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1894, March 30. See page 119.

The following report of the Aurora of March 30 is written down from memory on the 12th of April by W. C. Clymer.

Aurora was first observed at 8:16 E. T. but not much of it being seen no report can be given. However at about 8h 30m there appeared a wide streamer of the Aurora was seen in the east, (almost due east) about 5° in width which ~~moved~~ apparently moved to the north being sometimes narrowed and sometimes wider, it was not noticed as disappearing as ~~the aurora~~ streamers appeared in the north and west and mingled with it. At about 8h 35m (more or less) the corona was observed with its center, as nearly as could be determined, ~~in a line with~~ at E Leonis.

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Copy of Aurora note made Mar 30.9 regarding the

Aurora of Mar 30.3 & Mar 30.5 — 1894.

J. A. Dunne observer - at Cambridge, Mass

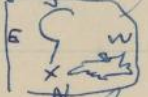
A very brilliant aurora lit up the whole sky from dusk to midnight on Mar 30.

At 7.; o'clock the first appearance was an arch about 20° high and 160° long in the SOUTH; none in the north; diffused hazy electric auroral cloud from arch to zenith in the south.

At 7.15; Faint convergent streamers from north east and north west and north.

At 7.20; Streamers converging from all sides; took observation as follows:- "The auroral corona is clearly defined and almost exactly 2/5 from the 1st mag star in the zenith (Mr. Dunne says this star was β Geminorum) (approximately; perhaps a little south) and the star forming the "handle" of the Sickle; the convergent point seemed to be in the meridian or a little east of it; and a little south from zenith as indicated above.

The Sickle was south east of the zenith at this time



The highest point of the southern arch was about 15° south of the declination of α Sirius or

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just about the altitude of the two second mag. stars  south of Sirius and about (very approximately) 15 min. in R.A. following Sirius.

As regards the corona near the zenith the light was wholly whitish in color and diffused, whereas the corona of (Feb 22-23) was a dark spot almost devoid of light.

about 8.00 :- The color of the aurora so far was whitish; at 8.00 a brilliant band of rays shot up from the north west, of brilliant white; a few minutes after, active rays of intense brilliancy shot up from the south west by south; these rays were green at base and (beautiful dark crimson) from altitude 40° to 60°) from horizon. The converging rays of whitish light played with rapidity meanwhile, and I was almost convinced that the corona had moved eastward ~~toward the~~ but could not verify this as the coronal light was too intense to distinguish the stars, even the brightest, at that spot - they being seen only at instants.

about 8.30 the display of colored aurora ceased, and immediately 180° Apart to a similar brilliant display of streamers in the north east by east

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See p. 119.

was seen; the colors were the same beautiful light green at base and dark crimson at altitude 40° to 60° from horizon). The coronal rays of white light playing all the time.

about 8.45 :- the display died down except occasional faint white streamers from different points of horizon. Her colored rays seen after this (at times of occasional scouring of the sky).

Occasional displays of white arcs seen — at 12 midnight.

J. S. Dennis

Note:- No arch was visible in the north though streamers were active at times.

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Meteorological Notes.

January, 1889.

1, 8.0 P.M. Clear; no aurora; zodiacal light visible.

1, 10.2 P.M. Day clear and cool; evening clear at first, becoming rather cloudy; no aurora seen.

3, 10.9 A.M. Yesterday cloudy day and evening.

4, 5.8 P.M. Yesterday cloudy, clear towards night; evening clear; zodiacal light seen about 7.5 P.M.; no aurora seen.

5, 11.2 A.M. Yesterday rather warm and clear; thick haze in the evening.

6, 11.9 A.M. Yesterday cloudy day and evening; rain today.

8, 8.0 P.M. Yesterday and previous day cloudy with some rain, most of it on Jan. 6; today clear and warm, now rather cloudy; no aurora seen.

9, 10.8 A.M. Yesterday evening mostly cloudy, clear about 11 P.M.; no aurora seen. This morning rather cloudy, warm.

10, 10.7 A.M. Yesterday cloudy and warm, with some rain; strong south wind in the evening. This morning clear.

10, 11.2 P.M. Day and evening clear and cool; moonlight; no aurora seen.

11, 10.5 A.M. This morning clear and cool; wind N.W.

11, 10.6 P.M. Day mostly clear; clouds very frequent in the evening; no aurora seen; moonlight.

12, 10.7 A.M. Cool, nearly clear, wind W.

12, 11.0 P.M. Day and evening clear and cool; no aurora seen.

13, 11.5 A.M. Clear, cool, nearly calm.

13, 10.3 P.M. Day clear till about 8 P.M., then becoming cloudy; moonlight; no aurora seen.

14, 10.7 A.M. Light south wind; cloudy and chilly.

14, 11.2 P.M. Day becoming clear; evening clear; moonlight; no aurora seen.

15, 11.1 P.M. Day and evening clear; no aurora seen.

16, 10.8 A.M. Mostly cloudy; light S.W. wind.

17, 10.5 A.M. Yesterday cloudy; a little rain in the evening and ~~to~~ today.

17, 11.3 P.M. Day cloudy and warm with some rain; evening mostly clear and warm; no aurora seen; moonlight.

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January 1889

18, 10.8 A.M. Clear, cool, light N.W. wind.
18, 10.8 P.M. Day and early evening clear; zodiacal light visible before morning; no aurora seen; cloudy after 10 P.M.
19, 11.4 A.M. Nearly clear, cool; wind moderate, N.W.
19, 6.6 P.M. Zodiacal light visible.
19, 11.2 P.M. Day and evening clear, rather cold; no aurora seen.
20, 12 M. Rather clear and cold; light N.E. wind; extensive thin clouds.
21, 12.1 P.M. Yesterday rather clear with increasing clouds; snow in the evening and later; rain early today; now cloudy without rain.
21, 11.5 P.M. Day becoming clear; evening clear, rather cold; some clouds now; no aurora seen; zodiacal light visible at 8 P.M. and previously.
22, 10.8 A.M. Clear rather cold; moderate wind, W.
22, 10.8 P.M. Day clear; evening clear at times, partly hazy and cloudy; no aurora seen; zodiacal light visible about 6½ P.M.
23, 10.7 A.M. Nearly clear, cool; wind light, S.W.
23, 11.2 P.M. Day and evening clear; zodiacal light visible 6 to 8 P.M.; no aurora seen.
24, 10.1 P.M. Day rather clear, becoming cloudy and warm; evening cloudy.
25, 12.0 M. Clouds thin in the latter part of the evening yesterday; clear today.
26, 2.0 P.M. Yesterday afternoon and evening clear; no aurora seen; zodiacal light visible. ~~Thus far~~ Today cloudy, clouds rather thin, now somewhat thicker.

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January 1889

26, 10.5 P.M. Cloudiness increasing, somewhat diminishing after sunset and again increasing; now somewhat clear, but northern sky still cloudy.

27, 11.2 A.M. Cloudy and chilly, with some rain.

27, 9.0 P.M. Day and evening cloudy with a few snowflakes at times and some rain.

28, 10.9 A.M. Rather cloudy, moderate wind, W.

28, 10.5 P.M. Day and evening cloudy.

29, 11.8 A.M. A little snow early; thin clouds later.

29, 11.3 P.M. Afternoon and evening clear; zodiacal light visible; no aurora seen.

30, 10.9 A.M. Rather cold; thin clouds.

30, 11.3 P.M. Afternoon became clear; evening nearly clear; no aurora seen.

31, 10.9 A.M. Yesterday evening zodiacal light visible. This morning cloudy.

31, 10.2 P.M. Day beginning clear; evening partly clear, with frequent thin clouds and haze; zodiacal light visible; no aurora seen.

To save time and space, the system of abbreviations employed in the years 1871–1876 will be resumed, with additions to the list of small letters and changes as well as additions among the capitals. The revised list is given on the next page.

Report to Signal Service for January.

Aurora looked for every clear evening; none seen.

Zodiacal light seen on the evenings of Jan. 1, 3, 18, 19, 21, 22, 23, 25, 29, 30, 31; other evenings unfavorable to observation, owing to moonlight or clouds.

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Abbreviations.

A	aurora	a	rain, rainy
B	about	b	brisk
C	continuing, continuously	c	chilly
D	day	d	cold
E	evening	e	heavy
F	frequent	f	fog, foggy
G	night	g	gentle
H	thin	h	hot
I	sunrise	i	mild
K	thick	k	broken
L	little	l	cool
M	mostly	m	mist, misty
N	noon	n	wind, windy
O	no	o	hail
P	yesterday; PP, day before yesterday, etc.	p	partly
Q	subsequently	q	squall, squalls, squally
R	rather	r	clear
S	some, somewhat	s	snow, snowy
T	today	t	strong
U	sunset	u	sultry
V	visible	v	variable
W	white frost	w	warm
X	midnight	x	sleet
Y	sky	y	clouds, cloudy
Z	zodiacal light	z	haze, hazy.

☽ rising of moon

☾ setting of moon

yy, very cloudy; zz, very hazy, etc.

↑ north; ↗ northeast, etc.

N before noon; N after noon; so also with other letters.

10, ten A.M.; 4, 4 P.M., etc.

y< clouds increasing

d> cold increasing, etc.

☽ Moonlight.

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February 1889.

1, 12.9 yB 8.5 ; Qr, d<.
1, 11.2 Dr, Rd; Er, z<; ZV; OA.
2, 11.0 Rd; Hy.
2, 11.6 Dy, Qr; EMr; ZV; OA.
3, 11.3 cl
3, 10.3 Dr, sqB 5 ; ERr, ϕ; Qy; OA.
4, 11.0 r, Rd.
5, 10.9 Pr, Qy; EMy. Dy, a; Or.
6, 11.2 Py, Sa; Ey. Trl.
6, 11.1 Dr, d<; br←; Erd, ϕ; OA.
7, 11.0 y, Rd.
7, 11.4 Drd; Erd ϕ; OA.
8, 11.1 Hy, Rd.
9, 1.7 Py<d>; LosE. TLos, QRy, i.
10, 12.4 PEMy; Rr 11; OA. Trl.
10, 11.3 Drl; Erl; SHy; ϕ; OA
11, 10.9 y, Rd.
12, 10.6 Py, Ss; Es. Ty Los.
13, 10.9 Py, Ls; yk E. Trd.
13, 10.2 Drd; EFHy; y<; ϕ; OA.
14, 10.8 Dr, Rd.
14, 11.3 Dr, Rd; Er, Rd; ϕ; OA.
15, 11.1 cl
15, 11.4 Drl; Erl; ϕ; OA.
16, 11.1 Hy
17, 1.0 Py<; Ea; Ty.
17, 11.0 DMy; Er, QRy; ϕ; OA.
18, 6.8 Dy; Sax.
19, 10.9 d'PEy>; rX. Trl.
19, 11.2 Drl; ErRd; ZV; OA.
20, 11.0 Mr, Rd.
20, 10.7 DMr, Rd; ERr, Rd; ZV; OA.

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February, 1889

20, 10.8 Gegenschein not visible; the body of Leo is all relatively dark; Saturn is about half way from Regulus to Praesepe, and would interfere with any observation in its immediate neighborhood.

21, 11.8 rd

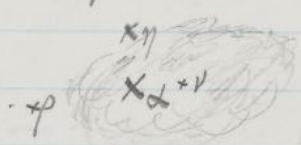
21, 10.0 Drl; Ez<; OA.

22, 11.3 Hy

22, 9.1 DSy Qz; Ez, Qy; ZV; OA.

23, 11.2 d; S Hy.

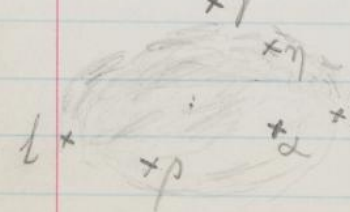
23, 11.3 DMz d; Ezd; ZV; OA. Gegenschein suspected, but very slightly; centre about ν Leonis, $9^h 51^m.8 + 13° 0'$ as in sketch.



24, 12.8 rd

24, 10.0 Dzd; EzQz; ZV; OA.

25, 11.4 LesG; Dzd; Ezd; ZV; OA. Gegenschein suspected more decidedly than on Feb. 23; centre one third of the way from ρ to γ Leonis; Mr. Wendell observing independently, suspects Gegenschein in the same region; centre 3/15 of the way from ρ to γ Leonis. The sketch represents the observation of A. Searle.



Body of Loo certainly not relatively dark on Feb. 20; it is at least as bright as the sky below, and brighter than the sky between

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February, 1889

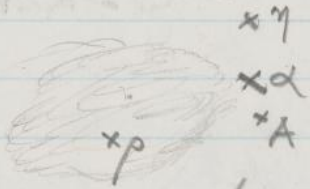
Regulus and Saturn.

ρ Leonis	10^h $26.^m5$	$+9°$	55′
γ Leonis	10 13.4	+20	27′
Gegenschein by obs. of A.S.	10 22.1	+13	26
" " " " O.C.W.	10 18.6	+16	14

26, 11.3 Rd, Shy.

28, 10.4 PP γ <; Py, Les; Ty.

28, 11.4 Dy >; Ez, Lz; ZV; OA. Gegenschein very slightly suspected; centre 1/3 of the way from A to θ Leonis.



A Leonis	10^h $1.^m5$	$+10°$	35′
θ Leonis	11 7.9	+16	5
Gegenschein	10 23.6	+12	25

Mr. Wendell, observing independently, thinks Gegenschein pretty well visible with centre 1/3 of the way from H.P. 1856 to H.P. 1874.

H.P. 1856 (46 Leonis)	10^h $25.^m8$	$+14°$	45′
H.P. 1874 (50 Leonis)	10 32.5	+16	45
Gegenschein	10 28.0	+15	25

Report to Signal Service for February.

Aurora looked for every clear evening; none seen.

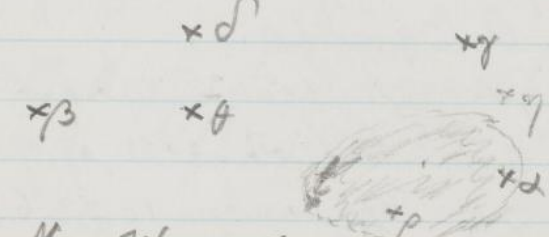
Zodiacal light seen on the evenings of Feb. 1, 2, 19, 20, 22, 23, 24, 25, 28; other evenings unfavorable to observation, owing to moonlight or clouds.

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March, 1889

1, 11.7
1, 11.6 xi.
Dxi; Ext; ZV; OA; Lz. Gegenschein rather doubtfully visible; however, it seems certain that the lower part of the body of Leo is not so dark as the upper part or as the space between Regulus and Saturn. Centre 1/3 of the way from α Leonis to θ Leonis.



α Leonis 10h 2m.0 +12° 33′
θ Leonis 11 7.9 +16 5
Gegenschein 10 24.0 +13 44

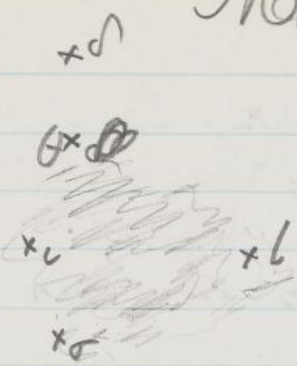
Mr. Wendell, observing previously, considered the place of Gegenschein same as last night: 10h 28m.0, +15° 25′.

2, 12.5 Rw, n<
3, 11.6 PN Ey. TRw, Hy.
4, 10.6 ~~P~~ PMy; c U, Qy. TRy, n→
5, 11.0 Py; Ey; Ta, Rc.
6, 10.9 Py; Sa; Ey; TSa.
7, 11.8 Py; Sa; Ey; Sa, Ss; TRy.
7, 11.3 Dy, ~~R~~y > U; EMr; ○; aurora slightly suspected at present over clouds in the north.
7, 11.5 Moon setting among clouds; previous suspicion of aurora not confirmed. Body of Leo darker than band below it; slight suspicion of Gegenschein with centre half way between γ and ι Leonis, but not distinguishable from band following ι and σ; ~~Zodiacal~~ rough sketch on page 9.

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March 1889



λ Leonis $10^h 42^m.9$, $+11° 11'$
ι Leonis 11 17.7 +11 11
Gegenschein 11 0.3 +11 11

8, 11.7 yl; Las
8, 10.5 Dy; Ey, Las; QSz; ϕ; OA.
9, 11.3 y, nt
9, 11,0 Dy; Ey, Qz; ϕ; OA.
10, 3.0 Gegenschein looked for at 2.5 and at 3.0; if visible, not distinguishable in the usual band between Leo and Virgo; but the forward part of Leo is certainly darker than the rear.
10, 12.1 rl
11, 10.5 pRz; Ey; Tab.
11, 11.3 Drl; Erl; ϕ; OA.
12, 11.0 Hy
12, 11.3 DRy; Ez,i; ϕ; OA.
13, 10.9 Rw, Sy
13, 10.6 DFy; Ey, QRz, Qy; ϕ; OA.
14, 10.6 y, rl.
14, 11.2 Drl; El, Sz; ϕ; OA. Faint lunar halo.
15, 10.9 y, Sc
15, 11.6 Dyc; Eyb.
16, 11.3 yl; n
16, 11.9 Dy; Ea.
17, 9.1 Dy; Sa; Sx; Ey; Lea.
18, 10.5 yl.
18, 11.3 Dy; Ey.
19, 10.5 yl.

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March 1889

19, 11.7 Dy; Ey.
20, 10.6 yl. Lsb y B 9.5
20, 10.1 Dy; Ey.
21, 10.7 yl.
21, 11.3 Dy; ERy, Fz, SHy; OA.
22, 11.1 yl.
22, 11.3 Drl; Erb; ZV; OA. Body of Leo darker than band below it; sky in Virgo too much affected by artificial light for observation.
23, 10.9 Rw; SHy
23, 11.3 DRwr; ERwr; ZV; OA. Remarks as on March 22.
24, 10.9 2 Rw.
25, 11.0 P Mrw; OA.
26, 10.7 P Sy. Er; OA.
26, 10.4 DMr; Er, Qy; ZV; OA.
27, 10.8 Rw, Sy.
28, 10.9 P yE; Ey. Ty; La.
28, 11.3 Dy; La, Ls; yE; Sz; ZSV; OA.
29, 11.0 yl
29, 10.7 DRrw; Ey.
30, 11.2 LsB5. Qrl.
30, 11.3 Drl; Erl; ZV; OA. Remarks on Leo and Virgo as on March 22.
31, 12.8 Ty, Ls.

