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INTERIM REPORTS

5

Observations of the Aurora Australis  
Macquarie Island, May 1950 - April 1951

*By*

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## INTRODUCTION

Systematic auroral observations commenced on 1 May 1950 at Macquarie Island (Geographic Latitude  $54^{\circ} 29' S$ , Longitude  $158^{\circ} 58' E$ ; Geomagnetic Latitude  $61^{\circ} S$ , Longitude  $243^{\circ} E$ ).

With the exception of the first four months (when observations usually ceased at midnight) auroral watches were kept from sunset to sunrise on all nights. Descriptions of all displays including significant changes in form, location and intensity were recorded. The only instruments employed were a cloud inclinometer for determination of elevation and a small direct vision spectro-scope for establishing the presence of auroral activity on lightly overcast nights and of weak displays in moonlight or twilight.

Auroral displays were recorded on 206 nights during the year. Disregarding continuously overcast nights this represents a frequency of 86% of possible occasions, indicating the proximity of the island to the Auroral Zone.

Detailed analyses are being carried out of certain aspects of the work and the results will be published in A.N.A.R.E. Reports, Series C. Some general observations on auroral forms and features of special interest are included at the end of the present report.

## TERMS AND ABBREVIATIONS USED IN DESCRIPTION OF THE AURORA.

The observations which follow have been transcribed verbatim from the original set of field log books. Times of all observations are recorded in Greenwich Mean Time. The description of each display is preceded by information on times of sunset, sunrise, moonrise, moonset and end and beginning of the periods of astronomical twilight. This information is included for comparison with times of occurrence of displays.

At Macquarie Island geographical midnight occurs at 1324 G.M.T. and magnetic midnight (mean of year) as defined by McNish (1936) at 1224 G.M.T. The direction of the geomagnetic field is specified by  $I = 78^{\circ} S$ ,  $D = 232^{\circ} E$ .

The fractional cloud cover in eighths is included with each observation and appears as a fraction following immediately after the time of the observation. Frequently some indication is given of the distribution of cloud, e.g.  $3/8$  broken, mainly in north-east sector.

The standard 0 to 4 intensity scale (La Cour 1932) has been used throughout. All figures referring to the intensity of a display appear in brackets, e.g. (3).

In the description of the position of a display or special features of a display, geographical bearings have been given in the usual abbreviated notation, e.g. NNE. Occasionally the letter H is used for the word "horizon".



Elevations from the horizon have been given in degrees, followed by the bearing, e.g.  $15^{\circ}\text{SE}$  means  $15^{\circ}$  above the SE horizon. Elevations of arcs, bands or draperies refer to the lower border except where specifically stated otherwise. In the special case of arcs, the elevation given is always that of the apex of the lower border. In the case of multiple arcs, the elevations of the two outside arcs of the group are usually given, or this is inferred by a statement such as "multiple (1) arcs between  $50^{\circ}\text{N}$  and  $75^{\circ}\text{N}$ ". Statements such as this never refer to the trend of the arcs, which were all roughly symmetrical about the magnetic meridian. In many cases, the general trend of bands or draperies is indicated by reference to end-points, e.g. rayed band  $15^{\circ}\text{WSW}$  to  $60^{\circ}\text{S}$ .

The abbreviation Z (zenith) has in some cases been used to denote the exact geographical zenith, e.g. sharp end to band  $5^{\circ}\text{E}$ . of Z; but in other cases such as descriptions of distribution of pulsating forms or of cloud, Z has been used rather loosely to refer to a region up to  $10^{\circ}$  in radius centred on the true zenith.

The following abbreviations have been used for the various auroral forms, and unless otherwise stated, are consistent with the definitions outlined in the "Atlas of Auroral Forms" (1930):

HA	homogeneous arc
RA	rayed arc
HB	homogeneous band
RB	rayed band
MA	multiple arcs (homogeneous)
MZA	multiple zenithal arcs - a form of display seen very frequently and consisting of a group of weak narrow homogeneous arcs passing directly overhead.
MZB	multiple zenithal bands - referring to displays similar to MZA but in which irregularities prevent classification as arcs.
DS	diffuse surface
DS <sup>s</sup>	diffuse surfaces
PDS	pulsating diffuse surfaces
G	glow - this has been used either in the strict sense of normal usage (c.f. "Atlas of Auroral Forms") or to indicate auroral activity whose form is uncertain due to the presence of considerable cloud. e.g. (2) G through cloud gaps below $30^{\circ}\text{SE}$ to E.

No abbreviations have been used in referring to draperies, coronas, isolated rays, flaming or striated forms. Other abbreviations include :

BCO.	began continuous observation (in contrast to intermittent observation).
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DCO.	discontinued continuous observation.
MAX.	time of maximum observed activity of a display. This appears only when such a maximum was definite.
obs.	observation.
met.log.	indicates data extracted from the station meteorological log.
no sign.	no sign of auroral activity.
LNS.	line not sought - refers to the spectroscopic auroral green line. Reference is frequently made to the presence or otherwise of this line, observations being made with a small pocket spectroscope.

Most of the observations were made from a position where hills obscured a minimum of the sky. From S to W the sky was obscured to a maximum elevation of  $8^{\circ}$ , and from N to ENE the sky was again obscured to a maximum elevation of  $8^{\circ}$ , the average elevation of the skyline in each case being about  $5^{\circ}$ . In all other directions the view was unobstructed. Some observations made at Lusitania Bay (about 14 miles south of the main station) are included.

MAY 1950.

MAY 1.

(0518 Moonrise Fraction illuminated: 0.98  
(0559 Sunset  
(0802 End astronomical twilight  
(1842 Beginning astronomical twilight  
(2030 Moonset  
(2044 Sunrise

1300 8/8 till now and still overcast.

1430 8/8 (Met. log).

BCO 1610 1/8 in W. Moon in W.(2) multiple arc  $45^{\circ}$ - $70^{\circ}$  N.

1615 Band from E to Z. Multiple arc continues, but with moonlight difficult to tell whether it is complete or confined to NE quadrant.

1617 Band from E to  $70^{\circ}$  SE, (3) in E.  
(1) rays SE of Z.

1625 7/8. Green line distinct in most parts of sky.

DCO 1630 Almost 8/8. Bright patch through cloud in SE.

1730 8/8.(Met. log).

MAX.1750 (4) band from E to Z.

1830 Nutt reported display still very bright.

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MAY 2.

8/8 all night. No sign of aurora.

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MAY 3.

(0550 Moonrise Fraction illuminated: 0.99  
(0555 Sunset  
(0759 End astronomical twilight  
(1845 Beginning astronomical twilight  
(2048 Sunrise  
(2353 Moonset

0815 Display observed by Ward.

BCO 0820 HA through Z.

0825 1/8. (1) HA with curved irregularities in W

0828 Triple arc through Z. Bright moon obscuring E portion.

0830 Quadruple arc through Z.

DCO 0835 7/8.

MAX.0902 (2) drapery.

0930 7/8. No sign of aurora. Stars visible where display was.



MAY 3 cont'd.

- 0945 Very faint HA N of Z.  
 0952 Ray bundle momentarily in SW.  
 0955 Very faint HA through Z.  
 1027 0/8. (1) rays in W.  
 1033 0/8. (1) DS in Z.  
 1050 0/8. (1) DS or diffuse rays from W to Z.  
 1115 Very faint diffuse band from W to Z.  
 (1) single ray due S.  
 1140 2/8 in NE. No sign.  
 1158 1/8. No sign.  
 1230 0/8. No sign.  
 1630 Ward reported "Now 8/8. Frequent obs. during night but no sign of aurora though sky usually perfectly clear".

MAY 4.

Observing conditions very poor.  
 Frost believed he saw an extremely weak aurora at about 0930.

MAY 5.

8/8 nearly all night. No sign of aurora or green line, though Douth and Boyd claim to have seen zenithal HA between 1000 and 1200.

MAY 6.

- (0551 Sunset  
 (0755 End astronomical twilight  
 (0818 Moonrise Fraction of moon illuminated: 0.80  
 (1850 Beginning astronomical twilight  
 (2054 Sunrise Time total darkness: 23 mins.

0900 Douth reported (3) HA  $45^{\circ}$  S seen through break in cloud.

0940 Green line present. Patches of light visible through gaps in cloud, with suggestion of red.

MAX. 1020 1/8. (2) HA  $45^{\circ}$  S. (3) drapery in SW.

1045 7/8. No sign.

1130 8/8. Green line present.

1210 Same.

MAY 6 cont'd.

1320 7/8. No sign. Green line not distinguishable on background of continuous spectrum.

MAY 7.

(0547 Sunset  
(0752 End astronomical twilight  
(0942 Moonrise Fraction of moon illuminated: 0.70  
(1850 Beginning astronomical twilight  
(2054 Sunrise Time total darkness: 1 hr. 50 min

0810 8/8 and very dark. Glow through cloud SE.

0835 4/8 - clear in N. No sign.

0930 Few stars visible. Light in SE.

1020 8/8 and very dark. No sign.

1105 Nutt reported: "8/8. Signs of moon but no sign of aurora".

1230 Ward reported there may have been a faint display about 1230.

MAY 8.

8/8 all night. No sign of aurora.

MAY 9.

(0543 Sunset  
(0748 End astronomical twilight  
(1235 Moonrise Fraction of moon illuminated: 0.49  
(1854 Beginning astronomical twilight  
(2058 Sunrise

0735 7/8. (2) Glow WSW.

0745 2/8, partly in W. Glow due W(1)-(2).

0810 3/8. (1)-(2) G in S.

0820 1/8 in S where (1) G still present.

BCO 0837 Diffuse G covering most of S sky. HA low in S. (1) ray due S of short duration.

MAX 0838 1/8, half in S sky. Glow more intense in S.  
? (2) HA 10°.

0842 (1)-(2) rays of short duration SSW.

0846 Diffuse G continues in S. Suggestion of rays, particularly when viewed indirectly.

MAY 9 cont'd.

- 0848 Intensity of brightest part either reduced or obscured by low cloud. No suggestion of rays.
- 0854 Cloud increasing in S. Intensity of G reduced.
- 0856 3/8 in SW. (1) ray S.
- DCO 0900 5/8. Region of G almost obscured.
- 0916 7/8 and snowing. Diffuse G in S. No sign of previous arc.
- 0930 1/8 mainly in S. Glow now very feeble but quite extensive.
- 0950 Same.
- 1010 3/8 mainly in N (1/8 in S). Faint extensive G, brightest in SE.
- 1025 1/8 in low bank in S where G was brightest. Upper edges of bank slightly lighter than rest of sky.
- 1045 5/8. G in S extremely feeble.
- 1110 1/8. G in S a little brighter. Suggestion of rays in SE. One ray swept across sky rapidly.
- 1132 1/8 in S. (1) G in SW with two weak diffuse rays.
- 1150 1/8. G continues in S extending from SE to SW. No rays.
- 1210 1/8 mainly in S. G almost (2) in SW.
- 1250 1/8. (1) diffuse HA  $25^{\circ}$  S with centre obscured by cloud.
- 1255 Cloud obscuring most of HA, but quite distinct in SW. (1).
- 1305 Cloud almost absent in region of arc. (1) and elevation about  $25^{\circ}$  S.

MAY 10.

- (0541 Sunset
- (0747 End astronomical twilight
- (1356 Moonrise Fraction illuminated: 0.39
- (1855 Beginning astronomical twilight
- (2100 Sunrise
- 1034 7/8. (1) glow from E almost to Z.
- 1036 6/8. Glow almost (2).
- 1040 7/8. Glow also observed on W horizon, (2).
- 1103 8/8. Sky not quite dark - display may still be present.



MAY 10 cont'd.

1132 8/8. No sign.  
 1155 8/8. Possible faint glow through cloud in E.  
 1220 8/8. No sign.  
 1330 Same.  
 1730 6/8 (Met. log).  
 MAX. 1830 Nutt reported: "No cloud. (1) band from E to N 45°. (3) ray due N".

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MAY 11.

(0540 Sunset  
 (0745 End astronomical twilight  
 (1514 Moonrise Fraction illuminated: 0.30  
 (1856 Beginning astronomical twilight  
 (2102 Sunrise.  
 0812 (1) glow visible at edge of cloud bank, possibly upper part of 10° HA.  
 0818 Diffuse light from E.  
 BCO 0827 G SE 45° through gap in clouds.  
 0830 8/8. Glow through cloud 45° W and SE.  
 0832 Cloud clearing in S. (2) G 45° S.  
 0840 (2) and (3) rays in SE.  
 0841 3/8. (3) RB in SE.  
 0842 3/8. (1) parallel rays from E to Z.  
 0845 6/8, Z obscured. G in E. (3) drapery SE 45°.  
 0855 4/8. Slight glow in S through cloud.  
 (1) double arc from E to W through Z and extending to 60°N.  
 0902 Cloud obscuring S sky. No sign of glow. No change in N sky.  
 0905 Cloud obscuring most parts of display. Glow visible through cloud in W and S.  
 0908 3/8, S horizon obscured. (2) G to 45° S. Display same in N.  
 0910 (2) band from ESE to 45° S.  
 0911 (1) double arc still present in N. Single ray ESE to 45°, rapidly faded.  
 0912 Band in ESE faded to (1). Ray from ESE to Z.  
 DCO 0915 Almost 8/8.

MAY 11 cont'd.

- BCO 0930 (1) HA  $45^{\circ}$  N. General (1) glow in W. (1) drapery  $60^{\circ}$  S.
- 0932 (2) rays in SW and E from  $30^{\circ}$  to  $60^{\circ}$  pointing to approx.  $10^{\circ}$  N of Z. Slight suggestion of corona.
- 0933 (1) corona.
- 0938 3/8, obscuring part of display in S. Rays and G in S to  $60^{\circ}$ , HA  $45^{\circ}$  N and (1) corona.
- 0942 RB S to SW  $45^{\circ}$  to  $70^{\circ}$ , (2). (1) G S to SE.
- 0944 (2) ray from ENE to little beyond Z, curving at upper end. 7/8 cloud obscuring rest of sky.
- DCO 0948 Almost 8/8.
- BCO 0957 3/8. Display fainter, but still same general features.
- 1000 (2) RB  $60^{\circ}$  S in E-W direction. Gradually fading.
- 1003 3/8, mainly in S. (2) glow in W just being obscured by cloud. (1) corona. Previous HA  $45^{\circ}$  N now (1) band.
- 1009 (2) RB developed rapidly in SW. (3) ray on W edge fading gradually to (2) and drifting to WNW.
- 1011 (3) RB  $15^{\circ}$  S. Rays to Z brightened to (2) and then faded to (1).
- 1014 (2) drapery NW  $30^{\circ}$ . Corona more distinct  $10^{\circ}$  N of Z.
- 1019 (3) broad ray from SSW to  $45^{\circ}$  rapidly fading.
- 1024 3/8. Display quieter, most intense part being (2) in E. low.
- 1037 3/8, mainly in S and E. Only part of display visible is (2) band  $40^{\circ}$  N in E-W direction.
- DCO 1040 5/8.
- BCO 1055 Quiet diffuse (2) band still present in N. (3) rays from S to Z. These faded and two parallel draperies developed in SE  $60^{\circ}$ .
- 1100 Corona reappeared  $10^{\circ}$  N of Z. Draperies present in S, SW and E.
- 1102 Draperies faded. Broad DS in E quadrant from Z to  $60^{\circ}$  E.
- 1105 3/8. Band still present in N. DS moved to NE, (1). Draperies disappeared.
- DCO 1114 4/8 and increasing. (1) glow through cloud in E and W. (1) rays in SE and NW.

MAY 11 cont'd.

- 1125 5/8. Band in N now rayed, with rays extending to form (1) corona.
- 1135 7/8. Diffuse glow through cloud in N, E and W. Occasional rays.
- 1145 6/8. Diffuse (2) glow in W. Remainder of display much weaker. Suggestion of corona.
- 1157 7/8. Diffuse glow in E and W, (1).
- 1210 Same.
- 1225 Almost 8/8 with stars dimly visible through haze elsewhere. Band from E to W  $60^{\circ}$  N.
- 1235 1/8. (3) ray from SE  $45^{\circ}$  to Z. (2) rays SW. Band in N still present.
- 1241 3/8. (1) rays from S and WNW almost to Z. Diffuse glow in E.
- 1247 7/8. Diffuse glow through cloud in NE, E, SE, W and NW.
- 1304 8/8. Same.
- 1320 Same.
- 1340 4/8. Diffuse rays from W through Z to E  $45^{\circ}$ .

MAY 12.

8/8 all night. No sign of aurora.

MAY 13.

8/8 all night. No sign of aurora.

MAY 14.

8/8 all night, but green line clearly visible.

MAY 15.

- (0532 Sunset
- (0739 End astronomical twilight
- (1901 Beginning astronomical twilight
- (2016 Moonrise Fraction illuminated: 0.04
- (2107 Sunrise
- 0815 7/8. (2) glow through gap in cloud from SSE to SW to  $45^{\circ}$ .
- 0820 Display appears to be (3) HA  $40^{\circ}$  S.



MAY 15 cont'd.

- 0825 (2) HA  $45^{\circ}$  S.
- 0835 8/8. Glow through cloud SW  $45^{\circ}$ .
- 0840 8/8, thin in parts. Glow through cloud where HA was.
- 0847 8/8. Glow diminished.
- 0900 8/8. Glow still present in S.
- 0915 8/8. Glow through cloud SE  $45^{\circ}$ .
- 0937 5/8. (1) G over most of S sky. No sign of previous HA, but cloud obscuring S sky up to  $30^{\circ}$ .
- 0945 8/8, thin in parts. Glow through cloud ESE  $45^{\circ}$ .
- 1015 2/8 in S up to  $30^{\circ}$ . (2) glow through cloud  $20^{\circ}$  S. No sign elsewhere.
- 1020 2/8 in S. Two parallel dark bands from E to W through Z amid diffuse (1) G.
- 1025 5/8 obscuring these dark bands. (1) glow through cloud in E.
- 1027 8/8. No sign.
- BCO MAX 1040 3/8. (1) patchy G  $45^{\circ}$  S developed suddenly into (2) drapery extending from E to W  $45^{\circ}$  S and moving rapidly towards E and Z. Very rapid rippling. Corona developed in Z. (3) drapery near Z became (4) with red-mauve lower edge. Changing rapidly.
- 1042 Strongest part of display around Z with some patches of G and rays in NW down to  $60^{\circ}$ .
- 1047 5/8. Now only patches of (1) G in S half of sky.
- 1050 (2) drapery centred due S. (3) rays also present.
- 1052 Drapery now (1) and quieter in S. Patches of G near Z and few (1) rays from  $45^{\circ}$  NW to Z.
- 1056 2/8 in S and W. (2) G in S and (1) DS N of Z.
- 1058 Same with suggestion of corona in Z.
- DCO 1102 8/8. General glow through cloud.
- 1114 8/8. (2) glow through cloud SW  $30^{\circ}$ .
- 1125 8/8. Some patches of glow through cloud mainly in S.
- 1138 Same.
- 1158 (3) drapery rapidly fading seen through gap in cloud.
- 1223 8/8 and snowing.

MAY 15 cont'd.

1240 8/8. No sign.  
1300 8/8. Scattered patches of glow through cloud over most of sky.  
1333 8/8, thin in parts. Glow through cloud SW  $30^{\circ}$ .  
1340 3/8. Glow through cloud in S to about  $30^{\circ}$ .

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MAY 16.

