an almost cont. dark band as far as the wide br. band H₅. On this wide br. H₅ is superposed line 37, which is split up into two distinct dark lines.

Still another dark line is superposed on br. H₅. The whole appearance of br. H₅ is as in L.

H₅ dark is distinctly divided by a bright line.

37

Almost absent in L, is a well marked dark band in S.

H₂

Bright, very wide as in L. 3 dark lines superposed. The middle one is fine H₂ and there is also one which is hazy, perhaps double bet. fine H₂ and broad dark H₂. This is not seen in L, or is very faint.

March 7, 1901.

(44) H₂

Wide dark band, having a sharp ^{superposed} dark line which is br. on edge of

44 a

8th line bet. wide H₂ and fine K. More intense than in L, as intense

45

fine K - the same

45 a

hazy line on side of sh. p. of fine K, more intense than in L.

K

Wide, divided in 2 parts, more widely separated than H₂

H₃

A distinct dark band is present on the side of sh. p. of this band. If this is due to the doubling of the hyd. lines, the esp. is much larger here than at the others, and the strong portion is here br. the red. H₅ shows the more intense portion br. the violet, also H₂. No diff. detected at H₃ + H₄.

H₄

Broad. not sep.

H₅

Broad but certainly fainter than H₄.

H₆

Redish, & more intense than H₅

March 7, 1901.

Probable order of plates.

C 13158 C 13160 (Feb 24) taken Feb 24 1900.
H 13161 (Feb 24) H 13162 (Feb 24)

B 13167 (Feb 25)
B 13168 (Feb 25) 13169 (Feb 25)
O 13166 (Feb 25)
M 13165 (Feb 25)
Q 13176 (Feb 26)
N 13172 (Feb 27)
P 13176 (Feb 27)
13183 (Feb 27)
Q 13184 (Feb 27)
A 13187 (Feb 28)
13187 (Feb 28) 13189 (Feb 28)
S 13195 (March 6)

J 13193 made to thin. (March 1)

March 7, 1901.

Comparison of p. of Kora with
B Orionis.

The strong band in Kora bet
45 & 47 appears to match lines
38561 & 3863 in Orion. These
lines are due to silicon.
This is correct since the strongest
bands in the Kora on Feb 22
were 4481 & 4128-4131, the latter
being due to silicon.
3856 band has not been seen
on plates taken Feb 22, no plates
yet examined show the region.

March 10, 1901

23^c

Plate T Nova Persei
Resembling S. C. 13, 99

#2 #5 & #7 are more clearly enlarged than on S.

There seems to be a dark line superimposed on the dark H₂, H₂ & H₂ dividing them into two portions, of which the one of gr. B is much fainter than that of center.

The separation is not seen at H₂.

21 This dark band is separated or has a comp. line on side of sh. 2, but 21 and 21a (separable). This comp. line is more intense on T than on S.

26-27 Dark line more intense than on S.

39 Shows large shift from the violet or has widened or toward violet.

H₂ distinctly divided. Portion of gr. 2 fainter than on S.

H₂ a fine dark line is superimposed on the hazy dark band at edge of sh. 2

March 10, 1901

C. 13158 & 13195 compared

When dark wide H₂K are matched ~~on~~ these two plates, the narrow H₂K on 13195 have considerably greater wave lengths than on 13158.

Incriminate measures.

	C. 13158	C. 13195	Diff
H ₂	100,000	100,000	0
Fine H ₂ (45)	$\frac{118867}{118732}$	118732	-135
Fine H ₂ (43)	116889	116760	-129

March 11, 1901

Plate II C 13194

Very narrow image.
The hydrogen lines are very different from their appearance on S + T.

While on T, the strong portions of the divided $H\gamma$ & $H\delta$ was broad. The violet, the strong portion is more towards the red, and by supposing it appears that the fainter portion has moved away to the side of $H\gamma$ & $H\delta$.

The double hydrogen line is best seen at $H\delta$. The separation is here very large. The fainter portion may possibly be $H\epsilon$ or other lines than hydrogen. On S, very faint lines seem to be present at the positions of the fainter portions of $H\gamma$ & $H\delta$ on K.

70

March 11, 1901

Plate V C 13192

Very poor.

Evidently preceding S + T.

C 13149 Nova Persei

Very narrow

 $H\delta$ dark.

Probably nothing can be determined from this plate.

C 13150 Nova Persei.

- 1 Line not seen. Image too faint.
- 2 As on 13151
- 3 " " "
- 4 Not seen.

4661, 4481, 4128 & the hydrogen lines are well seen. Dark and wide, also some of the fainter lines visible on the next plate taken C 13151. There is no obs. difference in the spectrum.

March 11, 1901.

I 26680 Nova Persei

Short image.

Image overlaps well into the red,
but no lines are seen of γ or δ than
H β .

Sp. continuous, hyd. lines dark.
4481 or 4471 dark, can
not tell from this exposure
which ~~of~~ line it is.

H β bright on edge of γ .
4481, H γ , H δ also bright on
edge of γ .

H γ & H δ are ~~not~~ ^{but not} seen distinctly
bright on edge. H α is present
after dark, or at least a line
is seen about in the position for
H α .

Bright line at 4660 (approx.) seen

4128 (dark) seen.

The spectrum on this plate looks
very much like an Orion type star.
For the strong 4481 would naturally
be taken for 4471. The bright edges
of the lines are the only noticeable
peculiarity.

March 11, 1901.

I 26673 Nova Persei

Much poorer than 26680.

H β , 4481, H γ , H δ , 4660 seen,
H β distinctly bright, no bright edges
4481, H γ , H δ also bright on edge of
 γ .

March 11, 1901
 Dates of C. Plates of Nova Persei.
 Copied from record book.

C	13149 - 13152	Feb. 22
"	13153 - 13155	" 23
"	13156 - 13163	" 24
"	13164 - 13169	" 25
"	13170 - 13177	" 26
"	13178 - 13186	" 27
"	13187 - 13190	" 28
"	13192 - 13193	March 1
"	13194	" 2
"	13195 13198	" 6
"	13199 13200	" 7

Examined

{	13158
	13160
	13161
	13162
	13193 "Image too thin"
	13165
	13166
	13167
	13168
	13172
	13176
	13178

Examined.

13183
13184
2
13187
13189
13190
13192
13195
13199
13194

Wednesday, March ¹⁹~~28~~, 1901, 23^h
 Nova Persei C. 13201 Taken Mar. 12, 1901

Very narrow. Differs
 slightly from 13199
 H_β is wider and more conspicuous dark band
 H_β dark is narrower and appears
 to be separated from bright
 H_β by a space not so
 dark as dark H_β

(15) appears to be fainter
 H_β dark is not clearly shown
 the edge of H_β is
 sharply defined

H_γ shows the same appearance
 as H_β. Between dark H_γ and
 bright H_γ there seems to be a
 somewhat dark division. The
 dark H_γ itself appears also to
 be divided

March 19, 1901
 Nova Persei C13201

#5 - Dark #5 is divided into two distinct lines. the one of gr. 2 being slightly 1.5 as intense as the rest of shorter 2.

#2 fine appears fainter than on 12/99.

#2 dark is divided into 2 distinct parts the one broader and being stronger.

R (fine) the same
 R wide, hazy and divided
 as on 13/99.
 R (fine) is more intense than wide R.

#4 divided into 2 portions, the one wider being stronger.

H η wide.

March 20, 1901, 0²

Nova Persei C13204, taken March 12, 1901

Finest image, does not show detail.

Appearance of dark line 4 is different (#) is a wide dark band, 4a is not distinctly seen, and the bright band is not so well defined.

Red end is too faint to study the bands in detail.

#6 dark is not divided.

15 - not seen. Image faint at this point.

#8 dark seems to consist of two portions, the one of gr. 2 being much fainter and more diffuse than the one of shorter.
 39 is very faint.

#2 fine is not seen.

#2 dark is double?

R is wider & more diffuse than

#2 R fine is very faint of present

March 20, 1901.

Bright bands H_β, H_γ, H_δ, H_ε
and H_ζ form a decreasing
series in brightness.

C 13205 Nova Pucci. Taken Feb. 14, 1901.
Resembling presage plate in
thickness and lack of detail.

Faint at red end.
Band 4 is wide and dark.

H_β br. shows 2 dark lines superposed.

H_β dark does not appear double.

Region from H_β to H_γ is too
faint to show any detail.

H_γ br. has 2 dark lines superposed
and perhaps a very faint one
too red.

H_γ dark is indistinctly separated.

H_δ dark appears blue too dark
lines, of which the one too red is
more intense.

March 20, 1901.

C 13205

Band 39 is very wide and well
marked. It is more intense than
H_β. This band shows a large
shift towards the violet as compared
with C 13158. This shift was
first noticed on C 13199.

H_δ narrow

H_ε wide & hazy.

Image too faint in this region.
Find H_ε and K, are however not
seen.

I do not see any change from
March 12. March 14 in this spectrum.

March 20, 1901

I 26675. Nova Persei

Dense image, 2 or 3 by d. lines
seen edges of wh. appear
bright. Image too dense
to see much

I 26676

Very wide thin image
H γ , 4481, H δ well seen
all darks
H β comes in thin part.
Bright edges ~~not~~ seen,

I 26677

Image too dense.
Dark by d. lines H β , H γ ,
H δ , H ϵ , H ζ seen when
sp. is sup. on another
of same dispersion

March 20, 1901.

I 26680.

Measure from H ϵ to H β .
Scale 1329

H ϵ	0	11.8
H β	11.9	0

$$\frac{11.9}{2} = 5.95 \text{ mm. or } 5.95 \text{ cm.}$$

March 22, 1901

Spectrum Plates of Nova Persei.