Report to Signal Service, sent April 1, 1889.

Aurora — looked for every clear evening; none seen.

Zodiacal light — visible on the evenings of March 1, 22, 23, 26, 28, 30; other evenings mostly unfavorable to observation; no observation March 24 and 25.

Remarks — Faint, March 14, about 11 P.M.

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April 1889

1, 11.0 Ry, Ss, Qa. Ty, Sa.
1, 9.5 Dy, Sa; Eyq.
2, 11.2 Dy; ERc, Syz; ZLV; OA. zK 11
3, 11.0 yRw
3, 11.4 Dy, Sa; Ey.
4, 12.2 y
4, 10.8 Dy; Ry U, Qy, QRr; OA.
5, 11.1 Dy; EMy.
6, 10.4 Dl
6, 11.2 Dy, QRr; ERr, Sz; zK 11; Φ; OA.
8, 11.3 Ry, QRr; Ey. TSy.
8, 10.8 DMy; Ey.
9, 11.0 Rr
9, 11.3 DSy; EMr; Φ; OA.
10, 11.6 wr
10, 11.2 Dww; ERrw; Φ; OA.
11, 11.0 w, Rr.
12, 10.8 Rwy<; Ey, Twyz.
13, 10.6 Rwy, Sa; Ey, TrRl.
13, 11.1 Drl; Erl. Φ; OA.
15, 10.9 Rl; Φ; OA.
15, 11.1 Drl; ESy; Φ; OA.
17, 11.1 PRr, y<; yRy. Ty.
18, 11.0 Ry; Sa; Ty, Sa
19, 10.9 Ry; Sa; Tw, Rr.
19, 11.1 Dwr; Er; ZV; OA.
20, 11.1 r, ww
21, 10.9 Pww, y<. Occasional thunder showers day and evening.
22, 10.8 Rwy; y>; y<6; slight thunder shower about 7 P.M.; Ey, Qr; OA. TRy, Rl.
23, 11.7 Prl; Erl; ZV; OA. Trl.

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April 1889

23,	11.1	Drl; ERr, Sz; ZV; OA.
25,	11.2	PzRw; ERy, QRr, Sz; OA.
26,	11.0	PMy; Sa; Ey, Rr 11; OA.
27,	10.9	Py; Sa; Ey.
28,	11.0	Py; Sa; Sy; Ty; Ez, Soz; ZV; OA.
30,	1.7	PMy; Ey; Tsw.
30,	11.6	DMrw; Ry U; EMRr; ZV; OA.

Report to Signal Service, sent May 1, 1889.

Aurora looked for every clear evening; none seen.

Zodiacal light visible on the evenings of April 2, 19, 22, 23, 28, 30; circumstances on other evenings unfavorable to observation.

Thunder and lightning. Occasional thunder showers on April 20, during the day and evening; slight thunder shower April 21, about 7 P.M.

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May 1889

2, 11.0 PRr; ERy.

3, 10.8 PRr; Ey

3, 9.4 Dy; Ey.

6, 10.6 PR (at Newburyport) Rv b; ERy. P (at Newburyport) www v; E (at Cambridge) Rr, Sz; Φ; OA.

6, 11.5 Dr, Rw, w>; n→; ERL, Rr; Φ; OA; y< 10.5; Qy.

8, 10.9 PMRy; Ey.

8, 11.2 DRyw; ERr, z; Φ; OA.

9, 11.3 Dwv Rr; ERy, z; y>; Φ; OA.

10, 1.8 Thunder shower beginning not more than half an hour ago, accompanied by brisk northwest wind and hail; several hailstones measured by Professor Pickering half an inch in diameter.

11, 11.5 PMy; slight thundershowers towards night.

11, 11.7 Dy, y>; ERr; Φ; OA.

13, 11.1 PRyw; ERy, Qr; Φ; OA.

13, 10.5 Dr; Ey; Lda

15, 11.0 PMy; ERy

16, 2.1 PMy; ESy

17, 11.9 PRy; ERy; Lba

17, 11.5 DMr; Er; OA.

18, 10.9 Dywv; Er; OA.

19, 11.5 Dr, w; ERr, y<; OA.

21, 11.5 Ryw; rain in heavy showers day and evening.

22, 11.0 Ryw; Sa; Ey.

23, 3.2 PMy; ERy; RvBL T; QRy; OA.

24, 10.8 PMy; Ey; vB 11; OA.

24, 11.3 y, Qr; ERy, z<; OA.

25, 11.4 Rain with heavy thunder 3h & 4h A.M.

26, 5.7 PMr ERz; OA. Qya

26, 11.0 Dy; EMr, Qy; OA.

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May 1889

27, 11.0 qh
28, 11.9 Py; Sa; Ey.
28, 11.2 DMr; Er. OA.
30, 13.8 PMr; ESy; 2 H T; OA.
31, 11.0 PMy; Ey.
31, 11.4 DMy; Ey, Q Rr; OA.

Report to Signal Service, sent June 1, 1889.

Aurora looked for every clear evening; none seen.
Zodiacal light not seen.
Thunder and lightning; also hail.

May 10, 1h 50m P.M. Thunder shower began not more than half an hour ago, accompanied by brisk northwest wind, and hail: several hailstones half an inch in diameter by measurement.
May 11. Slight thunder showers towards night.
May 25. Rain with heavy thunder 3h to 4h A.M.

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June 1889

2, 11.1 Ry; Ey; aT, Qy.

3, 11.3 Ry; ERr; Qy; OA.

4, 11.2 Ry; Ey; Sa! Ty; y>N; ERr; Sy; OA.

5, 1.6 Thunder shower 11h A.M. to noon. Another coming on after 1. P.M.; puff of wind from west at 1h 30m, followed 1m later by rain and hail, heavy for 3m, then light rain. Hailstones mostly about 1/4 to 1/2 inch in diameter; longest measured 7/8 inch. Thunder preceding but not during the shower. Shower renewed, accompanied by a peal of thunder at 1h 38m.5 P.M., lasting about 3m; rain, no hail. Rain heavy again at 1h 45m P.M., ceasing about 1h 50m P.M. Occasional thunder.

6, 10.2 PRy; yHE Qy<.

7, 4.1 PRr; ERy, r1 T; OA.

8, 11.7 PRr; Ey. Sa T.

9, 11.3 Ry, Sa; ERy.

10, 10.3 PRy; Ey.

11, 10.5 Ry; Ey. Rather distant thunder and lightning 5.2 to 6.2, followed by a little rain

12, 10.5 Ry; Sa; ERy.

13, 11.2 Ry; Sa; Ey.

14, 3.3 PRr, RyBW; ERy; QRz; OA.

14, 11.5 DRhz; Ez, Qy; OA.

16, 1.7 PRy; Sa; a slight thunder shower about 5; Ey

17, 11.2 PRRr; ERy. Sa T.

18, 11.2 Ry; Sa; Ey, QRr; OA.

19, 3.2 PRrl; Ebz; Gbz; OA.

20, 11.3 PRy; Ey.

20, 11.5 DRhz; Ez; OA

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June 1889

22, 10.8 Pz Rh; Ey.
23, 3.4 Py Qz; ERz, Iz; OA.
23, 11.3 Dz; Ez; OA.
25, 11.6 PRz; z<; Ey.
25, 11.0 DMy; Ey QIz; y↑
27, 11.6 PMyu; Da; Ey.
28, 10.7 PMyu; Ey.
28, 11.2 DMyu; EMyu; much lightning without thunder in the northwest and north.
30, 2.4 Lightning continued after last record, with thunder. PRy, QRz; ERz, Iz; OA.
30, 11.3 Dhz; Ez, Iy; OA.

Report to Signal Service, sent July 1, 1889.

Aurora looked for every clear evening; none seen.
Zodiacal light not seen.
Thunder and lightning; also hail.

June 5. Thunder shower 11^h A.M. to noon. Another coming on after 1^h P.M.; a puff of wind from the west at $1^h 30^m$ P.M., followed 1^m later by rain and hail, heavy for 3^m, then light rain. Hailstones mostly $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; the longest measured $\frac{7}{8}$ inch. Thunder preceding but not during the shower. Shower renewed, accompanied by a peal of thunder, at $1^h 38.^m5$ P.M., lasting about 3^m; rain, no hail. Rain heavy again at $1^h 45^m$ P.M., ceasing about $1^h 50^m$ P.M. Occasional thunder.

June 10. Rather distant thunder and lightning $5^h 10^m$ to $6^h 10^m$ P.M. followed by a little rain.

June 15. A slight thunder shower about 5^h P.M.

June 28. Much lightning during the evening in the northwest and north, accompanied after 11^h P.M. by thunder.

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July 1889

2, 12.3 Py, QRr; EKr, y BX; OA.
3, 11.3 Py. Ea; Ey. Ty; Sa.
4, 11.5 Pyu; Sa; Ey. Ty.
5, 11.0 Pyu; ea B 3.6; QSa; Ey.
6, 1.8 PRr; Ez OA.
6, 11.2 DMr; EKr, y Hy; OA.
8, 11.2 PRy; Ey.
9, 11.7 PMy; ERy.
10, 9.6 Py; Ey.
11, 10.7 Py; Sa; Ey.
12, 10.6 Py; Sa; Ey.
12, 11.5 DMRr; EKr, y B 11; OA.
13, 11.7 DRy; EMy; Rr B 10; OA.
15, 10.6 PRy; Ey.

Report on instruments sent by request of Signal Service, July 15, 1889.

Kind of rain gauge. The present standard gauge is of the pattern recommended by the New England Meteorological Societ; diameter, 8 inches.

Position of gauge. Present position about 60 feet north of west wing of Observatory building. The nearest building to the gauge is about 22 feet northwest of it and about 20 feet high. See annexed proof [from Vol. XIX, Part I] for descriptions and places of this gauge and another previously used.

Height of gauge above ground. 1 foot.

Maker of thermometer, dry. W. Bond & Son. Position vertical, in shelter described in annexed proof [from Vol. XIX, Part I.]

Maker of thermometer, maximum. L. P. Casella. Position horizontal, in shelter described in annexed proof [as above].

Maker of thermometer, minimum. J. Green. Position horizontal, in shelter described in annexed proof [as above].

16, 1.0 Pya; Er; OA.
16, 11.5 DMr; Ez; OA; Sy

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July 1889.

17, 1.6 Thunder and a little rain 12h.2 to 12h.5.
Puff of wind from east of north at 1h 35m.
17, 11.9 A little more rain about 2. Er; OA.
19, 1.7 Pr; Er; OA.
20, 10.4 Prw; Ey; Ya
21, 12.2 Py; Ia; y > N; Er; OA.
22, 12.4 Pr; EMr, Jy; OA.
23, 12.6 PRr; ESy, y >; OA.
23, 6.4 Morning cloudy, with thunder after 11 and thunder showers later; clearing off about 5.
23, 11.6 Er; Jy; OA.
24, 11.3 Dr, Qy; Ia; MvN; ERr, Fy; OA.
25, 11.0 DRr; PEMy, Qr; OA.
27, 10.8 PMr; ERy, QRr; OA. Ja.
28, 12.5 Pa; Ey.
29, 10.6 Pr; Ev. ea B2 J.
30, 10.4 PRy; EyIaB9.5; v11; OA. A little lightning without thunder early in the evening.
30, 11.9 Dy; Ia; Eya; vB11, Qy; OA.

Report to Signal Service, sent Aug. 1, 1889.

Aurora looked for every clear evening; none seen.

Zodiacal light not seen.

Thunder and lightning. July 17. Thunder and a little rain from $\frac{1}{4}$ to $\frac{1}{2}$ an hour after noon. Sudden puff of wind from east of north at 1h 35m P.M. and a little more rain about 2 P.M.

July 23. Morning cloudy, with thunder after 11 A.M. and thunder showers later; clearing off about 5 P.M.

July 29. A little lightning without thunder early in the evening.

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August 1889

1, 10.7 Pya; Ey; aJ; ea B 9.5 F; some thunder and lightning.
1, 1.8 More heavy showers and some lightning with much thunder between noon and the present time.
2, 10.8 Pya; Ey; Jy.
3, 11.1 Pj; Ez, Jy; zK↑. Rain with thunder about 9 today and later.
4, 1.3 Pj; Ja; Ey; lightning without thunder in the evening.
4, 10.8 DMr; ERr, Jy; y<; OA.
6, 10.6 PMy, Ja; ERz, Ky; Qr; OA.
6, 11.8 Dr; 3Mr, Jy; OA.
7, 11.5 DMr; Er, Fy; OA.
9, 2.0 PRr; ERy.
10, 10.3 PRy; Ey, Ja.
10, 11.5 Dy y>; ERr Fy; OA.
11, 11.6 DL; Er; OA.
13, 12.1 PMr; Er, Qy; OA.
13, 9.7 Dy; La; Ey.
14, 2.5 Pj; Ey; Ga. Thunder about 2 AM. today.
15, 11.3 Pj; Ey; Ja.
16, 10.5 Pj; Ky; Jf.
16, 11.5 DL; Er, OA.
17, 9.9 Dr; ERr Fy; OA.
19, 12.2 PRyz; Ez Fy; OA.
20, 11.3 PRy; Ey.
20, 10.8 Dzw; Ez, Qy<; OA.
21, 11.4 DRyz; Ez; OA.
22, 11.3 Dr; Er; OA.
24, 10.8 Py; Ja 6.
24, 9.5 Dy; Ja; Qr; Er, Qy; OA.
25, 9.5 Dy, Qr; ERr, Qy; OA.
27, 11.5 Pj, Qr; EMy.

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August, 1889

27, 11.3 Dy, Qr; Er; OA.
29, 12.6 Pz; Er; Sf; Od.
29, 10.5 Dy, Qr; ERr, Sy; y < 10; OA.
30, 11.0 DRr; ERz; dA.

Report to Signal Service, sent Sept. 2, 1889.

Aurora, looked for every clear evening; none seen.
Zodiacal light not seen.
Thunder and lightning: Aug. 1; heavy rain about 9h 30m A.M.; some thunder and lightning; more heavy showers and some lightning with much thunder between noon and 2h P.M.
Aug. 3; rain with thunder about 9h A.M. and later; lightning without thunder in the evening.
Aug. 14. Thunder about 2h A.M.

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September, 1889

1, 10.5 Pw, Rz; zKE; OA.
2, 11.4 PRr; Ez, Qy; OA.
3, 9.7 Pwz; zKE; OA.
3, 11.6 Dwz; zKE; OA.
4, 10.9 DRr; ERr; OA.
6, 10.9 PRy; ERy.
7, 1.0 PRy; ERy, QRr; OA. Ty; n∧
9, 10.4 At Dunstable, Mass., PPy; Ey; Py; y>; ERr; OA.
10, 10.3 Py; Lom; Ey.
11, 10.7 Py; La; Ey; LaT.
12, 10.8 Py, La; Ey; La B 11].
13, 10.7 Py; La; Ey; yk.
14, 10.9 Py; La; Ey; La.
15, 10.9 Py; RrN; Ey.
15, 9.0 Dy, QRr; ERr, Qy; auroral light slightly suspected in the northwest.
16, 11.0 PERr B 9.5], Qy. TSr.
17, 11.1 PRy; La; EMy.
20, 11.3 19Q yu; Ey; Pal, QRr; ERr, y<; OA.
21, 10.8 PRr; Ey; La B 10].
21, 1.3 Shower with a little thunder and lightning from 12h 50m to 1h 15m P.M.
22, 10.8 PSy; Ey, Qr; OA.
22, 11.7 DKrl; Er; OA.
22, 11.8 Band from Pleiades somewhat visible; sky too bright ~~towards~~ east of the meridian to follow it well, and western part of band rather low; ~~the~~ it seems to be rather conspicuous east of 27 Piscium, with eye expansion towards the south, which may be Gegenschein; centre one-third of the way

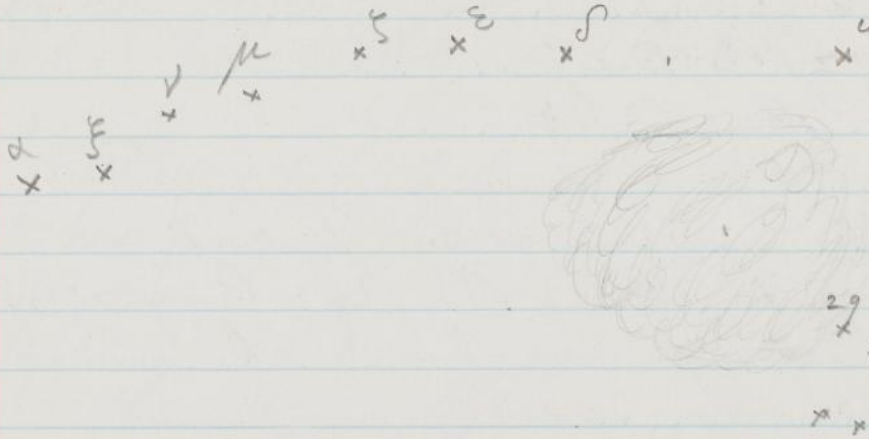
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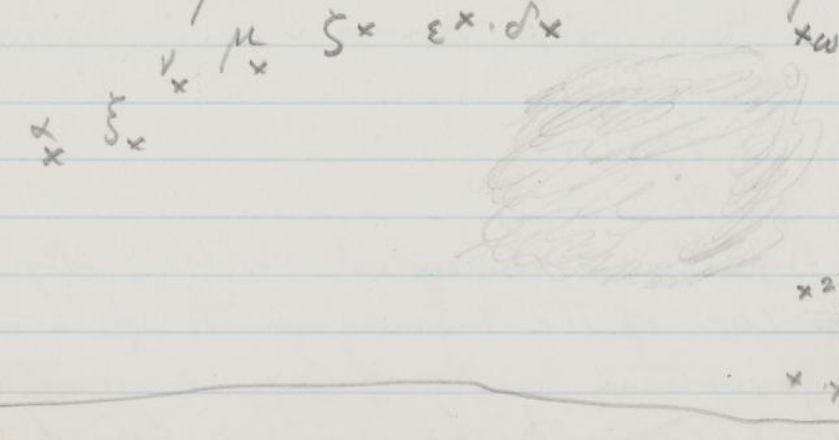
September, 1889.

from 29 Piscium to δ Piscium.