(0532 Sunset  
 (0738 End astronomical twilight  
 (1902 Beginning astronomical twilight  
 (2109 Sunrise

1050 5/8. Patches of diffuse G due S through breaks in cloud.  
1055 3/8. Diffuse (1) G to  $30^{\circ}$  S.  
1057 4/8. Diffuse glow appears to be part of broad (1) HA with lower edge about  $10^{\circ}$ . Suggestion of (1) diffuse G S  $75^{\circ}$ . Green line not visible.  
1100 7/8 covering all of display.  
1102 Patches of (1) diffuse glow through cloud due E and due W.  
1105 (1) G  $40^{\circ}$  W. Remainder of sky clouded.  
1109 6/8. Glow still present in W. Considerable glow behind cloud low in S and SSE.  
1112 (1) G low in W to WNW. (1) G  $45^{\circ}$  SW. Suggestion of glow through cloud  $10^{\circ}$  S.  
1115 7/8. (1) G along horizon from SW to NW.  
1117 Two broad (1) bands of glow from W to near Z. (2) G in S from  $5^{\circ}$  to  $15^{\circ}$ . Green line clearly visible.  
MAX. 1120 4/8. (2) RB from  $30^{\circ}$  W to Z, curved being convex to N. (3) G  $5^{\circ}$  S.  
1125 6/8. RB obscured. (1) G NW and E. Glow in S through cloud.  
1127 8/8.  
1134 7/8. Glow in S through cloud.  
1145 2/8. (1) G in S and E. No sign of RB.  
1155 6/8. Diffuse glow in E from  $15^{\circ}$  to  $30^{\circ}$ , (1).  
1202 8/8. No sign.  
1214 8/8, thin in parts. Glow in SW and E up to  $45^{\circ}$ .

MAY 16 cont'd.

- 1227 8/8. Weak glow through cloud in W.  
1245 5/8, clear in W and Z. Here (2) DS from W to Z.  
1304 3/8. (1) diffuse glow from E to W through Z.

MAY 17.

- (0531 Sunset  
 (0737 End astronomical twilight  
 (1904 Beginning astronomical twilight  
 (2111 Sunrise
- 1115 1/8 and slight mistiness. (2) G  $5^{\circ}$  S.  
1120 Same.  
1135 3/8 and mist. Glow mainly in S and E, very weak through mist.  
1145-1220 (Continuous obs.) (1) remnant HA from  $30^{\circ}$  S to E, static.  
 (1) RB  $5^{\circ}$  S to SE. Patches of (1) G SW to W to  $45^{\circ}$ , static. 2/8 and mist throughout.  
BCO 1230 1/8. Remnant HA developed to (1) HA  $40^{\circ}$  S. RB  $10^{\circ}$  S in E-W direction. (2) at W end and (1) at E end.  
1234 RB now (2) in SSE, (1) in W. HA same.  
1236 (3) RB from S to ESE horizon. Lower edge clearly defined. Dark horizontal bands through the RB.  
1238 RB descending slowly to about  $5^{\circ}$  S. Band from S to SW  $10^{\circ}$ .  
1240 (3) drapery in E. (1) HA still present.  
1242 Rays extending up to HA in SE.  
1247 HA almost absent.  
1252 0/8. RB in SE from (2) to (3) merging up into weak HA.  
1255 Band in W developing into RB.  
1256 Rays from RB in SE up to  $45^{\circ}$ . Original HA now only remnant in E. A second RB developed joining main RB in bundle of rays on SE horizon. Two HB's appeared  $15^{\circ}$  and  $20^{\circ}$ W.  
1300 Remnant HA developing at  $70^{\circ}$ , from E to S. Second (upper) RB in SE faded.  
1302 HA  $60^{\circ}$  S. HA  $30^{\circ}$  S ending in bundle of rays on SE horizon.



MAY 17 cont'd.

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- 1303 Upper HA becoming diffuse. Lower one now remnant RA S - SE.
- 1307 Upper (1) HA more diffuse. Lower RA only present on SE  $5^{\circ}$  and fading. Rays very weak.
- 1315-1330 (1) double arc developed  $75^{\circ}$  and  $80^{\circ}$  S, rapidly brightening to (2). (1) RB from  $10^{\circ}$  S to SE horizon. RB developed in SW and became (3) drapery extending over all S sky between  $10^{\circ}$  and  $30^{\circ}$ . Some patches of drapery and ray bundles at greater elevation.  
(2) HA gradually changed form and increased in elevation till it extended from Z to  $40^{\circ}$  N in E-W direction. Became flaming aurora with very rapid flame-like motion from W to Z and from E to Z. (3).
- MAX. 1335 Brilliant (4) drapery  $15^{\circ}$  SE with slight red colour along lower edge.
- 1337 Drapery extended right across S sky with lower edge  $15^{\circ}$ .
- 1341 Drapery reverted to RB (3) with clearly defined straight lower edge  $10^{\circ}$  S. Corona in Z. Flaming motion continuing down to  $20^{\circ}$  N.
- 1350 (3) drapery again  $5^{\circ}$  S to SE. Flaming display (2) continues.
- 1355 Radiation point of corona appears to have moved to slightly NW of Z. Curved lines and flames round Z change shape steadily.
- 1400 Radiation point now very slightly N of Z. Pulsations over all N sky and down to  $30^{\circ}$  S. (2) RB still present in S - SE.
- 1405-1420 Fairly steady drapery down to  $5^{\circ}$  S, (2) in SSE. Corona still present, and pulsations still continuing, the main pulsations being from E and W. Somewhat quieter than previously.
- DCO 1420
- 1432 1/8. Patches of drapery and ray bundles varying between (2) and (3) in most parts of sky, particularly in S, E and W. Pulsations still present but less marked.
- Till 1830 Ward reported: "Glow remained in S till 1830. Corona and luminous patches disappeared by about 1600, having continued to fade after 1430. E sky quite clear".

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MAY 18.

- (0529 Sunset  
(0737 End astronomical twilight  
(1905 Beginning astronomical twilight  
(2113 Sunrise

1145 1/8 in S. (1) RB SSE.

MAY 18 cont'd.

1150 RB changed to diffuse (1) glow in SE.  
1210 1/8. (1) glow low in S through thin cloud.  
 May possibly be 10° HA.  
MAX. 1230 Short (2) ray seen through thin cloud 10° SSE.  
 Short (1) rays in SE.  
1245 2/8 low in S sky. (1) glow from S to SE.  
1305 2/8. (1) RB SE.  
1320 Same.  
1340 3/8 and mist. (1) G in S to SE up to 30°.

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MAY 19.

0830 5/8. No aurora recorded. (Met. log).  
1130 Same.  
1430 8/8. (Met. log).

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MAY 20.

8/8 all night. No sign.

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MAY 21.

0830 3/8. No aurora recorded. (Met. log).  
1130 8/8. (Met. log).  
 Remained overcast for rest of night.

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MAY 22.

8/8 all night. Green line clearly visible at 1220.

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MAY 23.

(0235 Moonrise Fraction illuminated: 0.31  
 (0522 Sunset  
 (0732 End astronomical twilight  
 (1142 Moonset  
 (1912 Beginning astronomical twilight  
 (2120 Sunrise  
  
1030 8/8 and light rain. Sky fairly light and  
 green line visible.  
  
1105 Stars visible through mist from SSW to Z. Auroral  
 light present but no sign of forms. Brightest in  
 N and W.

MAY 23 cont'd.

- BCO 1136 5/8. (3) re-entrant drapery WNW, mainly  $45^{\circ}$   
MAX
- 1139 6/8. Parts of drapery over most of W sky.
- 1140 (2) drapery  $60^{\circ}$  W, rapidly moved up to Z forming partial corona.
- 1142 7/8. Patches of glow through thin cloud from SW through Z to  $45^{\circ}$  N.
- 1150 5/8 and very thin mist. Patches of (1) and (2) G extending from SW to NW and through Z to  $45^{\circ}$  N. Weak corona in Z.
- 1153 4/8. No sign in Z. Elsewhere almost same, but some (2) G patches showing faint drapery structure. Suggestion of red colour in (2) glow low in SW.
- 1202 3/8. (3) band through Z from  $60^{\circ}$  S to  $70^{\circ}$  N rapidly diffusing into (2) glow round Z. (1) rays from low in S to  $50^{\circ}$  S. No sign of display elsewhere.
- 1211 8/8 mist cloud, with some stars dimly visible. Main part of display appears to be at  $45^{\circ}$  W.
- 1222 (2) G  $10^{\circ}$  -  $25^{\circ}$  SW. Patches (1) glow from W to Z, slowly fading in Z.
- 1245 3/8 light mist. (2) G  $10^{\circ}$  -  $25^{\circ}$  S - SW. Small patch (1) glow  $45^{\circ}$  N. Nothing elsewhere.
- 1247 2/8. (1) glow SW, W and NW.
- 1304 2/8. Patches of (1) glow in W to NW,  $30^{\circ}$ . (1) HB from E to W through  $60^{\circ}$  N. Three (1) rays from E to Z. Whole display fading and reappearing evenly with a period of about 5 sec. Slight corona.
- 1310 Steady (1) glow SW - W to  $20^{\circ}$ . Steady diffuse (2) glow round Z with slight ray structure at edges. Two long (2) bands between  $45^{\circ}$  and  $70^{\circ}$  N subject to random fluctuations in intensity and position.
- 1312 3/8. Diffuse (2) glow in Z now pulsating in random fashion.
- 1315 5/8. Glow in Z now only (1) but still pulsating. Two bands still present between Z and  $30^{\circ}$  N, pulsating to max. (2). No sign in S-SE sector.
- 1320 Broad diffuse (1) band slightly S of Z. Bands still present in N but now (1).
- 1321 (1) glow extending from SE  $50^{\circ}$  to Z.
- DCO 1325 3/8. Patch (1) glow  $40^{\circ}$  S. Four distinct



MAY 23 cont'd.

but diffuse (2) bands radiating from low in W, two passing through Z to  $60^{\circ}$  E, the other two passing through  $70^{\circ}$  and  $40^{\circ}$  N to E.

MAY 24.

8/8 all night.. No sign.

MAY 25.

8/8 all night. No sign.

MAY 26.

(0307 Moonrise Fraction illuminated: 0.62  
 (0517 Sunset  
 (0728 End astronomical twilight  
 (1604 Moonset  
 (1914 Beginning astronomical twilight  
 (2125 Sunrise

BCO 0830 1/8. (1) HA  $35^{\circ}$  S.

0835 HA now (2).

0840 1/8. Several short (1) rays at W end of HA.

0843 HA became weaker and split two (1) HA's  $30^{\circ}$  and  $45^{\circ}$  S converging into patch with (1) rays at W end.

0845 (2) RB horizontal  $15^{\circ}$  S - SE. Broad (1) rays at S end.

0847 Five HA's in S sky as follows: (1)  $30^{\circ}$ , (1)  $45^{\circ}$ , (1)  $50^{\circ}$ , (2)  $60^{\circ}$  and (1) Z. (2) RB remains at  $15^{\circ}$  S - SE.

0848  $30^{\circ}$  HA now (2). HA through Z turned into (3) corona with intense broad beams from E and W.

0849 1/8. Very broad (3) band through Z from E to W.  $30^{\circ}$  HA still (2).  $15^{\circ}$  RB turned into (4) drapery in SE from almost sea level to  $15^{\circ}$ . Edges red and moving rapidly first from S to N and then from N to S.

0852 Broad (3) band through Z still present, curving smoothly to S at E end.

0853 Whole of S sky covered with (4) draperies in rapid motion.

0855 (4) drapery in SSW with distinct red colour on lower edges.

MAY 26 cont'd.

- 0857 Rapid motion in all draperies. (2) rays from NE to Z.
- 0858 (1) glow in Z and (2) rays from it to E and W. (4) drapery in S with very rapid motion and vibrating comb-like structure. Long isolated (2) rays in ESE.
- 0900 Original RB through Z now disappeared and replaced by patches of (1) glow together with (2) rays from NE and W.
- 0902 1/8. Rays from NE and W now (1). Single long (2) ray from NNE to Z. Draperies in S sky down to (2) in most parts with some isolated (3) parts.
- 0907 Broad (2) HB from  $45^{\circ}$  S to Z and then curving sharply W. This broke rapidly into diffuse glow with some broad rays. (3) drapery still present in S. Long (2) rays SE to Z. (2) rays from NE to Z. Patch (2) glow  $80^{\circ}$  N.
- 0909 2/8. Narrow (2) HB from  $70^{\circ}$  SE through Z to  $70^{\circ}$  NW. (3) glow in SW, low. Draperies much quieter.
- 0910 2/8, mainly in S. Very short (3) ray low in SE.
- DCO 0913 No sign of draperies. (1) glow E and (2) glow S.
- 0920 1/8, mainly in S. (2) drapery again in S-SW. (1) diffuse glow again in Z and E.
- 0925 2/8, mainly low in S. (1) G visible through gap in cloud S-SW to  $20^{\circ}$ . Patch (2) G  $10^{\circ}$  SSE. (1) long broad rays from E to Z.
- 0930 (1) G low in SE-SW. No other sign.
- 0945 (1) G SE-SW up to  $25^{\circ}$ . Several (1) rays from E to near Z.
- 0955 1/8. (1) rays from E to Z. Impossible to see how far beyond Z they extend because of moon (probably part of multiple zenithal arcs).
- 1030 1/8. No sign.
- 1130 8/8. No sign.
- 1200 Same.

MAY 27.

The following obs. are all from the Met. log.

- 0830 6/8.
- 0900 Display visible in S.

MAY 27 cont'd.

1130 5/8.

1430 8/8.

MAY 28.

8/8 all night. No sign of aurora.

MAY 29.

(0514 Sunset  
 (0727 End astronomical twilight  
 (1917 Beginning astronomical twilight  
 (2100 Moonset Fraction illuminated: 0.90  
 (2129 Sunrise

0900-1200 Weak display (Met. log).BCO 1300 3/8. Bright moon. (1) RB from W to E through Z.MAX. 1301 Very suddenly RB developed into exceptionally brilliant (4) drapery from W to E in extremely rapid motion with vivid red and green colouration. Drapery whipped to and fro across sky at very great speed. Double edged portion in Z, one edge rushing to W, the other to the E.1310 Brilliant display continued as above, gradually extending until it covered all of S sky. Patches of (1) and (2) glow and (1) and (2) rays in NE.DCO 1315 Gradually faded away to (1) glow in E and (1) glow low in S.MAY 30.

No display recorded.

MAY 31.

No display recorded.



JUNE 1950JUNE 1.

8/8 all night. No sign of aurora.

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JUNE 2.

1120 3/8 in N. Bright moonlight. No sign of aurora.

1135 8/8.

1245 4/8. No sign of aurora.

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JUNE 3.

1130 Dawson reported: "7/8. (2) drapery from S to SE."

1235 7/8. Considerable moonlight. No definite signs of aurora. Spectroscope not used.

1248 7/8. Completely overcast in S. No sign.

1300 3/8. Parallel bands, almost certainly cloud, from E to W mainly in S sky. ((1) if auroral).

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JUNE 4.

Frequent observations till 1130. Cloud usually about 4/8, but no sign of aurora.

1130 6/8. No sign of aurora.

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JUNE 5.

0830 8/8 (Met. log).

1130 8/8 (Met. log).

1430 5/8 (Met. log).

1745 7/8. Auroral glow to S. (Met. log).

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JUNE 6.

(0507 Sunset  
(0721 End astronomical twilight  
(1252 Moonrise Fraction illuminated: 0.65  
(1925 Beginning astronomical twilight  
(2138 Sunrise

BCO 0803 2/8. Series (3) RB's 45°N. Developing into draperies with fairly rapid motion at E to Z.

JUNE 6 cont'd.

- 0805 W end obscured by cloud.
- 0808 5/8. E end obscured. (3) RB's in W with some long rays. (2) DS  $30^{\circ}$  S.
- 0810 (3) waving bands, now almost through Z. Several weak bands (1) from E to W down to  $45^{\circ}$  N.
- MAX.0813 3/8. (4) bands waving through Z. (3) draperies again in E. (2) DS  $45^{\circ}$  S.
- 0815 Slow waving motion along length of bands through Z. Southern limit clearly defined.
- 0816 Band now (2) in E, (3) from Z to W. (2) rays from NW. (2) band in S to  $60^{\circ}$ .
- 0819 4/8. (1) Diffuse glow with weak rays over all N sky. (3) B still present E to W through Z. (2) diffuse G in S to  $80^{\circ}$  most intense in SE where some rays extend from  $45^{\circ}$  to  $60^{\circ}$ .
- 0821 (3) drapery developed  $40^{\circ}$  -  $70^{\circ}$  SE rapidly fading to (2). Zenithal bands moved to  $80^{\circ}$  N and are now quieter - almost HA with faint suggestion of rays at E and W ends.
- 0823 B drifted to  $50^{\circ}$  N
- DCO 0824 6/8 and snowing.
- 0835 5/8 covering most of S. (2) RB, almost RA,  $45^{\circ}$  N. (3) glow WNW from horizon to  $15^{\circ}$ . (1) G below RB to N horizon.
- 0837 Same, but only (2) in WNW.
- 0855 7/8 and snowing. Drapery just visible through snow in SE sector to  $70^{\circ}$ . Glow still present behind thin cloud in NW and just N of Z.
- 0905 8/8 and light snow. Glow visible behind clouds in all sky except SW.
- 0935 8/8 and snowing. Suggestion of G behind clouds in NW.
- 1105 8/8 and snowing. Glow behind clouds just N of Z.
- 1145 4/8. G in N sky.
- 1150 8/8. No sign of aurora.
- 1220 7/8. Glow behind clouds in Z.
- 1340 Boyd reported: "Cloud varying rapidly. Aurora still present".
- 1930 Cohen reported: "Aurora still present"
-

JUNE 7.

- 1210 4/8. (2) G  $5^{\circ}$  -  $10^{\circ}$  S and (1) G up to  $40^{\circ}$  extending into SE and SW.
- 1215 Same - display quiet.
- 1220 6/8. (2) G in S with some weak rays.
- 1245 4/8. (2) G SW, (1) G S and SE to  $50^{\circ}$ .

JUNE 8.

- 0830 7/8. (1) glow through cloud  $20^{\circ}$  S.
- 1140 7/8. (1) glow through cloud  $20^{\circ}$  -  $30^{\circ}$  S.
- 1150 Same.
- 1200 5/8. (1) G  $20^{\circ}$  -  $30^{\circ}$  SE through cloud.

JUNE 9.

- (0506 Sunset
- (0719 End astronomical twilight
- (1637 Moonrise Fraction illuminated: 0.35
- (1927 Beginning astronomical twilight
- (2141 Sunrise

- BCO 0855 2/8. (1) RA  $80^{\circ}$  S. Isolated (1) bundle of rays from SW horizon to  $60^{\circ}$ .
- 0900 Ray bundle disappeared. Arc much broader and now (2) with very slight ray structure at W end.
- 0902 Several narrow (1) bands near Z parallel to arc. Bundle (1) rays appeared WNW.
- 0903 1/8. Broad (2) HA  $70^{\circ}$  S with (1) HA's near Z. Rays from E and W ends.
- 0905 Arc moving slowly S. Single (1) ray from  $20^{\circ}$  -  $60^{\circ}$  S.
- 0907 2/8. Arc still (2). Two long (1) rays from W to Z.
- 0908 (1) diffuse glow low from E to NE. Lower edge of main arc becoming sharper. Suggestion of very weak HA  $45^{\circ}$  N.
- 0910 4/8, obscuring most of main (2) HA at  $70^{\circ}$ . Broad (1) HA  $40^{\circ}$  N.
- 0914 (1) HA through Z now disappeared.
- 0916 Several broad (2) rays from E end of (2) arc to Z. (1) HA  $80^{\circ}$  N. (1) HA  $40^{\circ}$  N still present.



JUNE 9 cont'd.