Feb. 22	{ 13149 [✓] 13150 [✓] 13151 [✓] 13152 [✓] 13153 [✓] 13154 [✓] 13155 [✓]	Feb. 27	{ 13183 [✓] 13184 [✓]	Apr. 1	13228 [✓] max
			{ 13187 [✓] 13189 [✓] 13190 [✓]	" "	13229 [✓]
		Feb. 28	{ 13192 [✓] 13193 [✓]	" 11	13231 [✓] min
Feb. 23	{ 13156 [✓] 13157[✓] 13158 [✓] 13159 [✓] 13160 [✓] 13161 [✓] 13162 [✓] 13163[✓] 13164[✓]	March 1	{ 13194 [✓] " 6 13195 [✓] " 7 13199 [✓] (Feb. 12) 13201 [✓] " 13 13204 [✓] " 14 13205 [✓] " 16 13206 [✓] () 13207[✓] " 17 13208 [✓] " 19 13211 [✓] min " 23 13214 [✓] max " 27 13215 [✓] max " " 13216 [✓] " " " 13217 [✓] " " 29 13221 [✓] min " " 13222 [✓] min " 30 13223 [✓] max " " 13224 [✓] "	" 12	13237 [✓] min?
				" 13	13240 [✓] max
				" 26	13247 [✓] min
				" 27	13252 [✓] max
Feb. 24	{ 13165 [✓] 13166 [✓] 13167 [✓] 13168 [✓] 13169 [✓] 13170 [✓] 13171 [✓] 13172 [✓] 13173 [✓] 13174 [✓] 13175 [✓] 13176 [✓] 13177 [✓] 13178 [✓]	March 2	{ 13194 [✓] " 6 13195 [✓] " 7 13199 [✓] (Feb. 12) 13201 [✓] " 13 13204 [✓] " 14 13205 [✓] " 16 13206 [✓] () 13207[✓] " 17 13208 [✓] " 19 13211 [✓] min " 23 13214 [✓] max " 27 13215 [✓] max " " 13216 [✓] " " " 13217 [✓] " " 29 13221 [✓] min " " 13222 [✓] min " 30 13223 [✓] max " " 13224 [✓] "	" 28	13257 [✓] min
				May 1	13267 [✓] "
				" 3	13267 [✓] "
				" 6	13272 [✓] top
				" 7	13274 [✓] "

March 22, 1901

Measurements of distances bet centre
of light and dark bands in
Nova Persei. C 1317887

Desc	Measure
C. Centre dark	0
" light	4.6
Line C	5.0
centre of dark	0
centre of br. HE	5.5
fine B.C	5.0
centre of B. J	0
" dark	5.3
centre of br. Bg	0
" dark	5.1
" " B.B	0
" br.	3.5
dark + 922 centre of	0
" " dark	3.1
centre of br. 5.15	0
" " dark "	3.0
centre of br. H.	0
" " dark "	1.7
C. Centre br.	0
" dark	3.5

March 22, 1901
 Measure Jap. of light and dark centres
 on C 13187 Nova Persei

center of light K	0	0
" " dark "	5.1	4.6
fine K	0.1	0.5
center of br. H ϵ	0	0
" " dark "	6.0	5.5
fine H ϵ	0.9	0.5
center of br. H δ	0	0
" " dark "	6.1	5.3
center of br. H γ	0	0
" " dark "	5.2	5.1
" " br. H β	0	0
" " dark "	4.0	3.5
" " br. H α	0	0
" " dark "	3.8	3.1
" " br. 5015	0	0
" " dark "	3.0	3.0
" " br. b.	0	0
" " dark "	3.1	3.5
" " br. D	0	0
" " dark "	1.8	1.7

March 22, 1901

C 13208 Nova Persei, taken March 17.

The dark hydrogen lines are very sharp and narrow.

Dark K is also narrow.

When sharp K (reversed) is mapped superposed on sharp K of 13187 the fine dark lines H ϵ , H δ , H γ , H β & H α of 13208 come at extreme edge of shorter wave length of wider dark H ϵ & H δ of 13187. There appears to be some change in the position of these reversed H ϵ & H δ .

Both K lines are narrow & dark. The one of shorter λ is more intense.

March 30, 1901

Reticle on end of eye-piece used
 Measures of separation of plates of light & dark
 lines on C 13199 Nova Perse

center of dark b	0
" " br. "	2.7
" " br. 5015	0
" " dark "	2.2 very faint
" " br. 4922	0
" " dark "	2.1 very faint
" " br. 76/8	0
" " dark "	3.2
" " br. 76/8	0
" " dark "	4.1
" " br. 76/8	0
" " dark "	5.2
" " br. 76/8	0
" " dark "	5.8
76/8 fine	0
" broad	5.6
center of "dark	0
" " " "	4.9

I could not measure from center of broad dark H₂ to center of broad dark K, because the H₂ (broad) is so faint on this plate that I could not see it distinctly with the reticle superposed.

March 30, 1901

second measure of separation of
 bright and dark features on
 C 13199 Nova Perse

center of b. b	0		mean	²⁴ / ₁₀₀₀ inch
" " dark "	2.3	2.7	2.5	472
" " br. 5015	0			
" " dark "	2.0 very faint	2.2	2.1	397
" " br. 4922	0			
" " dark "	not distinct	2.1	2.1	397
" " br. H/3	0			
" " dark "	3.3	3.2	3.2	⁶⁰⁵ / ₄₁₆
" " br. 76/8	0			
" " dark "	4.6	4.1	4.4	832
" " br. H/3	0			
" " dark "	5.1	5.2	5.2	983
" " br. H/3	0			
" " dark "	6.0	5.8	5.9	1115
H ₂ fine	0			
center of dark H ₂	5.3	5.6	5.4	1021
" " " "	0			
" " first	5.0	4.9	5.0	945

Monday, April 1, 1901 ^{0^h 20}

C13223 Nova Persei 1 ps.

Wide bright bands and several dark lines are present.

It is distinctly seen, narrow & dark, but there is no brighter band. When this dark R is superposed upon R in β Orion C₁₃₀₈₁, the following lines can be identified.

This spectrum of the nova extends to D, but β Orionis is not dense enough in the red to show lines for comparison.

H₃ The centre of the broad bright band in the broad coincides with H₃ in β Orion. A reversal is seen, consisting of a very faint dark line crossing the bright band.

3 ~~the~~ bright bands in the nova do not coincide with lines in β

At this point a bright band appears. This is the brightest band between H₃ and H₂.

April 1, 1901

H₄ Centre of bright band coincides approximately with dark H₄ in β Or. Double reversal is not seen in H₄, but ^{H₄} is very dense and the faint dark line may be burned out.

No distinct bright bands between H₄ and H₃. Something like a bright space appears nearly mid-way between and an appearance of a narrow bright line at slightly greater λ than 4144.0.

H₅ H₅ in β Orion is broad & violet from centre of H₅ bright in nova. No distinct reversal is seen. H₅ very broad and dense.

4026 A bright band is present at the same length of this helium line.

H₂ Two faint dark lines appear to be superposed. One corresponds with H₂ in β Orion. The other has shorter wave length. An indistinct dark line is seen between H₂ and R.

April 1, 1901.

K a well-defined, though faint, dark line.

H γ A bright band. No reversal seen.Unknown The strongest dark line in the spectrum. This has greater λ than the sodium line 3863 m μ 30 m μ s and appears blue at the approx λ 3867. It may be the helium line 3867.H η A faint brightener at this point.

3819 A dark bandy appears to coincide with this helium line.

The space bet. H η and H γ appears like a dark band.

The continuous spectrum extends well up into the violet, but no certain lines or bands are seen beyond the space just referred to.

Comparison of this spectrum from H α to rep with IC 13061 \approx Orion's, which shows the dark D $_2$ line a bright band in the H α corresponds to dark D $_2$ in λ 3819.D $_2$

April 1, 1901.

4922 Bright band in H α 5015 " " " " or near this λ The other bright bands in the H α do not correspond to anything in λ , or the image of λ is too dense to show the lines of present.Bright band 5015 is brighter than λ band.

Sunday April 2, 1901

C 13206 Nova Persei.

Image thin

Br. Bands at red end are very faint

H_β

Bright acid dark components
fully seen. The bright band shows
a hazy dark line superposed
not centrally, but towards edge
of shorter f. This dark superposed
line may be double.

H_β dark shows little contrast to
the continuous spectrum, but it
appears to be quite a thick line.

"2"

Dark band 4627 is the most intense
dark band now seen between
H_γ & H_β.

A narrow dark line appearing
at extreme end of ch. & of what
was band "22" on C 13155.

H_γ

Bright band very broad. No
distinct dark lines are seen
the superposed on bright H_γ, but
it looks hazy.

Dark H_γ is very sharply defined
wr. red and recent indistinct
wr. violet. It ~~appears to be~~ ^{appears to be} double.

April 3, 1901.

Image too faint between H_γ and
H_δ to show lines or bands

distinctly.
H_δ Bright band
as wide as H_γ but fainter.
No distinct reversals seen.

H_δ dark consists of a fine sharp line
towards red with a very faint
dark line towards the violet. The
separation is large between these two lines.
"39" Very ill-defined. Larger too
thin.

H_ε Bright H_ε is faint and appears
where two dark lines superposed
on it. These dark lines are
well separated.
H_ε dark is single, and sharp.

R is not seen. Image very thin.

H_ζ

A very faint bright band is seen.

April 2, 1901.

C 13266 Nova Persei

Measures of separation of light and dark bands.

Lines very much curved.

Image too faint to show any bands except those of hydrogen.
Order of measures marked on other side.

	(1)	(3)	Mean	X189
H β br.	0	0		
" dark	3.5	3.4	3.4	643
H γ br.	0	0		
" dark	4.6	4.6	4.6	869
H δ br.	0	0		
" " dark	4.9	5.1	5.0	945
H ϵ br.	0	very faint 0		
" dark	5.2	" 5.5	5.4	1021

April 2, 1901

C 13205 Nova Persei

Measures of separation of light and dark bands. Lines slightly curved. Image thin.

	(2)	(4)	Mean	X189
H β br.	0	0		
" dark	3.3	3.6	3.4	643
H γ br.	0	0		
" dark	5.0	4.8	4.9	926
H δ br.	0	0		
" dark	5.5	5.5	5.5	1040
H ϵ br.	too ft.			
" dark	"			

Friday, April 5, 1901

C13215 Nova Persei, 1 prism.
Dark hydrogen lines are not seen.
Identif. of lines when superposed on
2 sources so that the ^{central} bright hydrogen
lines match dark lines in 2.

#0 Barest trace of dark line
#n Not distinctly seen
3819 A wide dark band falls at this
point
#3 not well seen but there appears
to be a faint bright band.

3863 A wide dark band crossed
by a bright line.

#2 Bright, and probably having one
or two very dark lines superposed.

#1 ~~not seen~~ Fine dark line
#2 A bright band having a central
dark line which matches #2 in
2 or 3 parts.

"39" Wide and dark

#5 Bright, nebulas not seen
#1 " " "

April 5, 1901.

4471 Bright band

"39" Dark band

~~4649~~
~~4712~~ A wide bright band

#3 Bright. No unusual seen.

Spectrum seen as far as "4" and
farther. Below "4" there is a
wide dark band, which may
be D₂.

Bright 5015 = bright b

Saturday, April 6, 1901

C 13208 Nova Pucci.
Measures of separation of bright
and dark lines.

		mean	x159
Centre H β br.	0	0	
" " dark	3.9	3.8	718
" H γ br.	0	0	
" " dark	4.7	4.4	832
" H δ br.	0	0	
" " dark	5.5	5.2	983
" H ϵ br.	0	0	
" " dark	5.8	5.6	1058
K - K β	5.9	6.0	
K β fine - HE	5.2	5.1	

Brightness difficult

April 6, 1901.

C 13168, Measures of separation of
bright and dark lines.

Centre D br.	0	0	Centre H br.	0	0
" " dark	1.5 Very difficult.	2.2	" " dark	5.0	5.5
Centre G γ br.	0	0	K β fine to Centre H.	5.1	4.8
" " dark	3.0	3.0			
Centre F br.	0	0			
" " dark	2.8	2.3			
" " 8 br.	0	0			
" " dark	3.2	2.7			
Centre E br.	0	0			
" " dark	3.9	3.9			
Centre D γ br.	0	0			
" " dark	3.1	3.1			
Centre D δ br.	0	0			
" " dark	3.5	3.4			
" H β br.	0	0			
" " dark	4.8	4.6			
" H γ br.	0	0			
" " dark	5.1	5.9			
" H δ br.	0	0			
" " dark	8.8	8.4			
" H ϵ br.	0	0			
" " dark	5.5	6.0			
H γ fine - Centre H γ	5.1	4.6			
H ϵ " - K β fine	10.7	10.8			

April 6, 1901.