29 Pisc. $23^h\ 55^m.7$, $-3°\ 42'$ } Gegenschein $0^h\ 11^m.3$, $-0°\ 9'$
δ Pisc. $0\ 42,5$, $+6\ 56$ }



23, 11.7] Drl; Ex; O.A. Gegenschein somewhat suspected; centre halfway from 29 Piscium to δ Piscium. Effect of electric light string throughout Cetus, so that all observations must be doubtful; the band to the Pleiades somewhat visible, and apparently enlarged and brighter where Gegenschein is suspected. Position $0^h\ 19^m.1$, $+1°\ 37'$.



24, 11.4] Dr; yO< B2l; QRy, Qz; bz; O.A. Too hazy for observation of Gegenschein.

26, 10.9 Ry; Ey; La T.

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September, 1889

27, 10.8 Pz; Ia; Ez.
27, 11.0 DKrl; Erl, y < B 10.5; Qy.
29, 1.4 PNrl; ENy.
30, 12.3 PzRw; y < B 6; Ey.

Report to Signal Service, sent Oct. 1, 1889.

Aurora looked for every clear evening; auroral light slightly suspected in the northwest during the evening of Sept. 15.

Zodiacal light not seen.

Thunder and lightning. Shower with a little thunder and lightning from $12^h 50^m$ to $1^h 15^m$ P.M. on Sept. 21.

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1889phae.proj.1666C

October, 1889

1, 11.2 Pwy; Ea.
2, 11.0 Pr; RvV; Esr QRy; OA.
2, 11.5 DRr; Er, QSy; OA. Clouds between ζ Piscium and the Pleiades, rather bright from electric lights of Boston; band from Pleiades only slightly visible; Gegenschein not seen.
4, 11.3 PRyl. EMy.
4, 10.7 Dr, QRy; Ey, Qr; OA.
5, 9.7 DRy, Qr; EMy.
6, 9.6 DyRc; Ey, M.
7, 11.5 Dy; SaPE; Ty >; Er; OA.
8, 11.7 DRy; Er; OA.
9, 10.7 Dr, Qy; ERy, y <.
10, 11.7 DSy; EMr; OA.
12, 11.3 PRy; Esr, Rf; OA.
13, 11.9 PMy; Ea.
14, 11.1 Pyl; Ey.
15, 11.4 Dy; Sal; Ey; Sa.
15, 11.4 DMr; Er; OA.
16, 11.5 Dr; Er; OA.
18, 11.1 PMr; Er, Qy; OA.
18, 11.4 Dzw; Er; OA; ZSV?B8
18, 11.7 Slight haze; band from Pleiades only imperfectly visible; the region where Gegenschein was suspected in September now not relatively bright; the brightest part of the band is between μ and ο Piscium; it seems not much wider than usual if at all; centre half way from μ to ο; μ 1h 23m.9 +5° 31′
ο 1 39.1 +8 33

Gegenschein 1 31.5 +7 2

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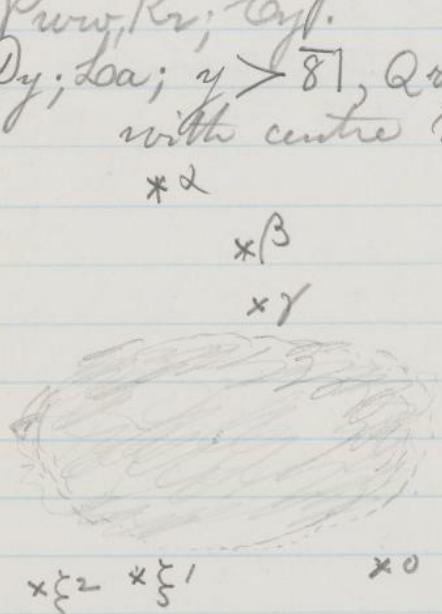
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October 1889

Mr. Wendell observing independently sees Gegenschein more extensive and with centre $\frac{6}{10}$ of the way from γ Arietis to o Piscium

γ Arietis	1h 46.m9	+18° 42′
o Piscium	1 39.1	+ 8 33
Gegenschein	1 42.2	+12 37

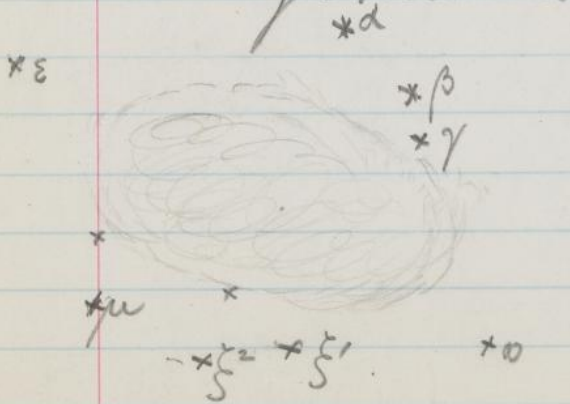
20, 12.1 | P Mz, Rw; Ey.
21, 11.0 |
21, 11.5 | Pwv, Rx; Eyf.
Dy; Lα; γ > 81, Qr, Lσ; OA. Gegenschein suspected, with centre halfway from γ Arietis to ξ¹ Ceti.



γ Arietis	1h 46.m9	+18° 42′
ξ¹ Ceti	2 6.6	+ 8 17
Gegenschein	1 56.8	+13 30

Band from Pleiades visible farther west than Gegenschein, but soon disappearing as its altitude diminishes.

23, 10.9 | PRx; Ez; OA.
23 11.4 | DSy, Erl; OA. Gegenschein rather decidedly suspected, band from Pleiades fairly distinct; centre of Gegenschein half way from γ Arietis to μ Ceti.



γ Arietis	1h 46.m9	+18° 42′
μ Ceti	2 38.5	+ 9 36
Gegenschein	2 12.7	+14 9

Mr. Wendell, observing independently, suspects a little Gegenschein with centre $\frac{1}{3}$ of the way from ξ¹ Ceti to η Piscium.

η Piscium	1h 25.m1	+ 14° 44′
ξ¹ Ceti	2 6.6	+ 8 17
Gegenschein	1 45.8	+11 30

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October 1889

25, 11.4 Pyl; Ey.
29, 11.1 Ppea; Py, La E.
30, 11.0 Py; Ey.
30, 11.7 Dy; Ey.
31, 10.7 Dy, Srki; Ey, Qa.

Report to Signal Service, sent Nov. 1, 1889.

Aurora looked for every clear evening; none seen; no observation Oct. 26.

Zodiacal light suspected on the evening of Oct. 18.

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November 1889

2, 11.3 Ry; Ey.
3 11.2 Ry, Rw; RvN; Ey.
3, 9.7 Dy Sa; y > B9; QRv; OA.
4, 9.7 DMv; EMy.
5, 11.3 DRy; EMRv; Φ; OA.
6, 11.4 DRy; EMv; yR7; Φ; OA.
7, 10.9 DRv; Ey.
8, 11.4 Dy; Ey.
10, 10.8 Ry; Soa; Ey.
10, 11.9 Dy; Sa; y > B8; Qv; Φ; OA.
12, 11.9 DRMy; Ey. TMy; RvBd; ZVB8; OA; Qy.
14, 11.2 Ry; Soa; Ey.
14, 11.6 DRv, Sy; EMv; ZVB8; OA.
15, 11.4 Dv, Rd; Ev; ZV; OA
16, 11.5 Dv, Rd; Ev; ZV; OA. Band from Pleiades now visible as far as Pisces; appearance normal.
17, 9.0 Dd; Ev; ZV; auroral light ahighly suspected near northern horizon.
17, 11.5 v; OA.
18, 10.3 DMRy; ESy, y<; OA.
19, 11.0 Dy; Sa; Ed.
21, 11.3 Ry; Sa; vBd; Ev, Qy; Sa; ZV; OA.
22, 11.9 Rv, Qy; Eya; Ty; y > B8.5; QRv, Sz; OA.
23, 11.0 Dy; ERv; d7; ZV; OA.
24, 9.9 DRy; Ey.
25, 11.6 Dy; Ey, Qv; ZSVB9; OA.
26, 8.6 Dd, Rd; y < 8; Φ; auroral arch or white cloud in the north 7P.M. and later; probably a cloud, from its unsymmetrical and at the same time persistent form.
28, 11.4 Ry; Eoa.

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29, 11.9 Pya; QRa; ESy, QRa; OA.
29, 11.0 Dsl; EMn; ☌; OA.
30, 10.9 Dsd; End; ☌; OA.

Aurora — Report to Signal Service, sent Dec. 2, 1889.
looked for every clear evening: Nov. 17; auroral
light slightly suspected near northern horizon
about 9 P.M.; Nov. 26; auroral arch or white
cloud in the north 7 P.M. and later; probably a
cloud, from its unsymmetrical and at the
same time persistent form.

Zodiacal — light seen in the evenings of Nov. 12, 14, 15, 16,
17, 20, 23, 25; observations on other evenings
hindered by clouds or moonlight.

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December, 1889.

2, 11.1 Prl; ERr; Φ; OA.
2, 9.8 DRr; Ey, Rw
3, 11.3 Dy; Ld; QLr, d<; rB8; Qrd; Φ; OA.
4, 10.2 DRy, Ls; rB11; Qy, Qr, Qy; Φ; OA.
5, 10.2 DRy; y<; Qa; Ed.
6, 11.4 Dy, y>; Er. Φ. OA.
7, 11.4 Dh; Er; Φ; OA.
9, 11.3 PMy; Ea; Ty; y>, w<; Er, Rw; ZVB 6; OA.
10, 10.3 DRr, y<; Ey.
11, 11.7 Dy; RrB11; y<Q; QRr; Φ; OA.
12, 10.3 Dr; Er Qy; ZV; OA.
13, 11.4 Dy, Qr; Er, yR7; Qrd<; ZV; OA.
16, 11.2 PPy; Ls; Ey, Ls; Py, y>; EMr; ZV; OA.
16, 11.3 Dd; EMh; Syr; ZV; OA.
18, 11.1 Py; Ey
19, 11.3 Pym; La; Eya.
19, 11.8 Dy, QRr; ERr, Sz; ZLV (haze in southwest) OA.
21, 11.7 Pr Qy; Ey.
21 11.4 Dr, d<; Erl; ZV; OA.
23, 11.0 Py, Sa; Er, Qy; ZV; OA; Tr; Er; ZV; OA.
25, 12.6 PRy; Ey; Sa.
26, 11.3 Prw; Rr; Φ; OA.
26, 9.5 DMy; La; EMydw; Lsq, B6; Φ; OA.
27, 9.7 Dr, Rd; Er; Φ; OA.
28, 11.6 Drl; Er; Φ; OA.
29, 10.4 Dy, w<; La; Ewy; La.
31, 11.7 Py, QRr; EMy; rB11; OA.
31, 11.0 Dr; Er, y<; Φ; OA.

Report to Signal Service, sent Jan. 1, 1890.

Aurora looked for very clear evenings; none seen.
Zodiacal light visible in the evenings of Dec. 9, 12, 13, 15, 16, 19, 21, 22, 23; other evenings unfavorable for observation.

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January, 1890.

2, 10.3 PMyw; Ey; TMywvw; EMy.

3, 11.7 DRr; Er, Qy, Qr; ϕ; OA.

4, 9.8 Drl; EMy; yHz; ϕ; OA.

7, 10.8 PPMy; Lea; Ey; Pyw; Lea; Ey; Ty; ERy; ZSV; OA.

8, 11.4 DMRy; ERy, Qr; ϕ; OA.

9, 11.5 DMrRnd; EMr; ZV; OA.

10, 9.6 Dy; Ss; Ey.

13, 11.5 PPyd; Sst; Ey; Pvw; Ey; Lea.

14, 11.7 Pyvwv; Lea; EMr; ZV; OA.

14, 11.4 Drl; Er, Lez<; ZV; OA.

15, 11.5 Last night, about 11.5 there was a ray or streamer of light in the northeast, pointing towards the north at an angle of about 20° with the horizon. It was not seen some time later. It may have been auroral light, but perhaps more probably resulted from some strong electric lights in Somerville or that region.

16, 11.1 PyRd; Lea; d>; Ey.

17, 11.6 Pr; Sa; Er; ZV; OA.

18, 11.4 PRr; Er, Q Sz; ZV; OA.

19, 11.5 PRy; Er, Rr, Sz; ZSV; OA.

20, 11.0 PSd; EMy.

20, 11.2 Dy; Lea; r B 8; Qr; OA; ZV.

21, 11.0 DRy; y>; Er; ZV; OA.

22, 11.5 DMrd; Er; ZV; OA.

24, 11.3 Pr; Ss; Ey.

24, 11.3 Dr, Rd; Er; ϕ; OA.

27, 10.9 PPRy; Ey; PRr y<; ERy.

27, 10.5 Dy, Ls; Er B 8; Qy<; Ls; ϕ; OA.

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January, 1890

28, 11.0 Dz Rd; E Rr; ϕ; OR.
31, 11.2 Pz Rw; Ez; Pz; Sa; Ls; Ez

Report to Signal Service, sent Feb. 1, 1890.

Aurora looked for every clear evening; none seen, except that about 11½ P.M. Jan. 14, there was a ray or streamer of light for a short time in the northeast, which may have been due to aurora, but was more probably the result of some strong electric light in that direction.

Zodiacal light visible (in the evenings of) Jan. 7, 9, 13, 14, 16, 17, 18, 20, 21, 22; other evenings unfavorable to observation.

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1889phae.proj.1666C

February, 1890.

1, [11.7] Py; Sa; Ey.

3, [5.3] PRy; Hy; Ey.

4, [12.1] Py; Ssa; Eyy.

5, [12.7] PMay; Ey; Sd.

5, [10.2] DRy; y>; Ant; EMy; SHy; Φ; OA.

6, [10.4] DMv; Rd; Ev; ZV; OA.

8, [10.8] Py; Ss; Ey.

9, [12.2] Py; Sa; Ey; vB 11; OA.

9, [11.1] Dv Rd; Ev; ZV; OA.

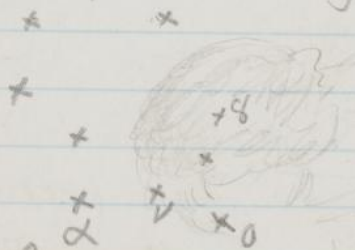
10, [11.0] Dy Rd; Ss; Ey; Ls.

11, [10.5] Drd; Ev; vB 10; ZV; OA.

12, [11.5] DMvw; EMy; ZV; OA.

13, [11.5] About [11.6] yesterday, body of Leo dark relatively to sky on all sides of it; light from Praesepe eastwards reaches apparently somewhat higher than usual, so that everything west of the line from ν to ε Leonis appears light.

13, [11.7] DvRw; Ev; ZV; OA. Appearance of Leo about as yesterday; if Gegenschein is visible, its centre may be about the place of 8 Leonis, q 9h 30m.5, +16° 59'; but its preceding limit cannot be distinguished.



15, [11.0] Pyw; Sa; Ey.

15, [10.5] DMv; Ev; ZV; OA.

17, [10.8] Pd; Ea, Lz; ZV; OA.

19, [10.7] PPMy; Ey; Py; LsE; thunder and lightning in

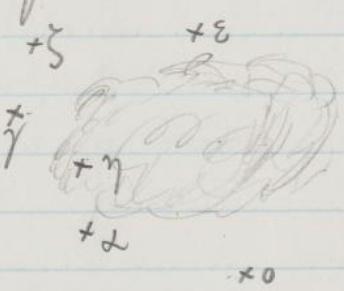
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1889phae.proj.1666C

February, 1890.

the evening, beginning with a very loud clap a few minutes after 10.

20, 12.5 Ry; Er; Qo; Ts, Q Lea.
20, 11.3 Ry; bb; Q vm Rd; Er; ZV; OA.
21, 11.2 Drd; Er; ZV; OA. Gegenschein suspected; Saturn interferes with observation; but east of Saturn and γ Leonis the body of Leo is certainly darker than the band below or than Leo Minor, while near γ Leonis and north of it the sky is even somewhat lighter than between Praesepe and ο Leonis.



Centre of suspected Gegenschein half way from ο to ε Leonis;
ο Leonis 9h 34m.7, +10° 26'
ε Leonis 9 39.0, +24 20
Gegenschein 9 36.8, +17° 23'

22, 10.2 Drd; Er, Lez; ◐; OA.
24, 11.2 Pz Rw; y < B 7.5; Q y.
25, 11.2 Ry; Ey.
26, 11.0 Ry; Sa; Ey.
27, 11.4 Rw w; E My.
28, 11.4 Ry; Ey.

Report to Signal Service, sent March 1, 1890.

Aurora looked for every clear evening; none seen.

Zodiacal light visible on the evenings of Feb. 6, 9, 11, 12, 13, 15, 16, 20, 21; other evenings unfavorable to observation.

Thunder and lightning, with snow, in the evening of Feb. 18, beginning with a very loud clap of thunder a few minutes after 10 P.M.

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March, 1890

1, 11.0 Cy; Loa; Ey; Sa.
2, 12.2 Cy; Ey; LssQ.
3, 10.3 Cy; esE.
3, 10.3 Dy; Ss; rBN; Qr; Er; Loz; Φ; OA.
5, 11.5 Cz; wL; Er; LdKy; Φ; OA.
6, 11.4 CsBr; EMy.
7, 12.6 Cy S; Ey
7, 10.5 DzKd; Er; Φ; OA.
9, 11.4 CrKd; Er; Φ; OA.
9, 9.0 Dzd; Er; ZV; OA.
11, 11.2 Crw; EKy.
12, 11.0 Cyf; Loa; Ey.
13, 11.2 Crw, Ky; EKy.
14, 11.3 CKwy; Ey.
15, 11.1 Cyk; Sa; Ey.
16, 11.0 Cy; Ss; Ey.
17, 11.0 CKy, Qy; EMy; SaB10.
17, 9.5 DMc; Cb Sy, My; OA.
18, 10.0 DKr; Er; ZV; OA.
20, 11.0 Cys; Ey, Qr; OA.
20, 11.5 DKr, Qy; Ey, Qr; OA.
21, 9.8 Dy; Lod; Ey, Qr; ZV; OA.
23, 11.9 Cy; Loa; Ey; Sa.
23, 11.7 DMy; LSs; rV, Qy; Qr; OA. Gegenschein
was slightly suspected; centre half way
from ν Leonis to δ Virginis, but preceding
limit confused with
band of Coma Berenices.