- DCO    0917    6/8. Most of display obscured.
- 0925    8/8 and snowing.
- MAX.   0935    (3) corona just NW of Z. DS  $35^{\circ}$  E. Diffuse glow above cloud in S.
- 0940    2/8. (2) diffuse G with several rays to  $45^{\circ}$  S. Two parallel (2) rays from SE to  $45^{\circ}$ . (2) RB curving from SE through Z to W. Single (1) ray ENE to Z.
- 0945    RB through Z faded. Bundle of borad (1) rays amongst (1) G E - SE. (2) G  $10^{\circ}$ - $30^{\circ}$  S.
- 0947    5/8. (2) diffuse G from S - E to  $50^{\circ}$ .
- 1000    Almost 8/8. Glow through cloud in E.
- 1030    8/8 but glow through cloud over practically all sky. Brightest part just N of Z and low in WSW and ENE.
- 1035    6/8. (1) diffuse glow SW, Z and E.
- 1045    5/8. Broad (1) HA  $45^{\circ}$  N. Two weak parallel rays in SE sector. Remainder of sky clouded.
- 1100    3/8. (1) G in NE and NW joined by (1) rays through Z. S sky obscured by cloud.
- 1115    8/8. Glow through cloud in W.
- 1230    5/8. Single ray in SE. Diffuse glow in NW and NE. Glow through cloud in SW. No sign of activity in Z.
- 1240    1/8. Drapery  $45^{\circ}$  S. DS in NE. Band through Z, almost corona but rather diffuse and rapidly fading.
- 1243    4/8. DS in NE.
- 1252    8/8. Diffuse glow in W through cloud.
- 1303    7/8. Diffuse glow through cloud over all N sky. No sign in Z or S.
- 1320    2/8. (1) corona. Double RA (probably remnant) in NW, (2). (2) diffuse glow in NE. Single long very narrow (1) ray NW  $20^{\circ}$  to  $60^{\circ}$ .
- 1327    3/8. Two parallel (1) HA's  $35^{\circ}$ N and  $50^{\circ}$ N. Four parallel (1) B's from  $30^{\circ}$  E to Z, the most southern one being through Z and the rest N of it. Single (1) ray  $10^{\circ}$  -  $20^{\circ}$  S.
- 1337    5/8. Two parallel (1) HA's  $35^{\circ}$  N and  $50^{\circ}$  N. (1) DS NE to E, low. Two (1) bands through Z from E - almost HA's, but slight curvature N at Z.
- 1345    8/8. Glow visible through cloud in E and near Z.
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JUNE 10.

(0506 Sunset  
 (0719 End astronomical twilight  
 (1752 Moonrise Fraction illuminated: 0.26  
 (1928 Beginning astronomical twilight  
 (2142 Sunrise

0815 1/8. (1) HA  $10^{\circ}$  S.

0835 2/8 in S. (1) uniform G over all visible S sky up to Z.

0902 5/8. (1) diffuse G below  $20^{\circ}$  S. (1) diffuse glow S - SE  $70^{\circ}$  (may be part of HA).  
 Remainder of sky obscured by cloud.

1042 7/8. (1) HA  $50^{\circ}$  N.

1115 6/8. (1) rays forming weak corona in Z.  
 Glow from most of visible N sky.

1150 8/8. No sign.

MAX 1243 5/8. (1) HA  $80^{\circ}$  S. (2) multiple zenithal arcs from Z to  $50^{\circ}$  N.

1248 Almost 8/8. Patches (2) activity through gap in cloud  $10^{\circ}$  -  $40^{\circ}$  S. Glow through cloud in most parts of sky.

1335 1/8. (1) G in most of S sky. (1) rays from SE to Z.

JUNE 11.

0850 5/8. Weak glow in S sky through cloud.

0915 2/8. (1) G in S and W  $10^{\circ}$  through gaps in cloud.

0930 Same.

0935 1/8. (1) G to  $30^{\circ}$  S - SE.

1120 2/8. (1) G to  $35^{\circ}$  S.

1250 6/8. Faint glow low in SE. Upper edge fairly straight and sharp, but may be cloud. No stars visible in S sky.

JUNE 12.

(0506 Sunset  
 (0719 End Astronomical twilight  
 (1929 Beginning astronomical twilight  
 (2029 Moonrise Fraction illuminated: 0.12.  
 (2143 Sunrise

0845 3/8. (1) and (2) G in S and W.

JUNE 12 cont'd.

0905 3/8. (1) G over most of visible S sky to 80°.  
0930 6/8 - only Z clear. No sign.  
0940 8/8. No sign.  
1008 8/8. Suggestion of glow through cloud in S.  
1011 8/8. Weak glow low in SSE.  
1020 8/8. Same.  
1130 8/8. Suggestions of glow near Z.  
1200 8/8. Suggestion of glow about 30° S.  
1250 8/8. Very faint glow through cloud in SE.  
1400 8/8. No sign.

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JUNE 13.

0830 6/8. Aurora visible through breaks (Met.log).  
 Obs. continued to 1400, but although sky clear at times no other sign of display was recorded.

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JUNE 14.

Cloud varied between 7/8 and 8/8, but no sign of display was recorded.

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JUNE 15.

Cloud varied between 7/8 and 8/8, but no sign of display was recorded.

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JUNE 16.

(0504 Sunset  
 (0718 End astronomical twilight  
 (1930 Beginning astronomical twilight  
 (2146 Sunrise

0830 1/8. No sign.

0900 Same.

1000 Same.

1035 3/8. (1) G to 20° S - SE.

1045 4/8. (1) G to 30° S - SE.



JUNE 16 cont'd.

1050 Same  
1055. 6/8 and mist. Small patch (1) G through gap in cloud  $10^{\circ}$  -  $15^{\circ}$  SSE.  
1130 2/8, mainly in S (low). (1) G to  $30^{\circ}$  S-SE.  
1145 4/8. (1) G to  $30^{\circ}$  S - SE.  
1250 7/8. Very faint glow in SW through thin cloud,  $30^{\circ}$ .  
1325 2/8, mainly in S. No sign.  
1420 3/8. (1) G through cloud in SE.

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JUNE 17.

(0504 Sunset  
 (0635 Moonset  
 (0718 End astronomical twilight  
 (1931 Beginning astronomical twilight  
 (2146 Sunrise.

0900 1/8. Very broad (1) HA  $45^{\circ}$  S.  
0930 1/8. (1) HA now  $50^{\circ}$  S.  
0933 Same and (1) DS  $45^{\circ}$  E with faint suggestion of rays at upper edge.  
0945 (1) HA  $50^{\circ}$  S. Long (1) ray from W almost to Z.  
MAX. 1020 (2) drapery  $45^{\circ}$  S - SE.  
1045 Haze over most of sky. (1) ray from E to Z.  
1055 8/8 haze. Broad (1) ray in S. Suggestion of HA  $30^{\circ}$  S.  
1130 8/8 haze. HA still present in S. (1) parallel rays from E to Z.  
1215 8/8. Glow through cloud mainly in S.  
1300 Same.  
1350 Same.

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JUNE 18.

8/8 all night. No sign of aurora.

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JUNE 19.

(0505 Sunset  
 (0719 End astronomical twilight

JUNE 19 cont'd.

(0928 Moonset Fraction illuminated: 0.11  
 (1931 Beginning astronomical twilight  
 (2147 Sunrise  
  
0915 2/8. No sign although sky quite light.  
0940 4/8. Definitely lighter in S - SE sky, but  
 no definite border to weak glow.  
  
1045 8/8. No sign.  
1100 Same.  
  
1216 6/8. Very weak glow through thin cloud  
 SSW - S to about  $20^{\circ}$  S - may be HA.  
 Green line just discernible.  
  
1220 8/8. No sign.  
1222 8/8 and snowing.  
1225 0/8. Very faint glow S - SSW horizon.  
1233 1/8. Same.  
  
1430 7/8. Sky light - probably weak auroral  
 glow in N, S, E and Z.  
  
1930 Figg reported: "Bright band extending in  
 broad curve up from E to near Z and  
 curving away to disappear behind Wireless  
 Hill to the NNE"

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JUNE 20.

(0505 Sunset  
 (0719 End astronomical twilight  
 (1155 Moonset Fraction illuminated: 0.18  
 (1931 Beginning astronomical twilight  
 (2147 Sunrise.  
  
0830 8/8. No sign.  
0900 Same.  
  
1045 7/8 - clear only in Z. No sign.  
  
BCO 1125 6/8. (2) glow between clouds  $20^{\circ}$  SSW - SE,  
 may be HA. Rapidly becoming obscured by  
 cloud.  
  
1130 8/8. Glow behind cloud only in E.  
1135 8/8. Glow through clouds low due S and  $20^{\circ}$  E.  
1140 Patch of (2) glow still present, now  $20^{\circ}$  SE -  
 gap in clouds rapidly moving towards E.  
1145 5/8, mainly in S. Suggestion of glow through  
 cloud S - E up to  $30^{\circ}$ .

JUNE 20 cont'd.

DCO 1147 4/8. Same.

1151 6/8. Sky very light, although no definite display visible. Green line just discernible in S.

1157 6/8. Weak glow through gap in clouds  $45^{\circ}$  S.

1200 5/8. Sky generally very light in S half, but no definite display visible through breaks in clouds. Green line just visible.

1215 7/8. No definite sign although sky still fairly light. Green line not visible.

1220 Same.

1233 7/8. Glow behind clouds very low in S. Also sky light through thin cloud from N to W up to  $20^{\circ}$ .

1245 8/8. No sign.

1315 7/8, clear in Z only. No sign.

1345 8/8. No sign.

1425 Same.

JUNE 21.

8/8 all night. No sign.

JUNE 22.

(0505 Sunset  
 (0719 End astronomical twilight  
 (1355 Moonset Fraction illuminated: 0.37  
 (1932 Beginning astronomical twilight  
 (2148 Sunrise

1245 Till now 8/8.  
 Now 7/8. G (probably (1)) through thin cloud  $45^{\circ}$  SE.

1255 5/8. G (now probably (2)) through thin cloud  $25^{\circ}$  SSE.

1310 3/8, all in S. (1) G through thin cloud in many parts of S.

1405 8/8. Faint G in SE through heavy cloud.

JUNE 23.

0845 8/8. No sign.

0950 3/8. Bright moon. No sign.



JUNE 23 cont'd.

1018 5/8. No sign.

1026 8/8. No sign.

1035 8/8. No sign.

JUNE 24. 8/8 all night. No sign of display.JUNE 25. 8/8 all night. No sign of display.JUNE 26.

8/8 all night. No sign of display.

JUNE 27.

0815 1/8 - calm clear moonlight night. No sign of aurora.

0823 Same.

0830 1/8. No sign green line.

0840-1030 Practically continuous obs. 1/8 all time with no sign of aurora. Thin haze gradually covering entire sky by 1030.

1045 1/8 and haze. No sign green line.

1225 (2) patch (almost rayed) through thin cloud 30° SW.

1230 3/8. No sign again.

1245 4/8. No sign.

JUNE 28.

8/8 all night. No sign of aurora.

JUNE 29.

1100 Frequent obs. till now have revealed no sign of aurora or green line. 6/8 - 8/8 most of time.

1540 From Met. log: "Auroral glow to E with ray extending to Z".

1700 From Met log: "Spectacular auroral display in E in form of ever moving green curtains with rays reaching to the Z at times."

27.

JUNE 30.

0840 7/8 thin cloud. Bright moon.  
No sign of aurora.

0855 Same.

0911 Same.

0940 Same.

0950 6/8. Sky light in S but green line not  
visible. Moon fairly bright.

1032 8/8 thin cloud. No sign.

1155 7/8 thin cloud. No sign green line.

1200 Same.

1225 8/8. No sign.

1400 Same. Remained overcast for remainder  
of night.

28.

JULY 1950

JULY 1.

8/8 all night. No sign of aurora.

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JULY 2.

1010 Till now 8/8 and raining. No sign of aurora. Now beginning to clear.

1015 6/8. No sign.

1020 Same.

1115 Same.

1235 7/8. No sign.

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JULY 3.

(0510 Sunset

(0724 End astronomical twilight

(0915 Moonrise Fraction illuminated: 0.87

(1931 Beginning astronomical twilight

(2146 Sunrise.

0715 7/8. Possible (1) glow through cloud in W and E, but not definite.

0830-1122 Frequent obs. during this period. Always 8/8 with no sign.

1400 8/8. No sign green line on background continuous spectrum.

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JULY 4.

0830 8/8. Possible glow through cloud S - SW but not definite.

1300 Frequent obs. till now. Always 8/8 with no sign of aurora.

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JULY 5.

(0511 Sunset.

(0725 End astronomical twilight.

(1159 Moonrise Fraction illuminated: 0.70

(1931 Beginning astronomical twilight

(2146 Sunrise

1130 Till now 8/8 and light drizzle. No sign.

1200 4/8 (mainly in S and W) and mist. (1) G 30° SE. Green line distinct on large aperture.

1205 3/8. (1) G 45° S and (1) ray from S to Z.



JULY 5 cont'd.

- 1210 1/8. (1) broad diffuse rays from E to Z  
and from SW to  $50^{\circ}$ . Extensive (1) G.  
1215 1/8. (1) G extending into N sky.  
1220 (1) broad rays mainly from E and S to Z  
giving suggestion of corona.  
MAX. 1225 (2) RB  $20^{\circ}$  SE. (2) Patch SW. (1) rays from  
most parts of sky forming distinct  
corona in Z.  
1240 8/8, thin in parts. No sign of display.  
1305 8/8. No sign.  
1309 Same.  
1335 Same.  
1430 Same.
- 

JULY 6.

- (0512 Sunset  
 (0726 End astronomical twilight  
 (1316 Moonrise Fraction illuminated: 0.61  
 (1930 Beginning astronomical twilight  
 (2144 Sunrise.  
0702 2/8. (2) G through patchy cloud to  $20^{\circ}$  S-SE.  
0720 Same.  
0730 Same.  
0800 1/8 in S. Possibly auroral glow behind cloud,  
but not definite.  
0840 1/8. (1) HA  $45^{\circ}$  S. (1) G to  $30^{\circ}$  S.  
0855 1/8. (1) HA  $45^{\circ}$  S with (1) G at bases  
of HA in E and W.  
0859 3/8, becoming misty. Same as last obs. and  
(1) rays from  $20^{\circ}$ - $50^{\circ}$  E.  
0919 5/8 - S sky obscured. (1) G to  $45^{\circ}$  W and  
 $45^{\circ}$  E.  
0938 5/8. (1) HA apparently centred  $50^{\circ}$  NNW.  
Bright glow through cloud  $45^{\circ}$  S appeared and  
moved rapidly eastwards - probably (2)  
drapery.  
0941 Elevation (1) HA in N now  $80^{\circ}$  N.  
(1) G to  $10^{\circ}$  W.  
0947 (1) G to  $10^{\circ}$  from W to N. Practically no  
sign of former HA in NW. Broad (1) DS

JULY 6 cont'd.

- 0947 extending to near Z from E. Apparently considerable activity behind cloud at high elevations in SE - (2) glow at upper edge of cloud.
- 0956 6/8. Patch of (3) G  $10^{\circ}$  WSW through gap in cloud. Patches of G visible through cloud over most of sky between SW and NE up to about  $70^{\circ}$ . (1) G to  $10^{\circ}$  NW.
- 1000 4/8. Extensive (3) G SW through patchy cloud, becoming less intense with altitude in rather non-uniform manner - semblance of weak bands superimposed on general glow. Two long (1) rays from W to near Z. Small (1) patch  $10^{\circ}$  NW. Still considerable glow through cloud SE - E.
- 1010 6/8. (3) G still present from W to S - visible to  $15^{\circ}$ , but obscured by cloud above this elevation. (2) G through gap in cloud  $30^{\circ}$  SE - E. Two close short rays in E. Nothing visible elsewhere, but green line very distinct everywhere in S.
- 1015 6/8. (3) G now visible to  $20^{\circ}$  S. Patchy glow present through clouds over most of sky from W - NE through S.
- 1200 7/8. Only patches (2) G visible through gaps in cloud scattered over S sky.
- 1205 8/8. Patchy glow still evident in E, S and W.
- 1320 3/8. (2) band (apparently quiet) through thin cloud  $30^{\circ}$  S.

JULY 7.

8/8 and mist all night. No sign of aurora.

JULY 8.

- 0830 Fairly clear sky with no sign of aurora.
- 0915 4/8. No sign.
- 1218 3/8. No sign.

JULY 9.

Nearly always 8/8 with no sign of aurora.

- 1530 Aurora to SW (Met. log).

JULY 10.

(0516 Sunset.  
 (0729 End astronomical twilight  
 (1823 Moonrise Fraction illuminated: 0.24  
 (1928 Beginning astronomical twilight  
 (2141 Sunrise

0820 8/8. No sign.

0842 8/8. Sky definitely lighter at high elevations in SE.

0912 Same.

1000 8/8. Rather light patch  $60^{\circ}$  S.

BCO 1025 5/8 - sky rapidly clearing in S and Z. Several (1) isolated rays E and W of Z, changing and fading fairly rapidly. (2) G  $60^{\circ}$  S, becoming more like band.

1026 (1) HB developed through Z running E-W.

1030 6/8. Several (1) narrow parallel arcs E-W through Z. Small patch (1) G  $5^{\circ}$  SE and (2) G  $5^{\circ}$  E.

1035 Almost 8/8. Weak glow along horizon from S to E and at  $60^{\circ}$  SE.

1037 Zenith fairly clear. No sign of previous arcs.

1038 6/8 and mist. Appears to be weak moving band about  $50^{\circ}$  E - SW.

1042 6/8 and mist. Weak glow through cloud still visible  $50^{\circ}$  E - W (may be HA). Glow along SE horizon to  $10^{\circ}$ . Two very weak bands through Z running NE - SW (only short length visible).

1045 Very misty. Weak glow from E to Z with semblances of weak broad rays. Small patch glow visible dimly in SSE.

DCO 1050 8/8 mist.

1105 8/8. No definite sign, although sky fairly light.

1220 8/8. Still fairly light.

1320 8/8. No sign.

The following obs. reported by Ward:

1500 Curved band running SE.

MAX 1530 (3) RB from ESE curving towards S. Rayed at east end.

1545 RB still present.



JULY 10 cont'd.

- 1615 Single (2) diffuse band in ENE, almost invisible overhead and reappearing in WSW.
- 1645 Band now (1), more homogeneous and less curved. Moved considerably towards SE.
- 1700 (1) band still further displaced towards SE and still unbroken.
- 1800 (1) glow in SE only.
- Cloud 3/8 at 1730 (Met log).

JULY 11.

8/8 all night. No sign.

JULY 12.

- (0519 Sunset  
(0731 End astronomical twilight  
(1927 Beginning astronomical twilight  
(2047 Moonrise Fraction illuminated: 0.10  
(2140 Sunrise
- 0640 Display reported by Met. observer.
- BCO 0650 2/8. (1) rays from E, SW and W to Z, very long and fluctuating. Patch (2) DS  $5^{\circ}$  S.
- 0651 (2) drapery developed from W to Z.
- 0655 Bundle long (1) rays from W to Z. Weak drapery (1) with fairly straight lower edge from SW to S -  $10^{\circ}$  SW end,  $40^{\circ}$  S end. Small patch (1) G  $60^{\circ}$  E. Extensive (1) G to  $20^{\circ}$  SSE - SW.
- 0700 (1) corona now formed by long rays from W, S and E to Z. Very long bundles of weak rays from W and SW to Z.
- 0706 (2) bands  $20^{\circ}$  -  $30^{\circ}$  S. DS  $40^{\circ}$  S. (2) rays from  $30^{\circ}$  SW to Z. (2) corona in Z with short rays only on E and N sides. (1) bundle of rays in E.
- 0708 Zenithal corona now faded. Weak drapery strongest due S  $50^{\circ}$  extending to  $10^{\circ}$  SW.
- 0709 Drapery from S - SW now (2).
- 0710 (2) drapery from S - SW rapidly fading. (2) band S. Corona again in Z, fairly steady.
- MAX 0711 Drapery reappeared in S and more irregular, (3) SSW. Corona in Z.