C13228 Nova Persei

Bright H β , H γ , H δ , H ϵ , H ζ and
H η (very faint) are seen. Each one
appears to have a dark line
traversing it, which dark lines
merge up into the hydrogen
lines in ϵ Orionis C13025.

3819 3867 and "39" are dark.
Bright hydrogen bands do not
have dark lines on edges of
shorter wave length.

Saturday April 13, 1901

C13237 Nova Persei 1 prism

1 bright band at red end
This is not D but has shorter
wave length.

b. Bright band not seen.

5015 # Bright band present but
faint.

4921 Bright band not seen

H β Very sharp on edge of fr. &
Indistinct dark line is superposed
upon the bright band

Indistinct dark lines or band on
edge of shorter wave length of the
bright band.

4649 Bright band at this point.

Monday, April 14, 1901 22^h

4649 C 1323 of ^{superposed on 13028 & on as that the center of} (cont.) ^{the bands of hyd. match}
The spectrum appears blue banded at this point. The edge of one band is at 4659 approx. the other at 4712 approx. and there may be a still fainter band of still greater wavelength. The bands are most sharply defined on edge of fr. 2. 4659 band is most intense.

4471 Bright banded

H_Y Bright band, sharp on edge of greater wave lengths. Hazy dark line is superposed on this br. band

4365 A bright line at this λ , approx. This bright line may be connected with H_Y by a hazy ^{dark line} ~~superposition~~, or the hazy may be due to focus.

Dark line on edge of shorter λ of H_Y is not well seen. If really present it is barely distinguishable from the continuous spectrum.

Apr. 14, 1901.

C 13737 (cont.)
No lines or bands either bright or dark are seen from H_Y to H₅.

H₅ Sharp on edge of fr. 2
hazy on edge of shorter λ .
Hazy dark line barely seen the superposed.

H₂ A bright band very sharp on edge of fr. 2. A dark line crosses this band. This dark line is made to match dark H₂ on λ & λ Omnis. Then the other hydrogen lines on λ match the centers of the bright bands in the Nova, approximately.

H₃ There is only the faintest trace of this hydrogen line. But at a slightly shorter wave length there is a very bright band, sharply defined on edge of greater wave lengths and fading towards violet. This band is brighter than H₂. There is a peculiar band in β Lyrae at this point. The one in the Nova may be the same.

Tuesday, April 16, 1901, o^h

C13187 measured with small glass ruled to $1/100$ of an inch.

Cent. D br.	0
" " dark	1.9
" "7" br.	0
" " dark	2.2
" b br.	0
" b dark	2.6
" 5015 br.	0
" " dark	2.6
" 4922 br.	0
" " dark	2.5
" H ₃ br.	0
" " dk	3.4
" H ₂ br.	4.0
" " dk	4.0
" H ₅ br.	0
" " dk	3.9
" H ₂ br.	0
" " dk	5.1
" R br.	0
" " dk	4.0

Dark line is wide & fuzzy

(good)

This is also the dark fine R object
is actually superposed on br. R

April 16, 1901.

C13187 measured same as preceding plate.

Cent. 7" br.	0
" " dk	1.9
" b br.	0
" " dk	2.3
" 5015 br.	0
" " dk	2.2
" 4922 br.	0
" " dk	2.2
" H ₃ br.	0
" " dk	2.9
" H ₂ br.	0
" " dk	3.8
" 145 br.	0
" " dk	4.4
" H ₅ br.	0
" " dk	4.4

April 16, 1901.
C 13172
measured with $\frac{1}{5}$ -mm. scale.

Centre to br. 0
" dk 3.6 very broad
5815 br. 0
" dk 2.9
4922 br. 0
" dk 3.6 very broad
Hs br. 0
" dk 4.0
Hy br. 0
" dk 4.9
Hs br. 0
" dk 6.7
Hs br. 0
" dk 6.1
K br. 0
" dk 5.1

April 16, 1901.
Plate on thin number lettered "A." on paper pasted
on side

Centre to br. 0
" " dk 3.5
" 5015 br. 0
" " dk 2.6
" 4922 br. 0
" " dk 3.1
" 463 br. 0
" " dk 4.0
" Hy br. 0
" " dk 5.1
" 468 br. 0
" " dk 6.1
" 462 br. 0
" " dk 6.1
" K br. 0
" " dk 5.0

April 17, 1901, 22° 40'
 measured with Miss Leland's eye-piece div. to
 C 13187 $\frac{3}{5}$ mm.

center D by 0	0	0
" " dh 1.1	0.9	1.0
" " br 0	0	
" " dh 1.0	1.0	1.0
" " br 0	0	
" " dh 1.9	1.9	1.8
" 5015 br 0	0	
" " dh 1.4	1.3	1.4
" 4922 br 0	0	
" " dh 1.7	1.5	1.6
" H3 br 0	0	
" " dh 2.5	2.5	2.3
" #8 br 0	0	
" " dh 2.7	2.9	2.8
" H5 br 0	0	
" " dh 3.6	3.6	3.6
" H2 br 0	0	
" " dh 3.0	3.0	3.0
" R br 0	0	
" " dh 2.9	2.6	2.8

Monday
 Saturday, April 21, 1901 23° 30'

C 13172 measured with $\frac{1}{5}$ mm. reticle

	Temp. 86	mean	x 189
Center by 0	0		
" " dh 3.4	3.6	3.5	662
" " br 0	0		
" " dh 3.0	2.9	3.0	567
" " br 0	0		
" " dh 3.1	3.6	3.4	643
" 43 br 0	0		
" " dh 3.8	4.0	3.9	737
" H7 br 0	0		
" " dh 4.9	4.9	4.9	926
" 45 br 0	0		
" " dh 6.1	6.7	6.4	1210
" 42 br 0	0		
" " dh 5.3	6.1	5.7	1077
" R br 0	0		
" " dh 4.8	5.1	5.0	945

April 21, 1901

C 13195 measured with $\frac{1}{5}$ mm. reticle

		From p. 94	mean	$\frac{24}{1000}$ inch
Centre "7" h	0	0		
" " dk	2.1	1.9	2.0	378
" h h	0	0		
" " dk	2.5	2.5	2.5	472.5
" "12" h	0	0		
" " dk	2.3	2.7	2.5	472.5
" "13" h	0	0		
" " dk	2.6	2.6	2.6	491.4
" 4p h	0	0		
" " dk	3.4	3.8	3.6	680.4
" 4f h	0	0		
" " dk	4.8	4.9	4.8	907.2
" 45 h	0	0		
" " dk	5.0	5.9	5.4	1020.6
" 4e h	0	0		
" " dk	5.7	6.6	6.2	1171.8
" 11 h	0			
" " dk	4.9			926

very hazy.

April 21³, 19012^h

Relative intensities of bright bands in the spectrum of Nova Persei.

C 13167 Feb. 25
Order of bright bands.H β H γ

G

H δ H ϵ

4922 = 5015

16

7 = 8 = 9

D

C 13178 Feb. 27

H β H γ H δ H ϵ

G

4922 = 5015 both much < G

7

8

9

Portion of 4 on side of G & band 4a < portion on side of cluster

April 23, 1901.

C13158	5	7	8	9	6	12	13	43
C13158	0	<u>2</u>	<u>3</u>	<u>2</u>	<u>30</u>	<u>8</u>	<u>6</u>	<u>125</u>
C13166	Regin not seen from Dth				<u>8</u>	<u>10</u>	<u>10</u>	<u>30</u>
	<u>5</u>				<u>30</u>			<u>125</u>

44	45	46	47
<u>30</u>	<u>15</u>	<u>15</u>	<u>5</u>
<u>20</u>	<u>20</u>	<u>10</u>	<u>10</u>

Plate very poor.

April 23, 1901.

C13178 measured with $\frac{1}{5}$ mm. ^{reticle} scale,

D cut D br. 0
 " " " dk 1.8
 S " 7 br. 0
 " 12 " " dk 4.3
 " 5 br. 0
 " " dk 3.1
 " 12 br. 0
 " " dk 3.2
 " 13 br. 0
 " " dk 3.1
 " H₅ br. 0
 " " dk 4.1
 " H₇ br. 0
 " " dk 5.0
 " H₅ br. 0
 " " dk 6.0
 " H₂ br. 0
 " " dk 5.3
 " K fine 0
 center " dark 4.9
 center dark K dark 0
 " " K fine 5.2

April 23, 1901

C13194

Separation of dark H₅ and H₇.

These two lines appear to be
 divided into two parts, the
 more intense towards the red.
 $\frac{1}{5}$ mm. reticle used.

H₅ Centre dark line to violet to centre red = 2.2
 H₇ " " " " " " " " " " = 2.0

April 25, 1901

sh 31

Shift or change in band "39"

Plate-

13158

13168

13172

13178

13184

13195

4072 4075

13

4066 4079

as on 13168, perhaps fainter

The largest shift towards the violet is on C13178, where the greater edge of the band appears to coincide with the shorter edge on C13158.

Monday, April 29, 1901

sh

C13240 Nova Persei Apr. 13, 1901

Image poor

Bright bands $H\beta$, $H\gamma$, $H\delta$, $H\epsilon$ and $H\zeta$ are seen

$H\beta$, $H\gamma$ and $H\delta$ have dark lines mainly centrally superposed
 $H\epsilon$ and $H\zeta$ also appear to have a central dark line, but it is very faintly seen.

A very faint continuous spectrum is seen from a little shorter than $H\gamma$ to about D , but no bands or lines are seen except between $H\delta$ and $H\gamma$. These appear like the same bands present on C13223.

C13229 Nova Persei, taken Apr. 1, 1901.

Image poor, quality 2.

Bright bands $H\beta$, $H\gamma$, $H\delta$, $H\epsilon$ & $H\zeta$ are distinguishable, nothing else seen except continuous spectrum.

C13231 Nova Persei

Quality 1.

April 29, 1901

C 13225 Nova Persei. taken Feb 30, 1911

1, prism

Plate probably not isochromatic,
 spectrum seen from $H\gamma$ to 4922 ,
 image broad dark lines very much
 enshrouded. Focus not so good as
 my C 13223

I see no differences, ^{between this and 13223} except in the
 quality of the image.

April 30, 1901

C 13247 Nova Persei. taken Apr. 26,

125, plate.

Spectrum crooked and very poor.

Faintest spec. seen as far east, but no bands.
 Only bright bands are seen from 5015 to

B and I not seen.

Bright band 4015 is very nearly equal
 to $H\beta$. 4922 is not seen.

 $H\gamma$ is fainter than $H\beta$ $H\gamma$ is the most intense band.

Order of intensities of bright bands

 $H\gamma$, $H\beta$, $H\delta$, $H\epsilon$, $H\zeta$ $H\delta$, $H\epsilon$, $H\zeta$, $H\eta$, $H\theta$

Band 4659-4712 is not covered,
 since there appear to be several bands
 bleeding together.

4471 faintly seen.

This does not appear to be $H\gamma$, but the
 band of slightly shorter λ , present on
 C. 13247, described on p. 71. (May 3, 1901)

These lines are so crooked that it is difficult
 to tell which edge is more sharply defined,
 but $H\epsilon$ and near $H\gamma$ appear to be cut
 sharply on the edge of shorter λ , as on
 13207. (May 8, 1901)

May 7, 1901.

22^h

C 13252 Nova Persei Apr. 27.

Image very poor, plate fogged.
 $H\gamma = H\beta$ or slightly more intense.