× δ
× β
× γ
× η

ν Leonis 11h 30m.8, −0° 10′
δ Virginis 12 49.6 +4 3
Gegenschein 12 10.2 +1 56

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March, 1890

24, 11.5 ~~RP~~ There was some thunder and lightning on the evening of March 22.

24, 9.0 About this time there was a lunar halo rather faint with two pretty well marked parasselenae, one at the northern and one at the southern intersection with the halo of the horizontal line through the Moon.

24, 9.5 Drl; Slty; Er, Sz<; ◐; OA,

26, 11.6 Ry; Sa; Ey.

27, 11.3 Ry; a B 16.5; Qy.

27, 9.3 Dsfr; Er; ◐; OA.

28, 2.0 Partial lunar halo and parasselenae seen by J. A. Dunne about 10.8 yesterday.

29, 11.7 Ry; Sax; Ey.

29, 9.5 Dy; Ey.

30, 1.5 Rc B 11.0; OA.

30, 8.7 DRr; Sy; Er; ◐; OA.

31, 12.3 ~~RB~~ PE; BX; OA.

Report to Signal Service, sent April 1, 1890.

Aurora looked for every clear evening; none seen.

Zodiacal light visible on the evenings of March 9, 18, 21; other evenings unfavorable to observation.

Lunar halo with parasselenae on March 24, about 9 P.M.

Thunder and lightning on March 22 from 7h 15m to 7h 20m P.M.; four or five flashes. [Last remark by J. A. Dunne].

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April. 1890

1, 11.4 Pr Qy; Ey; La.
1, 9.3 DMr; Er; Φ; oA.
1, 11.3 r; Φ; oA.
2, 11.5 DMr; EKr; LHy; Φ; oA.
3, 11.3 DMrw; EKr; LHy F; Φ; oA.
4, 11.8 Dy; La; EKy; LrB 8.5; Φ; oA.
5, 11.2 Drl; Er; Φ; oA.
7, 11.8 PKr; Ey; Φ; oA.
7, 11.5 Dy. La; Er; ZV; oA.
9, 11.3 PMy; Ey; La.
10, 11.5 Py; Ld; Ey;
11, 11.4 Py; Ey.
11, 11.6 DMr; Er; ZV; oA.
12, 11.2 Drl; EMyr, z<; ZV; oA.
13, 11.9 DMr; Sy Or; Er, Iz; ZV; oA.
15, 12.5 Pr Qy; Ey.
15, 11.5 DMr; Er; ZV; oA.
16, 11.6 Dr; Er; ZV; oA.
17, 11.8 Dr; Er; ZV; oA.
19, 11.9 Pr; ESy; Rr B XX; oA.
19, 11.4 Dr; Er; Qr; oA.
20, 11.3 Dr; Er; ZV; oA.
21, 10.5 DKy; EMr; Φ; oA.
22, 10.8 DKr; EKr; Φ; oA.
25, 11.2 PPKy; Ey; Py; La; Ey.
25, 10.6 Dy; La; Qr; EKr; LHy; Φ; oA.
27, 12.1 PMy; La; Ey.
28, 11.2 Py; La; Ey.
28, 11.3 DSy; EMr; Φ; oA.
29, 11.5 DKr; Er, QLHy; Φ; oA.
30, 11.1 Dr; Er, LHy; Φ; oA.

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Report sent to Signal Service, May 1, 1890.

Aurora looked for every clear evening; none seen.

Zodiacal light visible on the evenings of April 7, 11, 12, 13, 15, 16, 17, 20; other evenings unfavorable to observation.

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May. 1890.

1, 10.7 Dr, Qy; La; Ey; Sa.
2, 11.2 Dr; Eb; ∅; OA.
4, 11.5 Prw; y < e.
5, 2.8 Py; Sa; Ey; thunder shower in the following night.
7, 11.5 PRy; Sa; Py; Sa.
8, 10.8 Py; Sa; Ey.
9, 11.3 Py; Sa; Ey.
9, 10.3 Dr; Eb.
11, 11.9 Py; La; Ey.
11, 9.5 DRw; ERr; OA. Zodiacal light not visible about 8h 15m P.M., when there was still a distinctly visible twilight; visible at 8h 45m P.M.; easily visible about 9h P.M.; no longer visible with certainty at 9h 30m P.M., the brighter portions being then too low.
12, 11.3 Dr; HoyFE; Qf; OA; ZVBq. (
13, 1.5 The fog late yesterday evening was considerably above the ground, and should perhaps rather have been called cloud.
14, 10.7 PrRw; Ey.
15, 11.2 PRRy; Ed; showers in the evening, with thunder.
15, 9.8 Dy; Fa; ERMy, RrBq; ZV; OA.
16, 11.3 DRy; La; a little thunder about 4h; ERy, y>; OA.
18, 10.4 Pr, Qy; ERMy; RrB 11.5; OA.
19, 11.0 PrRl; ERr, Sy—; ZSV; OA; QRy.
19, 10.5 DRrw; ERr; Fy; ZSV; OA.
21, 11.3 Pya; Ey; Tr; Er; ∅; OA.
22, 11.4 Dy; Er; ∅; OA.
23, 11.2 Dy, QRr; ERy; OA.
24, 11.6 DRr; ERr, SHy; ∅; OA.
26, 11.5 PRrl; ERy.

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May, 1890

26, 10.5 Dy; La; Ey.
28, 11.5 Py; Sa; Ey
30, 12.5 PPy; Ey; Py; Ey.
31, 11.5 PRr; EBy; OA.
31, 9.8 DRr; Er; ☌; OA.

Report sent to Signal Service, June 2, 1890.

Aurora looked for every clear evening; none seen.

Zodiacal light visible on the evenings of May 11, 12, 15, 18, 19; other evenings unfavorable to observation.

Thunder and lightning. Thunder shower in the night following May 4; showers, with thunder, in the evening of May 14; a little thunder about 4 P.M., May 16.

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June, 1890

1, 10.8 Dr. EMr; Φ; OA.
3, 1.9 BKr; ESy; Φ; OA.
5, 11.2 PPz; Qy; Ey; Py; Sa; Ey.
6, 12.9 Py; Ey; thunder shower beginning at 8.
7, 11.1 Py; Ey; thunder shower in the evening.
8, 3.8 Py; EMy; Qr; OA.
8, 11.7 Dr; Er; OA.
9, 11.7 Dr; Er; Sz; OA.
11, 1.0 Pwz; Eyz; OA.
12, 12.1 PMy; Ey; heavy thunder shower about 5 P.M.
13, 11.2 Py; Sa; Ea.
13, 10.5 Heavy rain early, with thunder. Dy; Sa; Ey.
15, 12.4 Py; Sa; Ey.
16, 12.5 Py; ☌B 4; ERr, Syz; OA.
16, 11.4 Dr; Er; OA.
18, 11.7 Pr; Er; OA.
19, 3.2 Pr; Er; OA.
19, 9.7 Dr; Er, Qy; OA.
20, 9.5 Dr, Rr; Er; OA; zodiacal light suspected during the last ten minutes; Mars just set in a bank of clouds; sky midway from γ to θ Leonis thought to be somewhat brighter than the sky at the same altitude on each side.
22, 12.3 PRy; Ey
25, 10.5 PPRr; Ey; PRr; Ey; thunder showers before sunrise today.
26, 11.6 Pr; Er; aurora not looked for.
27, 2.2 PRr; Ey, QRr; OA.
28, 12.2 PRy; ERy; OA.
29, 1.8 Prw; Er; OA.

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June 1890

29, 11, 3] DSy; ESy; OA.

Report sent to Signal Service July 2, 1890.

Aurora looked for every clear evening except June 25; none seen.

Zodiacal light suspected June 20 about 9½ P.M.

Thunder and lightning; June 5. Thunder shower beginning at 8 P.M.

June 6. Thunder shower in the evening.

June 11. Heavy thunder shower about 5 P.M.

June 13. Heavy rain early, with thunder.

June 25. Thunder showers before sunrise.

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July 1890

1, 1.8 Pr Rh; Er; OA.
2, 1.8 PRr, Qy; Ey, Qz, Qy.
3, 11.3 PMy; Ey.
4, 11.7 PMy; EMy.
5, 11.0 PMy; Lea; EMy.
6, 1.7 PMRy; rBU; Er; OA.
7, 10.8 Pr; RRr; OA.
8, 11.2 PRr; EMy; Lea.
9, 1.4 PMr, h; Er; OA.
10, 1.4 Pr, w>; Erl; OA.
11, 10.8 PRr; Ey.
11, 11.5 DrRl; Er; OA.
14, ~~10.9~~ 11.2 PP(at Newburyport) r, Qy; Ey; P(at Newburyport) Mr; T(at Newburyport) Mr; E(at Cambridge) r; OA.
15, 9.9 Dh, Rr; EMy.
16, 11.2 DMrh; EMrf; OA.
17, 11.1 DMy; EMr; OA.
18, 11.0 Dr; Erl; OA.
20 9.8 PMy; thunder shower beginning at noon; showers with a little thunder in the afternoon; EMr; OA. TMy; Lea; Ey; OA.
21, 11.4 DRr; ERy, Qr; OA.
22, 11.7 DRr; ERr; OA.
23, 11.5 Dr; Er; OA.
27, 8.0 PPP Lr; Ey; PPy; La; Ey; Py, ea; ERy; TRr.
27, 10.8 ERr, Ly; OA.
29, 11.1 PLr; ERy.
30, 11.0 Pyu; Ey.
31, 10.8 PRrh; Ey.
31, 10.0 Dh, Rr; Thunder shower B7; EMy, Lt B 9.5; OA.

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Report sent to Signal Service Aug. 1, 1890.

Aurora looked for every clear evening, (except that no observation was made July 12 and 13); none seen.

Zodiacal light not seen.

Thunder and lightning: July 19; thunder shower beginning at noon; showers with a little thunder in the afternoon; July 31; thunder shower about 6 P.M.

Supply of stationery; 2 more envelopes left; several blanks.

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August, 1890.

4, 10.7 Weather at Dunstable, Mass., Aug. 1, 2, and 3, generally clear and warm; no aurora seen.

4, 9.5 DRrh; Er; OA.

12, 10.3 Weather at Dunstable, Mass., Aug. 5 to 10 inclusive mostly rather clear; a little rain Aug. 9 and 10; no aurora seen; Aug. 11 rather clear early; afternoon and evening, at Cambridge, rather cloudy.

13, 9.8 Pyl. Ey.

18, 9.8 Weather at Newburyport, Mass., Aug 14 to 17 inclusive, mostly clear and warm; aurora not specially looked for; thunder shower evening of Aug. 17. Today at Cambridge mostly clear and warm; evening clear; OA.

28, 10.4 Weather at Newburyport, Mass., Aug. 19 to 27 inclusive, mostly rather clear; some heavy rains; ~~today at Cambridge~~ aurora not specially looked for. Today at Cambridge mostly clear and warm; evening clear, with some thin clouds at present; OA.

29, 11.2 DRrw. Er. OA.

30, 11.1 DRy; a13T; QRr; Er; OA.

31, 10.4 Dr, QRy; MrN; ERy.

Report to Signal Service, sent Sept. 2, 1890. Observer absent from Cambridge except on the evenings of Aug. 4, 11, 12, 13, 18, 28, 29, 30, 31; no aurora or zodiacal light seen.

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September, 1890

2, 10.9 Prw; Er; OA; Trw; Er; OA.
4, 11.4 PRy; ERy; Ty QRr; Sf; ERf, Qy, QRr; OA.
5, 10.5 Drw, Rr; Ey, Qr, Rz; OA.
7, 9.5 PRr, Qy; a few E.
8, 11.1 PRr; Er; OA; Trw; Er; OA.
9, 9.8 Dy; LLa; Ey.
10, 11.2 Dy; La; Ey.
12, 10.6 Ry; La; Ey.
12, 10.4 Dyw; La; Ey.
16, 11.0 Sept. 13, 14, and 15, mostly cloudy day and evening, with occational rain; this morning heavy showers with some thunder.
17, 10.9 Ry; Ey.
18, 10.4 Ry; Sal; Ey; Sa.
18, 11.4 Dy; y>; Er; OA.
19, 9.9 Drw; Er; OA.
20, 9.8 Dy; QRr; Er; OA.
22, 10.0 Psl; Er; OA.
22, 8.8 Dy; y>BL; EMr; OA.
23, 9.6 Drw; Er; OA.
24, 10.7 Drl; Er; OA.
25, 9.6 Drl; ESly; OA.
27, 10.7 Ry Rw; Sa; Ey.
28, 10.2 Ry Rw; Ey.
29, 11.9 PRyl; ERy, Qr; OA.
29, 10.5 Drl; Er; OA.
30, 10.5 Drw; Erw; OA.

Report to Signal Service, sent Oct. 1, 1890.

Aurora looked for every clear evening; none seen.
Zodiacal light not seen.
Thunder during heavy showers in the morning of Sept. 16.

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October, 1890

1, 9.8 Drw; Er; OA.
3, 10.7 Pzkrw; Ekyz.
4, 11.2 Pyw; Sa; Ey, Qa.
5, 12.6 PMy. Sa; Ey, Sa; Qz; OA. Lightning without thunder about 7.5 P.M.
5, 9.4 DMr; EMr; auroral light among and over clouds in the north; streamers distinct and rather long, reaching an altitude of about 45° about 9h 15m PM.
6, 10.2 DRrl; EMy.
7, 10.3 Dyc; Sa. Eya.
9, 10.7 PMy; SrN; Ey.
9, 9.8 DRrl, Qy; Ey.
11, 11.4 PMy; Sa; Ey.
11, 10.8 DRy, Rw; Ey; OA.
12, 11.0 DRl; Er; OA.
13, 11.1 DzRl; Er; OA.
15, 10.9 Py; Sa; Ey; Sa.
15, 11.4 DRl; Er; OA.
17, 11.3 Prw, Qy; Eya.
18, 11.2 Py, nt; Sa; Ey; Sa; TRrw; Er, z<; OA.
19, 10.4 Dya; Eya.
21, 11.7 Pyc; Sa; Ey.
21, 11.4 Drl; Er, Ey; OA.
22, 9.9 Drl; Er, Sf; OA.
24, 11.5 Py; Ey.
25, 11.6 Pya; Eya.
25, 9.3 Dy; ERy; y Fk.
27, 11.3 Pz; Ey.
27, 10.2 Dyl; Ey, Qy>.
29, 11.7 Py; ERr, Qy; OA.

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October, 1890

30, 10.8 Pya; Ey.
31, 11.1 Rkr; Ez, Qy; OA.
31, 9.5 Dkr, Qky; Ey, Qz; OA.

Report to Signal Service, sent Nov. 1, 1890.

Aurora looked for every clear evening; results as follows:

Oct. 5. Auroral light among and over clouds in the north; streamers distinct and rather long, reaching an altitude of about 45° about 7h 15m P.M.

Zodiacal light not seen.

Lightning without thunder Oct. 4, about 7h 30m P.M.

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November, 1890.

2,	10.5	PRy; Er, Qy; OA. Ty; Ey.
4,	12.5	Pz Qy; Ey, Qz; OA.
5,	5.5	Psy; Qz; Er; OA.
5,	10.3	Dz; Er; OA.
6,	9.3	Drw; Er, SHy; OA.
7,	9.2	DRy; RrAl, Qy; z[3 9]. Aurora about 9 P.M.; diffused light among clouds in the north; streamers above; fragments of a higher arch over the streamers; at 9h 20m low arch over clouds, without streamers. Zodiacal light somewhat visible.
7,	9.8	More streamers, reaching to the pole.
7,	11.2	Bright somewhat irregular arch over clouds or dark sky.
8,	10.7	DRy; Esr, FHy; OA.
10,	11.2	Py; Ry.
10,	9.5	Drw; d<; Er; OA. Zodiacal light suspected 9]
12,	11.4	Py; Esa; Ey.
13,	11.5	Py; Ea; Ey.
14,	4.8	Pz; Er; Z[3 7]; aurora noticed 6h 30m to 7h P.M.; broken arch and streamers; Mr. Dunne saw aurora also about the midnight of ~~Oct.~~ Nov. 12–13.
14,	11.2	De; ERd, Sz; Z[3 7]; OA.
17,	11.4	PPy; Ea; Ey; Pz; Er; ϕ; OA.
18,	10.5	Pya; Eya.
19,	1.8	Pz; Er. ϕ; OA.
19,	10.2	DSy; Ea B 3.5]; ERe, Qz; ϕ; OA.
21,	4.5	Pz, d<; Er; ϕ; OA.
22,	3.5	Pz; Er; ϕ; OA. Tr, z<
22,	10.1	DSy; Ea; Er; ϕ; OA; Qy

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24, 11.4 ~~24~~ Pr; Er; ϕ; OA.
25, 11.1 PRy; Ey.
26, 11.1 PRy; Ey.
27, 11.3 PRy; ERy; ϕ; OA.
28, 11.7 PRy; Ls; ERy.
28, 9.3 Drd; Er; ZSVBG; Qϕ; OA.
30, 12.2 PRr; ERy.

Report to Signal Service, sent Dec. 1, 1890.

Aurora looked for every clear evening; results as follows:

Nov. 7. Aurora about 9 P.M.; diffused light among clouds in the north; streamers above; fragments of a higher arch over the streamers; at $9^h\ 20^m$ P.M. low arch over clouds, without streamers. At $9^h\ 50^m$ P.M. streamers reaching to the pole. At $11^h\ 10^m$ P.M., bright, somewhat irregular arch over clouds or dark sky.

Nov. 13. Aurora noticed $6^h\ 30^m$ P.M. to 7^h P.M.; broken arch and streamers. Aurora reported to have been seen about the previous midnight.

Zodiacal light seen, or suspected, in the evenings of Nov. 7, 10, 13, 14, 28.