- 0714 Display fairly steady (1). Feeble remains of drapery in SW.
- 0716 1/8 low in S. (2) drapery SSE. (2) DS  $45^{\circ}$  S. Nothing in Z.
- 0720 (2) double RB from  $20^{\circ}$  SW to  $40^{\circ}$  SE. (2) drapery SSE split into two parts, one retaining drapery form, the other appearing as uniform (2) patch.
- 0722 (2) draperies SSW and SW joining in diffuse patch  $60^{\circ}$  S.
- 0724 Draperies faded. Single (2) ray in Z rapidly fading. (1) rays from S to Z.
- 0726 Bundle (1) rays appeared  $45^{\circ}$  SE and rapidly faded. RB again in S  $40^{\circ}$  right across sky and second band  $25^{\circ}$  S.
- 0730 RB still present in S. (1) rays from SW to Z.
- 0736 1/8 in S. (2) glow at upper edge of cloud ( $10^{\circ}$  S) - may be HA or extensive DS. (1) patches of G scattered over S sky with (1) scattered rays.
- 0737 2/8. Patchiness gone. Single bundle long (1) rays from low in W, rapidly fading.
- 0740 Practically no activity above the DS extending to  $20^{\circ}$  S.
- 0744 3/8. Only (1) G above cloud  $20^{\circ}$  SE - SW.
- 0745 Strip of (2) G now visible parallel to horizon  $10^{\circ}$  S - SSW.
- 0749 Strip now obscured. Very faint G extending to  $40^{\circ}$  E - W.
- 0755 3/8. Very weak G covering most of S sky to  $45^{\circ}$  - appears to be slightly striated into horizontal bands, but too weak to say definitely.
- DCO 0807 4/8 - S sky obscured to  $40^{\circ}$ . No sign in S. Very faint patchy glow over large area centred  $40^{\circ}$  NNE. Here green line visible.
- 0823 4/8 haze. Extremely weak structureless glow extending over all N sky. Green line clearly visible everywhere.
- 0830 Same.
- 0833 Same.
- 0845 8/8 light misty cloud. No sign but LNS.
- 0907 7/8. Diffuse glow  $30^{\circ}$  S through thin cloud. Elsewhere no sign except for general feeble light. LNS.

JULY 12 cont'd.

- 0920 8/8. Green line just visible being most prominent in E and S.  
0925 Same.  
0930 8/8. Sky not completely dark, but LNS.  
1010 Same.  
1045 8/8. Green line faintly visible in SE sector only.  
1130 7/8. No sign.  
1155 8/8. No sign. Green line not visible.  
1300 8/8. No sign.
- 

JULY 13.

- (0520 Sunset  
 (0732 End astronomical twilight  
 (1925 Beginning astronomical twilight  
 (2138 Sunrise

0720 7/8. Suggestion of auroral glow through cloud in S, E and NE. Green line not visible.

0827 7/8. No sign.

BCO 1020 5/8. Patches (1) G in W, SW and E. Green line distinct.

1030 4/8. Extensive weak glow SW - SE from  $5^{\circ}$  to  $30^{\circ}$ . Isolated DS's in E, NE and Z at high elevations. Intensity nowhere exceeds (1).

1036 (1) patch  $30^{\circ}$  ENE and  $40^{\circ}$  NNW. (1) G from SW to E and up to  $40^{\circ}$ .

1038 G now (2)  $20^{\circ}$  S - SSE.

1045 5/8. (1) G  $20^{\circ}$  E - NE. (1) G NW  $5^{\circ}$  and  $70^{\circ}$ . (1) G over large area W - SE to  $45^{\circ}$ . This is very patchy and changes quickly. Long arms of weak glow extending in straight and curved lines appear and fade rapidly along upper and W edges of glow.

1050 6/8. Glow now visible only through cloud gaps, but still present in NW and NE to about  $60^{\circ}$ . Also still present over S sky to about  $40^{\circ}$ .

1054 4/8. Glow from W to NW up to  $60^{\circ}$ , has appearance of drifting luminous arms of mist.

1056 Drapery developed in WNW increased to (2) and rapidly faded to (1).



JULY 13 cont'd.

- 1057 3/8. Practically whole sky now covered with straggling patchy (1) G.
- 1059 Structureless glow W  $40^{\circ}$  reached (2) and rapidly faded to (1).
- 1100 Semblance of very long (1) band (irregular) curving from W horizon to high in NW. Single patch of (1) G  $45^{\circ}$  N. Clear in S where extremely weak glow is present  $10^{\circ}$ .
- 1103 3/8. Main activity is W and N of Z where patchy (1) glow is present.
- 1106 Now patchy (1) glow E and N of Z about  $70^{\circ}$ . Long (1) rays from  $30^{\circ}$  E to Z.
- 1107 Glow now extends from W through N to E with long dark band from  $40^{\circ}$  W to  $40^{\circ}$  E through Z.
- 1109 3/8. Same. Glow now almost disappeared from S sky.
- 1111 (2) G<sub>0</sub> developed rapidly SE - SW above cloud at  $20^{\circ}$  and then faded to (1). Considerable area of glow visible W of Z and NW of Z. E clouded.
- 1114 Cloud rapidly increasing. Extensive patchy (1) G again visible in Z and N of Z. Two parallel dark bands from  $50^{\circ}$  W through Z to  $60^{\circ}$  E.
- 1118 6/8. Main visible glow now E and NE of Z, fading.
- DCO 1120 6/8. All S sky overcast. Feeble patchy glow in E and NE.
- 1135 8/8 thin cloud. Glow through clouds, mainly in S.
- 1145 8/8. Long horizontal strip of glow visible through cloud  $5^{\circ}$  W.
- 1200 8/8 thin cloud. Patchy glow visible W and NW to Z.
- 1245 7/8. Slight glow through cloud in S. Distinct patches  $80^{\circ}$  N and  $45^{\circ}$  E.
- 1300 7/8. Glow through cloud  $60^{\circ}$  N.
- 1325 8/8. Glow through cloud  $60^{\circ}$  N and  $30^{\circ}$  SW.
- The following obs. were reported by Ward:
- 1600 Clouded till now. Now moderate glow in SSW with weak streaks from SSE to SSW about  $10^{\circ}$ .
- 1630 Same.
- 1700 8/8.
-

JULY 14.

8/8 all night. No sign of aurora.

JULY 15.

(0522 Sunset  
 (0734 End astronomical twilight  
 (1925 Beginning astronomical twilight  
 (2137 Sunrise  
  
0830 8/8. (Met. log).  
1130 5/8. (Met. log).  
1155 5/8. (2) G from E to SW to  $70^{\circ}$ .  
1235 Almost 8/8 - one star visible in NE.  
 Glow through cloud  $70^{\circ}$  N.  
1255 1/8. (2) G to  $60^{\circ}$  S. No sign in N.  
1350 8/8. Small patch of glow through cloud  
 $40^{\circ}$  SSE.

JULY 16.

(0524 Sunset  
 (0559 Moonset Fraction Illuminated: 0.01  
 (0736 End astronomical twilight  
 (1924 Beginning astronomical twilight  
 (2136 Sunrise  
  
0725 1/8. (1) G from E to SW to  $30^{\circ}$ .  
0820 5/8 - all S sky obscured. No sign of  
 aurora or green line.  
0850 8/8. No sign.  
0930 8/8. Glow visible through cloud in line  
 from SW horizon to  $45^{\circ}$  S.  
0950 8/8, thin in parts. Glow through cloud  
 $50^{\circ}$  S.  
1025-1025 7/8. No sign.  
1039 8/8. No sign, but sky not completely dark.  
1100 Same.  
1140 Same.  
1145 Same.  
1200 3/8 heavy cloud and 5/8 thin haze. No  
 auroral forms visible but green line  
 faintly discernible.  
1255 8/8. Narrow strip  $10^{\circ}$  S quite light.  
 Green line visible.

JULY 17.

0715 6/8 - clear round Z. No sign.

8/8 for remainder of night with no sign of aurora.

JULY 18.

8/8 all night. No sign of aurora.

JULY 19.1240 Till now 8/8 with no sign of aurora.  
Now 8/8, thin in parts. Glow through cloud in two bands  $20^{\circ}$  and  $30^{\circ}$  S.

1300 8/8. No sign. Green line not visible.

JULY 20.(0529 Sunset  
(0739 End astronomical twilight  
(1144 Moonset Fraction illuminated: 0.24  
(1921 Beginning astronomical twilight  
(2131 Sunrise

0710 0/8. No sign. Moon in W.

0830 1/8 in S (mist over plateau). No sign.

0850 1/8 S - SW. No sign.

0925 3/8 - sky becoming hazy. No sign.

0951 1/8, S - SW. No sign.

BCO 0958 1/8. (1) glow S - SE. Semblance of half HA  $20^{\circ}$ , but as all cloud is below glow may be only upper edge of G. Green line clearly visible.

MAX 1000 Intensity of glow now increased to (2).

1002 Broad (1) rays from glow in SE.

1007 1/8. Glow again (1), but extends to  $25^{\circ}$  SE. Semblance of weak arc along edge of cloud right over to W, but green line not visible from this sector - may be moonlight on edge of mist bank over plateau.

1010 (1) glow visible all along S - SE horizon.

1013 (1) glow now general in E, SE and S to  $30^{\circ}$ .

DCO 1015 4/8 - cloud closing in from S and NW. Very weak glow still visible in E - SE sector.



JULY 20 cont'd.

- 1025 8/8. Some patches of weak glow in west, probably due to moon on thin cloud. No sign of green line in any direction.
- 1037 3/8. (1) glow above cloud  $30^{\circ}$  SE. Considerable amount of light on edges of cloud in W due to moon - green line not visible in that direction.
- 1055 2/8. (1) C over all E - SSW sky to  $30^{\circ}$ .
- 1125 7/8, clear in Z. No sign.
- 1135 4/8. (1) glow visible through gap in clouds  $30^{\circ}$  SE.
- 1141 7/8, thin in parts - stars dimly visible in Z. No sign of aurora and green line not visible.
- 1200 6/8. Sky slightly light in SE but green line not discernible.
- 1224 Almost 8/8 - one star visible. No sign.
- 1300 8/8. No sign.
- 1330 Same.

JULY 21.

- (0530 Sunset
- (0740 End astronomical twilight
- (1311 Moonset Fraction illuminated: 0.34
- (1920 Beginning astronomical twilight
- (2130 Sunrise
- 0815 4/8. No sign.
- 0840 5/8. No sign.
- 0925 1/8 and haze in W and Z. (1) G  $10^{\circ}$  SE. Green line visible.
- 0935 4/8. Patches weak glow through cloud  $15^{\circ}$  SSE and  $15^{\circ}$  SE.
- 0945 3/8, thick only in S - SW. (1) G  $5^{\circ}$  -  $20^{\circ}$  SSE.
- 1025 8/8. No sign. Green line not discernible.
- 1049 5/8. (1) G to  $20^{\circ}$  SSE.
- 1145 4/8 scattered. Glow (probably (2) rays) through gaps in clouds  $20^{\circ}$  S - SSE.
- 1155 4/8, mainly thin. (1) G over most of S sky to  $45^{\circ}$ .

JULY 21 cont'd.

- 1214 2/8 thin. Moon still bright. Patch (1) G with (1) broad rays  $10^{\circ}$  SSW. Possibly (1) HA  $45^{\circ}$  S. Nothing E of S where previous glow was.
- 1220 Patch in SSW faded. Also no sign of HA. Sky light to  $50^{\circ}$  S, but glow quite formless.
- 1250 2/8. (1) HA  $45^{\circ}$  S, rapidly faded. (2) DS with weak rays  $5^{\circ}$  -  $20^{\circ}$  SSW - weak rays also rapidly faded.
- 1400 8/8. Weak glow in SE.

JULY 22.

- (0532 Sunset  
(0742 End astronomical twilight  
(1442 Moonset Fraction illuminated: 0.45  
(1918 Beginning astronomical twilight  
(2127 Sunrise
- 0830 8/8. (Met. log).
- 1130 4/8, thin. (1) G in SE.
- 1220 4/8, thin. (1) G S - SE to  $50^{\circ}$ . Green line visible.
- 1310 8/8. Green line visible in SE.
- 1343 1/8. General (1) G over all SE sky to  $50^{\circ}$ , strongest near horizon. Could extend into W sky, but impossible to tell with bright moon.
- 1415 1/8. (1) G to  $50^{\circ}$  S. (1) rays in E.

JULY 23.

- (0533 Sunset  
(0742 End astronomical twilight  
(1616 Moonset Fraction illuminated: 0.56  
(1917 Beginning astronomical twilight  
(2126 Sunrise
- 0910 Sky fairly clear from 0800 till now with no sign of aurora. Now 0/8.
- 0950 3/8. No sign.
- 1000 4/8, scattered. No sign.
- 1054 2/8. Moon bright. No sign.
- 1115 Same.
- 1214 7/8. No sign.

JULY 23 cont'd.

- 1231 4/8. No sign.
- 1245 4/8. Suggestion of extremely faint HA  $10^{\circ}$  S, but may be cloud lighted by brilliant moon. Green line not definitely present on background of continuous spectrum, but there is a suggestion of it.
- 1310 6/8 - part of sky where "HA" was is quite clear. No sign.

JULY 24.

7/8 - 8/8 with snow showers all night.  
No sign of aurora.

JULY 25.

- (0537 Sunset  
(0745 End astronomical twilight  
(1913 Beginning astronomical twilight  
(1921 Moonset Fraction illuminated: 0.78  
(2122 Sunrise
- 0835 3/8. (3) band  $30^{\circ}$  SSE. (2) drapery from E to W through  $60^{\circ}$  S, most curved in W. All parts of display changing fairly rapidly.
- 0845 7/8, obscuring parts where display was. Slight glow through cloud SSE.
- 0854 1/8. (2) HA  $45^{\circ}$  S. (2) band  $20^{\circ}$  SSE with (2) tubular drapery just below it.
- 0857 1/8. No sign of HA. (1) band  $20^{\circ}$  SSE with diffuse (1) patch below it where drapery was.
- 0906 7/8. No sign.
- 0925 6/8. No sign.
- 0947 7/8. No sign.
- 1016 8/8. No sign.
- 1045 Same.
- 1120 8/8. No sign. Green line not visible on background continuous spectrum.
- 1145 Same.
- 1245 Frost reported aurora visible in SE, rapidly becoming obscured by cloud.
- 1325 8/8. Suggestion of glow through cloud  $40^{\circ}$  SSE, but difficult to be sure it is auroral with moon still up. Green line not discernible.



JULY 25 cont'd.

The following obs. were made at Sandy Bay, 4.5 miles S of main camp.

0910 2/8. (1) RA  $15^{\circ}$  S. (1) HA's at  $50^{\circ}$  S and  $80^{\circ}$  S.

0925 3/8. (1) HA  $50^{\circ}$  S. (2) rays  $5^{\circ}$  S partly obscured by cloud, but in rapid motion - possibly drapery.

JULY 26.

0820 2/8. No sign.

0920 5/8, clear in S. No sign.

0950 7/8. No sign.

1155 8/8. No sign.

1400 8/8. No sign. Green line not visible on background continuous spectrum.

JULY 27.

8/8 all night with snow showers. No sign of aurora.

JULY 28.

8/8 all night. No sign of aurora.

JULY 29.

8/8 and raining all night. No sign of aurora.

JULY 30.

8/8 nearly all night. No sign of aurora.

JULY 31.

8/8 all night. No sign of aurora.

AUGUST 1950AUGUST 1.

0800 8/8. No sign.  
0845 4/8 in S. No sign.  
0900 2/8. No sign. No line.  
0905 1/8. No sign.  
0920 2/8. No sign.  
0930 4/8. No sign.  
0945 5/8. No sign.  
1005 6/8. No sign. No line.  
1025 7/8. Light from moon on thin cloud, but no sign green line.  
1050 6/8. Moonlight very bright on edges of flocculent cloud in E but green line not visible.  
1340 8/8. No sign. No line.

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AUGUST 2.

1205 Till now cloud has varied between 8/8 and 3/8 with no sign of aurora. Now 3/8. Sky very light but no sign green line.  
1220 6/8. No sign.  
1420 8/8. No sign.

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AUGUST 3.

(0552 Sunset  
 (0757 End astronomical twilight  
 (1212 Moonrise Fraction illuminated: 0.76.  
 (1902 Beginning astronomical twilight  
 (2108 Sunrise  
0830 1/8. (1) G from SSE to SSW to 20°. Green line visible.  
0835 1/8. (1) G visible only in SSE. Cloud obscuring SSW.  
 BCO 0846 (1) G to about 30° S, with intensity gradually falling off towards upper edge.  
0847-0850 Same.  
0850-0900 Cloud increased to 2/8 covering lower half of extensive G the position and intensity of which have not changed.

AUGUST 3 cont'd.

- 0902 3/8. (1) G extending higher in W. Upper edge irregular in E - SE.
- 0904 E to S end of G developed into diffuse band almost horizontal between  $15^{\circ}$  and  $20^{\circ}$  with few short (1) rays in SSE.
- DCO 0906 4/8. (1) patchy band  $30^{\circ}$  E - SW. (Stars clearly visible below band). W obscured by cloud.
- 0912 4/8. Band disintegrated into separate DS's, very weak at E end, but two patches (2)  $25^{\circ}$  SSW and  $15^{\circ}$  SW.
- 0915 6/8. Patches in SSW and SW faded to (1) and becoming obscured by cloud. Patch on ESE now almost (2).
- 0920 6/8. S-W obscured. Elongated (2) DS between  $20^{\circ}$  and  $50^{\circ}$  ESE with very weak rays. Suggestion of extensive (1) glow behind thin cloud in ENE from  $15^{\circ}$  to  $50^{\circ}$ .
- 0924 4/8. (2) DS with sharp lower edge from  $70^{\circ}$  to  $80^{\circ}$  S. Patches (1) glow through thin cloud in E, NE and just N of Z. W obscured.
- BCO 0926 (2) DS has drifted towards W and now appears slightly striated. Two long (1) rays from W to Z. Extensive (1) G in N, NE and E.
- 0927 3/8. Patchy (2) G  $45^{\circ}$ - $55^{\circ}$  SE to SW. Several long (1) rays from E to  $50^{\circ}$  and from W to  $40^{\circ}$ . (1) G in N now extends from E to W through about  $25^{\circ}$  N.
- 0934 3/8. G N of Z still present. Two long (1) rays from E to Z. Broad (2) RB from SSW to W with sharp lower edge.
- 0937 (2) RB now almost drapery with little motion. Gradually moving to W and losing altitude and intensity.
- 0939 Drapery now (1). G almost disappeared in N. (1) band  $40^{\circ}$ - $50^{\circ}$  ESE - SE.
- 0941 4/8. Band in SE now (2) and linked by long band with (1) RB in W.
- 0942 (2) band through  $45^{\circ}$  S, almost arc with ray structure at extreme W end.
- 0945 1/8. Band from  $20^{\circ}$  E through  $40^{\circ}$  S and disappearing behind hills  $5^{\circ}$  W. Rayed in S - W half and almost (3) at W end. No sign elsewhere.
- 0947 (1) rays protruding below band about  $20^{\circ}$  SSE.



AUGUST 3 cont'd.

- 0948 1/8. RB now (2) with small (1) diffuse patch where rays were, i.e.  $20^{\circ}$  SSE.
- 0950 0/8. Display fairly quiet.
- 0955 1/8. RB still (2). Few (1) rays below band at ESE end.
- 0957 Form same but now (1).
- 0958 Whole band faded quickly and then reappeared and increased to (3).
- 1000 (2) draperies formed rapidly in SE sector. Corona formed with some rapidly moving rays.
- 1002 Very sharp narrow (3) drapery from E through Z to  $30^{\circ}$  W.
- 1003 (3) drapery through Z rapidly broadening in Z and extending further to E and W. Diffuse (2) draperies over all E - SSW sky. Original RB still present, but split into two parts at W end.
- MAX. 1006 (3) drapery through Z drifting S. (3) draperies over all S sky below  $60^{\circ}$ .
- 1008 Main drapery near Z rapidly faded away.
- 1009 Another (3) narrow drapery formed through Z in E-W direction and faded again to (2). Other draperies in S now only (2).
- 1010 Drapery through Z faded.
- 1012 (3) drapery rapidly formed S - SW  $10^{\circ}$ .
- 1013 Very little activity above  $40^{\circ}$  S. Display faded to (2) except at  $10^{\circ}$  SSW where intensity still (3).
- 1014 Quiet (2) bands from SE - SW. Several parallel (2) draperies  $15^{\circ}$  SW - W. Two (1) parallel draperies forming from E to Z.
- 1015 (3) DS  $20^{\circ}$  SSW. (2) drapery in three or four tiers  $20^{\circ}$  SW with solitary (1) ray. In SSE three (1) rays curve up from  $20^{\circ}$  towards Z becoming weaker with altitude.
- 1017 1/8. One of the rays brightened to (2) and faded. Another curved over towards the W. (3) tiered drapery still present  $20^{\circ}$  SSW.
- 1020 Drapery fairly quiet but now (2). Single (3) ray from  $20^{\circ}$  SSE fanning out at  $45^{\circ}$  into diffuse patch and fairly rapidly fading.
- 1021 Draperies focussing to point  $10^{\circ}$  W. Very broad (1) sweep of glow from focal point in W through Z joining up with odd rays, (1) bands and DS's in E - SE.