Order of intensities

 $H\gamma, H\beta, H\delta = H\epsilon, H\zeta, 5015,$ $H\eta$ + b not seen. $H\zeta$ appears blue in normal position
 when this plate is superposed on C 13223.

C 13257. Nova Persei. Apr. 27.

This is seen at first glance
 like the spectrum on 13237
 and 13247.Band of slightly shorter λ than $H\gamma$ is
 very intense but a little less than $H\gamma$.

Order of intensities

 $H\gamma, H\delta$ band near $H\gamma, H\epsilon, H\beta, H\delta, 5015,$ band near $H\gamma$ and $H\gamma\epsilon$ are very sharply
 defined on edge of shorter λ , and
 fade on edge of longer λ . $H\delta$ is hazy
 on both edges. $H\gamma$ and $H\beta$ appear more sharply defined to red.

May 7, 1901.

C 13237 and 13257 superposed.
 General type of spectrum is similar,
 but there are marked differences.Strong band near $H\gamma$ appears to have
 shorter λ on 13257 than on 13237.Bands on 13237 are sharply defined
 on edge of longer λ , on 13257 they are
 sharply defined on edge of shorter λ .This difference in definition is very
 marked in bands $H\epsilon$ and (near) $H\zeta$.

Order of intensities on 13237,

 $H\gamma, H\delta, H\beta = \text{near } H\gamma = H\epsilon, 5015.$

5015 is very faint.

 $H\delta$ is much less intense on 13257
 than on 13237.

5015 is more intense on 13257.

Band or line to red of $H\gamma$ on 13237 is
 not seen on 13257. This may be due
 to the faint image on latter plate.

May 8, 1901.

Plates C13211 (Incl 19), 13237 (Apr. 12),
13247 (Apr. 26) and 13257 (Apr. 28)
resemble each other in the displacement
of H γ towards the violet, or absence of
H γ and presence of this strong band.

Consulting the light curve of Nova
Piscis it appears that the dates
Incl 19, Apr. 26, Apr. 28 were
points of minima. I do not know
about Apr. 12, as there were not enough
observations preceding.
It may probably be assumed that
Apr. 12 was also a date of min.

May 8, 1901.

C13253 Nova Piscis The Apr. 27.
This appears to be an ^{ordinary} ~~approximate~~ plate.
Image not visible in region of fr. 2
than 5015.

The spectrum is of the max. type.
5015 is faint, much less than
H β . The image is cut off very
sharply on the edge of fr. 2 of this
band.

H β is the most intense band.

Order of intensities

H β , H γ , H ϵ , H δ = H δ .

H δ not seen.

"39" seen as on 13223

Dark line to violet of H γ appears to
be present as on 13223, but it is not
clearly seen, wraps perhaps to
the poor image.

H ϵ , H δ and H γ appear to be ~~sharp~~
sharply defined on edge of fr. 2.
H β is sharp on both edges.

It thus appears that this sp. was different
on Apr. 27 from that of Apr. 26, and
on Apr. 28, was again like that
of Apr. 26.

May 8, 1901

C13153. returned after being
intensified by Mr. King

The fine lines of several near R and
H₂ are seen as on C13158.

May 13, 1901

C13267 Nova Persei (May 3)
This appears to be exactly like
C13254 and represents the
main type of spectrum.

C13249 Nova Persei (Apr. 26)
Very thin and poor.

C13272
C13274

Dual, "1" both plates
" " " "

May 13, 1901

643 Mich. 27, 1901

C 13215 (1 for.) width of hands
measured with Miss Leland's
eye-piece.

Setting on violet end

Setting on red end

	to ft.	to ft.	Mean
5015	1.0	1.1	1.05
4923	to ft.	to ft.	
H3	1.6	1.2	1.4
H4	2.2	2.0	2.1
H5	2.0	1.9	1.95
H2	1.8	1.6	1.7
H1	1.5 very hazy	1.5	1.5

May 13, 1901.

C 13228 measured with Miss
Leland's eye-piece

Setting on violet end

Setting on red end.

	to ft.	to ft.	Mean
H3	1.5	1.3	1.4
H4	1.9	2.0	1.95
H5	2.1	2.1	2.1
H2	2.1	2.0	2.05
H1	1.9	1.8	1.85
H7	to ft.	to ft.	

May 13, 1901.

C13257

Apr 28, 1901

Miss Leland's eye-piece.

Setting on violet end

Setting on red end

5015-	1.1	1.0	Mean 1.05-
H3	1.2	1.1	1.15-
Hx	1.5	1.3	1.4
H8	1.8	1.7	1.75-
H6E	2.0	2.0	2.0
Near H3	1.9	2.1	1.92.0

Lens very much curved.
It may be present as a faint
band on the edge of shorter
of the strong band. This
faint edge was ^{not} measured.

May 13, 1901.

C13217

Mel. 27, 1901

Miss Leland's eye-piece

Setting on violet end

Setting on red end

H3	1.2	1.1	Mean 1.15-
Hx	1.5	1.6	1.55-
H8	1.7	1.4	1.55-
H6	1.6	1.5	1.55-
H5	1.5	1.4	1.45-
H9	too ft.	too ft.	

May 13, 1901

C 13253

Mrs Leland's eye-piece
Setting on violet end

	Setting on red end	mean
B. B.	1.4	1.21
B. Y.	1.8	1.6
B. O.	1.7	1.8
B. E.	2.0	2.0
B. Z.	1.8	1.4

These bands are so hazy that
the settings seemed to be mostly
guess-work

May 17, 1901

23⁴⁵

C 13262 Mrs Pucci

This is poorer than 13257 but it
appears to be exactly like the
latter plate.

May 31, 1901

21st 31C13021 2 Orinis.
Measured from H_β to H_ε
D1339 1 dir. = 1/2 mm.

1 Po.

H_β 0
H_ε 35.8

35.9

H_ε 0
H_β 36.0

C13223 Nova Persei 1 Po.

H_β 0
H_ε 36.1H_ε 0
H_β 36.1
$$\begin{array}{r} 36.1 \\ 35.9 \\ \hline 2) 36.0 \text{ mm or} \\ 18.0 \text{ 1.8 cm} \end{array}$$
C13208 Nova Persei. 2 pers.
~~H_β 0~~
~~H_ε 36.1~~
 a different part of the scale was
 used in this case the measure
 is therefore rejectedH_ε 0
H_β 35.4
$$\begin{array}{r} 75.3 \\ 37.6 \\ \hline 2) \end{array}$$

3.77 cm.

H_β 0
H_ε 35.2

June 6, 1901

Measure of sp. from H_β to H_ε

I 26791

Circles of bright bands. Scale D1339
1 dir. = 1/2 mmH_β 0
H_ε 11.7
$$\begin{array}{r} 11.75 \\ 5.87 \\ \hline 2) \end{array}$$

0.59 cm.

H_ε 0
H_β 11.8

Rept. Scale less accurate.

Reticle 1/5 mm.

H_β 0
H_ε 28.3
$$\begin{array}{r} 28.35 \\ 5.67 \\ \hline 5) \end{array}$$

0.57 cm.

H_ε 0
H_β 28.4

I 26798

H_ε 0
H_β 28.4
$$\begin{array}{r} 28.4 \\ 5.68 \\ \hline 5) \end{array}$$

0.57

H_β 0
H_ε 28.4

June 6, 1901

F 26811 Class I
meas. on reticleH_β 0
H_γ 6.9

$$\begin{array}{r} 5) 6.85 \\ \underline{1.37} \end{array} \quad 0.14 \text{ cm}$$

H_ε 0
H_δ 6.8

measured on scale D 1339

H_β 0
H_γ 2.9

$$\begin{array}{r} 2) 2.85 \\ \underline{1.42} \end{array} \quad 0.14 \text{ cm}$$

H_ε 0
H_δ 6.8

Saturday, Sept. 21, 1901

1^h 40^m

X 10252 J bel.

Top part. H_β region of H_β
burned out. A trace of dark H_β
is seen, but it is uncertain.

X 10273 of Centauri

H_β is an intensely bright line well
defined and narrow. The edge of
shorter wavelength is dark.

Oct. 2, 1901

0ⁿ 40^mX10273 ^{9 Cent.} (cont. from preced. page)As comp. w. 5 Cent. on X8295
H β on X10273 is 0.4 as bright
as in 8.H γ consists of a distinct dark
line br. br. violet. This br. line
corresponds to H γ br. in 5 Cent.
There is the faintest trace of
brightness on the edge of sh. X H γ
dark H δ .

The hydrogen system is narrow.

Ozone lines are broad.

There is a general haziness about
the whole spectrum.

Oct. 2, 1901

X10260 X⁶ Cap.Dor image. H β is barely seen
but appears. There is a faint dark
line. Plate too poor to be of
much use.

This plate shows the faint phase of hydrogen.

4387 H γ
C10261 = Cap.H β very faint, less distinct
than 4922. H γ narrow. Ozone
lines broad.

X10262 = Cap.

H β dark & narrower than 4922.H γ very sharp.4387 & 4471, much wider and
less sharply defined than H γ .
Numerous faint lines are
seen especially near 4471 and
4471.This sp. resembles the early
ones of 7 Cent. See X5759.

Oct. 2, 1901.

X10265, 2 Cap.

This is like X10262 (see page page)
 H β is very faint. The fine lines
 of γ & δ then 4471 are not
 well seen on this plate.

X10266 X^o Sag.

Good plate.
 A very peculiar spectrum.

H β not distinctly seen.4387 > H γ 4125-4131 and 4144 are very
 intense. 4120 not seen.

Line near H γ and δ retd
 is quite intense. This may be
 4116 or a solar line.

{ See Pl. X, p. 191. For exam. Cplac
 5030, where I state that above
 line is not 4116.

The intensity of the whole series
 of hyd. lines probably changes
 on this sp. Compare C6918 where
 H γ > 4387 and H β is a
 well-marked dark line.

Oct. 2, 1901.

X10266 (cont.)

H γ is the most intense hydrogen line.
 H γ slightly > 4026.

It is well-marked.

H β is very faint, and there is
 an appearance of a dark band
 of shorter λ .

This plate is a good one showing
 the faint phase of the hyd. lines.

C10268 X^o Sag

Very poor plate. Lines barely seen
 except at violet end.

H β not seen.4387 appears > H γ .

This is probably the faint phase
 of the hydrogen lines.

Oct. 2, 1901.

X10269

2 Cap. not on plate.
Star in center is 5th.

X10271 2 Cap.

H β appears to be missing.
4922 is faintly seen.
H γ narrow.

Other lines are in general faint
and not widened as on many
plates. Solar lines not seen.

X10272 2 Sag.

H β invisible

This appears to be exactly like
X10266.

X10277 β Scorpion

Lines a little hazy.
4471 double?

Oct. 2, 1901

X10279 η Cent.

H β is distinctly bright, but less
intense than on X10273 (see pp. 125, 6)
H γ is also less intense, quite

4481 appears to be fainter than
on X10273.

10279 is thinner than 10273, and I am
not sure that the differences above
mentioned are real.

X10276 η Cent.

Very peculiar violet end seen
at first glance. Two very intense
dark lines and a fainter one
are visible. These lines are in
position like H γ 45 and H α
a star near γ . No trace of H β of the
slit is seen. It should cross
sp. of η near H γ and H α . red
but no such line is present.
It may be lost in brightness of
the spectrum at this point.