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December 1890

1, 12.1 Pyc; Ey.
2, 10.1 DSy; Ey.
2, 8.8 Dcd; Er; ZV; OA.
4, 11.8 Pdys; d>; Ea.
4, 9.1 DMr, Rd; EMr; ZV; OA.
6, 11.0 Py, Ss; Ey, Ss.
7, 3.4 Py, Ss; Ey, Sa.
8, 11.1 PrRd; Er; ZV; OA; TMy; Ey.
9, 11.8 DMr; Ey, QSr, Rz; Qy; QRd, z>; OA.
11, 10.7 PMy; EMy.
12, 11.1 PSr; Ey.
12, 10.0 DMr, d<; Er; ZV; OA.
13, 8.7 Dcd; Er; ZV; OA; yBS.
14, 9.9 DRy; zKe; OA.
15, 11.4 Dcd; Er, QRy; Φ; OA.
17, 11.5 Py; Ey.
18, 11.3 Py; Sd; Ey; Sa.
18, 11.8 DMr; EMr, nt; Φ; OA.
19, 11.2 Dcd; Er; Φ; OA.
20, 11.3 DrRd; EMr, FHy; Φ; OA.
22, 11.0 Py; Sa; EMy.
22, 11.3 DMrl; EMr; SHy; Φ; OA.
23, 11.2 Dr, Qy; Ey, Sa, Qr; Φ; OA.
25, 12.5 PMr; Er, Qy; Φ; OA.
26, 11.5 Prd; Er, z<; Φ; OA.
27, 11.4 Ps; Ea.
27, 9.8 DRy; Er, Qy; Φ; OA.
28, 11.3 DrRd; Er, QSHy; ZV; OA.
29, 11.3 DRd, y; Qr; Er, QRy, Qr; ZV; OA.
31, 11.1 PMy; Ey; Sa.
31, 10.5 Dy, QRr; Er, y←, Qy; OA.

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Report to Signal Service, sent Jan. 1, 1891.

Aurora looked for every clear evening; none seen.

Zodiacal light seen on the evenings of Dec. 2, 4, 8, 12, 13, 28, 29; observation on other evenings hindered by clouds or moonlight.

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January, 1891

3, 12.3 | PPy; Ls; Ey; Py; Sa; Ey.
3, 11.4 | Dy, Qr; d<; Er; ZV; OA.
5, 11.1 | Py; Ey.
6, 11.4 | Pd; Ss; Ky; Ls.
6, 10.0 | DKr, QRy; Ls; ERy, Ly.
7, 11.4 | DMoy; Ey, Qr; ZV; OA.
9, 10.6 | Pr; Er; ZV; OA; Tr; QHy; ERr; y<.
10, 11.3 | Drl; Er; ZV; OA.
12, 11.3 | Py; Sa; Ey; Sa.
13, 11.7 | Py, Qr; Er; ZV; OA.
13, 10.9 | DrRd; Er, QRyz, Qr; ZSVΦ; OA.
15, 6.5 | PMy; Ls; EMy; Φ; OA.
15, 10.7 | Dr; EHy, Qr; Φ; OA.
16, 10.8 | DMr; Er, QFy; Φ; OA.
18, 12.5 | Py, sx; Eya.
19, 10.7 | Pr; Las; Ey.
19, 10.0 | Dy; Ey.
20, 10.4 | Dry, Qr; Er, y B10; Φ; OA.
21, 11.4 | Dyi; Ey.
22, 11.7 | Dywa; Ey >, My.
23, 10.8 | Dr, Rw; Er, Qr; Φ; OA.
24, 10.0 | Dr, Rw; Er, Qy; Φ; OA.
25, 10.0 | Dis; y > B 2; QRr; Er; Φ; OA.
26, 11.2 | Dyl; EMr, Ey; Φ; OA.
28, 11.2 | Pr; Ey Ls; Ey.
29, 12.5 | Pr, Qy; Ey. TLs, QLa.
30, V0.8 | PEy Q.
30, 11.1 | DrRw; Er, Fy; ZV; OA.

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Report to Signal Service, sent Feb. 2, 1891.

Aurora looked for every clear evening; none seen.

Zodiacal light seen on the evenings of Jan. 3, 7, 8, 10, 12, 13, 30;
other evenings unfavorable to observation.

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February 1891

1, 1.7 Pr; Sa Er; Tr

2, 10.9 Pr Ry; Er; ZV; OA.

2, 11.3 DSy; Er; ZV; OA.

4, 11.2 Py. Sa; Ey.

4, 10.7 DRy, d<; Er; ZV; OA.

5, 9.4 Dr; d>; Ez<; ZV; OA,

6, 11.1 Dy; Lsa; Er, Qzy; ZV; OA.

8, 11.8 PRy; Es; Ts.

8, 11.5 Ds; y> 36; ERr, Sz; ZLV B 8.5; aurora slightly suspected about 8.5, but electric light and haze made its presence doubtful.

10, 11.7 Py s, QLa; Ey, La.

10, 11.5 Dy, Qr; Er; ZV; OA.

11, 10.5 Dr; Er; Φ; auroral arch now suspected.

13, 11.1 Pr; Qy; Ey.

13, 11.2 DRr; Er; Φ; OA.

14, 10.9 Dr, d<; End; Φ; low auroral arch, sky dark below, for a time about 10, with some streamers.

16, 10.6 Pr; Ey; Tyw; Eyw.

18, 11.2 Py; Ld; Oy

18, 11.0 Dy, QRr; Er; Φ; OA.

19, 10.9 DRr; ERr, Sy; Φ; OA.

20, 11.6 Dys; Ey, Ts.

21, 11.5 Dr; Ld; Ey; La

22, 10.8 DRr; Er; Φ; OA.

23, 10.7 Dr; Er; Qy; Φ; OA

24, 9.1 DSy; ERr; Qy; Φ; OA.

26, 11.3 Pyw; La; Eyw; Ea.

27, 11.7 Py; La; Ey; Ls. Tys, QRr.

27, 11.0 DRr; Er; ZV; OA.

28, 9.4 DRr; Es.

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Report to Signal Service, sent March 2, 1891.

Aurora looked for every clear evening; results as follows:

Feb. 8. Aurora slightly suspected about $8^h 30^m$ P.M., but electric light and haze made its presence doubtful.

Feb. 11. Auroral arch suspected at $10^h 30^m$ P.M.

Feb. 14. Low auroral arch, with some streamers, for a time about 10^h P.M.; sky dark below.

Zodiacal light visible on the evenings of Feb. 1, 2, 4, 5, 6, 8, 10, 27; circumstances unfavorable to observation on other evenings.

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March, 1891

1, 9.8 | DKdr; Er; ZV; OA.
2, 10.7 | Drd; Er, Qszy; ZV; OA.
3, 11.4 | Dr, Ss; Ey, Las.
5, 11.4 | Res; Ess.
5, 11.8 | DMr; EMr; ZV; OA.
6, 11.8 | Drl; Ey.
7, 10.3 | DMri; Erz, Sz; ZV; OA.
8, 9.2 | DMri; Ey.
10, 11.1 | Py, Loa; Ey, Sa.
10, 10.7 | Dri; Er; ZV; OA.
11, 10.1 | Dri; EHy, Q Sz; OA.
13, 11.1 | Py; ESa.
14, 11.6 | Py; Loa; Ey, Loa, Q r; OA.
14, 11.1 | DKy, Q Kr; EMr; Q; auroral ~~arch~~ arch now suspected.
16, 10.6 | PKy; EKy; TMr; Sy; Las; Er; Q; OA.
17, 10.7 | Dr; Ez, SHy; Q; OA.
18, 11.0 | DSy; EMy, Sy H.
19, 11.4 | Dy, Los; SKy, r; Q; OA.
20, 9.5 | Dy; Ey.
21, 10.3 | Dya; Eya.
23, 11.1 | Py; Ey; Ty Loa; Ey, Sa.
24, 9.5 | Dy; Sy.
25, 10.1 | Dri; Er; Q; OA.
26, 10.6 | Dri; Er; ZV; OA.
27, 10.0 | DSy; Ezc, Sy; OA.
29, 11.5 | PDy; Ey.
29, 11.4 | DKr; Esz, Qr; ZSV; OA.
30, 10.9 | DMr; EKr; ZV; moderate aurora all the evening; arch, sky at times dark below, and some streamers.
31, 11.0 | Dr, yc; EHy.

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Report to Signal Service, sent April 1, 1891.

Aurora looked for every clear evening; results as follows:
March 14. Auroral arch suspected about 11h P.M.
March 30. Moderate aurora all the evening; arch, sky at times dark below, and some streamers.

Zodiacal light seen on the evenings of March 1, 2, 5, 7, 10, 26, 29, 30; on other evenings circumstances unfavorable to observation.

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April, 1891.

1, 10.9 DMr; Er, y<; ZV; OA.
2, 11.0 DMy; Ey; Qa.
3, 11.4 Dy; Sds; Ey.
4, 9.0 Dy; Ey.
5, 10.5 DKr; Esz; OA.
6, 11.3 DRy; Ey; Qz; OA.
7, 9.6 Dr; QRy; EMy.
8, 11.3 DMr; Er; ZV; some aurora.
9, 10.2 Dr; Er; ZV; OA.
10, 10.3 DRy; y< E.
12, 9.0 Ry; Sod; Ey; Ty; Ey.
13, 10.3 Drw; Er; Φ; OA.
14, 11.4 Dw, y<; Ey.
15, 10.6 Dy; Ey.
16, 11.1 Dy; Ey, Qr; OA.
17, 10.9 DKr; RSy; y<.
18, 10.7 DKr; Ey; thunder shower after 8 P.M.
19, 11.3 DRr; RMy, Sz; OA.
20, 11.4 Dr; Ey.
21, 9.8 Dr; Er; Φ; OA.
22, 9.2 Drw; EKrw, Φ; OA; Qy.
23, 11.7 DRyw; Ey.
24, 10.6 DMr; Er; Φ; OA.
25, 11.5 Dy; Esa; EMr; ZV; OA.
26, 9.8 DKr; Er, y<; OA.
27, 10.4 Drw; Er; ZV; OA.
28, 10.7 DMr; EMr; no observation ↑Z; ~~OA~~ aurora now suspected.
29, 11.3 Dr; Er; ZV; OA.
30, 10.4 Dr, Rz; Esz, Rr; OA.

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Report to Signal Service, sent May 1, 1891.

Aurora looked for every clear evening; results as follows:
April 8. Some aurora this evening.
April 28. Aurora suspected about 10h 40m P.M.

Zodiacal light seen on the evenings of April 1, 8, 9, 25, 27, 29;
no observation April 28; other evenings unfavorable
to observation.

Thunder shower after 8h P.M. April 18.

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May, 1891

1, 11.7 DRyw; EMr; ZV; OA.
2, 11.1 DMr; Er; ZV; OA.
3, 11.7 Dy; Sa; EMr; ng observation of Z; OA.
4, 11.4 Dr, QRy; Er, Rz; OA; faint aurora now thought to be visible.
5, 10.9 Dy, Rd; Ey.
6, 11.9 DMy; Ly; Er; Qy; ZV; OA.
7, 11.5 DRy; Er; Qy; OA.
8, 10.9 DRyw; Ey.
9, 9.5 Dy, Rc; Ey.
10, 10.7 Dyw; Er; ϕ; OA.
11, 10.8 Dw, Rz; Ez; ϕ; OA.
12, 11.6 DMyl; Sa; Ey.
13, 11.0 Dr, Rw; Er; ϕ; faurora now and for some time previously; irregular arch, with slight appearance of streamers.
14, 11.3 DRr; ERy, g H.
15, 11.4 DRr; Ey, Sa.
17, 9.0 Pya; thunder before sunrise; Eya; Tyl; Er; ϕ; OA
18, 11.3 DMRy; Sa; ERz, Fzy; ϕ; OA.
19, 11.0 DRr, Ez; ϕ; OA.
20, 11.6 Dw, Sy; Ey.
21, 11.7 Dy, Sa; Ey.
22, 9.9 Dy; ~~Dw~~ Sa; Ey.
23, 10.9 Dyl; Er; ϕ; OA.
25, 11.7 PRr; ERy; TRr; Eyz; ϕ; OA.
26, 9.7 DMy; Sa; ERy
27, 11.3 DRy; ERr; ZOV (twilight); OA.
28, 11.4 DMr; Er; ZOV (twilight); OA.
29, 11.6 Dy; Sa; Ey.
30, 11.0 Dy, Rw; Ey.
31, 10.8 Dy; Er; yH; Qyz

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Report to Signal Service, sent June 1, 1891.

Aurora — looked for every clear evening; results as follows:
May 4. Faint aurora thought to be visible about 11h 25m P.M.
May 13. Aurora at 11h P.M. and for some time previously; irregular arch, with slight appearance of streamers.

Zodiacal light — seen in the evenings of May 1, 2, 6; not looked for May 3; other evenings unfavorable to observation

Thunder — before sunrise May 16.

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June, 1891

1, 11.1 DRy; ERr, FHy; OA.
3, 10.7 PMRy; thunder shower about 6h 30m P.M.; Ey; Ty; Ey.
4, 11.8 Dyl; Ey, Qr; OA.
5, 10.7 DMrr; ESy; Cy MH.
6, 10.2 DRy; Ey, QHy; OA.
7, 10.9 Dy; y > N; ERr; OA.
8, 11.5 DMrw; Er; OA.
9, 11.0 DRyw; Er; OA.
10, 10.9 DMrw; ERr; OA.
11, 10.5 DRhr; ERyr; OA.
12, 10.7 Dyw, y >; ERr; OA.
13, 10.7 DRrw; ERr; OA.
14, 10.9 Drw; Er; OA.
15, 11.4 Dhr; Er; OA.
16, 11.4 Dhr; ECy; a little lightning without thunder.
19, 1.8 PPy; Lya; Ey; Sa; Pya; Ey. Ty.
19, 9.1 Dy; La E.
20, 10.8 Dy; Ey.
21, 10.3 DNy; Ey.
22, 10.0 Dyl; Ey.
23, 11.0 DRy; y >; EMr; OA.
24, 11.2 Drw; ERr, Ly; OA.
25, 10.4 Drw; Er, Sy 13 10; OA.
26, 10.8 DSy; La N; a little thunder about 5 PM; Kz E.
27, 10.2 Dyl; Ey.
28, 10.4 Dy, Rw; Ey,
30, 11.3 Py; Ey; Ty, Qr; Er; OA.

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Report sent to Signal Service, July 1, 1891.

Aurora looked for every clear evening; none seen.

Zodiacal light not seen.

Thunder and lightning as follows: thunder shower June 3, about 6h 30m P.M.; June 16, a little lightning in the evening without thunder; June 26, a little thunder about 5h P.M.

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July 1891

1, 10.0 DMrw; Er, QRy; OA.
2, 10.4 Dyw; SSa; Ey, QHy.
3, 9.4 DRy; Ey.
4, 9.8 Rain and thunder early; DRy; thunder about 1; Qr; Er, QRy; OA.
5, 9.8 DRy; ERr; OA.
6, 11.2 DMr; Er; OA.
7, 10.4 DRr, y<; SaBN; Ea.
8, 10.9 DMy; Ey.
9, 10.9 Dy:y>; Ey; OA.
10, 11.1 Dr; Er; OA.
11, 11.0 Dr; ERr, SHy; OA.
12, 9.2 DRy, Qr; Er; OA.
13, 11.2 Dr, Rh; Er; OA.
14, 11.4 DRr, y<; ERy.
16, 10.8 Py; Ea; TSy; EMr; OA.
17, 11.7 DMr; EMr, SHy; OA.
18, 9.5 Dy; Ey, Sa.
21, 11.4 PRy; Ey; Ry; Ey; TMr; EMr; Sy; OA.
22, 11.6 DRw; ERr, Sy; OA.
23, 11.8 DMr; Er, QRy; OA.
24, 10.5 Dyy; Say; Ry, Qr; OA.
25, 11.5 DMr; ESyz; OA.
26, 11.2 DrRl; Sr; OA.
27, 11.9 DMr; Er; OA.
28, 10.4 DyRl; SaE.
29, 10.9 Dy; Sa; y>10; QRr; OA.
31, 11.5 Py; Ea; Ty, Qr; Er; OA.

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Report sent to Signal Service Aug. 1, 1891.

Aurora looked for every clear evening; none seen.

Zodiacal light not seen.

Thunder July 4, early and about 1ʰ P.M.

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August, 1891.

1, 10,9 Dr, Qy; a little thunder about 6]; LaE.
2, 10,5 Dy; Qr; Er; OA.
3, 11,3 Dr; EKy, QRr, QKy; OA.
4, 11,3 Dy; Ey; Sr 11]; OA.
6, 11,2 Py; LaE; TRr; Er; OA.
7, 10.3 DRr, y<; thundershower towards night;
Ey; some lightning without thunder.
8, 11.0 Dr; Er; OA.
9, 10.6 Dr, Qy; EMy.
10, 10,9 Dr; Er; OA.
11, 9.9 Dr, Sy; EHyz; OA.
13, 11.0 Py; brisk thunder shower about 3 P.M.;
Ey; Tr; Er; OA.
14, 9.6 Dr; EMy.
15, 11.9 Dy; Sa; Ey.
16, 11.0 DRr; EMy.
17, 11.0 DRr; ERy, MHy; OA.
18, 11,1 DRyw; Ey.
19, 11.1 Drl; Er; OA.
20, 10,2 Drw; Er; OA.
26, 10.7 No obsrvations till yesterday; PERy,
26, 10,4 DRy; ERy.
28, 10.7 Dya; some thunder about 7]; ERr,
OA; Qya. Py; Ey.
29, 9.8 Dr; Ey.
31, 10.2 Py; Sa; Ey; Ty; La; Ey; La.

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Report sent to Weather Bureau Sept. 12, 1891.

Aurora — looked for every clear evening (no observations Aug. 21 to 24 inclusive); none seen.

Zodiacal light — not seen

Thunder and lightning: Aug. 1, a little thunder about 6 P.M.
Aug. 7; thunder shower towards night; in the evening, some lightning without thunder.
Aug. 13; brisk thunder shower about 3h P.M.
Aug. 28; some thunder about 1 P.M.