AUGUST 3 cont'd.

- 1023 Drapery in W quiet. Diffuse (1) band concave to W in SSE.
- 1025 1/8. Tiered drapery now gone. (1) rays appearing in SW. General diffuse G over S sky with (1) bands superimposed in SSW  $20^{\circ}$ .
- 1027 Series of weak bands over most of S sky with few rays at E and W ends.
- 1029 Display extends to  $20^{\circ}$  in SW - W. Isolated rays in E and S with single broad band SE - S.
- 1031 Band (almost HA) through  $30^{\circ}$  S, (1). Several long (1) rays from ESE to Z.
- 1032 (1) rays from SSE to Z forming suggestion of corona.
- 1033 0/8. Band through  $30^{\circ}$  S weaker and more irregular. (2) band  $10^{\circ}$  from S - W.
- 1037 Diffuse (1) G from SE to W. (2) RB  $30^{\circ}$  SW and band  $20^{\circ}$  from SW to S superimposed in general G.
- 1040 1/8 low SE - W. Display faded to weak almost uniform G over practically all S sky. Almost (2) in lowest portion. Still suggestion of band structure low in W.
- 1045 Same.
- 1048 As above except that suggestions of bands now very diffuse.
- DCO 1100 1/8 and mist gathering. Same, but (2) ray to  $10^{\circ}$  W.
- 1130 5/8. (1) G in SW to  $10^{\circ}$ .
- 1140 6/8. Display obscured, but green line just visible in S sky.
- 1225 5/8. No sign.
- 1246 8/8. No sign.
- 1330 Same.

AUGUST 4.

- (0553) Sunset
- (0758) End astronomical twilight
- (1329) Moonrise
- (1900) Beginning astronomical twilight
- (2107) Sunrise

AUGUST 4 cont'd.

- 1035 Till now 8/8 with no sign of aurora or green line.
- 1112 8/8. No definite sign, although sky not completely dark in S, particularly low above snow covered plateau. No sign of green line.

AUGUST 5.

- 0900 2/8. No sign.
- 0913 7/8. No sign.
- 0927 8/8. No sign.
- 0950 Same.
- 1130 7/8. (Met. log).
- 1315 Display reported.
- 1320 2/8. G to  $15^{\circ}$  SE - SW, (1) in SW and (2) in SE where several short (1) rays are also present.
- 1335 8/8. Glow visible through cloud low in S.
- 1410 4/8. (1) G visible to  $25^{\circ}$  through gaps in clouds SE - SW.

AUGUST 6.

- 0855 8/8. Slight lightness  $45^{\circ}$  E and W.
- 0915 8/8. Slightly light in small area in Z. LNS.
- 1000 8/8. No sign.
- 1035 Same.
- 1155 Same.
- 1330 4/8 and thin haze. Slightly light  $30^{\circ}$  SE just at edges of cloud - may be stars behind thin cloud. Green line not discernible.

AUGUST 7.

- (0558) Sunset
- (0801) End astronomical twilight
- (1723) Moonrise Fraction illuminated: 0.39
- (1856) Beginning astronomical twilight
- (2101) Sunrise
- 0715 0/8. No sign.
- 0725 0/8. No sign.



AUGUST 7 cont'd.

- 0805 Aurora reported by Dawson.
- BCO 0813 0/8. (3) band from E horizon through  $25^{\circ}$  SSE to SW horizon.
- 0817 Band now (2) and slightly rayed.
- 0819 Fine structure in SW portion resembling short rays.
- 0821 Band double in SW. (3) in SE and turning into drapery.
- MAX 0822 (3) drapery in SE moving slowly W leaving broad diffuse glow behind it.
- 0825 (2) drapery in SE sector. (2) double band in SW.
- 0826 (1) rays from S portion.
- 0827 Drapery reverted to (2) HB in SE. Broad (1) ray bundle  $80^{\circ}$  E.
- 0829 (2) drapery SW. (1) rays  $80^{\circ}$  SW.
- 0834 2/8, rapidly increasing. E end of (2) HB still visible together with glow through cloud along WSW horizon. No sign of activity above  $30^{\circ}$  in S sky.
- 0837 3/8. Otherwise same.
- 0842 3/8 scattered over all S sky. (2) glow visible through gaps low in SE. Two (2) rays  $10^{\circ}$  WSW through gaps. Very faint glow now appears to extend over all S sky to about  $70^{\circ}$ .
- 0846 3/8. WSW rays now obscured. (1) G extends further E, parts being slightly N of E. (2) patches still visible  $5^{\circ}$  SE - S. Very long broad (1) ray from W to Z.
- 0848 Same and single short (1) ray through Z in NE direction. This ray rapidly faded.
- 0849 2/8 - clearing in S. Broad (1) HA  $45^{\circ}$  S. (2) straight band from  $5^{\circ}$  S to ESE horizon. Feeble G over all S sky.
- 0851 1/8. Broad (1) HA  $45^{\circ}$  S still present. (2) band has broadened and risen slightly now forming almost double HA  $7^{\circ}$  -  $8^{\circ}$  S.
- 0858 (2) band slightly less regular, and consists of two parallel bands. Lower edge rising slowly. (2) drapery with weak ray structure began to form below SE end of bands and slowly moved S.

AUGUST 7 cont'd.

0900 1/8. Top of band region has developed into almost perfect HA centred slightly W of S. Intensity slightly less but still (2). (1) HA still present  $45^{\circ}$  S, diffuse.

0905 1/8. - SW obscured. Now almost DS from SE to  $S 4^{\circ} - 12^{\circ}$ , (2). Slightly rayed at ESE end.

0908 Long (2) rays from ESE. (1) drapery SSE.

0910 2/8 in SW. General G in all visible S sky. Rays in ESE somewhat curved. DS to  $20^{\circ}$  S.

0913 Rays practically gone.

DCO 0917 3/8 over S sky. Glow visible through cloud in SSE and SW.

0925 5/8. Glow visible at edges of cloud and through cloud in SSE and SW.

0945 4/8 in S. Otherwise same.

0954 7/8. Otherwise same.

1006 2/8 scattered in S. (1) G over all S sky, slightly brighter low in SSE. Single (1) ray  $20^{\circ} - 40^{\circ}$  WSW.

1027 3/8 - SW obscured. (1) G over most of SE sector. Suggestion of glow at top of clouds  $70^{\circ}$  SW.

1033 Same, though perhaps feebler.

1037 Same and patch (1) G visible low in WSW.

1055 4/8. (2) drapery  $15^{\circ}$  WSW - W.

1100 2/8. (2) drapery in W extends into broad regular (2) band through  $30^{\circ}$  SE to E. (1) G to  $10^{\circ}$  S - SE.

1106 2/8. (2) draperies in SW and SE below band which has weakened to (1). Three parallel (1) bands converging to W horizon. Extensive (1) G E-SE. Nothing above  $50^{\circ}$  in E, S or W.

1115 1/8. Fairly uniform (1) G over all S sky with slight increase in intensity - not definite arc - across sky through  $40^{\circ} - 50^{\circ}$  S.

1140 3/8 in S. (1) G visible through all gaps in cloud over all S sky.

1157 2/8 in S. (1) G through gaps and at edges of cloud.

1202 0/8. (1) HA  $30^{\circ}$  S. Very feeble G elsewhere over S sky.

AUGUST 7 cont'd.

- 1230 0/8. (2) HA  $30^{\circ}$  S. (1) G over remainder of S sky.
- 1300 1/8.  $30^{\circ}$  arc rayed at E end and changing in position and intensity fairly rapidly. Momentarily (3) but usually (2) or (1).
- 1305 Rayed portion now diffuse and (2). Arc quiet elsewhere.
- 1350 3/8. Faint glow through cloud in SE where arc was.

AUGUST 8.

- (0600 Sunset  
(0803 End astronomical twilight  
(1835 Moonrise. Fraction illuminated: 0.30  
(1853 Beginning astronomical twilight  
(2059 Sunrise
- BCO 0720 (2) rays in all N sky.
- 0725 Since last obs. display developed into (4) drapery with red predominant in E and yellow-green in N. Rays reached not quite to Z. Drapery changing slowly.
- 0730 2/8. Now (2) rays in W and diffuse (2) patches in N and E.
- 0737 2/8. Display now in all parts of sky, main features being (3) diffuse patch  $20^{\circ}$  S and rays in N with fairly well defined lower edge  $20^{\circ}$  N.
- 0741 Large portions of N sky covered by DS. Rays in N show semblance of break about  $25^{\circ}$  and continue above (sunlit?) Suggestion of (2) corona.
- 0745 (3) draperies in all E sky. (2) band through  $45^{\circ}$  N and (2) rays in N.
- 0750 3/8. (2) DS and bands in N, NE and E mainly round  $45^{\circ}$ . Little activity in S.
- 0753 Extent of display considerably reduced. Diffuse rays from SE to Z forming suggestion of corona. Diffuse patches in N sky.
- 0755-0800  
MAX Brilliant green sheet appeared over entire E - N sky rapidly spreading to NW. Long rayed draperies rapidly formed sweeping towards Z. Then brilliant (4) draperies developed over all N sky reaching to Z forming a swirling corona containing practically all colours of the rainbow, purple, green and yellow predominating.



- 0803 Faded in N. Drapery in SE, (3), in fairly slow motion. Corona still present. Very violet patch  $45^{\circ}$  NW, fading.
- DC0 0812 Display continues over entire sky, though considerably weaker. Brightest in SSW where (3) drapery present. Reddish tinge in SW.
- 0835 6/8. Glow visible through gaps over entire sky. Several isolated (1) long rays in E and W and two parallel (2) draperies low in S converging to a point due S.
- 0855 8/8 thin cloud - one star visible SSE. Glow visible through cloud in most parts of sky, but appears to be weak everywhere.
- 0915 1/8. (2) curved diffuse patch in SW. (1) arcs in most of N sky up to Z. Glow in NE.
- 0920 1/8. Curved patch in SW has become (1) arc through  $30^{\circ}$  S, rayed in SW. (1) arcs continue in N.
- 0925 Arc in S now (2) and rayed. Elsewhere same.
- 0930 Now HA through  $40^{\circ}$  S, (2). Solitary ray in E. Double (1) HA  $30^{\circ}$  N.
- 0935  $40^{\circ}$  HA now almost absent. (1) rays from E to  $60^{\circ}$ .
- 0948 8/8. Glow visible through cloud.
- 0958 7/8. Two (1) rays from WSW horizon to  $3^{\circ}$ .
- 1000 7/8. (1) rays to  $10^{\circ}$  SW, just below cloud.
- 1008 1/8. (2) RA  $40^{\circ}$  S, most rayed in SW. HA's in N sky from Z to  $30^{\circ}$  N, (1).
- 1012 1/8.  $40^{\circ}$  arc now (1). (2) Arcs through Z, somewhat curved particularly in E.
- 1014 Intensity zenithal arcs now (1).
- 1015 Whole sky from  $40^{\circ}$  S to  $30^{\circ}$  N covered by (1) G crossed by arcs through Z.
- 1021 (1) rays from  $30^{\circ}$  to  $50^{\circ}$  SE superimposed on general G.
- 1026 1/8. (2) narrow band (almost remnant HA) from E horizon to Z. (2) RB (almost RA) from ESE horizon to  $30^{\circ}$ . Several (1) DS's between these two bands. No activity elsewhere.
- 1030 3/8. (1) RB from SE horizon to  $30^{\circ}$  S (probably disappearing behind cloud). Two (1) parallel rays from E through Z disappearing behind cloud in W. All fading.
- 1040 3/8. (2) rays from W through Z fading to (1) in E. Diffuse patches in N and S.

AUGUST 8 cont'd.

- 1043 1/8. Two (1) short bands in E and SE  $15^{\circ}$ .
- 1057 1/8. (1) remnant HA from E to Z. Two (1) rays  $10^{\circ}$  WSW. Two small patches (1) G  $20^{\circ}$  SE. Sky generally light in E.
- 1100 2/8. (1) arcs from E to W through Z.
- 1107 1/8. (2) drapery with very long rays from ENE to Z with almost straight lower edge, fading towards Z. (1) G low in SE. Nothing elsewhere.
- 1110 2/8 in W. (2) curved band from NE to Z.
- 1115 (2) and (3) band from  $5^{\circ}$  E through Z to  $30^{\circ}$  W. (1) rays from SE and SW. Suggestion of corona in Z.
- 1117 In addition to zenithal band, (1) band across S sky rayed at  $30^{\circ}$  S. Feebler band beneath this about  $15^{\circ}$  S.
- 1122 Broad (3) drapery from  $10^{\circ}$  E through Z to  $15^{\circ}$  W.
- 1125 Intensity increased to (4) momentarily. Rippling from W to E along edge with momentary rippling from E to W. Lower edges tinged with red. Quickly faded to (2).
- 1135 During past ten minutes there has been (1) corona in Z, now practically gone. Also extended drapery in S, (3) in parts and in fairly rapid motion, usually unfolding from W to E.
- 1136 1/8. Suggestion of corona formed by (1) rays from N, E and W (short). Several (1) isolated rays in SW and ENE. (1) fairly regular band from SE - SW.
- 1150 0/8. Single (2) diffuse patch  $45^{\circ}$  SE.
- 1220 Very thin mist over entire sky. (1) rays from E to Z.

AUGUST 9.

- (0601 Sunset
- (0804 End astronomical Twilight
- (1852 Beginning astronomical twilight
- (1935 Moonrise Fraction Illuminated: 0.22
- (2057 Sunrise

BCO 0700 0/8. (2) draperies in most of SE sky. (1) band extending from region of draperies right across sky to disappear behind WSW horizon.

AUGUST 9 cont'd.

- 0705 (2) strongly rayed draperies over all S sky up to Z. Changing rapidly.
- 0709 Draperies faded rapidly. Now only isolated very weak rays near Z and in E. Very faint suggestion of HA low in S.
- 0711 Weak rays from E to Z brightening to (2) and fading rapidly.
- 0713 (3) narrow band through Z. (1) drapery from SSE to SSW, rapidly brightening to (2) in SSW.
- 0714 Zenithal band rapidly fading.
- 0719 Drapery in S faded. Only sign of activity is several long (1) rays in SSW and SSE.
- 0724 1/8 in W and S. Weak glow  $5^{\circ}$  S.
- 0725 (1) RB  $10^{\circ}$  SSW. (1) rays in SSE and G due S.
- 0728 2/8. (2) drapery appeared  $10^{\circ}$  SSE and fairly rapidly extended westwards to join RB in SSW.
- 0730 Drapery now most intense in SE  $10^{\circ}$  although much obscured by cloud.
- 0731 Drapery extending further E, and is (2) over most of it.
- 0735 (3) at SE end of drapery with rays extending from  $15^{\circ}$  to  $45^{\circ}$ , the intensity rapidly diminishing with altitude. RB extending to SW, (2) in most parts.
- 0737 1/8. Drapery most folded in SE becoming RB from SSE to SW. Elevation increasing - now  $30^{\circ}$ . Intensity (2). (1) RB below this. (1) Rays momentarily appeared  $45^{\circ}$  E.
- 0740 Lower RB now weaker. Drapery fairly steady and (3).
- 0741 (1) rays visible in Z.
- 0742 Rays in Z became diffuse and faded away. Large bulge developed in drapery, due S.
- 0744 Display in ESE which was end of drapery almost separated from main part, the break being at the bulge.
- 0745 2/8. Bulge now disappeared and two parts regrouped. (2).
- 0749 6/8. Display obscured except for end of (2) drapery in E  $10^{\circ}$ .
- 0750-0755 8/8 and beginning to snow. Very weak patches  
DCO of glow visible through clouds.



AUGUST 9 cont'd.

- 0800 8/8 and snowing.
- 0805 6/8. (1) diffuse glow from E to S to  $40^{\circ}$ . Also suggestion of glow all along S - W horizon.
- 0820 3/8. (2) diffuse glow from SE - SW below  $30^{\circ}$  S. Several very long (1) rays from E to ESE and from WNW forming corona in Z.
- 0835 1/8. Parts of (2) Drapery SE - SW  $15^{\circ}$  visible through cloud. Suggestion of very faint HA  $30^{\circ}$  N. (1) glow in NE.
- 0838 1/8. Drapery not so extensive and generally weaker - (1) in most parts but (2) in SW. Single (1) rays in E to  $45^{\circ}$ , fading.
- BCO 0848 1/8. (3) S-shaped drapery  $15^{\circ}$  SW. Broad (1) parallel arcs from E to W through Z.
- 0850 1/8. Drapery gone being replaced by (2) G. Zenithal arcs still present.
- 0853 (1) drapery from SW to SE through  $40^{\circ}$  S. (1) arcs through Z remain. G over most of sky.
- 0855 (2) drapery in SE in form of great S.
- 0857 1/8. Drapery gone. (2) G  $10^{\circ}$  SSW. Suggestion of remnant HA from E to  $45^{\circ}$  S being lost there in general glow. Arcs through Z still present.
- 0900 2/8. (2) DS low in SW. Two isolated (1) rays to  $30^{\circ}$  SE. Zenithal arcs now extend to  $70^{\circ}$  N and arc (2).
- 0906 1/8. (2) G along S-W skyline. Whole sky covered with very long (1) rays forming very weak corona in Z.
- 0909 1/8. (2) drapery  $15^{\circ}$  SW. (1) G over all S sky. (1) rays and bands from E and W horizons to Z and several (1) bands (almost HA's) covering all N sky.
- 0913 0/8. Nothing above (1). Drapery in SW gone. (1) drapery  $10^{\circ}$  SE - S. Corona formed by long rays from SE - S and W - NW. Series HA's over all N sky still present.
- 0918 Corona formed by very long (1) rays from E, NE and W. (1) G in SSW.
- DCO 0923 1/8. Same and two well defined (1) HA's  $10^{\circ}$  and  $20^{\circ}$  N.
- 0939 1/8. Broad (1) HA  $15^{\circ}$  N. (1) partial corona formed by long rays from W, NW, E and SE. Small patch (1) G  $10^{\circ}$  S.
- 1001 6/8. (2) DS (?) through breaks in cloud in SE. Patches of G in N sky.

AUGUST 9 cont'd.

BCO 1021 3/8. Diffuse almost structureless glow over S sky. (2) and (3) drapery in N from  $10^{\circ}$  to  $50^{\circ}$  in form of fan. (1) rays from E and W forming suggestion of corona.

1025 All sky except patch  $45^{\circ}$  N covered by diffuse glow. Solitary ray in ENE.

1032 4/8, mainly in S. (2) drapery in E extending towards Z. Several (1) bands, rays and DS's scattered over N sky.

1037 4/8. (2) RA through  $80^{\circ}$  S. Extensive (2) DS with striated effect at lower edges in N - NE. (2) DS  $10^{\circ}$  SE. Elsewhere scattered patches (1) G through gaps in cloud.

1039 RA changed into band. Otherwise same.

1045 6/8. (2) band still present from E through Z disappearing behind cloud W of Z. E end curves slowly to NE. Patches of G through cloud over entire sky.