This sp. appears to be exactly like
that on 10273

Oct. 2, 1901.

X10280 β ScorpionH₅ double?Lines ~~long~~ but not very broad.X10274 β ScorpionLines appear double with the
fainter comp. ν ν violetThe effect is best seen at $\times 471$ X10275 α 's Scorpion μ ' Lines broad, not separated.Lines very sharp in μ X10278 μ 's Scorpion μ Lines very broad & longLines sharp in μ X10281 μ 's ScorpionLines double well separated,
Components ~~in~~ ~~equal~~ ν ν .
violet is more intense.

Oct. 2, 1901.

X10282 η CentThis plate is darker than the several
preceding and shows very clearly
the sp. of the fainter star at
violet end. H₅ & H₅ $\frac{1}{2}$ H₅ of this
fainter sp. are distinctly photographed.
No trace however is seen of H₅
even on the edge where this sp. overlaps
that of η Cent.This spectrum is like that on
X10273X10283 β ScorpionLines broad also found in
 α 's Scorpion. Poor plate.

Tuesday, March 25, 1902

X 10316 β Scipii

Double exposure
Images narrow.
Orion type star
Lines hazy.

X 10317 μ^2 Scipii

Very poor focus. The lines in μ^2 appear double also.

X 10284 μ^2 Scipii

Lines hazy in μ^1 , but not separated.

X 10285 η Centauri

H β bright and well defined
H γ dark with a bright edge towards violet.

Orion lines broad

4481 β narrower than 4471

March 25, 1902

X 10286 β Scipii

Lines hazy and double towards the violet. Probably due to poor focus

X 10287 μ^2 Scipii

Lines double in μ^1 . More intense component is towards the red.

X 10288 η Centauri

Plate scratched.

H β bright.

Doubt if very narrow with a bright line towards the violet.

4387 and 4471 are very broad and hazy. The contrast between the width of dark H γ and 4387 is very marked.

X 10318 η Centauri

H β bright

H γ bright towards violet

H δ appears to be sharply defined towards the violet

4471 & 4387 are very broad
The numerous color lines visible on earlier plates are not seen.

March 25, 1902.

X10309 μ^2 Scorpio

Lines very sharp in μ^2

Lines very broad in μ^1
4387 is double and component
of shorter λ seems to be more
intense.

X10310 γ Centauri

$\lambda\beta$ bright

$\lambda\beta$ appears like triple, and to
consist of two dark lines with
a bright space between. The dark
line towards the violet is much
less intense than the one towards the
red, but distinctly seen.

4387 and 4481 are double, but the
separation is not large.

X10311 β Scorpio.

Very sharp focus. Lines well defined.
The two other μ^1 lines on the plate show
lines very narrow.

March 25, 1902

X10312 μ^2 Scorpio

Lines broad in μ^1 but not distinctly
separated.

X10313 γ Centauri

$\lambda\beta$ bright is very narrow. Also
 $\lambda\gamma$ dark towards the red,
the dark component of the complex
 $\lambda\delta$ towards the violet is rather
wide. Orion lines very wide.

X10314 β Scorpio

Lines not quite so well-defined
as on X ~~10311~~ 10311

X10315 γ Centauri

$\lambda\beta$ bright.

$\lambda\gamma$ the same as on X10310.
The Orion lines are very faint,
broad and hazy.

X10316 β Scorpio

Lines a little hazy.

March 25, 1902.

X 10320 μ^2 Scorpii.
Very narrow images.
Lines double in μ^1

X 10321 η Centauri
H β bright.
Spectrum probably the same
as on X 10310, but the image is
narrower.

X 10322 β Scorpii
Lines a little hazy.

X 10323 μ^1 Scorpii
Lines hazy.

X 10324 η Centauri
Spectrum appears like the same
as on X 10310.
H δ has a decided bright line
towards the violet.
Other lines are very wide, probably
double.

March 25, 1902.

X 10325 η Centauri
H β bright in general
Spectrum, same as on X 10310

X 10326 η Centauri
H β bright.
Spectrum same in general as
on X 10310.

X 10327 η Centauri
H β bright
Spectrum same in general as on
X 10310

X 10328 η Centauri
H β bright
Spectrum very narrow & appears
like like that on X 10310

X 10329 η Centauri
H β bright.
The O γ lines are very broad
and hazy.
In general like X 10310

March 25, 1902

X10355 α Sagittarii

Focus very sharp, lines narrow
 $H\beta$ is an intense dark line.
 The intensity of $H\beta$ is very striking
 when this planet is superposed
 on X10272, where $H\beta$ is missing
 & extremely faint.

Lines 4471 & 4481 are very sharp.

$H\gamma$ is a very close double.

$H\delta$ also is a close double.
 4128 & 4131 are seen as a close
 double.

The whole space between $H\gamma$ and
 $H\delta$ is crossed by fine lines.

4471 & 4481 are very sharp.

March 25, 1902.

X10289 η Centauri

$H\beta$ bright

In general like X10310

4387 appears double.

X10290 β Scorpii

very narrow and poor images

X10291 μ Scorpii

Lines hazy.

X10292 η Centauri

like X10310

There is a faint trace of a narrow
 bright fine near bright $H\beta$ towards
 the red.

X10293 β Scorpii

Lines quite well-defined

X10294 μ Scorpii

Lines double

Stronger component towards the violet
 separation large.

March 25, 1902.

X 10295 η Centauri
 Is bright and has a dark line
 towards the violet. ~~It~~ dark
 with a bright line towards the violet.
 Green lines very broad.
 General like X 10310.

X 10296 β Scorpii

Lines 4471 + 4389 appear double.

X 10297 μ Scorpii
 Lines very broad.

X 10298 η Centauri
 Like 10295

X 10299 β Scorpii
 Lines a little hazy.

X 10300 μ Scorpii
 Lines double. 4389 and 4481
 are well separated.

March 25, 1902

X 10301 η Centauri
 Like X 10295

X 10302 β Scorpii
 Lines rather well-defined
 4471 appears like a close double.

X 10303 μ Scorpii
 Lines hazy.

X 10304 η Centauri
 Like X 10295

X 10305 β Scorpii
 Lines hazy.
 4471 double? Stronger comp.
 towards red?

X 10306 μ Scorpii.
 Lines double
 Stronger comp. towards red

X 10307 η Centauri
 Like 10295
 Line 4922 seems to have a
 bright line towards red

March 25, 1902.

X10308 β Scorpii
Hydrogen lines very br. violet
other lines fairly well-defined.

X10331 α Sagittarii taken Sept. 4, 1901,

H β absent or very faint.

This spectrum is very different from
that on 10355 and resembles

X10272 taken July 20, 1901

4387 γ H γ

4481 is very narrow

4128-4131 = H δ

X10333 α Capricornis
H β very faint much less than
H γ H β about = 4922
Image like that on X10265.

X10335 α Capricornis

H β barely seen.

The fourth appears blue poor, so
that the last intense lines are very
faint.
H γ is well-marked.

March 25, 1902.

X10337 α Cap.
Image narrow and fainter lines
are barely seen. H β very faint.

H δ

X10338 α Cap.

H β faint, about = 4922

Other lines broad.

H γ rather narrow

X10340 α Cap.

H β barely seen. faint γ = 4922
Lines large.

X10342 α Cap.

H β very faint
Other lines faint.

X10344 α Cap.

H β very faint red = 4922.
Other lines very faint.

These plates of α Cap. are nearly
alike. The fourth of the variable H β
is probably not a short one.

September 22, 1902

X 10356 = Capricorn Oct. 1, 1901

H β very fine and narrow. 4922 is broad and hazy. H γ is narrower than 4387.

X 10357 = Sag. Oct. 3, 1901.

H β dark and well marked. H γ double?

Many safer lines seen, some of which look hazy and double, but 4471 is peculiarly narrow and sharply defined.

X 10358 = Capricorn Oct. 3, 1901

H β and H γ very narrow and sharp. This spectrum appears like exactly like that on 10356.

X 10359 = Sag. Oct. 5, 1901

H β dark well marked. Apparently like in all respects the spectrum on 10357.

Sept. 22, 1902.

X 10360 = Cap. Quality "1"

Nothing seen.

X 10366 A. G. C. 9181.

Too poor. H β not well seen in w. Cam. Maj. or A. G. C. 9181.

X 10367 A. G. C. 11028

Photog. on acc. of comp. brightness of H β . H β not distinctly seen but there is no trace of brightness.

X 10368 = Velorum.

H β dark and rather ill-defined. The Innis lines are very faint on this plate and 4471 appears much more intense than 4471. Sp. 1384?

X 10378 A. G. C. 14145 = Velorum

Image very narrow and poor. H β dark.

Sept. 22, 1902.

X 10371 A.G.C. 9181.
Star out on plates

X 10372 A.G.C. 9181.

Too poor. Only a small
portion of 9181 visible.
Can not see H β .X 10373 ~~Vibromis~~
A.G.C. 14295
Ring star.

Oct. 10, 1902

Exam. of spectrum of $-10^{\circ}47'13''$ (at
Prof. Pickering's request) as phot.
on recent plates. Draper Catalogue
gives sp. E. See Miss Clerk's
Outfield in Knowledge Vol. 25, p. 226,
Oct. 1902.B 19014 Sp. B. Image dease
B 21782 Lines all burned out.
B 14392 Spect. B. A or B. A.
Ours line 4026 is the strongest of
the Ours lines, 4144 & 4171 are
also seen.This sp. is classed E in Draper
Catalogue from plates B 1377, 1407
and 1506. These are all very poor.
B 1407 is the best of the three, but
the sp. is so poor on this plate that
no lines are distinctly seen.

October 25, 1902.

Notes from Pernau letter handed
to me by Prof. Pickering, concerning photos
of stars having peculiar spectra.
Exam. by Prof. Bailey & Mr. Mason

Bort 415

12 13" boxes 3570-3581

Plates 10425-10568.

α Scorpii { Plates giving material
 " " { for more accurate
 δ Centauri { plates of pairs

β Lupi { X 10414, 10521, 25, 36, 52
 60, 62, 65, 68, 70, 82, 87,
 89, 95, 601, 7, 14.
 Lines always single.

γ Centauri { X 10524, 28, 35, 40, 43,
 47, 49, 54, 55, 59, 94,
 600, 605
 No changes in spectrum

χ Apollis { Some changes.
 Plates poor.

υ Sag. { 1902, May 28 - June 11, # lines dark
 extremely faint.
 X 10621, # lines strong.

ζ Cap { X 10450, 55, 72, 73, 78, 79, 96,
 97, 516, 17, 622 20. No changes.

November 6, 1902

Exam. of plates to determine spectrum
in Louis letter of 1902 Oct. 21, given
to me by Prof. Pickering.

I 9856

D.M. +16° 57' 9"

For L. Fair image.

183

I

D.M. +16° 57' 9"

Sp. poor For L or G.

I 24138

D.M. +16° 57' 9"

Image too dense. Lines burned out.

I 13720 For L or G. Can not tell which

D.M. +16° 57' 9"

I 6486

D.M. +40° 29' 05"

I 6488 K.M.

I 6695 before I 22967 Say poor

I 1842 K.M.

I 1747 Ma Break clearly green

I 3602 K.M.

I 3833 Ma?