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September, 1891

2, 12.4 Ry; Da?; Ey.
2, 9.9 Drw; Er; OA.
3, 9.9 Drw; Er, QRyz; OA.
9, 6.5 No observations Sept. 4 to 9 inclusive; aurora (indistinct arch) at Dunstable Mass. about 9.5 Sept. 8.
9, 10.4 Er; aurora much of the evening; irregular and varying arch; previous to 10 an arch from east to west, with faint bright streamers high in the sky, forming a partial corona near α Cygni.
10, 9.7 Drw; EMr; auroral arch, at present rather distinct.
11, 10.5 Drw; ERyz.
12, 10.0 Drw; Er; OA.
14, 10.5 PSy; Ea. Tr.
14, 10.4 Dr; Ey; y>B9; Qr; OA.
15, 8.9 Dr, Qy<; Ey.
16, 8.3 DMr; EBA, QMryy; OA.
16, 10.9 Mr; Dr; OA.
17, 8.1 DMr; Ey, Qr, Qy, with distant thunder and lightning; OA.
18, 9.8 DrRh; EMy; lightning without thunder along northern horizon.
19, 10.6 DSy, Qr; Er; OA.
20 10.3 Dr; Er; OA,
21, 8.8 Dr; Er, Qy; OA.
22, 10.5 Dy; Ey.
23, 10.4 Drw; EBr, Fy; OA.
24, 11.0 Dy; y>BU; ERr, Sz; z<; OA.
25, 11.2 Dr, Rh; Er; OA.

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September 1891

26 | 11.2 | DMr, w; w>; EMr; Sy; OA.
28 | 11.4 | PRr; Ey; TMr; Er; OA.
30 | 11.4 | PMy; Ey; Sa; TRl; Er; OA.

Aurora

Report sent to Weather Bureau Oct. 1, 1891.
Looked for every clear evening, except that no observations were made Sept. 4 to Sept. 7 inclusive; results as follows;

Sept. 8. Indistinct auroral arch seen (at Dunstable, Mass.) about 9h 30m P.M.

Sept. 9. Aurora much of the evening; irregular and varying arch; previous to 10h P.M. there was an arch from east to west, with short bright streamers high in the sky, forming a partial corona near Alpha Cygni.

Sept. 10. Auroral arch, rather distinct about 9h 40m P.M.

Zodiacal light not seen.

Thunder and lightning; Sept. 17, distant thunder and lightning in the evening; Sept. 18, lightning in the evening along the northern horizon, without thunder.

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October, 1891

1, 11.2 Dr.l; Er; OA.
1, 10.0 Dr; ERr; y<; OA.
3, 11.5 Drw; Er; OA.
5, 1.2 Prw; ERy.
5, 11.1 Dr La; Qy; y> N; Esr, Ry; OA.
6, 10.9 DRyl; Ey.
7, 10.8 Dyc; Lal; Ey; La.
8, 11.4 Dy; eaJ; y> B N; Er; OA.
9, 11.4 DMrl; Er; OA.
10, 11.2 Dyf; Ey.
11, 10.2 Dyl; Ly B 7; Ey, Qr; OA.
12, 9.4 DRyl; Ey.
15, 9.3 PRy; Ea; Ry; ERr; OA; Ty; Er, OA; Q fy; Q sr.
15, 11.1 Sy; OA.
16, 11.6 Dr, Sw; Er; Qf.
17, 11.2 Dr, Sw; Er; OA.
18, 10.9 Dy, QRr; EMRy.
20, 10.7 PMy; Ey; Tya; y> B 4; Er; OA.
21, 11.0 Dy; Qr; Er; Q Ry; OA.
23, 11.0 Ry; La; Ey; Tys; Qr Rd; ERr, Q Ry; Z 8 V B 8; some light at times during the evening among clouds in the north, perhaps aurorae.
24, 11.3 Dy; Qy>; Er; Z V B 8; OA.
25, 10.6 DNr; EMr; OA.
26, 11.9 Dy; Sa La; Ey.
28, 10.5 Ry; Ey; Ty, Qr Rd; Er; OA.
29, 9.5 Dr.l; Er, Sz; y<; OA
30, 9.2 DRrw; Ezy.
31, 9.0 DRyw; ERr, y<.

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Report to Signal Service, dent Nov. 2, 1891.

Aurora — looked for every clear evening; on October 23, some light, perhaps auroral, was seen at times during the evening among clouds in the north.

Zodiacal light somewhat visible in the evenings of Oct. 23 and 24,

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November, 1891

2, 11.4 PRy; Ey; TrRd; Er; OA.
3, 11.3 DrRd; Er; OA.
4, 11.3 DrRd; Er; ZSVB8; OA.
5, 10.2 DyRc; Ey.
6, 11.2 Dy, yV; Er; ZSVB8; indistinct diurnal arch at present.
9, 10.3 PPSy; ESy, yH; OA; Py, Qz, Er, OA; Tr; Ey.
10, 11.3 Dy; LLga; Ey.
11, 11.3 Dwy; Sa; Ey, Qz; OA.
13, 11.5 PMw; Fy E; OA; Trl; Sy; EMa; ϕ; OA.
14, 11.5 DRy; EKr, Fy; ϕ; OA.
16, 2.5 Prd; Er, Qy; OA; zodiacal light somewhat visible during lunar eclipse.
18, 11.3 PRy; Sa; Ey; Ryw, Sa, nt; Ey; Tr, Rd; Er; ϕ; OA.
19, 11.3 Dr, Rd; EMk; SHy; ϕ; OA.
20, 11.2 Drl; Er; ZSVB6 and 8; OA.
21, 10.0 DRy; Ez, Qr, Qy; OA.
25, 11.4 Nov. 22 and 23, Ny; Sa; Ey; Pz; Er; ZSV; OA; TMr; EMr, Fy; yL; OA.
27, 10.8 PMy; Sa; Eya; Trl; Er; ZSVB8; OA.
29, 10.8 Py, Rw; Ey; Tyd; ESr, Hy.
30, 11.1 Dr, Rd; Er; ZSVB6.5, Ey; OA.

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Report to Weather Bureau, sent Dec. 2, 1891.

Aurora looked for every clear evening; results as follows:

Nov. 6, about 11 P.M. Indistinct auroral arch.

Zodiacal light somewhat visible on the evenings of Nov. 4, 6, 15 (during lunar eclipse), 20, 24, 27, 30; other evenings unfavorable to observation.

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December, 1891

1,	11.5	Drl; Er; OA.
2,	11.2	DSy; ERz, Mz; OA.
3,	11.3	Dr, Rw; Er; Sl; OA.
4,	11.6	Dy Rw; EMy, Sa; nt.
5,	11.2	Drl; Er; ZVB 8; OA.
6,	11.9	DMrl; EMy.
7,	9.5	Dyw; Sa; Ey, Qz; ϕ; OA.
8,	11.1	Drl; Er, SHy; ϕ; OA;
9,	9.4	DSy; EKy; OA.
10,	11.7	Dr, Rw; Er; ϕ; OA.
11,	11.0	DMz, Rw; Er; ϕ; OA.
12,	10.6	Drl; ERz, FHy; ϕ; OA.
13,	11.2	Dr Rw; Er; ϕ; OA.
14,	9.7	Dy Rw; Ey, QRz; ϕ; OA.
16,	10.0	Py; Lsl; Lsa; Ey; Ty, Qz; ERz, Qy; ϕ; OA.
17,	10.7	Drd; Erd; ZVB 6; OA.

No subsequent observations this month.

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January, 1892

1 to 15 incl. No observations.

17, 11.4 Pr Rd; Er; ZV B 6.8; OA.
19, 11.1 PRa; Sy E; Py; Sa; Ey
20, 9.4 Pya, Qs; Es; TMrd; Er; ZV B 6.5; OA
21, 9.6 DrRd; Er; ZV B 6.5; OA.
23, 11.3 PNoRr; Ey; TRr; Ey.
25, 6.9 PRr; Ey; Ty, Qr; Qy; Er, Qy; ZV B 6; OA.
25, 11.8 Sr; OA.
26, 7.5 Rd; dL; Ed, Rz; OA.
26, 9.0 Rz; OA.
27, 9.3 DRed; Sy; EMRyz; OA.
31, 10.2 Mostly cloudy with a little snow, since last entry; Trb Er; Φ; OA.

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Report to Weather Bureau, sent Feb. 2, 1892
No observations made between Dec. 18, 1891, and Jan. 16, 1892, inclusive; aurora not seen on any evening in December or January; zodiacal light seen in the evenings of Dec. 5, 17; Jan. 16, 20, 21, 25; weather generally unfavorable for observation.

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February 1892

1, 11.5 Dγl; ERγ, QRr; OA!
4, 11.1 PPγ; Pγs; Trl; Er; Φ; OA.
5, 11.3 DRγl; Eδγ, Qr; Φ; OA.
6, 9.8 Drl; ERr, MRγ; Q; OA.
9, 9.4 PPr, Qγ Lδa; Pγ Lδs; Tγ, Lδs; Er; Φ; OA.
10, 10.2 Dzl; Eγ.
12, 7.8 Pγs; TRγ, Lδs; Eδγ; Φ; OA.
13, 9.7 DrRd; Er; Φ; aurora about 7] and later, with conspicuous red light and red streamers in the northwest; probably still continuing without red light, but not distinct in moonlight.
15, 10.1 Pγ; LaRδ; Trl; Er; ZVB 6.5]; OA.
16, 10.1 Drd; Er; ZVB 6.5]; OA.
17, 10.3 Drd; Er; ZVB 6.5]; OA.
18, 10.0 Dr, d>; Erl; ZVB 6.5]; OA.
19, 9.5 DRr, γ<; Eγ.
22, 11.5 PPγ; Pγ, Lδa; Tδr; Eδγf.
27, 8.8 Feb. 23 to 26 inclusive cloudy; Tδr; Eδγ; ZVB 7.5]; OA.

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March 1892

2, 6.7 Feb. 28 and 29 cloudy. Py, Ls; Tys.
2, 11.4 Ey, Rd.
4, 10.8 Pys; Ey; Tr, Rw; Erl; Φ; OA.
5, 9.5 D Or, Rw; Erl; Φ; OA.
6, 10.3 Dr Rw; Erl; Φ; OA.
7, 9.7 Dr, Rw; Er; Φ; OA. [Aurora reported to have been seen about 8 P.M. March 6].
8, 11.5 DRr, Qy; Ls; Sa; Ey.
10, 11.8 PRy; Ey; Qr; OA; Ty; Ey, Sa.
11, 8.0 Dyn; Ls; E Ey.
12, 10.3 D My; Ey; QRr; Φ; OA.
13, 9.3 Dr Rd; Er; Φ; OA.
14, 9.2 Drd; Er, Ey; Φ; OA.
15, 9.3 DRr, Rd; E Or; ZVB7; aurora with arch and some streamers about 7 P.M. and later; not distinct after moon rose.
16, 9.0 D Rr; Er; ZVB9; OA.
17, 10.7 DRr, y<; E My.
19, 11.8 Pys, QSa; Ey.
19, 9.1 DRy, Ls, Dy>; Er; ZVB8; OA.
21, 8.7 PRr; y<; Ey; Tr, Rd; Er; ZVB8; OA.
23, 11.9 PRy; Ey; Ty, Ls; Qa; Ey.
24, 10.0 Drd; Er; ZVB8; auroral arches 8 P.M. and later, sometimes broken.
25, 11.4 Drl; Er; OA.
26, 9.9 DRr, Sy; ERr, Sz; ZSVB8; OA.

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April 1892

1, 9.6 | No observations March 27 to 31 inclusive; weather mostly clear. Tr Rw; Er; Φ; OA; slight haze about moon.

4, 10.5 | ~~PPRch; Ey; PLa; Qy; QRr, Ea~~ PRSy, Ey; PRch, Ey; TLa, Qy; QRr; Ey.

5, 10.3 | DyL; Ey.

6, 10.4 | DRyw; Qz; Er; Φ; OA.

8, 9.6 | PRdw; ERy; TSy; ERr, Qy; Φ; OA.

9, 10.4 | DMr; Erl; Φ; OA.

11, 10.4 | PRdl; ERr; Φ; TSyl; ESy, Qz; Φ; OA.

12, 10.6 | Dz QRy; EMr; Φ; OA.

14, 10.2 | PRy; EMr; Φ; OA; TRr, Qy; Ey.

18, 11.1 | PPPRr, ERy; PPMy, ESy, Qz; PRr, Ey.

18, 9.0 | DSy; ERy, QRr, QRz.

19, 10.3 | DRrl; Er; zodiacal light not noticeable about 9 | but Venus interferes with observation; OA.

20, 10.3 | DyRw; Er; ZSVB 9 |; OA.

22, 9.6 | Ry; Ey, La; Ty; La; Ey.

23, 9.7 | Dr, D'Er; extensive and quiet auroral arch now visible, sky not noticeably dark below.

24, 11.8 | DrRy; Erl; OA.

26, 6.4 | Prl; Er; rather brilliant irregular auroral arch and streamers seen about 11.8 |. Tr, Rl.

26, 10.7 | TEr; low auroral arch with streamers visible at present.

27, 9.8 | Drl, QRz; ERz, QMr; OA.

28, 11.0 | DyL; LLa; Ey.

30, 11.0 | Ry; La; EMy; TMr; Er; Φ; irregular auroral arch and streamers now visible.

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May 1892

4, 11.2 Weather: May 1, 2, 3, cloudy with some rain.
4, 8.8 Dy, Qr; Trw; Φ; OA.
6, 9.8 PRy; Ey; Th, Qy; Ey.
8, 11.6 PMrl; ERr, Sy; Φ; OA.
9, 7.0 PRy; Lba; 8Sy; TMrl;
10, 8.9 1PRr; OA; Tr, Qy<; EMy.
13, 11.2 PPy, Sa; Py, La!
13, 10.9 Sy; EMy!
15, 10.4 PPRrl; Ey, Ta.
17, 9.3 PPym; PMr; Er; OA; Trw; Er; OA.
18, 10.8 DzRw; Er; aurora all the evening, very extensive and variable, not very bright; corona at 8h 10m P.M. and at times, later.
20, 9.3 Py; Sa; Ey; Ty; Sa; Ey.
22, 11.1 Py; Sa; Ey; Ty.
23, 10.0 Py; Sa; Ey; Ty; Er Qy; OA.
26, 10.7 PPRy; Er; OA; PRr; Ey; TRy; ESz, Rz; OA.
27, 11.3 Dy; La; y> N; Er, Sz, QSy; OA.
28, 10.9 DNrw; Er; OA.
31, 11.3 PPRr, ERy; Py; La; Ey; Tyw; EMz, Sz; OA.

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Report to Weather Bureau, sent June 6, 1892.

Aurora of May 18, visible all the evening, very extensive and variable, not very bright; corona at 8h 10m P.M. and at times later.

Zodiacal light. Observations of zodiacal light this season impeded by the presence of Venus as evening star, at times when other conditions were favorable to observation.

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June, 1892

1, 9.4 Dk, Mr; Er; OA.
2, 9.7 Dk, Mr; Ey BU; EMr; OA.
3, 9.5 DMy, Lα; Ey.
5, 10.1 PSr, ERy; TRy; ESr; OA.
6, 10.0 Dfy; slight thunder shower about 5 P.M.; Er; OA.
7, 10.0 Drw; Er; OA.
9 8.2 Pr, y< ; Ey; Tya; Ey; thick fog for a few minutes about 6.5, passing from north to south.
10, 10.8 Drl; EMr; OA.
12, 12.5 PMr; ERr, Iy; OA.
13, 9.7 Phr; Er; OA; Thr; Er; OA.
15, 11.1 Phr; y B 6; thunder showers during the evening.
15, 9.9 Drw; Er; OA.
16, 9.5 Drw; Ey.
19, 8.3 PPRyh; Ey y< N; heavy thunder shower about 4; Ey; Pyh; Ey; Ty Ryh; y> BU; Esr; OA.
19, 10.2 Ey<
20, 9.0 DRy, h; y> ; ERr; OA.
21, 10.5 DRy, h, QRr; ERr, Hy; OA.
22, 9.3 DSy, Qr; ERy, y↑.
23, 8.5 DMyw; Lα; Ey.
25, 8.5 PRy, Qr; Ey, Lα; Ty; cα B4; Ey.
29, 8.4 June 26 and 27 mostly cloudy with showers; Py, y>; TRy; ERy.
30, 8.9 DRy4, Lα B5; Ey.

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Report to Weather Bureau, sent July 5, 1892.

Thunder and lightning. June 6; slight thunder shower about 5 P.M.

June 14; thunder showers during the evening.

June 17; heavy thunder shower about 4 P.M.; rainfall of an inch in twenty minutes.

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July, 1892.

1, 9.0 Dy, Rl; Sa; Ey.
3, 11.1 Pz, Qy; Ey. Tyf; Sa.
4, 10.0 Pya; Eya; Tfw; ESy.
7, 10.9 PPRa[illegible]; ERv; ERr; OA; TRr; ERr, Sy; OA.
8, 10.9 DMr; Er; OA.
9, 9.3 Dr, y<; Sa; Ey, Sa.
11, 11.0 Pr, Rh; Er; OA; TRh; Er; OA.
12, 10.5 Dh, Mr; Er; OA.
15, 10.0 July 13 and 14, at Newburyport; mostly hot and clear; Thr, Sy; EMr; OA.
16, 9.9 Drw; Sa I; Er; auroral arch now visible.
31, 10.0 No observations July 17 to 30 inclusive; weather mostly clear and hot; Tya; Ey.

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August, 1892.