1055-1100 3/8 and mist. (3) bands from E to W across N sky with slight reddish tinges present. These rapidly developed into draperies which rapidly faded. (3) draperies rapidly developed in SE and W, the former increasing to (4) and quickly faded to (2). Extensive (2) G over all S sky below  $20^{\circ}$ . Some patches of G elsewhere.

MAX

1105 6/8 and thin haze. Drapery (?) in SSE in rapid motion with distinct tinges of red, (4). General (2) G over N sky.

1106-1109

DCO

5/8. (4) drapery  $15^{\circ}$  SE - S continues in rapid motion with fluctuations in intensity of the pink colour. SW cloud covered except for strip along skyline and drapery apparently extends from S to SW skyline. Entire N sky covered by (1) G.

1114 Drapery quieter now and is (2). Risen slightly. Otherwise same.

1122 6/8. (2) patches visible through small breaks in SSW. Probably (2) drapery.

1143 8/8. Glow in most parts of sky through cloud.

1205 5/8. (2) drapery or RB fringed by cloud  $70^{\circ}$  S. (1) rays ENE. General (1) G over most of visible sky.

1217 3/8 in W and general thin haze. No features visible (1) G (weaker than previously) over most of visible sky.

1235 1/8 and haze. Three broad (1) arcs from E to W through Z. Elsewhere (1) G.

AUGUST 9 cont'd.

- 1245 3/8 and haze. Very diffuse (2) rays in narrow fan in E to 60°.
- 1255 8/8. No sign except that sky is not completely dark.
- 1307 Almost 8/8 (one star visible). Same.
- 1730 Boyd reported display still visible.

AUGUST 10

- (0603 Sunset  
(0806 End astronomical twilight  
(1850 Beginning astronomical twilight  
(2019 Moonrise Fraction illuminated: 0.14  
(2055 Sunrise
- 1120 Till now 8/8.
- 1125 7/8. (2) drapery right across N sky through 50°.
- 1130 Same.
- 1135 7/8. Drapery visible only in E and Z.
- 1137 8/8. No definite sign, although sky rather light.
- 1140 8/8. Patches of glow dimly visible through cloud, N of Z.
- 1149 8/8. No sign, but sky light.
- 1158 8/8. No sign.
- 1205 Same.
- 1330 Same.
- 1335 Same.
- 1400 8/8. No sign, although sky fairly light. LNS.

AUGUST 11.

- (0605 Sunset  
(0807 End astronomical twilight  
(1849 Beginning astronomical twilight  
(2051 Moonrise Fraction illuminated: 0.08  
(2053 Sunrise
- 0726 Almost 8/8. Sky quite light but green line not visible.
- 0815 8/8. No sign.
- 0835 8/8. Sky very dark.



AUGUST 11 cont'd.

- 0850 Same.
- 1055 8/8. Green line clearly visible. Display apparently fairly intense and extensive as evidenced by patchy light filtering through clouds over most of N sky.
- 1115 Same, although glow through clouds not quite so bright.
- 1120 6/8 and haze. (1) uniform G appears to cover entire N sky. Cloud thicker in S and no glow visible there.
- 1134 8/8. Glow visible through cloud, chiefly low in E. Small patch for brief time just W of Z.
- 1147 8/8. Still considerably patchy light through clouds mainly in E. Dawson reported momentarily catching glimpse of (2) G through gap in cloud  $45^{\circ}$  SE.
- 1202 5/8 and haze. Glow through haze in SE, W, NE and Z. Probably (2).
- 1210 8/8. Glow through cloud, mainly low in E - S and in SW.
- 1216 7/8. Considerable glow through cloud over most of S sky, particularly low in SE.
- 1225 7/8 and haze. Same and glow in SW.
- 1321 4/8. Several long (1) rays from NW converging towards Z.
- 1331 4/8. (1) and (2) multiple zenithal arcs.

The following obs. were made by Ward.

- 1400 Four (2) and (3) bands curving from NNE through W sky to SSW extending from  $15^{\circ}$  to  $70^{\circ}$  W. (2) diffuse patch  $15^{\circ}$  SW.
- 1430 Bands now broader and passing through Z. End in diffuse patches on NNE and SSW horizons.
- 1500 Diffuse (2) glow WSW. Broad (3) and (4) band from NNW through E sky to WSW ending in diffuse glow in WSW. Band extends from Z to  $10^{\circ}$  E in E sky. Fairly curved in WSW.
- 1505 Band rapidly contracting to S and breaking up into weaker draperies.
- 1507 Band formed running from ENE to WSW through  $25^{\circ}$  W. Rapid motion.
- 1508 Band curves sharply eastwards in ENE and WSW. Glow persists in Z and to WSW with (3) glow near WSW horizon.

AUGUST 11 cont'd.

- 1520 Broad diffuse (2) band ENE to WSW.  
 1540 8/8.  
 1740 Cleared for two minutes. (2) corona in Z. Bands in NE and SW,  $25^{\circ}$ . Rays in E and W extending to about  $50^{\circ}$  above S horizon.

AUGUST 12.

8/8 and raining all night. No sign of aurora.

AUGUST 13.

- (0609 Sunset  
 (0811 End astronomical twilight  
 (1844 Beginning astronomical twilight  
 (2048 Sunrise
- 1015 Till now heavily overcast. Now beginning to thin although still 8/8. Sky quite light over most parts, particularly SE, W and Z. Green line clearly visible.
- 1020 Same.
- 1025 8/8. Weak glow through cloud mainly in Z, NW and SE of Z.
- 1045 Same.
- 1100 8/8. No definite patches of glow. Green line very feeble.
- 1120 8/8. Sky not completely dark. LNS.
- 1135 8/8. Green line feeble.
- 1141 5/8. (1) glow above cloud bank  $45^{\circ}$  S- $30^{\circ}$  WSW.
- 1150 4/8. Almost (2) glow along top of dark cloud bank in S - almost HA  $35^{\circ}$ - $40^{\circ}$  S. No sign elsewhere.
- 1157 2/8, low in S. (2) G  $25^{\circ}$  -  $40^{\circ}$  SE - SW.
- 1200 2/8 and haze. (1) G (probably HA)  $10^{\circ}$  S.
- 1204 Same.
- 1214 Same, though not much haze.
- 1215 1/8. (1) G extends to  $30^{\circ}$  S.
- 1245 0/8. Suggestion of very feeble G SE to  $10^{\circ}$  particularly when viewed indirectly. Also slight G in S.

AUGUST 13 cont'd.

- 1334 0/8. (1) HA  $10^{\circ}$  S and extremely weak G in S.  
 1350 Same.  
 1433 0/8. No sign.
- 

AUGUST 14.

- (0610 Sunset  
 (0633 Moonset Fraction illuminated: 0.00  
 (0812 End astronomical twilight  
 (1842 Beginning astronomical twilight  
 (2046 Sunrise
- 0903 2/8 and thin haze. (1) G along top of cloud low in S to about  $10^{\circ}$ .  
 0908 2/8. (1) HA  $15^{\circ}$  S. (Cloud in this region).  
 0909 1/8 and slight haze. (1) G to  $20^{\circ}$  S. Suggestion of very faint HA  $45^{\circ}$  S. (1) broad diffuse band from E to Z.  
 0917 3/8. (2) HA  $32^{\circ}$  S. Single (1) short ray near Z from NE.  
 0922 2/8 and thin haze. (2) narrow HA  $25^{\circ}$  S.  
 0938 2/8, mainly low in S and W. (2) HA (suggestion of close twin HA) lower edge  $26^{\circ}$  S.  
 0948 3/8. (1) G  $20^{\circ}$  SSE amongst cloud.  
 1010 2/8. HA still present, but (1) and much broader.  
 1025 (1) rays from  $30^{\circ}$  SE to Z, fluctuating in intensity.  
 1031 5/8 and haze. No sign. Green line not seen.  
 1045 Almost 8/8 (one star visible occasionally). No sign.  
 1120 Same.  
 1125 Same.  
 1147 0/8 and haze. No features present, but sky not completely dark.  
 1225 Same.  
 1242 General haze. (2) zenithal HA with slight irregularity in E. Slowly fading to (1) and broadening.



AUGUST 14 cont'd.

- 1245 (2) band with slight irregularities from E to W through  $70^{\circ}$  N. Broad diffuse (1) zenithal arc.
- 1249 Band weakened to (1) and more diffuse, almost fused with diffuse zenithal arc. (2) patch  $10^{\circ}$  W where the two bases meet.
- 1300-1307  
MAX. Band rapidly brightened and developed into corona reaching (4) at 1302. Rapid fluctuations in corona. Display also spread to most parts of sky and then slowly faded.
- 1310 (1) patches in Z and SW. Suggestion of HA  $40^{\circ}$  S.
- 1320 2/8 in S and haze. (2) drapery  $70^{\circ}$  -  $80^{\circ}$  S, fading.
- 1323 (1) corona in Z with (2) patch  $80^{\circ}$  S.
- 1331 Suggestion of weak rays from E and W to Z (seen through haze).
- 1334 Same and suggestion of corona.
- 1340 (1) bands in N, particularly round  $60^{\circ}$  N.
- 1344 Patches of glow NE  $80^{\circ}$  and  $60^{\circ}$  NW through haze.
- 1350-1355 Extensive DS's, mainly from  $70^{\circ}$  in all directions to Z, suddenly began to move through Z. Intensity (1). Semblance of corona formed by these DS's.
- 1400 0/8 and haze. DS's in most parts of sky, pulsating more rapidly in and around Z, intensity sometimes reaching (2).
- 1407 DS's less extensive, but pulsations continue up to (2). Two (1) rays to  $45^{\circ}$  SE.
- 1413 Pulsations continue to give coronal effect. Rays gone. Suggestion of (1) HA  $35^{\circ}$  S, but may be due to glow on cloud in S.
- 1416 Z now practically free of display. Continues from  $45^{\circ}$  down in most parts of sky being (2) in E.
- 1422 1/8 in S. Activity in Z again where pulsating DS's form suggestion of corona. Activity also  $45^{\circ}$  SW and a little in N and NW.
- 1450 1/8 in S and haze. Practically same. Pulsations decreasing in magnitude with decreasing elevation, the display being fairly steady  $45^{\circ}$  S.
- 1440 Same and (1) rays NNE.

AUGUST 14 cont'd.

1445 Pulsations less marked in Z and intensity now (1). (1) DS's in most parts of sky, but particularly in W half.

1452 Activity in all parts of sky except an area in N.

The following obs. reported by Ward :

1505 Broken ring of light patches about  $35^{\circ}$  from horizon in all directions. No sign in Z.

1515 8/8. No sign.

1530 Weak glow in NE behind cloud.

1700 8/8 from last obs. till now.

AUGUST 15.

(0612 Sunset

(0801 Moonset Fraction illuminated: 0.02

(0814 End astronomical twilight

(1841 Beginning astronomical twilight

(2044 Sunrise

0730 2/8. (2) HA  $10^{\circ}$  S.

0735 Faded to (1).

0820 1/8. (2) HA  $20^{\circ}$  S.

0827 1/8 low in S. (1) HA  $20^{\circ}$  S and (1) glow along top of cloud bank at  $10^{\circ}$  (Possibly another HA).

0836 1/8. (2) HA  $17^{\circ}$ . No sign of previous G beneath this amongst patchy cloud.

0852 5/8 and haze. (1) G low along SE-SW horizon and skyline and (2) glow at  $17^{\circ}$  S (probably E half of former HA).

MAX 0902 6/8. Patch of (3) glow  $10^{\circ}$ - $25^{\circ}$  due S.

0915 6/8. (2) G above cloud at  $8^{\circ}$  S-SE, -gradually falling off in intensity to about  $30^{\circ}$ .

0935 5/8. (2) patches through breaks in cloud in most of S sky below  $40^{\circ}$ . Appears to be more intense low in WSW.

0946 3/8, mainly in W and SW. (1) G below  $15^{\circ}$  S-SE.

1011 6/8. (2) G from S to E to  $5^{\circ}$ . Several long (1) rays reaching towards Z from ESE.

1043 6/8. (1) G low S-E. E half of (2) HA to  $8^{\circ}$  S.

1045 7/8. Glow in S through cloud.

AUGUST 15 cont'd.

- 1125 Broad diffuse (1) rays from SE to Z.  
(1) G 5° S. Feeble flaming in Z.
- 1130 4/8 and haze. (1) G to 20° S-SE above  
cloud bank. Several long (1) rays  
from ESE to Z.
- 1202 8/8. No sign.
- 1205 Same.
- 12412 Same.
- 1255 8/8, thin in parts. Glow through cloud in S.
- 1320 Almost 8/8 (two stars dimly visible). Glow  
in SSE through cloud.
- 1335 8/8. No sign.
- 1420 Snowing. No obs.

AUGUST 16.

- 0810 8/8. No sign.
- 0850 Same.
- 0905 6/8 and haze. No sign.
- 1115 8/8. No sign.
- 1155 Same.
- 1225 Same.

AUGUST 17.

- (0616 Sunset  
(0817 End astronomical twilight  
(1057 Moonset Fraction illuminated: 0.13  
(1037 Beginning astronomical twilight  
(2040 Sunrise

- 0900 3/8 in S. No sign.
- 0930 7/8. Glow in SSE through cloud. With moon  
still up this is probably not auroral.
- 0948 7/8. No sign.
- 1045 2/8 in S. No sign. Green line not visible.
- 1145 6/8. No sign.
- 1150 3/8. No sign.
- 1310 1/8. No sign.



AUGUST 17 cont'd.

1350 Same.

AUGUST 18.

(0618 Sunset  
(0819 End astronomical twilight  
(1228 Moonset. Fraction illuminated: 0.21  
(1834 Beginning astronomical twilight  
(2037 Sunrise

1100 Till now 8/8 with no sign of aurora.

1105 Aurora reported by Dawson.

1115 7/8. (1) patches visible through cloud from  $25^{\circ}$  towards E horizon. LNS.

1139 2/8. (2) G with rayed structure extending from SW to ESE and to  $40^{\circ}$ .

1142 Same.

1145 2/8. (2) G in S to  $40^{\circ}$ . Maximum of glow between  $20^{\circ}$  and  $36^{\circ}$ S, being less intense above and below. Glow extends to slightly N of E.

1157 5/8. Glow visible through cloud in S.

1213 1/8. Diffuse (1) G SSE-SSW to  $20^{\circ}$ S.

1217 G extends to about  $35^{\circ}$ S.

1225 3/8 mainly in SW sector. (1) G to about  $30^{\circ}$  from S to E.

1246 2/8. Otherwise same.

1315 8/8 and snowing.

1335 7/8 and haze. Glow through break in cloud  $40^{\circ}$ S.

AUGUST 19.

(0619 Sunset  
(0820 End astronomical twilight  
(1402 Moonset. Fraction illuminated: 0.31  
(1832 Beginning astronomical twilight  
(2034 Sunrise

0845 8/8, thin. Sky very light. Green line clearly visible.

0900 8/8. LNS.

AUGUST 19 cont'd.

- 0913 8/8 and snowing. LNS.
- 0945 8/8. Sky quite light but LNS.
- 1200 8/8 since last obs. Sky very light. Green line very distinct.
- 1220 8/8. Green line distinct.
- 1310 Same.
- 1435-1443 At first 8/8, thin enough  $70^{\circ}$  NW to see outline of drapery. Then sky rapidly cleared near Z revealing (4) corona with rapidly moving red tinged features appearing and fading. Rays visible from SE to Z.
- 1455 8/8 again but still very light. Patches of glow visible in NNW and E  $45^{\circ}$ .
- 1515 2/8. (4) corona formed by very long rippling rays from all sections of the sky. Red colour mainly confined to ray bundles from S.
- 1517-1524 Cloud gradually increased to 5/8. Corona now (3) formed of rays from all directions. Brilliant (4) draperies in rapid motion high in SE sector, drifting eastwards. Extensive (2) G from NW through  $25^{\circ}$  N to E. (2) rays from top of G to Z.
- 1530 0/8. Entire sky covered with scattered sections of draperies ranging in intensity from (2) to (4). Long (4) drapery curving in circular arc from  $20^{\circ}$  W through Z to SE. While watching kink developed in S direction over short length of drapery just E of Z. Corona still present - radiation point measured at  $78^{\circ}$  N.
- 1538 2/8. Corona now only (2) in region close to Z. Draperies still present over entire sky, (3), those in W drifting to N and those E of S drifting to E. (3) DS along E-NE horizon to  $15^{\circ}$ .

The following obs. reported by Nutt :

- 1637-1640 (1) and (2) rays in N-NE sector from  $20^{\circ}$  to Z. Gradually became diffuse patch of glow.
- 1643 Bands from S to E about  $35^{\circ}$ , intensity varying between (1) and (3) along length.
- 1646 Bands more patchy and extend from ENE to WSW about  $35^{\circ}$ .
- 1650 Diffuse glow from SE to SW with (1)-(3) draperies through  $30^{\circ}$  in gentle motion.

AUGUST 19 cont'd.

1652 Draperies from SE to S,  $30^\circ$ , extending into diffuse glow in SW. (4) in E portions with coloured rays rippling along edges.

1656 Obscured by cloud.

AUGUST 20.

(0621 Sunset  
(0822 End astronomical twilight  
(1536 Moonset Fraction illuminated: 0.42  
(1831 Beginning astronomical twilight  
(2032 Sunrise

0715 Display reported by Dawson in NE.

0718 6/8. Single (2) ray rapidly fading in ENE.

0724 7/8 mistiness. Single short (2) ray low in ESE.

0815 8/8 and heavy snow.

0830-0836 7/8, clear in Z and in parts of NE sector. (1) multiple zenithal arcs. (4) drapery developed  $45^\circ$  NE with rayed parts in motion, rippling from E to W. Then quite suddenly intensity of arcs from E to Z increased to (3). Bright patch due N  $15^\circ$ .

0840 (3) drapery  $20^\circ$  NNE.

0845 7/8. (3) drapery  $30^\circ$  ESE visible through small gap in cloud.

0850 6/8. No features visible but sky very light, particularly in NE sector. Clear S and W of Z.

0901 8/8, one star visible in S.

0915 8/8 and snowing. Cloud thin. Only definite sign of aurora is drapery-like glow through cloud low in SW.

0930-0937 At first 3/8 increasing to 6/8. Weak drapery  
MAX. from SW to SSE  $15^\circ$  brightening slowly in S to (4) ring shaped drapery with rays extending only a few degrees above the sharp lower edge.

Colour at first green-yellow, then became tinged with red. Drapery also brightened in SW. (1) rays from SE to  $45^\circ$ . Then the drapery in SW joined the ring in S.

This broke into two parts one due S and one SSW, and the rays lengthened towards Z finally forming (1) partial corona. Also single long ray in ENE developed into (2) ray bundle. (2) G in NE to  $20^\circ$ .



- 0941 4/8. Partial corona gone. Section of drapery S-W obscured, but (3) and fairly quiet in SE. Several isolated (1) rays low in ENE-ESE.
- 0943 7/8. Remnant of drapery visible in S.
- 0947 5/8. Drapery partly obscured, but (3) sections still visible in same positions in SE and SW. (1) rays and G along ESE-NE horizon.
- 0955 5/8. Sections of main drapery still visible in SE. Several long (1) rays in WNW and ENE. Two isolated areas of (2) G, one very low due E, the other about 5° ESE.
- 1002 5/8, patchy. Long (2) drapery of same shape as previous one but through 45° S. Several long (1) rays in E. Short (2) band through Z in E-W direction.
- 1016 6/8. (2) drapery very low in E-ESE, curving slightly N to form (1) band running through Z towards W. Hazy in region of display.
- 1055 8/8. No forms visible, but sky light.
- 1115 8/8 and snowing.
- 1140 8/8. Sky light.
- 1225 8/8 and snowing.
- 1240 Same, but sky light.
- 1400 7/8. Patches of glow visible through breaks in cloud in S sky below 20°. Stars visible 30°S and no sign of aurora there.
- 1427 4/8, being fairly clear round Z. (3) drapery 70° SW. Rays from SE to Z forming partial corona.
- 1430 Ward reported corona in Z and (2) and (3) ring drapery 35° S.
- 1435 Nutt reported (3) drapery 45° NE and (1) DS 30° NW.
- The following obs. reported by Ward:
- 1440 8/8.
- 1830 Weak glow in S.
- 1845 8/8. again.