I 25478 K? Image in poor focus

Nov. 6, 1902.

I 2880
D.M. +34° 2750
I 20813 Loo dense.
I 27206 Image poor.
I 20817 Loo dense.

D.M. +14° 690
I 19802 Loo dense II type.
I 13720. Gork.
I 9605 Sp. too narrow
I 9856. Sp. long dispersion

D.M. +42° 2214
I 20508. Sp. #9 Image not
very clear, but I seem to distinguish
the hydrogen lines.
I 26565 Loo poor.

I 4651 - good plate, dispersion better than I 2880
The blue is faintest. Class #59.
I 7015 - too good! Solar lines seen.

D.M. -0° 3300

I B11315

Either Gork.

There light is practically continuous
like sp. #9. Do not see hydrogen
lines.

I 20306 Loo dense.

Dec. 2, 1902

Search for sp. of W Virg.

Plates examined

I 1016 - too faint
I 1019 Does not cover up
B 14117 Loo faint
I 506 Does not cover up
I 9569 Not seen
I 854 Loo faint
I 11213 " "
I 3149 " "
I 7892 " "
B 11365 " "
B 11366 Not? or bad? Image faint

there is an appearance of a
bright line at or near position
I show to Mrs. Fleming.

Dec. 10. Mrs. Fleming examined the spectrum
of W Virg. and classed it "Cont. with
H and #1 strong" from B 11366

Monday, Dec. 15, 1902

C 13347 taken June 25, 1901,
very nearly like 13237. taken

Band nearest H β tracks
violet is more intense than on
C 13237.

Band in extreme red seem
where faded out, but this
may be due to thinness of the
images.

C 13354 taken June 27, 1901
~~It~~ Sp. very poor.
Probably like 13347

Saturday, Jan 24, 1903

Irona Paser

Comparison of lines present on C 13153,
Feb. 23, 1901, and C 13158, Feb. 24, 1901,
two plates superposed.

13153 is over this in regions of greater λ
than H β , but there seems to be a trace
of the black δ band and of 4922
and 5017.

Between H β and H γ all the lines &
bands on 13158, appear also to be
present on 13153.

Throughout the spectrum there is a strong
resemblance in these two images, and
there seems to be even a trace of the
bright bands on 13153. It may be
that they change in this spectrum
was not so sudden as has
been believed.

Lines certainly seen on 13153

"20"	4689.4 - 4653.7	"37"	= 4137.7
"21"	4638.3 - 4613.5	"39"	4072.1 - 4085.1
"22"	4597.3	"50"	3858.6 - 3866.6
"23"	4560.3		
"481" 25	4468.1 - 4489.5		
26	4439.0 - 4456.7		
27	4416.0 - 4427.6		
28	4387.3 - 4406.4		

For λ 's, see

Ph. II, p. 118.

It is much more
intense on 13158

Jan. 24, 1903
Exam. 12 X plates of special objects,
stars having #3 bright, and variable.

X 10398 J Velorum
Not J Vel. To be ident.

X 10383 J Vel.
Not J Vel.

X 10384 K Apodis "3"
Too poor

January 26, 190³

X 10410 J Vel.
J Vel is not on plate. Central star
not Carinae. Everything on the
plate has already been classified.
That is, all that is good enough
to classify.

X 10377 J Vel. Dual. "1"
Nothing seen.

X 10379 Dual. "1"
Nothing seen

X 11380 Dual. "1"
Nothing seen

X 10387 Dual. "1"
Nothing seen

X 10396 Dual. "1"
Nothing seen

X 10390 a. g. c. 10534
Not the right star.

X 10427 Dual. 1

X 10429. \approx Cap. Dual. "2". Too poor

Jan. 26, 1903

X10408 Serial. 2
Too poor.

X10404 Serial. "1"

X10389 A. G. C. 9/81
Not the right star.X10388 Q of bel.
Not on plate.
Same as X10410X10413 2 Cap. "3"
Part. many stars
At any rate, plate too poor.X10392 V Puffin
Many regions.X10393 A. G. C. 9/81
Many starsX10394 V Puffin
Many starsX10395 J bel.
Many stars

Jan. 26, 1903

X10398 V Puffin
Many stars.X10397 A. G. C. 9/81
Many stars.X10400 V Puffin
Many starsX10402 X' Apollis "6"
Part. many stars
Plate too poor.X10403 V Puffin
Many stars.X10405 J bel.
Many fields.
2 comets in centreX10406 V Puffin
Many starsX10407 J bel.
Many fieldsX10409 V Puffin
Many stars.

Jan. 26, 1903.

X 10479 Σ Cap.HB almost invis.
Own lines hazy and indistinct.

HB - 4922

HF strong.

X 10478 Σ Cap.

HB very faint

Own lines broad, almost double.

X 10496 Σ Cap.

Plate badly scratched in region of

HB.

HB not seen.

Lines hazy.

X 10492 \triangleright Sag. Quality "3".

Plate too poor.

Very faint lines seen.

HB not seen.

X 10490 Σ Cap.Not Σ Cap.X 10489 \triangleright Sag.

HB not seen

HF much < 4834 , HB very faint much < 4128 .

Calcium line 10

Jan. 26, 1903.

X 10488 \times 'Apo. dis.

HB not seen.

Images very poor. Other lines seen but own lines are not distinctly seen.

X 10486 \times 'Apo. dis. \triangleright Sagittarii

Focus too poor

All blurred

HB not seen

X 10485 Σ Cap.

Wrong star.

X 10484 Σ Cap.

Wrong star.

X 10483 \triangleright Sag. June 5, 1902.

3 images. Good.

HB distinctly seen. Brightness to

not HB is overexposed.	Jan. 27. The line taken for HB is really 4922 and HB is extremely faint, barely seen.
numerous lines seen.	
HF less than 4384.	
HB " " 4126	

X 10481 1/2 hel.

Plate broken

Quality "3"

Jan. 26, 1903.

X10414 v Puffin.
Many stars.X10415 f bel.
Many, a Carinae in centreX10416 v Puffin.
Many stars.X10418 K' Ap.
Many stars.X10401 f bel.
Many stars.X10391 { f bel.
10399 { Many stars.
10417 {X10493 f bel.
As dark and well marked.
No evidence of brightness seenX10480 v Sag. Dual "2"
Pretty fair spectrum, better
than many marked quality "3".
As barely seen. $H\gamma < 43\%$, $H\delta < 4\%$ 4128.

Jan. 26, 1903.

X10381 A. G. C. 9151
Many stars.X10441 K' Apodis '2"
Too poor.X10412 v Sag.
Many stars.X10447 K' Apodis.
Plate too poor.
As not seen. If really there, it
must be faint.X10419 v Sag.
Many stars.X10420 A. G. C. 11024
Many stars.X10422 f bel.
Many stars.X10421 v Puffin
Many stars.X10423 K' Ap.
Many stars.

Jan. 26, 1903.

X10424 v Puffin.
Many refines.

X10425 J bel.
Many refines.

X10426 K' ap.
Many refines.

X10442 J bel.
Many refines.

X10441 J bel.
Many refines.

X10439 K' Apokis
Many refines.

X10438 J bel.
Many refines.

X10437 A. G. C. 11024
Many refines.

X10436 J bel.
Many refines.

Jan. 26, 1903
X10435 A. G. C. 11024
Many

X10434 J bel.
Many.

X10433 v Sag.
Many.

X10432 K' ap.
Many.

X10431 J bel.
Many.

X10430 v Puffin.
Many.

~~X10~~ X10428. J bel.
Many.

X10474 v Sag.
HP as a fine, almost minor line.
A much ≤ 4387
No very faint change.

X10473 2 Cap.
HP faint double 4922

Jan. 26, 1903.

X 10472 2 Cap.
H₃ faint & hazy.
H₂ narrow.
Ozone lines hazy.

X 10471 v Sag.
Wing star.

X 10470 K' Ap.
Sp. very hazy.
H₃ not seen

X 10467 v Sag.
Very poor.
H₃ not clearly seen.

X 10466. 2 Cap.
Wing star.

X 10465 v Sag.
H₃ not seen. There are several
very faint lines in region.
H₂ & H₂ 2nd.

X 10464 K' Ap.
H₃ not seen
Sp. poor & little seen

Jan. 26, 1903.

X 10468 K' Ap.
H₃ not seen
Sp. poor

X 10456 v Sag.
Plate very poor.
H₃ not seen

X 10455 2 Cap.
H₃ fainter than H₂
Solid plate

X 10450 2 Cap.
H₃ a little fainter than 4922

X 10445 2 Cap.
Wing star?

X 10444 v Sag.
Wing.

X 10443 K' Ap.
Wing.

January 24, 1903

X 10482 ⁸² Carme

H β is a strong br. line.
Many bright lines seen; and
in some cases they have accompanying
dark lines either superposed or on
the edge of shorter λ 's. The dark
lines are not so numerous as on X 4759,
but some are very intense.
Line 4227 is a very strong dark
line with a distinct bright line on
each side of it. Another strong
dark solar line is seen bet. 4227
and 4271 which is light edged &
faintly bluish violet, and very
strongly broadened.

X 10494 η Carme

Spectra thinner than on 10482.
Spectrum appears to be the same
as on 10482.

Jan. 27, 1903.

X 10354 taken for β Sag. but identified
as β' and β'' Sagittarii.

β' Sag. spectrum F.

β'' Sag. spectrum G.K.

X 10269 taken for ϵ Cap. but
identified as γ Capricorni.

Spectrum G.K.

X 10264 taken for ϵ Cap.
Identified as β Cap.

β Cap. comp.
H band narrowed and very hazy.

January 24, 1903

X 10477 ⁸² γ Carinae

H β is a strong br. line.
 Many bright lines seen; and in some cases they have accompanying dark lines either superposed, or on the edge of shorter λ 's. The dark lines are not as numerous as on X 4769, but some are very intense.
 Line 4227 is a very strong dark line with a distinct bright line on each side of it. Another strong dark solar line is seen bet. 4227 and 4271 which is light-edged, faintly bluish violet, and very strongly broadened.

X 10494 γ Carinae

Sp. is thinner than on 10482.
 Spectrum appears to be the same as on 10482.

Jan. 27, 1903

X 10354 taken for β Sag. but identified as β' and β'' Sagittarii.

β' Sag. spectrum F.

β'' Sag. spectrum G.K.

X 10269 taken for ϵ Cap. but identified as γ Capricorni.

Spectrum G.K.

X 10264 taken for ϵ Cap. identified as β Cap.

Sp. is comp.

β band narrowed and very hazy.

January 28, 1903

X 10616 π Scorpi
Lines single, a little hazy.

X 10614 β Lupi
Lines single well defined.

X 10613 α w' Scorpi
Lines hazy & wide

X 10612 π Scorpi
Lines double.
Separation very large.
Faint components to violet.
This plate should be measured.

X 10611 γ Centauri
Lines single.

X 10610 γ Cent.
Lines single.

X 10609 α w' Scorpi
Lines double, ft. comp. to red.

X 10608 π Scorpi
Lines double
Ft. lines to red.

Jan. 28, 1903

4, 35

X 10607 β Lupi
Lines single.

X 10605 γ Centauri
As bright with a dark line
superposed

As it is growing dark, I must wait until
to-morrow for further exposure of these
plates.