1, 9.4 Dyl; Ey.
2, 9.7 Dyl; Ey.
3, 10.3 Dya, Qy; y> N; EKr; OA.
4, 9.9 DMr, Rh; EKr, y< Lightning in the north, without thunder, in the evening.
5, 10.3 Dyu; thunder showers in the afternoon; Ey>.
6, 9.3 DKy, y>; EKr; OA.
7, 9.5 DMr, Rp; Er; OA.
8, 8.7 DMy, Rh; EMy.
11, 8.2 PPh; thunder and lightning in the evening, very little rain; PKr, h; EKy; Irh, Ey.
12, 2.1 PE some thunder, more lightning, little rain; thundershowers after midnight; Iy.
18, 9.9 No observations Aug. 13 to 17 inclusive; weather generally clear. Irh; Er; OA.
19, 9.9 Dy, Qrh; Er; OA.
20, 10.6 Dy, Rl; Ey.
21, 10.3 DMr, Iy; Er; OA.
22, 9.8 Drw; Er; OA.
23, 9.6 Drw; EKy, QMr; OA.
24, 10.1 DKy; EMr; OA.
26, 10.2 Ryb, Loa; Ey; Iya; Eya.
27, 10.2 Dy, Loa; Ey, Lb.
29, 11.4 PIh; Ey; Iy, y> BL; Er, Lf; OA. About 9 S. P. Bailey and A. Scull went to the shore of Fresh Pond, (near the foundations of the ice house just pulled down which stood near Concord Avenue a little west of the railroad) to avoid the effect of electric lights as far as possible. S. P. Bailey observing as independently as possible,

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found a slight maximum of light about $\frac{3}{4}$ of the way from β Aquarii to ε Pegasi. He traced this light on the preceding side to the Milky Way, finding it pass between α and β Aquilae (so that it joins the central ring of the Milky Way between α and δ Aquilae). On the following side he traced it towards γ Aquarii. Beyond this, the effect of electric light and the presence of Jupiter in Aries prevented any definite observation. Both observers thought that if any Gegenschein was visible it should be placed in the region of γ Aquarii, but the impossibility of satisfactory observation following that region prevents any distinct conclusion. The place of γ^2 Aquarii is $23^h\ 11.^m7$, $-9°\ 50'$. The time of the observation was about 10.6. (Place of Sun $10^h\ 36.^m6$, $+8°\ 53'$.) The presence of Mars in Capricornus prevents any conclusion with regard to the relative darkness of that constellation.

31, 9.0 Ry; Cy; Ty; Sa E.

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September 1892

2, 10.0 PzRL; Er; OA; TrL; Er; OA.
5, 9.7 Observer absent Sept 3 & 4; Ty, Sa, Qr; Er; OA.
6, 9.7 Drw; Er; OA.
10, 9.7 Weather generally clear and pleasant for Sept 7, 8, 9, 10; OA.
12, 9.7 PyL, Q (at Dunstable, Mass) rRw; Tr; Er; OA.
13, 9.8 DLy, Rw; ERz, Lyz; OA.
16, 10.0 PPywa; PMr; Er; OA; TMr; ERz, Ly; OA.
17, 10.5 DMrw; Er; OA.
18, 10.5 Drw; Er, Loz; OA.
19, 10.2 DRz, yL N; Ey.
20, 10.0 DrL; Er; OA.
22, 11.3 Pz, Rw; Er; Ly. In the evening S. I. Bailey and A. Searle went to the Sharon station on the Providence R. R. to examine the distribution of light in Aquila and Aquarius. The results recorded on the spot are on a sheet of paper pasted on the opposite page. The observations were made from 8.5 to 10.0. During this time auroral light was visible over and among clouds to the north, in addition to much electric light in that direction. The sky to the south was nearly free from artificial light and favorable to observation. A little zodiacal light might be suspected following the Milky Way in Sagittarius and the preceding border of Capricornus, but the region was too low for secure observation. Mists, about the middle of Capricornus, prevented observation there. The following part of Capricornus was decidedly dark, without indication of any zodiacal light or zodiacal band. The auroral [illegible]

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from Aquila was pretty well seen. Mr. Bailey, observing as independently as possible, by looking along lines of stars transverse to the band, recognized it at successive portions of its course in conformity with previous results, obtained in former years as well as at the moment by A. Searle. (See annexed paper.) Afterwards, the Pleiades being higher, and the stars about them less, S. I. Bailey recognized the existence of the band from them towards Jupiter.

23, 10.5. PRy, w; Ey; Tyw; Ry.

26, 9.1 PPyw; Lay; Ly; Ty; Thunder shower early; Qla; Qdl; Er. OA.

27, 9.1. Dal; ERr. OA.

28, 9.2 Drkw ERr. OA.

29, 9.5 Drl; Er. OA.

30, 9.3 Drw; EMr; OA.

Report to Weather Bureau, Sept. Oct. 4, 1892.

Thunder shower early in the morning of the 26th.

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September 1892

2, 11.0 PrRl; Er; OA; Tcf; Er; OA.
5, 9.7 Observer absent Sep
6, 9.7 Drw; Er; OA.
10, 9.7 Weather generally
Sept. 7, 8, 9, 10;
12, 9.7 Pyf; Q (at Sunset
13, 9.8 DSy, Rw; ERr;
16, 10.0 PPywa; PMr;
17, 10.5 DMrw; Er;
18, 10.5 Drw; Er, Lz;
19, 10.7 DRy, y < N.
20, 10.0 Drl; Er; OA.
22, 11.3 Pr, Rw; Er; Ly.
and A. Searle
Providence, R.I.
light in Aquila
recorded on the
fasted on the
were made from
time auroral
among clouds
much electric
sky to the south
artificial light
A little zodiacal
the Milky Way
border of Capric
low for secure observation. Mabs, about the
middle of Capricornus, prevented observation there.
The following part of Capricornus was decidedly
dark, without indication of any zodiacal light
or zodiacal band.

Sept. 21, 1892
Sharon Station of Providence
line of Old Colony R.R.
Obs. J. J. Bailey and A. Searle.
8h 5m to 10h 0m
J. J. Bailey sees faint band
of Milky Way with its lower edge
about 4 Aquilae, and a little
below β Aquarii. Width of this
band in the region of 4 β Aquarii
4/10 of the distance between
10/10 and 11/10 of the distance (which is about
11° making band about 5° wide).
A. Searle estimated same width
in same region 4/10 of distance
between 11 and 10/10 of distance.
Both observers agree that
Bailey's estimates of this band
by J. J. Bailey dimmer estimated
by A. Searle. Part of the right hand
band of the Milky Way
band to the altitude of α Capricorni.
Both observers agree that
about 9h the Capricornus corner and
immediately to the N. of it

from Aquila was pretty well seen. Mr. Bailey, observing
as independently as possible, by looking along lines of stars
transverse to the band,
recognized it at
successive portions
of its course in
conformity with
previous results,
obtained in former
years as well as
at the moment
by A. Searle. (See
annexed paper.)
Afterwards, the
Pleiades being
higher, and the sky
about them less dark,
Bailey recognized
the existence of the
band from them
towards Jupiter.

23, 10.5 PRy,
w; Er; Tyw;
Ry.
26, 9.1 PPyw; Er; Ly;
Tg; Thunder shower early;
Qa; Qd; Er; OA.
27, 10.1 Drl; ERr; OA.
28, 9.2 DrRy; ERr; OA.
29, 9.5 Drl; Er; OA.
30, 9.3 Drw; EMr; OA.

Report to Weather Bureau dated Oct. 14, 1892.
Faint auroral glow seen early in the morning of Sept. 26.

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October, 1892

1, 9.1 Drw; d<; Er; OA.
3, 10.4 Rr, Rd; Er; OA; Tyd; LDa; Ey d>..
5, 6.2 Ry; Ey; Tya, Qy.
6, 10.2 RE Ry; Trl; ESy.
7, 9.9 DRyw; EMy.
9, 10.8 Rw, Ry; ERy; OA; Ty, Da.
10, 8.8 Ry; ERy; Tr Rw; Er; OA
12, 9.3 RRr, Rw; Tr, Rl; ERy.
13, 9.4 DRaw; Er, Sz; OA.
14, 9.6 Dw, Rr; Er; OA
16, 7.4 PRc Sy; Ey; Ty, Sa.
18, 12.7 Ry, ERd; TRy, y>.
19, 8.7 REy; TRyw Er. S. I. Bailey and A. Searle went to Waverly to observe zodiacal light. Arrived at field near mill pond on the cross road to Concord Avenue about 8.2. S. I. Bailey found dark space between Milky Way and δ Capricorni. Near α and β Capricorni the sky was light. This continued at the same altitude to the region of δ Capricorni. Farther on, about ε Pisc. Aust. at the same altitude, the sky was dark. All this independently observed by A. Searle who saw zodiacal light in Capricornus as usual at this season, except that Mars interfers with observation in its vicinity. Both observers tried drawing a contour line of brightness equal to that near β Capricorni, or between β and α Capricorni. According to A. S., this brightness

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was equal to that of the Milky Way half way from δ Aquilae to ζ Serpentis. S. I. B.'s observation was made at $8^h 30^m$, that of A. S. at $8^h 35^m$.

19, 9.8] Contour lines drawn by A. S. for band from Aquila, at points where light is equal to that at 27 Piscium.

Lower edge at $9^h 30^m$; upper edge at $9^h 45^m$.

19, 11.3] About 9.9] A. Searle considered light at 27 Piscium equal to that half way from ε to β Delphini; S. I. Bailey considered it equal to that at a distance from δ Delphini, along the line through α Delphini, of $1\frac{3}{4}$ times the distance from δ to α.

Both observers considered the light between ι Aquarii and β Aquarii stronger than that between β and α Aquarii; showing apparently that Zodiacal light was present in the first of these regions, in addition to the light previously present near ι Aquarii as seen last month.

Erw; O A.

20, 9.6] D Ryc; Ey. The observations yesterday evening were of light so faint that the entire contour line to be drawn had to be fixed in the mind before any record could be begun. S. I. Bailey's observation was probably affected by

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October 1892

the presence of Mars, and seems to be intended to represent detail in a small region rather than the general effect from a large region which was the object aimed at in the observation of A. Searle. S. I. Bailey considered that with such faint light no satisfactory contours could be drawn, but that no serious difficulty would be found in doing so when the zodiacal light was brighter. He reexamined the band from Aquila to the Pleiades, and while he thought it inexpedient to attempt any definite observation of it, he repeatedly found, in comparing the various portions of a line transverse to the band, from one star to another, that the sky was relatively bright in places through which A. Searle independently considered the band to pass. The presence of Jupiter prevented any attempt to observe Gegenschein, or to trace that portion of the band nearly in opposition to the Sun.

23, 1.5] PPSyc; Cr; OA; PMrw; Cr; OA; Tr, Rw.

At the place in Waverly where the observations of Oct. 19 were made, the southern sky was rather bright with electric light for 15° or 20°

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from the horizon. The place, therefore, was not as good as that at Sharon where the observations of September 21 were made, but still, except near the southern and eastern horizon, the sky was sufficiently dark for observation.

23, 9.3 DsNr; Er; OA.
24, 10.1 DNr; Rd; ErNr; OA.
25, 10.2 DNrl; Ey.
28, 6.0 Py; La; Ey; PNrl; ENr; OA; TRr; Rl.
29, 9.8 PERr; Lf; OA; Ty; La; QRr; ERr; OA.
30 " 8.9 DNrl; Er; OA.

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November, 1892

2, 10.5 PPRr, Qy; Ey; Py, Rc; Ey; Ty; La.
2, 9.5 Dy; Ey; Sm; La.
3, 8.0 Dy; La; Er; OA.
5, 6.8 Py; La; Ey; TRd, s; Q2; E2; OA.
7, 6.6 PMr, d>; Er, OA; Ty, Rw.
8, 1.9 PEy; La; TMrw
8, 6.6 Drw; w>; Er; OA.
16, 10.4 No observations since Nov. 8 till today; Ty, La; QRy; EMr; OA.
18, 10.6 Pw, Mz; Ey; OA.
19, 3.6 Pyw; Sea; Ey; TMrl.
19, 7.2 S. I. Bailey and A. Searle came to Waverly, same place as last month, arriving soon after 6. At 6h 45m made observations independently of lines of equal brightness on each side of the zodiacal light and the band to the Pleiades; the light along these lines was to be equal to that at 27 Piscium. Mars greatly impeded observation in its vicinity and the sky was affected by artificial light at least to the altitude of 2 Psc. Aust. On first arriving at the station both observers were inclined to think that twilight still hindered observation of the sky and made terrestrial objects more visible than on former occasions. (They visited the place on Nov. 17, about 6.3 as well as in Oct. 19). By 6h 30m it was dark enough for the observation

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to be attempted, as above stated; but the determination was very difficult. The entire observation had to be made without the assistance of the chart, and carried in the mind until the lantern was lighted, the chart examined, and the tracing paper adjusted. The chart employed was one from Argelander's Uranometria Nova.

22, 10.5 Evening of Nov. 19 mostly clear; OA; PPMcL; Er; OA; PKr, EKy; TMcL; EKr, Sy.

23, 9.7 DrL; EMr, Sy; OA.

23, 10.4 Counted 100 Andromede meteors between $10^h\ 6^m$ and $10^h\ 20^m$ Eastern Time. These meteors were noticeably frequent Nov. 19 and have been increasing since. Besides the 100 actually counted many more were probably seen but not directly enough in view to be certainly recognized. The meteors were mostly faint and their paths short, but some of them were as bright as stars of the second magnitude and left trains visible for 1 or 2 seconds.

24, 8.7 DrL; Er; OA. Andromede meteors looked for repeatedly between 6 and 8.5; none seen.

25, 11.1 DKr, Sy; EKr; OA.

26, 9.4 DMcL; EMy.

27, 10.0 Dy, d>; Er. Clouds prevent any observation of meteors this evening.

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November, 1892

8, 10.7 Dy; Lsa; Ey.
30, 11.0 Py; Ls; Ey; Tys.
30, 8.0 Dy, Ss; Ey, Lls.

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December, 1892

2, 6.0 Py; Ss; Ey; TKr, Qy.
2, 11.0 EMKr; OA.
3, 10.5 DKy; Ls; EKy.
4, 9.8 DKy; EMy.
5, 10.8 DrL; Er; OA.
6, 10.2 Dr, Qy; LsE.
7, 9.9 Dri; ESz, Qy; OA.
8, 10.6 Dy; Sa; Eym.
9, 10.8 DMrL; EMr; OA.
10, 11.4 Dyc; Ls; Esk, Qy; OA.
11, 10.4 DrL; Er; OA; zodiacal light pretty well seen about $7^h 20^m$ P.M. notwithstanding electric lights.
12, 10.1 DMrL; EMr, OA; Qz<.
13, 9.8 Dyc; Ey.
14, 10.5 Dy; Sa; Ey.
15, 10.8 Dy; Ey>, Qz; OA.
16, 10.5 Dr, y<; y> U; QMr; OA.
17, 10.5 DKy, y<; Ey.
18, 9.7 DKy, Ey.
20, 6.5 Py; Ey; Tys; Qz. At Waverly, $6^h 10^m$ P.M. beginnings of zod. light by S. J Bailey and A Searle; brightness represented that of χ Aquarii.
20, 10.4 End; OA. The cold, and inconvenience of recording the observations of zodiacal light this evening, obliged the observers to content themselves with a rather hasty record. The zodiacal light was easily seen in the usual conical form as far as the vicinity of Mars; Mars and Jupiter prevented any observation of its connection

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December, 1892.

with the band to the Pleiades, which could be seen however, between Jupiter and the Pleiades. S. I. Bailey estimated its position to be about two thirds of the way from ξ Ceti to α Arietis, but considered the observation uncertain and influenced by the memory of previous estimates. Although the zodiacal light was distinct, it could not be recognized for some time after the record had been made, so that, as before, the observation had to be completed before attempting any record, and carried in the mind until the tracing paper could be arranged for drawing the lines. Both observers thought, however, that the plan of recording by contour lines was practicable, and would give satisfactory results, under favourable circumstances for observation.

21, 10.0 D Ky; E bv, Rzy; O A.
22, 9.8 Dr, dK; Ex; auroral light near northern horizon slightly suspected at present.
23, 10.2 Dd, Rr; E Mr. O A.
24, 10.8 Dd, Mr; Ey; O A.
25, 10.5 Dy Rd, Ls; y > E; O A.
26, 9.9 Drd; Ex; O A.
27, 10.5 D Krd; Ey.
28, 11.0 D Rrd; E Mr; O A.
29, 9.3 Drl; Ex; O A.
30, 10.0 Drl; Ex Sl; O A.
31, 10.7 D Krl; Ky E.

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January 1893

2, 9.1 Ry, Ls; Q Sa; Eya. Fy, Q Mr; Er, Sy; Q My; OA.
3, 9.0 D Mr, d<; Er; OA.
4, 11.2 Dr Rd; Ey<
6, 10.7 Ry. Ss; Eys; Fy; Ss; E Mr; OA.
7, 8.9 D Mr, Rd; E Mr; S Ay; OA.
8, 10.7 D Mr, d<; Er; OA.
9, 11.0 Dys; Eys.
10, 10.5 D Ri; Q Ry; E Ry.
11, 10.8 D Prd; Er; OA.
12, 10.2 Dyd; Ls. E Ry.
13, 10.2 Dyd; Ls; Qrd; Er, Qy, L Ls; OA.
14, 8.7 D Mr; Rd; E Ri, Q Ry.
15, 9.7 Dyd; Ls; Ey; Ls.
16, 10.5 Drd; Er; OA.
17, 10.7 D Mrd; Er; OA; Qy.
18, 11.5 D Rd, y<; E Ry.
19, 10.9 D My, Sd; Er, Ly; OA.
20, 9.8 Dr Rd; Er; OA.
21, 9.8 Dr Rd; Er; OA.
22, 9.8 Dr Rd; Er; OA.
23, 11.0 Dyc; Ls; E My.
25, 10.9 Pyc; Ls; E My; Fy, Ls; Er; OA.
26, 11.3 D Ry, Q Ri; E M Ry.
27, 10.7 D Mr; Er, w>; OA.
28, 11.5 Dyc; Ls; Ey.
29, 9.1 Dy. Ly; w<; Ey.
30, 10.3 D M Rw; Ey.
31, 10.3 Dyl; Ls; Qy; Ey.

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February, 1893.

1, 11.0 Dyc; Ey; Lea.
2, 11.5 Py. Lea. Ey; Ty Rd; Lea; Ey, Qen; OA
4, 10.8 Dr, d<; Ek; brokn auroral arch at present.
5, 9.8 Drd; Er; OA.
6, 9.3 Dys; Qa; w<; Ey.
7, 11.2 Dy Rw; w>; ERr; OA.
8, 10.1 Dk, Rd; Er; OA.
9, 11.2 Dyl; Ey.
10, 10.7 DRwy d; Ey.
11, 10.2 DMyl; EMy.
12, 10.5 DrMrl; ERz.
14, 11.5 Pynsax; Eyxs; TMyi; EsMy.
15, 11.6 DRrw; EMr; high auroral arch now visible.
16, 10.7 DRrl; ERy, QRr; auroral light slightly suspected among clouds in the north.
17, 10.9 DyRd; Ey, Qs.
19, 11.3 PyRd, s; Ey, Qs.
20, 11.6 Py; Ey, Ss; Ty, nt, Ss; EMr; OA.
21, 11.0 DMr, d>; EMy.
22, 11.0 Dysx; Es, Qy.
24, 11.1 PSr, Qy; Ey; Tys, Qr, d<; Er; OA.
26, 10.3 PRy, Qy s; Eys; Trl; Er; OA.
27, 10.0 Dal; Er; OA,
28, 10.2 DRr, Qyc; Es.