## AUGUST 21.

- (0624 Sunset
- (0823 End astronomical twilight
- (1707 Moonset Fraction illuminated: 0.54
- (1830 Beginning astronomical twilight
- (2032 Sunrise

AUGUST 21 cont'd.

- 0725 7/8. No sign of aurora through gaps in cloud in SE and Z.
- 0755 Display reported by Dawson and Ward.
- 0800 7/8. (3) ray in E through only gap in cloud. Intensity appears to diminish with elevation, being brightest at  $15^{\circ}$ , just above edge of cloud.
- 0812 8/8. Light through thin cloud in E and N - could be moonlight. LNS.
- 0823 7/8. Three (1) parallel rays in E  $40^{\circ}$  through small break. Could be segments of multiple zenithal arcs.
- 0844 8/8. No sign.
- 0930 8/8. Sky very light in patches but no sign green line.
- 1050 4/8. No sign.
- 1055 7/8. No sign.
- 1135 Same.
- 1155 7/8. No sign but moon still bright.
- Frost reported 8/8 for remainder of night.

AUGUST 22.

- 1055 Till now 8/8 with intermittent rain. No sign of aurora.
- 1105 8/8 and sleeting. No sign.
- 1330 8/8. Sky light but no sign green line.
- Frost reported no sign of aurora during early morning though not always 8/8.

AUGUST 23.

- (0626 Sunset
- (0825 End astronomical twilight
- (1826 Beginning astronomical twilight
- (1920 Moonset Fraction illuminated: 0.76
- (2026 Sunrise

0853 7/8. No sign. No line.

1109 8/8. No sign. No line.

1310 8/8. No sign.

The following Obs. reported by Ward:

AUGUST 23 cont'd.

1530 7/8. (2) G in SSW.

1815 6/8. Signs of weak bands from N to S,  
elevation 50°.AUGUST 24.1625 8/8 all night with no sign of aurora.  
No sign of green line. Sky quite light.AUGUST 25.(0629 Sunset  
(0828 End astronomical twilight  
(1822 Beginning astronomical twilight  
(2017 Moonset Fraction illuminated: 0.92  
(2022 Sunrise

0915 Till now 8/8 thin cloud. No sign green line.

1200 Occasional obs. till now revealed no sign  
of aurora. Now almost 8/8 (One star visible  
in N and one in S). Definite auroral  
activity 5° SSE - probably (2) HA or band.  
Green line seen with difficulty.

1225 8/8. No sign.

1320 Same.

1415 8/8. Sky very light but no sign green line.

AUGUST 26.

1115 8/8 till now. No sign.

1245 8/8. Green line not visible on background  
continuous spectrum.

1330 Same.

1345 1/8 thin haze. No sign.

1350 Same.

1420 Same.

1430 3/8 thin cloud. No sign.

AUGUST 27.1250 Till now 8/8. Sky very light, but no sign of  
green line on background continuous spectrum.

1315 8/8. No sign.

Frost and Nutt reported no sign of aurora for  
remainder of night though not always 8/8.



AUGUST 28.

- 0815 8/8 thin cloud. Sky light but no green line.  
0825 6/8. No sign. No line.  
0835 Same.  
1217 8/8. No sign.  
1225 8/8. No sign green line on background spectrum.  
1420 8/8. No sign.
- 

AUGUST 29.

- (0637 Sunset  
 (0834 Moonrise Fraction illuminated: 0.98  
 (0836 End astronomical twilight  
 (1811 Beginning astronomical twilight  
 (2012 Sunrise
- 0745 Weak display reported by Dawson.
- 0825 1/8. (2) HA  $12^{\circ}$  S.
- 0830 1/8. HA almost completely faded. Several (1) rays from E to Z and from W to near Z. (1) DS  $10^{\circ}$  WSW.
- 0845 1/8. (2) RA  $5^{\circ}$  S. Small (2) patch of G on SSE horizon. Three (1) broad HA'S, lowest through  $39^{\circ}$  S, other approx.  $50^{\circ}$  and  $60^{\circ}$  S but too weak to measure with inclinometer.
- 0850 1/8. (2) HA  $33^{\circ}$  S, brightest at E end. (2) RB (almost RA, but slight bulge just W of S), very narrow, through  $9^{\circ}$  S. (2) section of drapery under band very low in SSE.
- 0855 1/8. Band in same position, but rays weaker.
- 0901 1/8. (1) HA  $35^{\circ}$  S. Very broad (2) band with weak ray structure very low in SSE with sharp cut-off just E of S.
- 0906 HA developed into (2) RB.
- 0920 (2) RB  $42^{\circ}$  S - only slight deviations from regular arc. Fairly broad. Several short (2) rays in close bundle very low in SSE. (1) narrow HA through Z.
- 0924 Previous RB now very broad with ray structure only at E end which has split into several parallel sections of almost drapery structure. Ray bundle still present in S. RB (3) at E end.
- 0930-0938 RB broadened considerably and at about  $40^{\circ}$  SSW took on appearance of an eddy with lines of flow ill-defined. Colour rich yellow and intensity (3). (1) multiple zenithal arcs.  
MAX.

AUGUST 29 cont'd.

0930-0938 The eddy gradually faded and four bright  
MAX. rays (almost draperies) appeared at W end  
up to  $30^{\circ}$ . At  $15^{\circ}$ S a band with both upper  
and lower edges clearly defined developed  
and SE end curved under forming a horizontal  
question mark. This, and the draperies in W,  
reached (4).

0951 3/8. E end of band faded to (2) and con-  
siderable (3) activity at W end. Then E end  
brightened to (3) and in S (4) drapery  
developed under original band. Rapidly  
moving, with long rays.

0954-1000 Brilliant (4) draperies developed over E  
half of sky below  $70^{\circ}$ . In rapid motion.  
Curve S from near Z. At 0956 one section at  
about  $20^{\circ}$  due S formed closed ring drapery  
but rapidly dispersed again. Finally several  
(3) parallel draperies formed running almost  
due S from Z (curve towards W near Z). Whole  
display faded slightly by 1000.

1005 3/8. Scattered (2) sections of draperies and  
bands low in S and SSW. Several long (1) rays  
in SSE and SE. W sector fairly quiet and  
partly obscured by cloud.

1012 3/8, mainly in N. Only features are (2) band  
low in SSW and a few (1) isolated rays low  
in SSE. Nothing at higher elevations.

1027 (2) band through  $10^{\circ}$ S.

1050 Two (2) bands  $5^{\circ}$  and  $15^{\circ}$  S, the upper one  
stretching from SSE to SSW, the lower one  
being shorter.

1124 3/8, clear in S. No sign.

1215 4/8. No sign.

1231 7/8. No sign.

1305 6/8. Sky quite light, but no sign green line.

AUGUST 30.

8/8 low cloud all night. No sign of aurora.

AUGUST 31.

8/8 all night. No sign of aurora.

SEPTEMBER 1950SEPTEMBER 1.

8/8 all night. No sign of aurora.

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SEPTEMBER 2.

0925 Until now 8/8.  
Now 7/8, clear in Z. No sign of aurora.

1300 Has remained 8/8 with no sign of aurora.

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SEPTEMBER 3.

(0646 Sunset  
(0845 End astronomical twilight  
(1505 Moonrise. Fraction illuminated: 0.65  
(1759 Beginning astronomical twilight  
(2000 Sunrise

0752 3/8 thin. (2) drapery in S-E sector running from near Z to 5° SSE.

0757 Drapery structure now only (2) DS SE-S 5°-15°. Several long (2) rays from S to Z and several rays of varying lengths from E and NW forming partial corona. This dispersed into drifting (2) DS's round Z.

0815 3/8 thin. (1) G along S-NE horizon. (1) bundle long rays from due S fading out at about 50° S.

0828 3/8. (1) G over all visible sky up to about 50°. Almost (2) on NNE skyline.

0837 3/8. G now (2) and slightly irregular in NW.

0850 3/8. G now patchy and slightly weaker and concentrated mostly in E-W through N. Area risen slightly and upper edge now near Z and lower edge about 20° in N-NE. Reaches lower in E and NW.

0907 6/8 thin misty cloud. (2) G still visible low in E-NE, but very little elsewhere.

0915 6/8 haze. Weak G visible only in E-NE up to about 15°.

0950 7/8. (1) G in W 20° and in E 40° through thin cloud.

1049 7/8. Isolated patches (1) G visible through gaps in cloud, in N half of sky.

1105 8/8. No sign.

1117 8/8 thin. Patches weak glow just N and E of Z.

1230 8/8. Weak glow through cloud 5° SE.



SEPTEMBER 3 cont'd.

- 1320 8/8. Weak glow through cloud  $10^{\circ}$ - $20^{\circ}$  W-NW.  
1510 8/8, very thin in parts (some stars visible in N). No sign, though sky not completely dark in N.

SEPTEMBER 4.

- 1115 8/8 till now and very dark.  
1325 8/8. No sign.  
1330 8/8. No sign of green line, though sky doesn't seem completely dark.

SEPTEMBER 5.

8/8 all night. Not completely dark, but no sign of green line.

SEPTEMBER 6.

- (0652) Sunset  
 (0851) End astronomical twilight  
 (1751) Beginning astronomical twilight  
 (1815) Moonrise Fraction illuminated: 0.36  
 (1952) Sunrise.
- 
- 0900 Till now 8/8.  
 Now 8/8. Fairly light in N half and green line clearly visible in this half.
- 1000 8/8. Green line feeble.
- 1148 7/8. Patchy (1) and (2) G through thin cloud over entire N sky. Also weak glow through cloud low in SE-S.
- 1152 8/8 thin. Patchy glow over entire sky. (2)  $10^{\circ}$  NW and low in SE.
- 1340 8/8 thin in parts (two stars dimly visible). (2) G in NE, SW and Z.
- 1348 7/8. (2)  $15^{\circ}$  E.
- 1405 7/8, thin. Activity everywhere except in SW. Mainly (2) G, but possibly (2) drapery  $30^{\circ}$  SSE (cloud not sufficiently broken to be sure).
- 1435 7/8. (1) ray  $15^{\circ}$  NE. G almost everywhere else.
- 1455 8/8, though very thin in parts. Activity everywhere but intensity nowhere greater than (2). No structure visible.
- 1500 7/8. (2) G or DS's practically everywhere - no structures visible.

SEPTEMBER 6 (cont'd.)

Dawson reported weak G still present at 1730, after which sky became heavily overcast.

SEPTEMBER 7.

(0653 Sunset  
 (0852 End astronomical twilight  
 (1748 Beginning astronomical twilight  
 (1850 Moonrise Fraction illuminated: 0.27  
 (1949 Sunrise

0815 8/8 and drizzle. Sky not very dark.

0855 8/8. Very dark.

1200-1215 7/8. (1) G over most of sky visible through thin cloud.

1220 (2) band from E to W through Z.

1245 8/8.

1430 1/8 and haze. (1) G over most of sky. (1) DS and suggestion of rays to 30° SSW.

1520 8/8. No definite sign, although sky generally light.

1540 8/8. Cloud light in patches, particularly in SE and Z.

SEPTEMBER 8.

(0655 Sunset  
 (0854 End astronomical twilight  
 (1746 Beginning astronomical twilight  
 (1914 Moonrise Fraction illuminated: 0.19  
 (1947 Sunrise

0810 7/8. Appears to be activity in many parts of sky. (1) rays visible 25° W.

0820 6/8, clear only round Z. (2) multiple zenithal bands, somewhat broken.

0828 4/8. (3) draperies over most of NW-SW sky and isolated (3) drapery from SE-S at about 30°. Several (2) rays from low in NNW to Z and many short rays from N and NE to Z. Draperies rapidly converged to Z forming swirling (3) corona.

0832 4/8. (2) DS low in W. (1) small DS just S of Z. Several very long (2) rays from E and ENE to about 70°.

0844 3/8. (1) G over all NW-W sky up to about 60°. Several long (1) rays from E and NE to Z. Small patch (2) G visible 60° S between clouds.

SEPTEMBER 8 cont'd.

0902 8/8. Sky not very dark.

0907 Same and rain.

0914 8/8 and snowing. No sign.

0924 6/8 and haze. (1) G to  $15^{\circ}$  NE. Suggestion of remnant (1) HA  $45^{\circ}$  SSW.

1015 0/8. Three (1) parallel arcs through Z.

1139 0/8. Single (1) HA through Z.

1150-1155  
MAX.

0/8 at first increasing to 3/8. (3) rather ill-defined draperies over wide area from SW-NW sweeping up to Z. (2) draperies in rapid motion in E-SE  $45^{\circ}$ . Rapidly developed into (4) drapery just W and SW of Z.

This rapidly changed and drifted into (3) corona and faded to (2). Drapery in SE flared up to (4) and drifted away towards E fading to (2).

1159 2/8. Patchy (2) G over entire sky with weak drapery from  $10^{\circ}$  SW to W horizon.

1233 1/8. (2) corona formed by long rays from all parts of sky. Two (2) bands W-SW.

1245 2/8. Patchy (1) G over NE through S to SW sky reaching to Z. Single long (1) ray from due S.

1350 1/8. (2) DS from  $30^{\circ}$  S-SE fading to (1) in Z.

1400 0/8. (1) HA with lower edge clearly defined through  $30^{\circ}$  S. No clear demarcation of upper portion. (1) multiple zenithal bands.

1510 0/8 but hazy. (1) band  $15^{\circ}$  S. (2) band  $15^{\circ}$  ENE. DS  $20^{\circ}$  NNE. (1) multiple zenithal bands. Quite suddenly a drapery appeared  $40^{\circ}$  S, with unfolding motion from W to E. Intensity reached (4) as evidenced by red tinges, but haze made display appear weaker. Faded rapidly.

1515-1520 1/8 and Haze. Band from SE through  $80^{\circ}$  S to W. Varying between (1) and (3). (3) band  $15^{\circ}$  SSW. (1) activity in Z.

1525 1/8. No sign of activity in S. (1) multiple zenithal arcs.

1535 1/8. Rapidly pulsating (1) DS in E-W direction through Z.

Dawson reported weak G in S and SW till 1700. Weak G in S at 1730. Afterwards clear but no sign.



SEPTEMBER 9.

(0657 Sunset  
 (0856 End astronomical twilight  
 (1743 Beginning astronomical twilight  
 (1929 Moonrise Fraction illuminated: 0.12  
 (1944 Sunrise

0845 2/8. (1) G  $20^{\circ}$ - $40^{\circ}$  above cloud in E-SSE.  
 Single long (1) ray from due S.

0850 1/8. G covers all S sky between E and SW to approx.  $50^{\circ}$ . (1) in most places but almost (2) in SE.

0855 7/8. (1) G visible from SE to NE up to about  $30^{\circ}$ .

0905 8/8 and raining.

0910 Same.

0950 1/8. (1) G up to  $40^{\circ}$  E-SW.

1040 8/8. Patches of glow through cloud in many parts of sky, but mainly in Z.

1110 0/8. (1) HA  $20^{\circ}$  S. (1) multiple zenithal arcs, not quite uniform round Z.

1115 4/8 and haze. (1) G in SW and very faint rays.

1207 8/8. Glow through cloud occasionally in Z.

1258 8/8. Light near Z.

1345 8/8. Sky quite light in entire N half, particularly in NE.

SEPTEMBER 10.

(0659 Sunset  
 (0858 End astronomical twilight  
 (1741 Beginning astronomical twilight  
 (1941 Moonrise Fraction illuminated: 0.06  
 (1942 Sunrise

0845 5/8, mainly in S. Small patch (1) G visible  $5^{\circ}$  W.

0855 3/8. (1) G above cloud about  $20^{\circ}$  -  $30^{\circ}$  SE-W.

0952 5/8, obscured in S. No sign.

1130 1/8. (1) G SE-W to approx.  $45^{\circ}$ . Almost (2) in SE.

1140 1/8. (2) glow extending from ENE through S to W in form of very broad band with ill-defined edges,  $15^{\circ}$ - $35^{\circ}$ .

1153 2/8. Glow has now broadened and now reaches to about  $50^{\circ}$ .

SEPTEMBER 10 cont'd.

- 1228 3/8. (1) and (2) G now extends from NE through S to NW and up to about  $50^\circ$  from all directions in these limits.
- 1415 4/8. (1) G over most of sky in S. (2)  $20^\circ - 40^\circ$  SSE.
- 1440 3/8. (2) display extending from  $60^\circ$  S through Z to about  $60^\circ$  N in form of broad band from E to W. The S edge is a clearly defined HA. In the N the sheet is non-uniform, having appearance of several bands separated very slightly.
- 1500 3/8. Display moved further N, ending approx.  $40^\circ$  N. Mainly (1), but (2) in E to  $30^\circ$ . Four bands clearly defined in N. S edge obscured by cloud.
- 1505-1508 3/8. Display covering all visible sky. Small (3) drapery  $20^\circ$  SW and small patch (2) drapery  $20^\circ$  SSW. (3) diffuse G in W to  $20^\circ$ . (2) DS, fairly steady, from  $60^\circ$  S to Z. Rapidly pulsating (2) and (3) DS's in entire N sky.
- 1510-1520  
MAX. (3) horseshoe drapery in S, apex  $80^\circ$  S. This gradually contracted to SE leaving behind it (2) diffuse glow. The drapery was very narrow and very clearly defined. Pulsations not so extensive in N but still very rapid. Most active in NE to  $50^\circ$ . Diffuse (1) G in S to  $10^\circ$ .
- 1522 4/8. Occasional weak pulsations in N. Elsewhere only (1) G.
- 1525 6/8. Pulsations now very rare. No structure visible.
- 1535 7/8. (2) strip visible either through gap in cloud or at edge of cloud  $10^\circ$  S. Elsewhere only stationary (1) G visible.

SEPTEMBER 11.

- 0925 8/8. No sign.
- 0940 Same.
- 1049 8/8. Sky not completely dark, particularly in Z.
- 1140 8/8. Fairly dark.
- 1250 8/8. No sign.
- 1430 4/8, clear in N. No sign.
- 1520 8/8. No sign.

SEPTEMBER 12.

(0703 Sunset  
 (0704 Moonset Fraction illuminated: 0.00  
 (0902 End astronomical twilight  
 (1736 Beginning astronomical twilight  
 (1937 Sunrise.

1215 Till now 8/8 and no sign.

1232 8/8 and snowing. Sky not very dark particularly in NE towards Z.

1500 Almost 8/8 - two stars visible  $60^{\circ}$  S. Here patch (2) G visible. Glow through cloud elsewhere in S sky and fairly light in N.

1505 7/8, clear in Z and  $60^{\circ}$ W. No sign in these parts, but glow through cloud distinct from S to E to  $60^{\circ}$ .

1525 4/8 and haze. (Stars visible over all N sky). Band of glow visible (probably through thin cloud) from SE to SW through  $10^{\circ}$  S. (1) G  $60^{\circ}$  S and  $20^{\circ}$  ENE.

1600 5/8 ( $1/8$  in S to  $10^{\circ}$ ). (1) G in S to  $30^{\circ}$ .

1625 5/8, clear in NE and W. No sign.

SEPTEMBER 13.

(0705 Sunset  
 (0834 Moonset Fraction illuminated: 0.01  
 (0904 End astronomical twilight  
 (1733 Beginning astronomical twilight  
 (1934 Sunrise

0835 8/8. No sign.

0845 Same.

0850-0855 8/8, appears thin. Quite light, particularly in SE and NW. Fairly light patch moved from  $45^{\circ}$  S up through Z.