X 10502 γ Vel. ϵ Cap.
None upon

X 10503 α Cap.
None upon

X 10509 ϵ Cap.
X 10510
None upon

January 29, 1903

X10497 α Cap.

AB very faint. Image then at
ad end.

X10606 γ Centauri

Lines wide and appear to be slightly
separated, but they are too hazy to
be sure.

X10573 π Scorpion

Lines double. Fainter component towards
the red. The fainter component is
very faint. It appears as if the
faint lines are always less intense when
towards the red than they are when towards
the violet. Compare X10612 where
the faint lines are towards the violet
with this plate and X10008 where
the faint lines are towards the red.

X10562 μ Scorpion

Lines very wide and hazy, but
not double.

X10563 β Lupi

Lines single.

Jan. 29, 1903.

X10565 β Lupi

Lines single.

X10566 π Scorpion

Lines single, hazy.

X10567 μ Scorpion

Lines very wide.

X10568 β Lupi

Lines single.

X10570 β Lupi

Lines single, but slightly hazy
on both sides, 'probably' due to focus.

X10571 π Scorpion

Lines double. Fainter comp. to
red? Focus poor.

X10572 μ Scorpion

Lines double. Fainter comp. to violet.
Focus very poor.

X10561 π Scorpion

Lines double. Fainter comp. to violet.
Focus very poor.

Jan. 29, 1903.

X 10544 μ' Scorpii
Lines double. H α comp. to red.

X 10545 μ' Scorpii
Lines double. H α comp. to red.
Focus poor.

X 10546 γ Centauri
Lines hazy.

X 10547 η Centauri
H β consists of a dark line superposed on a bright band, not centrally, but towards the violet, so that the edge of the bright band is barely seen towards the red, but is like a distinct bright line towards the violet.
H γ is dark with a bright line towards the violet.

The position of the dark line at H β appears to have shifted since X 10545 was taken. On that plate, the dark line was more violet. On 10547, it is more red. The diff. in width of the hyd. & O III spectrum of lines is very remarkable. The hydrogen lines are very narrow and sharp, the helium extremely wide.

Jan. 29, 1903.

X 10548 γ Cent.
Lines single

X 10549 η Cent.
H β consists of a narrow sharply defined dark line superposed on a bright band, as described on previous page X 10547. 10549 is a better plate and the complex line is seen more distinctly. H γ is dark with a distinct br. edge to violet. At H γ , there may be a haze of a bright edge more violet. The helium lines are very wide and hazy.

X 10550 μ Scorpii
Lines double. H α comp. to violet.

X 10551 μ' Scorpii
Lines single, hazy.

X 10552 β Lupi
Lines single

X 10553 γ Centauri
Lines double.
H α comp. to violet

Jan. 29, 1903.

X10554 η Centauri

Like X10549, except that the bright lines on edges of sh. δ of the dark hyd. lines do not seem to be quite so intense.

X10555 η Cent

Like X10554

X10557 α Scorpio

Lines double. Faint comp. terr. violet?
~~Hyd~~ Separation not well seen
 Lines very broad and hazy.

X10558 γ Centauri

Lines single, hazy.

X10559 η Cent.

The same as 10554

X10499 δ Vel

H β darkest with on base of brightness.

X10501 η Apodis

H β not seen.
 Hens very poor

Jan. 29, 1903.

X10505 η Centauri

Plate not very good.
 Bright H β does not seem quite so intense as on 10554 but I am not sure that this is real.

 ν Sagittarii

X10504

Plate scratched in region of H β .
 H β not seen

H α & H γ are extremely faint.

H δ much $<$ 4387

H ϵ barely seen

X10505 η Carinae

Plate scratched over η Carinae
 Numerous bright lines seen, and a few dark ones.

X10506 η Apodis

H β is a very faint bright line. Sub = 1

X10508 ν Sag.

H β not seen

H γ $>$ H δ

4387 very strong.

Are there broad absorption on this plate?
 The lines are irregular.

Jan. 29, 1903

X10599 γ Centauri
Lines somewhat broad.X10600 η Centauri
This appears like the 10554.X10601 β Lupi
Lines a little hazg, may be due
to poor focus.X10602 π Scorpion
Lines single, slightly hazg.X10603 μ' Scorpion
Lines double.
Faint comp. to violet.X10604 γ Centauri
Lines very wide.2.45 A.M. The day is so foggy that
it is almost dark and the light
is too poor to continue examining these
plates.

Jan. 29, 1903

(3.10 A little leftish)

X10591 μ' Scorpion
Lines double. Faint comp. to violet.X10592 γ Cent.
Lines single.X10593 γ Cent.
Lines single but slightly hazg.X10594 η Cent.
Probably like 10554.X10595 X10595 β Lupi
Lines a little hazg.X10596 π Scorpion
Lines double. Faint comp. to violet,
separation slight.X10597 μ' Scorpion
Lines very hazg.X10598 γ Cent.
Lines very hazg.

Jan. 29, 1903.

X10576 π Scorpii
Lines very heavy.

X10577 μ Scorpii
Lines not clearly separated but
they are very wide, and the
portion towards violet is more
intense.

X10581 μ Scorpii
Lines very wide, ~~is~~ probably double
fainter component to violet.

X10582 β Lupi
Lines single.

X10585 π Scorpii
Lines darker, fainter comp.
to violet.

X10586 μ Scorpii
Lines heavy.

X10587 β Lupi
Lines single.

X10589 β Lupi
Lines single.

Jan. 29, 1903.

X10590 π Scorpii
Lines double
Faint comp. to red

January 30, 1903

X10543 η Centauri taken June 17 1902
like X10554 " June 25 "

X10542 μ' Scorpii
Lines hazy.

X10541 π Scorpii
Lines a little hazy.

X10540 η Centauri
like X10554

X10539 π Scorpii
Lines hazy.

4387 seems double with fainter comp. to red. Other lines not seen distinctly doubles except perhaps 444120 & 4144 which may be due to focus

X10538 μ' Scorpii
Lines very broad & extremely hazy.

X10537 π Scorpii
Lines very hazy. Strongest violet.

Jan. 30, 1903
X10536 β Lupi
Lines single

X10535 η Centauri
like X10543 except that the bright line at 443 too violet does not seem to be quite so intense. This difference is probably photographic rather than real.

X10534 μ' Scorpii
Lines hazy.

X10533 π Scorpii
Lines double.
Fainter to red.
Separation not very great.

X10532 ζ Cent
Lines hazy.

X10531 μ' Scorpii
Plate too faint

X10530 μ' Scorpii
Lines hazy.

X10529 μ' Scorpii
Lines hazy.

Jan. 30, 1903.

X10528 η Centauri
Plate poor.
Apparently like 10554.

X10527 π Scorpii
Lines hazy.

X10526 μ Scorpii
Lines double.
Faintest red.

X10525 β Lupi
Lines single

X10524 γ Centauri
Exactly like 10554

X10523 μ Scorpii
Lines double but plate too poor
to determine much else.

X10522 π Scorpii
Sp. too narrow, lines burned out.

X10521 β Lupi
Lines a little wider in both plates.

Jan. 30, 1903.

X10520 μ Scorpii
Lines double.
Faintest to violet. Separations not
very well marked.

X10519 π Scorpii
Lines hazy.
Faintest to violet suspected.

X10518 γ Centauri
Lines single.

X10517 ϵ Cap.
Lines hazy.
H β very faint.

X10516 ϵ Cap.
Orion lines very hazy.
H β and ϵ 922 very faint & hazy,
H γ narrow & well marked.

X10515 ν Sagittarii
Very peculiar.
On back of H β seen. Solar lines
very prominent. All lines a little hazy.
H γ 4384.

Jan. 30, 1903
 X10514 γ Aporis.
 H β bright. Sub=L.
 Lines hazy.

X10513 η Carmine
 Numerous bright lines and bands seen.

X10512 δ Del.
 H β dark with no trace of hydrogen
 seen,
 4471 appears to be bright on
 edge of γ .

X10511 ν Sag.
 Sp. poor.
 H β invisible.

X10498 ν Sag.
 Sp. very poor.
 H β not seen, & probably not
 present.

Feb 5, 1903

X 10385 a. G.C. 9181
 Wrong star

April 8, 1903

Estimates of intensities of bands on horse
Pencil.

Brightest on C13195 is assumed the 100

C13195

H_γ 100

H_δ 100 110

H_ε 80 75

H_ζ 40

H_η too hazy + spread out

H_θ 20

5015 10

4922 10

17" 5

band "4a" 6

April 8, 1913

C13195

H_γ dark = 30

H_δ 30

H_ε

H_ζ

April 22, 1963

X 10617 μ 's Scorpio
Lines double well separated, but
there is very little difference in the
intensity. The comp. b red is
estimated as 1.1 that to blue.
See Remark 73. Vol. 68. Part II.

X 10618 μ 's Apollis
H β bright $\gamma = 3$
H γ dark and narrow.
4387 + 4471 ~~into~~ γ hazy.

X 10619 μ 's Apollis.
Images too narrow, lines burned out.

X 10620 ϵ Cap.
H β very faint, and faint to line
superimposed to red, 4922 γ hazy.
H γ dark and very narrow.
Silym lines very hazy compared
with H γ , H δ , H ϵ etc.

April 22, 1963

X 10621 δ Sagittarii
H β strongly dark. Int. = 10
H γ = 1.8 (4387.)

X 10622 ϵ Cap.
H β + 4922 almost invis.
4387 + 4471 also faint.
H γ well marked, also other
hydrogen lines.

June 16, 1903

X plates broken, not yet examined.

X 10440 A. G. C. 29028 2 Cap.

" 10448 " 20878 1 Cap.

~~" 10449 " Sag.~~

~~" 10454 " Cap.~~

" 10481 J. V. L.

" 10491 2 Cap.

~~" 10560 P. Lupi~~

" 10556 " Scorpiu

October 1, 1903.

X 10449 2 Sag. Broken. Slide 2040

HPs very faintly dark.
H₂ < 4387

X 10454 1 Cap. Broken Slide 2041

very poor
HP not distinctly seen

X 10560 P. Lupi Slide 2045
Lines very sharp.

Monday, Feb. 8, 1904

X10623 S Lyrae

Sp. of first type, ^{nothing but} ~~only~~ hyd. line seen.

X10624 A. G. C. 26570 = v Sag.

taken Sept. 2, 1902.
No trace of H β . The spectrum shows a complete change from that on 10621 taken July 12, 1902, and appears to be very nearly like that on 10515, taken June 11, 1902. H γ and 4387 are nearly equal.

X10625 v Sag.
Quality 1.

X10626 v Sag. (S.) Sept. 13, 1902.
Like 10624

The sp. shows no certain change bet. Sept. 2 and 13.

10627 v Sag. (S.) Sept. 13, 1902.
H γ line.
Like 10624.

Feb. 8, 1904.

X10628 v Sag.

Line at end of gr. λ is distinctly seen on the rectangular plate. It looks slightly fr. λ than 4944 on X10621.

X10629 v Sag.

Very poor.
Appears to be like 10628

X10630 v Sag. S.S.
No trace of H β .
Like 10624

X10631 v Sag.
Very poor.
No trace of H β .
Like 10624

X10632 v Sag.
No trace of H β .
Like 10624

Feb. 8, 1904.

X10633 A.G.C. 9181.
 9198 shows h. line as always.
 No trace of H β bright in 9181.
 H β is a strong dark line.