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March, 1893

1	10.0	DrMrl; Er; OA.
2	10.1	Dzd; Er; OA.
3	10.7	Dyl; LLs; Ey.
4	10.9	Dy, 3s; Qy>, d<; Er; OA.
5	9.8	DMyd; EKy; yfc.
6	9.5	Dr, Rd; Er; OA.
7	9.8	DSyl; Er; OA.
8	10.7	DRr, Rw; ESr, y<; OA.
10	9.9	Pya; Ey; Ty; EMy.
11	11.4	Dyl; Ey; LLa.
12	8.7	Dy; Lα; Er; OA.
13	10.7	Dzl; Er; OA.
14	10.4	DRy, y<; Ey.
15	9.4	Dy, aT; LLQ; Qr, Rd; Er; OA.
16	10.8	Dr, Rd; Er; OA.
17	11.4	Dr, y<; Ey.
18	10.3	Drl; Er; OA.
19	9.8	DRr, Sy; LLs; ERr; OA.
20	11.5	Drl; Er; OA.
21	10.7	Dy; La; Qy>; Er; OA.
22	9.3	DMy; Ey; Ls.
23	11.2	Dy; Ls; Ey.
24	11.7	Dyw; Ey.
25	10.9	Dzl; EMy; faint lunar halo now visible.
26	10.5	DMyc; EKy; OA.
27	11.7	DRrd; EMr; OA.
28	10.3	Dy, Rd; LLs; Ey.
29	9.5	Drl; Er; OA.
30	10.4	DMy, Rw; LLa; EHy.
31	10.0	DMr, Rw; Er; OA.

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April, 1893

1, 11.0 Dyw; Ey Qr; OA.
2, 10.5 Drl; SMy.
3, 10.2 Dy, Rw; Ey.
4, 9.9 Dyw: Ey; SSa.
5, 10.4 Drl; RMr; Szy; OA.
8, 11.0 Pys; y>; Er; OA; PMy; Ns; Ea.
8, 11.2 Dy, wL; thunder showers after noon; Ey>; QRr; OA.
9, 10.6 Dr, Rw; ERy, Sz; OA.
11, 11.0 Py, Rc; Ey
11, 10.8 Dr, Rw; Er; aurora strongly suspected at 8] and now.
12, 10.6 DMr, Rw; Ey.
13, 10.7 Dyw; Sa; Ey.
14, 11.0 Dyw; Sa N; SEa.
15, 11.1 Dyl; Sa; Ey.
16, 10.5 Dr, QMy; Ey.
17, 10.5 Dy, Rc; Ey.
18, 11.4 Dyl, QRcw; Er; OA.
19, 9.5 Dr, Rw; Er; aurora very slightly suspected.
21, 9.7 Pyl; Sa; Ty, Sa; Qr; Ey.
22, 10.2 DMy; Sa; Ey, Qr; OA.
23, 9.8 DRy; Er; OA.
24, 10.4 DMr, Rw; EMr; OA.
25, 10.3 Dya, Qr; Er; OA.
26, 10.2 Dr, Rl; ERr; y<; OA.
28, 9.9 Pyl; Sa; Ey; TRw; Ey.
30, 9.8 Pyw; SSa; Ey; Tcw; Ey.

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May, 1893

1, 10.0 Dyl; Ea; Ey;
2, 10.5 Pyl; Ey; TyL; Sa; Ea.
4, 10.2 Dya; Ey.
7, 9.6 PPSy; Ey; PsKy; LEa; ERr; OA; Ty, Qr, ERr; aurora (and now slightly suspected).
8, 10.2 DRy; Er; OA.
9, 10.6 DRiv; ERr; OA.
11, 9.8 PRe, Rh; ENr; OA; Trh; Er; OA.
12, 10.1 Dh, Ry; ERr, Iz; OA.
14, 9.8 Pya; Ey; Ty, Qr; Er; OA.
17, 11.1 RPpr; ERr; OA; Pya; Ea; Ty, QRr; EMy.
18, 9.7 DMy, Rl; ERr; OA.
19, 9.2 DRy, QRrl; ERr, Ty; OA.
20, 9.1 Drw; Er; OA.
21, 10.9 Dhr; ERr, IHyz; OA.
22, 10.5 Dhr; EMy.
23, 10.5 Dh, Ry; EMy.
24, 10.5 Drw; Er; OA.
25, 11.2 Drw; Er, OA; Qy.
26, 9.9 Dr, Qy, Rl; Ea; Ey,
27, 10.3 Dyl; Ea; thunder shower about 8 P.M. with rain later.
28, 10.2 Dyl; QRr; ERy.
29, 10.7 DMyl; Ey.
30, 9.9 DRrl; EMy.
31, 10.8 DRyl; ERy.

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June 1893

1, 10.7 DRrw; ERr; OA.
2, 10.3 DRrw; Ey.
4, 10.5 Pyw; Sab; Ey; Tyw; ERr; OA
5, 10.5 DRhr; ERr; OA
6, 9.8 Dhr; Ey, Sa.
7, 9.6 DRyw; ERr; OA.
8, 10.1 DRwr; EMy.
11, 1.3 PPRyw; EMy(at Newburyport); Prw; Er; OA.
11, 9.1 DRyh; ERr; OA.
12, 10.4 DyRl; Ey; LoSa.
13, 10.6 DyRl; Low; Ey; Sa.
14, 10.3 Dyw; Ey.
15, 11.1 DRrh; ERc, Rr, Qy; OA.
16, 10.2 DRyl; Ey.
17, 10.9 Dyla; Ey.
18, 10.5 DRrw; Ror; OA.
19, 10.5 Drw; ERr; OA.
20, 10.3 Drh; Er; OA.
21, 10.8 Drh, lyL; Ely; OA.
22, 10.8 Dlya; Ey.
23, 10.0 Dlya; Ela.
24, 10.4 Dy, QRrl; Ey.
25, 9.9 DRrl; Ey.
26, 9.9 Dyl; ERrl; OA.
28, 9.7 Ryl; Ey; Tyl; Qr; Er; OA.
29, 9.7 Drw; ERr; OA.
30, 10.3 Dy, QRrw; ERr; OA.

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July, 1893

1, 10.2 DRr, w; ErMr; OA;
2, 10.9 DMr, Rh; ErMr; OA.
3, 9.0 DRyh; Ey
4, 10.7 DMrw; ErMr; OA,
5, 10.2 Dyw; Ey; thunder shower aftw 9
6, 10.3 DMrw Sy; Er; OA.
7, 9.8 DMr, Rh; Er; OA,
8, 8.9 DrRh; y < ; Ey; La.
10, 10.0 PMrh; Ey; Trw; Er; OA.
11, 9.0 DMrut; ERy; OA.
13, 10.2 Pr, Qy; Sa; Ey; TRow; ESy; OA.
14, 10.7 Drw; ERy; OA.
16, 10.5 PRyw; Ey; TMr, Sy; Er; OA.
17, 10.9 DRyh; EMy, La.
18, 10.7 Drh; Qy; rain with some thunder about 4 P.M.;
brisk thunder shower about 7 P.M.; Ey.
19, 10.7 DRr; La B5; Er; OA.
20, 10.5 Drw; Er; OA.
21, 10.1 Drh; Er; OA,
23, 10.6 PRy; thunder showers towards night; Ey;
TMRr; thunder shower about 3 P.M.;
La B5.5; Er; OA.
24, 9.9 DMrw; Er; OA.
25, 10.4 DRr, Qy; Sa; Ey, Sa.
26, 10.4 DRyw; occasional slight thunder showers; Ey
27, 10.5 DMrw; Er; OA,
28, 10.0 DRr, Qy; Ey.
29, 9.8 DyRw, Qr; Er; OA.
30, 10.4 DRhy; ERa, Sy; OA.
31, 9.9 DRh, MRy; Ey.

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August, 1893

1, 10.3 DMyw; EMy.

8, 12.3 No observations at Cambridge till Aug. 7, about 6; weather at Strafford, Vermont, mostly clear, showers Sunday, Aug. 6, with some thunder and lightning; thunder showers also at Cambridge afternoon of Aug. 7, evening becoming clear; OA.

8, 10.9 Dh Kr; Er; OA.

9, 9.5 Dhr; Er; OA.

10, 9.5 Dhr; Er; OA.

11, 10.7 Dhr; Er; OA.

12, 10.2 Dyw; Ey; distant thunder during the afternoon.

13, 10.5 Dh; y; Qr; Er; OA.

14, 10.7 Drl; Er; OA.

15, 11.1 Dsyw; Er; OA.

16, 10.5 Dy, Qzl; EKr; OA.

17, 11.1 Dhy; Sa; Ey.

18, 10.2 Dy; Sa; Ey.

19, 10.8 Dy; y; Ey; EKr; OA.

20, 10.2 Dhy; Sza; Ey; A

21, 11.0 Dya; Er; OA.

22, 10.3 Dyw; Er; OA.

23, 11.2 DKyw; Ey.

24, 10.3 Dyw; Sa; Ey.

25, 9.8 DKr; EMr; OA; lightning without thunder in the north.

26, 10.5 Dh, MKr; EKr; OA.

27, 10.4 Dh My; Ey.

28, 10.3 DKyw; Ey.

29, 10.8 Dyyna; Qyh>; Er; OA.

30, 11.4 Dyw; Er; OA.

31, 11.2 Dyw; Er; OA.

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September, 1893

1	11.0	Drw, Qy; Ea.
2	11.0	DRy, Qr; Er; OA.
3	10.5	DMrl; EMr; OA.
4	9.6	Drl; Er; OA.
5	W 18.	Observer at Strafford Vt.
19	9.4	PEy; LLa; TyRc; Qa; Qrw; Eh, Rf.
20	10.2	DrlRy; QrRl; Er; OA,
21	9.1	DMrl; ERr, 3'Hy; OA,
22	9.8	Dyc; QLa; w<; EMy.
23	9.8	DRrw; Qy; La; Ey.
24	10.1	DRrw; Ey.
25	9.6	Dya; w<; Ea.
26	9.6	Dyl; Ey,
27	9.5	Dyl; Ey, y>; OA.
28	10.1	Dyl; ERl; OA.
29	10.0	Dyl; La; Ey; La.
30	10.8	Drl; ERy.

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October, 1893.

1	9.5	Dyc; w<; Ey.
2	10.3	DMc, Rw; ERr, Qy.
3	10.6	DRrw; y<; Ey.
4	10.0	DyRc; Da; Fy,
5	9.8	DRrw, Qy; y> BL; Er, Lf; aurora suspected at present.
6	9.9	DRrw, QRf; EMy.
7	9.5	Dw y>; ERr; OA.
9	5.8	Pw, Rrf; ERr; OA; Tw, Rr.
9	9.6	Er; OA.
12	10.8	PPMrw; PMrw; Tw, Ez<; OA.
13	9.8	Dw, Rz, y<; Ey.
14	9.4	Dyn; Sa, rw; Q y>; Er; OA.
16	6.7	PRr; Ey, QRr; OA, Fly.
18	10.5	PPEr; OA; PRrl; Er; OA; Ty, Qr; Er; OA.
19	9.7	DRr, Qy; Ey,
20	10.1	DRrw EMy.
21	10.0	Dw, Mr; Er; OA.
22	10.0	DRrw; y<; EMy.
23	10.4	Dyw, Sa; Ea.
24	11.5	Dyw, y>; Er; OA.
25	10.3	Dw, rw>; Er; OA.
26	11.0	DRr; y<; EMy.
27	9.8	Dyc; w<; Ey.
28	10.6	Dy, Rw; ERr; OA.
29	10.1	DMrl, Er; OA.
30	9.8	Drl; Ey.
31	9.9	Drl; Er; OA.

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1893 November

1, 10,3 DMrl; Er; Sy; light, perhaps auroral, among clouds in north;

2, 9,9 Drw; EMr; perhaps a little auroral light among clouds.

3, 10,7 DMy, LLa; EMr; OA.

4, 9,7 Dy; La; Ea.

6, 9,9 PMrl; Ey; Tr, Rw; Er; OA.

7, 9,7 DMrl; ERr; Lz; OA.

9, 10,1 PMyc; Ey; TMy, EMr; OA.

10, 9,5 DyRa; Er; OA.

11, 9,8 Drl; Er; OA.

12, 10,5 Dyc; Ey.

13, 9,9 Dy, Rw; LLa; Ey; LLa.

14, 10,4 DRrl; Ey.

15, 11,4 Dyc; Ey; La; LLx; ERr; OA.

16, 10,1 Dr, Rd; Er; OA.

17, 10,5 Dr, QRy; Ely.

18, 10,9 DRr, Sy; LLa; w>; Er; OA.

19, 10,2 DMyc; Ey.

20, 11,2 Dy; Ls; QRy; Ey, Qr; OA.

21, 11,3 Dr, Qyc; Ey.

22, 9,8 Dy; Sd; Qr; Er; OA.

24, 10,7 Pyc; Ey; TMy, Qr; Er; OA,

25, 10,3 DMr, Rd; Er; OA.

26, 10,8 Drd; Er; OA.

27, 11,3 Dr; y<; Ey.

28, 8,9 Dyw; QRy; Ey, QRr; OA.

29, 10,0 DRyl; ESr, Qy.

30, 10,5 DRrl; EMr; OA.

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December, 1893

1,	10.3	Dyl; Lbas; Ey.
2,	11.3	DMrd; Er, y <; OA
4,	11.4	Pys, Qa; Eaf; Sa; Trd; Er; OA.
6,	10.3	Pys; Es; Trd; ERr, Sz; OA.
7,	11.3	DRyl; EMr; OA,
8,	11.1	DSy; ERy; QRr; OA.
10,	9.8	Pyf; Ssa; Ey; TMy; Ey, Qr; OA.
11,	10.9	DMrd; ERr, Sy; Qy; OA.
12,	9.4	Dy; Ls; Qy>; Er, Qy, Qr; OA.
13,	10.1	Drd; Er; OA,
14,	9.4	PMy; LsE; Py; Ssa; Ea; Ty, Qr; Er; OA.
18,	9.3	Dr, Rd; Er, Qy; OA.
19,	10.3	Dyi; Ss; Ey, QRr; OA.
20,	10.5	Drd; EMr; Sy; OA,
21,	10.6	DRri; ERy.
22,	9.5	Dy, Rig; Ey; Lbs.
23,	9.9	Dy, Sa; Qr; Er; OA.
24,	10.6	DRyw; ESr; OA.
25,	10.4	Dyw, Qr; Er, Qy; OA.
26,	9.9	Dfrd; Er; OA.
27,	10.2	DMrd; ERr; OA.
29,	9.7	Py, Lsa; Ey, Qr; OA; Ty, Rw; Er; some aurora 9 P.M. and later.
31,	9.7	Py, Ls; Ey, Ls; Ty, Is; Qr; Er; OA.

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January 1, 1894.

As observations of aurora are now sufficiently recorded by others at this Observatory, and, as observations of zodiacal light have ceased to be practicable in recent years owing to the continued increase in the use of electric light in this neighborhood, the principal objects of this record no longer remain. It will therefore be discontinued, except so far as special meteorological facts of interest may be noticed in this book.

1894 Feb. 24 Early yesterday evening there was visible bright auroral light, which afterwards became fainter. Messrs. Dennie and King soon after 10 P.M. observed a rapid development of the aurora, which then exhibited a well defined corona, and displayed much red light in the west and northwest.

This development of red light towards the west rather than the east has repeatedly been observed here, and seems to be the general rule, although there have been exceptions. It is desirable to know whether the same phenomenon appears in other localities.

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1999phae.proj.16666

1894 March 30. Much aurora this evening at least as early as 8½ P.M., covering most of the sky. Reddish light at times, almost exclusively in the west. Frequent formation of moderately distinct corona. Centre at $8^h 45^m$ P.M., half way from ε to μ Leonis; at $8^h 55^m$ P.M., one third of the way from ε to ζ Leonis; at $9^h 0^m$ P.M., half way from ε to ζ Leonis: at $9^h 5^m$ P.M., at ζ Leonis. The light then became more intermittent with flashes and no distinct centre appeared; but about $9^h 15^m$ P.M. when there were enough distinct streamers to form an estimate, the centre still seemed to remain at ζ Leonis. From $8^h 45^m$ P.M. to $9^h 5^m$ P.M. there was a moderately well defined dark segment west of north, top of arch about 2° west of the western side of Cassiopeia.

At $9^h 37^m$ P.M. corona again better defined; centre $\frac{4}{5}$ of the way from ζ Leonis to 54 Leonis (H.P. 1908).

One observation each was made by Mr. Dunne at Cambridge and Mr. Reed at Andover.

Obs.	Time	Place, 1880.		Place, 1894¼		Sid. time	Hour angle.	{Azimuth (west from south)}	{Zenith distance}
D.	$7^h 20^m$ P.M.	$8^h 35^m.6$	+22° 1	$8^h 36^m.4$	+21° 58	$7^h 53^m.4$	$-43^m.0$	~~330°.1~~ 332.9	22°.3
J.	8 45 "	9 42.4	+25 27	9 43.2	+25 23	9 18.7	−24.5	341.6	17.8
J.	8 55 "	9 49.3	+24 14	9 50.1	+24 10	9 28.7	−21.4	344.7	18.8
J.	9 0 "	9 54.5	+24 10	9 55.3	+24 6	9 33.7	−21.6	344.5	18.8
J.	{9 5 / 9 15} "	10 10.0	+24 1	10 10.8	+23 57	9 43.8	−27.0	341.0	19.3
J.	9 37 "	10 41.3	+25 7	10 42.1	+25 2	10 10.9	−31.2	337.2	18.5
K.	9 32 "	9 31.8	+26 38	9 32.6	+26 34	10 5.9	+33.3	25.1	17.6

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1894 July 21.

Rather heavy thunder-shower about 1 P.M.; sharp thunder following closely (1 second and less) after the flashes.

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