X10637 a. G.C. 9181.

Poor focus
 H β dark in 9181.

Bright H β not clearly seen
 in 9198 but this is probably
 due to focus.

X10638 A.G. 9181.
 H β bright in 9198.
 H β dark in 9181. Sp. B3A

X10640 J. Velorum
 H β is an intense dark line with
 no brightness whatever. Spectrum B3A.

X10646 A.G.C. 9181
 H β and H γ bright in 9198.
 H β dark in 9181. There may be a faint trace
 of brightness on edge of fr. l., but it is uncertain.

Feb. 8, 1904. 21^h

X10639 A.G.C. 11024
 H β appears the faintly bright image
 thin.

X10641 A.G.C. 9181.
 H β and H γ bright in 9198.
 H β dark and narrow in 9181. May be
 slightly bright on edge of thin fr. green
 21.

X10642 A.G.C. 11024
 H β is a well-marked bright line. H γ very
 broad and hazy. All lines broad.
 A.G.C. 10921 is very distinct on this
 plate. This is Fr. l. peculiar showing
 the sharp antine lines the same as
 Fr. l. Scutellus and J. Velorum.
 This star was not classed in Vol.
 28, since it appeared only on
 Plate 10049, and was rather
 faint.

X10643 J. Tel
 Fr. l. peculiar. H β is a well-marked
 dark line.

Feb. 8, 1904

X10644 η Carinae η shows numerous bright lines, rather narrow.

A.G.C. 14656, seems to be more nearly like β Centauri than any other spectrum. This star is classed β 3A Pec. in Vol. 28 probably because the lines bet. $H\beta$ & $H\gamma$ are of peculiar intensity and $H\gamma$ stronger than in normal β 3A stars. This plate (10644) is better than the ones from which this star was classified and I think the spectrum should be β 1A.

X10645 A.G.C. 11024

 $H\beta$ distinctly bright. Other lines very broad and hazy.X10647 A.G.C. 11024 and γ Vel. $H\beta$ of 11024 is of this plate. Lines hazy.

Feb. 8, 1904

X10464

X10648 γ Vel.Nothing peculiar. $H\beta$ is a strong dark line.X10649 η Carinae

Numerous bright lines.

X10650 A.G.C. 11024

 $H\beta$ bright. Lines very wide & hazy.X10651 δ Apodis $H\beta$ is a very faint bright line.
 $H\gamma$ is a strong dark line.

X10652 A.G.C. 9181

Nothing peculiar. $H\beta$ dark. $H\beta$ bright in 9181

Feb 8, 1904

X10653 A. G. C. 11024 and J bel.

H₂ faintly bright in 11024. Image
thin.

X10654 J bel. (J)

Nothing peculiar. H₂ is a strong
dark line.

X10655 A. G. C. 9181

H₂ is a narrow dark line.H₂ bright in 9198.

X10660. A. G. C. 9181

H₂ dark.H₂ bright in 9198.

X10661 A. G. C. 9181.

H₂ dark, very narrow image.H₂ bright in 9198.

Feb 8, 1904.

X10662 A. G. C. 9181

9181 - H₂ dark

9198 " bright.

X10663 A. G. C. 11024.

Lines very broad. H₂ not distinctly
seen. Image thin.

X10664 J bel.

Nothing peculiar. H₂ is a strong
dark line.

X10665 A. G. C. 11024.

H₂ bright. Lines broad & hazy.

X10666 J bel.

Nothing peculiar. H₂ dark.

Feb. 8, 1904.

X10667 η Carinae

Numerous bright lines

X10668 f VelorumProbably not f VelX10669 f Vel.Nothing peculiar. H β is a strong dark line.X10670 γ Centauri

Lines hazy, not double.

X10671 μ Scorpis

Lines hazy,

Feb. 8, 1904

10672 η CentauriH β consists of a sharp dark line superposed on a bright line. A faint hydrogen lines are dark. Oxygen lines very wide. Solar lines not seen.

X10673 A. G. C. 9198

Among stars?

X10674 A. G. C. 9181

H β dark on 9181
" bright " 9198X10675 γ Cent.?

Lines double. Br. comp. to red.

X10676 η CentauriH β bright with dark lines superposed, slightly broader red. H γ may have faint bright edges. Oxygen lines very broad. Solar lines not seen.

Feb 9, 1904. o^h

X10677 β Lupi + κ Centauri
Lines equally well defined in both
stars.

X10678 A.G.C. 9181.

Lines burned out.

X10679 A.G.C. 11024.

H β bright. Other lines broad.

X10680 γ Vel.
H β dark.

X10681 κ Apodes.
H β not seen.
Lines poor, all lines indistinct.

X10682 ν Sagittarii
Very nearly like that on 1062f, taken July 12,
1902. H β is again a strong dark line, but not
so intense as on 1062f. H γ is a little \angle 438 μ .

Feb 9, 1904

X10683 ν Sag.
Like that on 10682

X10684 κ Aps. = Cap.
very poor

X10685 A.G.C. 9181.

9181 - H β dark
9198 " bright

X10689 κ Apodes.
H β unobscured. Image fair in refn.

10690 A.G.C. 11024.
Image very narrow, lines burned out

X10716 κ Apodes.
H β not seen. probably absent
or extremely faint

X10719 γ Vel.

H β dark. Nothing peculiar seen

Feb. 9, 1904.

X 10720 κ' Apodis.H β absent.X 10721 δ Vel.
H β dark. Nothing peculiar seen.X 10722 η Carmae.
Numerous light lines.X 10723 κ' Apodis.H β invisible.X 10724 κ' Apodis.

Image too poor. Lines not well seen.

X 10725 ϵ Cap.
H β is a very faint dark line with
not more than $1/20$ of the intensity
of H γ .

Feb. 9, 1904

X 10726 ϵ Cap.H β is a very faint dark line, fainter
than the adjacent line 4942.

Other lines hazy and wide.

X 10727 δ Sag. (June 12, 1903)H β not seen. H387 much stronger
than H γ .X 10728 γ Centauri

Lines single, slightly hazy.

A. G. C. 18507 on plate shows H β and
H γ bright and H δ bright.X 10729 η Centauri
H β is a faint dark line superposed
on a faint light band.
Other lines hazy. Solar lines not seen.

Feb. 9, 1904

X10733 π Centauri

Lines single, slightly wide.

A.G.C. 18859 shows H γ and H β bright.X10734 β Lupi

Lines a little wide.

X10735 π Scorpii

Lines hazy.

X10736 ζ Centauri

Lines a little hazy.

X10737 η Centauri

H β very faintly bright with a faint
dark line superposed.
Quin lines very broad and hazy.
Solar lines not seen.

Feb. 9, 1904.

X10738 π Scorpii

Lines double. Brighter component to red.

X10739 γ μ Scorpii

Lines hazy.

X10740 η Centauri

H β bright with a dark line superposed.
Quin lines broad. Solar lines not seen.

X10741 β Lupi

Lines a little hazy.

X10691 ζ Vol.

Range and poor.
H β appears the dark.

X10694 κ ApodisH β invisible. Lines hazy, but single.

Feb. 9, 1904,

X10707 κ ' Apolin.

Image too poor

X10708. ν Sag.

Image too poor.

X10709 ϵ Cap.

Focus too poor.

 $H\beta$ probably invisibleX10710 ν Sag

Too poor. Hardly any lines seen.

X10711 A. G. C. 11024

 $H\beta$ faint

Other lines indistinct.

X10712 f hel

Lines burned out.

Feb. 9, 1904

X10713 η Cassio.

Very narrow images.

X10714 γ ' Apolin. $H\beta$ not seen

Very poor focus.

X10715 f hel $H\beta$ dark. Sp. shows no peculiarities.

Feb. 9, 1904 21^h
 Examination of all the plates of
 A. G. C. 11024.
 Line $H\beta$ is probably variable.

X 10089.
 $H\beta$ is the faintest trace of a bright line,
 intensity 1 or less

B8888 $H\beta$ bright = 1

X 10639 Jan. 15, 1903
 $H\beta$ bright = $1\frac{1}{2}$

X 10642
 $H\beta$ bright = 3. Lines wide.

10665 (Feb. 3, 1903)
 $H\beta$ = 2 $H\gamma$ very wide.

10679 (May 7, 1903)
 $H\beta$ = 2 Lines in poor focus

10647 from Jan. 17, 1903
 $H\beta$ of the plate.
 Lines wide.

Feb. 9, 1904

X 10650 (Jan. 17, 1903)
 $H\beta$ = 2 Lines wide.

X 10711 (May 15, 1903)
 $H\beta$ = $1\frac{1}{2}$ $H\gamma$ very faint.
 Focus poor.

X 10690 May 9, 1903.
 Focus poor.

10645 Jan. 16, 1903
 $H\beta$ = 3

10653 Jan. 19, 1903
 $H\beta$ = $1\frac{1}{2}$. Image ft.

10663 Feb. 3 1903.
 $H\beta$ not seen. Image ft. at
 red end, but it seems as if there
 ought to be some trace of the line,
 if bright.

Feb 9, 1904

a. g. c. 11024

The evidence so far obtained is not conclusive as to the variability of H β .

The fact that X10663 does not show H β and X10665 taken the same night shows it as a distinct night. It seems to prove that its apparent change is due to length of exposure.

However, the star should be followed up, as there may be a change in the line.

March 15, 1904, B 18300

12651

13061

examined for sp. of 11024.
but the images do not show the line H β clearly enough.

March

February 16, 1904.

Examination of plates of \times Aquilae for possible changes in the spectrum.

C531 superposed on X7907. No difference in positions of lines seen.

C237 superposed on C5995, no change

C508 - too poor.

C499 - lines very wide. C500 & Leonis also shows wide hyd. lines.

C189 - does not show quite so many lines as C5995, but the focus is poor on C189.

C154 - focus poor.

C147 - fine lines very indistinct.

C146 - poor.

March 16, 1904

x Aquilae

C267 - lines the same as on X7907.

C263 - lines very hazy. C264 x Cygni
show narrow linesC193 & C242 show the violet end
well. C193 gives better def. of the
fine lines in violet. They appear sharper
and better defined than in 242 but
the difference is probably due to
focusC187 - ultra violet lines not seen
as on 193. probably due to focus

C541 - same lines as on X7907.

C537 - 3 prisms. lines very broad

C561 " " " "

C582 " poor.

C584 " a few lines seen
slightly sharper than on 537

March 16, 1904

x Aquilae.

C595 -

Lines very hazy.

C596 - too poor.

C598. Lines hazy.

C600 too poor.

C606 lines indistinct

C611 - lines very broad.

C639 " " "

C648 too dense

C651 lines broad. What is faint
edge?C655 - fork - shows fact x
Aquilae but x Cygni.

C1247 - Imperfect, dense image.

C1534 - Red int. poor.

March 16, 1904.

2 Aquilae

C 1883 - 1 prism.

Line bet H₂ and H₃ is stronger than in any sp. yet seen of this star.

C 1974 - 1 pr metallic lines indistinct

C 1946 - 3 prisms - lines long, same lines present as on X 7907.

C 2282 - very hazy.

C 2132 " "

C 2126 very broad.

C 2292 "

C 2723 lines indistinct

C 6049 - like C 5995, two prisms, lines fairly well defined