0902 7/8. (2) G visible  $10^{\circ}$ - $15^{\circ}$  S-SE. Two small patches (1) G  $45^{\circ}$  SE.

0945 8/8. Sky fairly light in NE.

1032 8/8. Sky light low in SE.

1100 8/8. No sign, sky dark.

1235 Same.

1250 Same.

1330 Same.



SEPTEMBER 13 cont'd.

- 1435 5/8, clear in Z and N. (1) G visible from SSE to NE to  $10^{\circ}$ .
- 1445 8/8. No sign.
- 1500 Almost 8/8 - small patch in SSE thinly misted. Here (1) G.
- 1530 Almost 8/8 - two or three stars visible in SE and E,  $30^{\circ}$ . Glow visible below this patch through cloud.
- 1620 5/8. Clear from SSE to NE to  $80^{\circ}$ . Possible very weak glow  $10^{\circ}$  SSE.
- 1645 Ward reported weak G in SSE.
- 1800 Ward reported weak glow in ESE, but could not be sure that it was auroral.

Frost reported that G continued through night till dawn in SE - SW reaching up to  $45^{\circ}$  S at times.

SEPTEMBER 14.

- (0707 Sunset
- (0906 End astronomical twilight
- (1007 Moonset Fraction illuminated: 0.05
- (1728 Beginning astronomical twilight
- (1932 Sunrise
- 0830 3/8. (2) G at edge of cloud from SSE to SSW to  $15^{\circ}$ .
- 0855 8/8. No sign.
- 1005 7/8. (2) G visible through gap  $10^{\circ}$  SSE. Sky light in SW through cloud.
- 1101 8/8. Sky dark.
- 1155 8/8. Very dark.
- 1355 8/8 thin. No sign.
- 1402 5/8. (1) G above cloud  $35^{\circ}$  -  $40^{\circ}$  in S-SE. (1) G low along SW-WSW skyline.
- 1500 8/8. Possible G  $30^{\circ}$  SSE, but could be stars behind thin cloud.
- 1525 5/8 and haze. Possible very faint G  $30^{\circ}$  S-SSE, but green line not visible.
- 1615 8/8. No sign.

SEPTEMBER 15.

- (0709 Sunset
- (0909 End astronomical twilight

SEPTEMBER 15 cont'd.

- (1142 Moonset Fraction illuminated: 0.11  
 (1728 Beginning astronomical twilight  
 (1930 Sunrise
- 0835 8/8. Sky fairly light particularly low SE-NE.
- 1015 Same.
- 1052 8/8. No sign.
- 1110 8/8. Sky light generally.
- 1115 Same.
- 1120 Same.
- 1240 8/8. No sign.
- 1320 8/8. Very dark.
- 1332 Almost 8/8. Appears to be definite glow over small area on WSW horizon and sky slightly light along W-NW horizon. Green line not visible.
- 1345 Ward reported (1) G  $15^{\circ}$  WSW.
- 1435 4/8. (1) G to  $10^{\circ}$  SW.
- 1500 1/8 low in S. G from E to SW to  $20^{\circ}$ . (1) mainly but (2) SSE.
- 1520 3/8, mainly low in S. Glow visible through cloud.
- 1530 Ward reported patch low SE-E.
- 1540 Almost 8/8 - two stars visible G to  $30^{\circ}$  S-SE.
- 1600 Ward reported 8/8.
- 1645 8/8. Glow through cloud to  $30^{\circ}$  S-SE.
- 1800 Ward reported 8/8.

SEPTEMBER 16.

- 0830 Till now 8/8 thick mist.
- 1040 8/8. No sign.
- 1126 Same.
- 1210 Same.
- 1415 Same.
- 1525 8/8. Sky not completely dark.

SEPTEMBER 16 cont'd.

- 1630 Same but green line not visible.  
 1725 Almost 8/8 (one star dimly visible in Z),  
 less mist. Fairly dark.
- 

SEPTEMBER 17.

- 0900 Till now 8/8 heavy mist.  
 1300 Same.  
 1420 Same.  
 1510 Same.  
 1820 8/8. No sign though not completely dark.  
 Sky observed at frequent intervals till now  
 but always completely overcast.
- 

SEPTEMBER 18.

- (0713 Sunset  
 (0915 End astronomical twilight  
 (1617 Moonset Fraction illuminated: 0.40  
 (1718 Beginning astronomical twilight  
 (1921 Sunrise

0825 1/8 thick in S and 5/8 thin. No sign.

0930-0945 1/8. (2) draperies rapidly increasing to (3)  
MAX. from W horizon through point just S of Z to  
 E horizon (several parallel draperies). (1)  
 corona formed rapidly and increased to (4).  
 Corona in rapid motion within itself. Rays  
 extended into N half of sky to about  $45^{\circ}$ .  
 Draperies reached (4) and then faded into (2)  
 and (3) RB extending right across sky through  
 approx.  $50^{\circ}$  S. Extensive (2) G SE-S slowly  
 developed during this period.

0950-0955 (3) RB E-SW, max. elevation  $30^{\circ}$ .

1017 1/8 and becoming hazy. (2) section of drapery  
 from  $20^{\circ}$  SSW to  $40^{\circ}$  W. (2) G over small area  
 on S horizon.

1026 5/8 and haze. Weak G low in S and also along  
 NE-SE horizon.

1140 4/8 thin and haze. (1) multiple zenithal arcs.  
 Diffuse glow from Z to (2) sharp lower limit  
 at  $50^{\circ}$  in eastern half of sky.

1255-1300 2/8 thick and thin patchy mistiness. Corona  
 formed by very long diffuse (1) rays from all  
 directions. (2) band, half in mist, to about  
 $30^{\circ}$  S-SSE.



SEPTEMBER 18 cont'd.

- 1345 2/8 thick and haze over remainder. Possible (1) ray from SSW to  $50^{\circ}$  and G in SSE, but may be moonlit cloud. LNS.
- 1450 3/8 thick and haze over remainder. G over entire visible sky, (2) to  $15^{\circ}$  SSW, (1) elsewhere.
- 1535 3/8 thick and haze over remainder. (1) G over most of S sky, up to  $60^{\circ}$ . Little sign of activity elsewhere.

SEPTEMBER 19.

- (0715 Sunset  
(0917 End astronomical twilight  
(1715 Beginning astronomical twilight  
(1719 Moonset Fraction illuminated: 0.51  
(1919 Sunrise
- 0810 1/8. Still very light. (2) remnant HA appeared  $10^{\circ}$  SSE and faded.
- 0820 (1) HA  $10^{\circ}$  S.
- 0825-0835 HA developed into (3) band and faded again.
- 0838-0840 1/8. (2) RA  $20^{\circ}$  S (measured) and E half of another (2) RA below it at  $12^{\circ}$ . This developed into a complete RA. Third RA, (2), formed close below latter.
- 0843 1/8. Upper two arcs now very faint. Lower arc broadened into wide (2) HA  $2^{\circ}$  -  $10^{\circ}$ .
- 0845-0850 (2) G from S horizon to about  $15^{\circ}$  and steadily rising. (Upper edge crosses Canopus at 0850).
- 0855 (2) G has formed rather diffuse double arc between  $5^{\circ}$  and  $15^{\circ}$ .
- 0900 6/8. No sign.
- 0902 5/8. DS  $30^{\circ}$  SE. Green line seen in this patch..
- 0907 2/8. (1) G to  $10^{\circ}$  S.
- 0915-0920 1/8. (2) G low SE-SW. Several long (1) rays from E and W towards Z. These brightened to (2) and E half extended into very broad series of rays of almost multiple drapery structure. N limit clearly defined by band E-W through Z.
- 0940 1/8. (3) RB  $10^{\circ}$  S. Broad diffuse sheet through Z ending  $70^{\circ}$  N in clearly defined (2) HA. S limit ill-defined, but appears to extend back to  $60^{\circ}$  S.

SEPTEMBER 19 cont'd.

- 1000 0/8. (3) band ( $15^{\circ}$  wide) with almost multiple drapery structure sweeping from W horizon through  $80^{\circ}$  N to ESE horizon. Small isolated patch (2) G  $5^{\circ}$  SE.
- 1002-1007 0/8. Same as above initially, but gradual change of form of (3) band. Irregularities developed in ESE and a circular gap (approx.  $5^{\circ}$  radius) appeared in band about  $10^{\circ}$  E of Z. Hairpin bend band formed in S-SW about  $60^{\circ}$  with apex towards S and arms roughly horizontal. (1) HA formed  $45^{\circ}$  N and (1) G gradually over all N sky down to about  $15^{\circ}$ .
- 1010-1013 1/8 in S. Main band faded to (2). Activity still present in N down to about  $15^{\circ}$ .
- 1015-1020 1/8 in S and thin alto cu drifting in from WNW. After initial fading of general display it increased again to (3). Hole in band gone. Hairpin structure still present, although upper arm now merges into the broad (3) RB running from E to W through  $80^{\circ}$  N.
- 1026-1025 Besides activity in N, (2) band or part of arc appeared  $15^{\circ}$  S and gradually divided into two parts at W end causing acute angle at E end. This brightened and developed into (4) drapery gently swaying back and forth from E to W.
- 1030-1035 General drapery-like broad band still present from E to W through Z. Double band, almost twin HA,  $30^{\circ}$  S. (2) HA  $45^{\circ}$  N. Quite suddenly (4) drapery swept up from WNW horizon with considerable internal motion. (3) corona formed and the HA at  $45^{\circ}$  N assumed drapery structure, (3) over centre portion.
- 1035-1040 0/8. (4) draperies swept up from E and W forming broad strip of intense and changing activity about  $20^{\circ}$  on each side of Z and right-across sky from E to W. Faded to (2) and (3) by 1040.
- 1042 Display changed considerably, main features being two (3) RB's extending from SE sector to W with hairpin loops at SE ends.
- 1045 (3) band from E to W through  $60^{\circ}$  S. Broad diffuse (1) HA  $45^{\circ}$  N.
- 1046 Band faded to (2).
- 1049 0/8. Broad diffuse (1) HA  $45^{\circ}$  N. (2) hairpin effect remains in SE. (2) drapery  $10^{\circ}$  W.
- 1055 0/8. (2) HA  $20^{\circ}$  N. General (2) band right across sky with drapery structure low in W. Two (2) bands in SE sector preserving previous hairpin bend effect at SE end. (1) partial corona.

- 1110-1120 At 1110 display quickly flared up with (4) and (3) draperies covering entire sky. Pattern of display subject to extremely rapid changes. Internal motion subject to random reversals of direction. Brightest first in W with vivid red colours, later in E. (3) corona, very changeable. Display faded to (3) with less violent activity by 1120. (2) HA  $10^{\circ}$ N.
- 1120-1130 Whole sky swept by rapidly moving (4) draperies. Beautiful (4) corona. Display extends right down to N horizon. By 1130 whole N sky became covered with extremely rapidly fluctuating flaming DS's, (2).  
MAX.
- 1133 Small patch near moon where display is not visible. Partial corona in Z (bands forming it have N-S trend rather than more usual E-W trend). Bright drapery display faded to (2).
- 1133-1145 Extremely active (2) flaming covers entire sky with rays occasionally visible in all quarters. Mainly a profusion of rapidly changing DS's.
- 1150-1155 Great (2) DS's in most parts of sky with flaming less marked. (2) band  $15^{\circ}$ E.
- 1200-1205 Corona developed increased to (4) for short time and rapidly faded. (4) RB in E to  $60^{\circ}$  in rapid motion with red, yellow and green colours.
- 1215  $3/8$  and increasing. Display fading but (3) band present  $45^{\circ}$  SSW.
- 1220  $2/8$  and general haze. With bright moon difficult now to tell which is auroral. If any activity present its intensity not greater than (2) and must be DS. LNS.
- 1315  $8/8$  haze. Many stars visible, but no definite signs of aurora. If present, must be weak. LNS.
- 1440  $8/8$  haze, only one or two stars visible. No definite signs.
- 1445  $8/8$  and mist. No sign.
- 1600  $8/8$ . Sky not completely dark but line not visible.
- 1815  $8/8$ . No sign.

SEPTEMBER 20.

- (0717) Sunset  
 (0919) End astronomical twilight  
 (1713) Beginning astronomical twilight  
 (1759) Moonset Fraction illuminated: 0.63  
 (1916) Sunrise



SEPTEMBER 20 cont'd.

- 1345 8/8 and raining intermittently all night till now.
- 1350 8/8. Sky light but no sign green line.
- 1600 Ward reported sky clear but no sign.
- 1610 1/8. (1) multiple zenithal arcs extending  $20^\circ$  either side of Z (i.e. in NS direction).
- 1615 1/8. Arcs more diffuse and gently pulsating. Intensity probably (2), but appear very weak in bright moonlight.
- 1630-1635 1/8. Great (2) DS's mainly in Z but also across sky from E to W and extending to  $30^\circ$  N. Pulsating gently.
- 1637 1/8. (2) DS's over most of N sky and back to  $80^\circ$  S. Occasionally suggestion of corona.
- 1640 Suggestion of (1) HA  $45^\circ$  S. Pulsations in N sky more rapid now.
- 1645 Ward reported (2) DS's forming broken band from NE to SW horizons passing through Z and to  $10^\circ$  each side. These were not pulsating.
- 1650 1/8. (2) band  $45^\circ$  S. Activity in Z fairly stable. Pulsations in N sometimes rapid, sometimes gentle.
- 1700 Ward reported DS's still quiescent in Z.
- 1705 Ward reported very rapid pulsations in N. Fluctuations appeared to be not only of intensity but also of height.
- 1707 4/8 in S half. Pulsations more frequent and rapid in N, (2).
- 1710 Ward reported pulsations appear to have stopped. Glow increasing in E.
- 1720 7/8. (2) pulsations continuing in N.
- 1723 Almost 8/8 (two stars occasionally visible). Glow visible through cloud.
- 1730 8/8. No sign although sky not dark.

SEPTEMBER 21.

- (0719 Sunset
- (0922 End astronomical twilight
- (1710 Beginning astronomical twilight
- (1824 Moonset Fraction illuminated: 0.73
- (1914 Sunrise
- 0820 4/8. No sign.

SEPTEMBER 21 cont'd.

0845 1/8. No sign. No line. Moon very bright.  
0910 2/8. (2) G above cloud 10°- 15° S-ESE.  
0927 3/8 and slight haze. Glow visible through thin cloud to 15° SE-SSW.  
1010 8/8 very thin cloud. No sign. No line.  
1045 0/8. No sign.  
1208 8/8. No sign though sky light generally.  
1250 8/8. No sign.  
1325 Almost 8/8 thin cloud. No sign.  
1615 8/8. No sign.  
1715 1/8 in SSW. No sign.  
1720 Same. No line.

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SEPTEMBER 22.

0840 8/8. No sign.  
0910 Same.  
0920 Same.  
1300 8/8 thin. No sign.  
1800 8/8 and mist for remainder of night. No sign.

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SEPTEMBER 23.

0820 8/8 and mist. No sign.  
1130 Till now same.  
1230 Still same.  
1725 4/8 - clear in N and patchy elsewhere. No sign of green line.  
1750 8/8. No sign.

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SEPTEMBER 24.

8/8 all night.  
 (Observers on board HMS St. Austell Bay).

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SEPTEMBER 25.

(0727 Sunset  
 (0931 End astronomical twilight  
 (1658 Beginning astronomical twilight  
 (1904 Sunrise and Moonset Fraction of moon  
 illuminated: 0.99

0830 6/8. No sign.

0945 1/8. No sign.

The following three obs. reported by Cohen:

1100 Display began as band through Z from ENE to  
 WSW. Changed into "split curtains".  
 Intensity (3).

1130 0/8. (2) ray due S.

1135 0/8. No sign.

1500 Boyd reported 1/8 and (3) zenithal band.

1530 Ward reported short (3) band in Z in E-W  
 direction. This suddenly narrowed and  
 curved in E and streaming began along its  
 length lasting for approx. one minute;  
 then diminished to short (2) band.

The following obs. also by Ward:

1533 Only short (1) and (2) diffuse bands.

1540 Still weak bands in E-W direction near Z.

1550 No sign.

1615 8/8.

SEPTEMBER 26.

0920 6/8. No sign.

0940 Same.

0954 3/8 thin. No sign.

1045 6/8 thin. No sign.

1115 Same.

1445 8/8. No sign.

1535 Same.

1635 7/8, clear in SE. No sign.



SEPTEMBER 27.

0800 8/8. No sign.  
 0915 Same.  
 1035 Same.  
 1136 Same.  
 1525 Same.  
 1650 Same. Light all night.

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SEPTEMBER 28.

0850 8/8. No sign.  
 1010 Same till now.  
 1220 Same till now.  
 1540 8/8. Green line not visible on background spectrum.  
 1620 8/8. No sign.

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SEPTEMBER 29.

1040 8/8, misty and very dark till now.  
 1540 8/8. Sky light but no sign.

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SEPTEMBER 30.

1140 Till now 8/8, misty and very dark.  
 1630 8/8. No sign.

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OCTOBER 1950OCTOBER 1

(0736 Sunset  
 (0943 End astronomical twilight  
 (1303 Moonrise Fraction illuminated: 0.80  
 (1642 Beginning astronomical twilight  
 (1851 Sunrise

1520 Till now 8/8 and no sign. Sky moonlit and cloud apparently thinning.

1745 6/8 - clear in N. No sign.

1815 8/8 and quite light.

OCTOBER 2.

(0738 Sunset  
 (0945 End astronomical twilight  
 (1512 Moonrise Fraction illuminated: 0.71  
 (1639 Beginning astronomical twilight  
 (1849 Sunrise

0835 7/8. Possible auroral activity  $20^{\circ}$  SW through very small cloud gap. (See 0850 obs. below).

0840 7/8. No sign.

0845 Same.

0850 7/8. Similar to 0835 obs., but G seems fairly certainly only twilight. No sign of green line on continuous spectrum.

0905 8/8. Sky light.

0910 8/8. Patches of glow visible through cloud  $30^{\circ}$  SW. Plateau and hills clearly outlined.

0930 8/8. Sky light. Green line clearly visible in all sectors.

0935 Almost 8/8. Two stars dimly visible in Z. Considerable glow through cloud in E and SE to  $20^{\circ}$ . Sky light elsewhere.

0945 8/8. Green line visible in all sectors.

1019 8/8 and snowing. No sign.

1045 7/8. (2) G visible  $15^{\circ}$  N. Sky very light in NW sector. Fairly dark low in S, but cloud probably much thicker there.

1048 7/8. (2) G extends to  $15^{\circ}$  N - NW along line similar to HA. No G visible through gaps  $20^{\circ}$  and  $30^{\circ}$  N and NW.

OCTOBER 2 cont'd.

- 1100 8/8. Glow through cloud to  $45^{\circ}$  NW, N and NE, but sky light everywhere.
- 1120 5/8 - clear from Z to S and SW. (1) and (2) G in N - WNW sector  $5^{\circ}$  -  $30^{\circ}$ . Appears strongest in 'arc-line'  $10^{\circ}$ . No sign in S-SW sector.
- 1123 3/8 - clouded right round horizon to  $20^{\circ}$ . (2) G  $25^{\circ}$  N and (1) G over entire sky (i.e. unclouded part) except for dark band from E to W through Z.
- 1145 6/8, mainly thin. Quite clear in SW and patchy in N. (2) G  $25^{\circ}$  N and (1) G elsewhere.
- 1200 3/8 in SE - N sector. (2) G S - N through W all along horizon up to about  $20^{\circ}$ . (2) ray bundle due S. Several diffuse (1) rays in W and NW extending up to form partial corona. Rays momentarily (3) in W.
- 1210 2/8. Activity reduced to (2) G as above.
- 1220-1230 6/8 broken. At first only G visible through breaks in all N sky. Rays formed in E and W and in W brightened to (4). Clouds cleared in Z revealing (3) corona which brightened to (4) by 1225 and was changing fairly rapidly. Break in S revealed (3) drapery across entire S sky down to  $45^{\circ}$ . By 1230 all appeared quiet with (2) and (3) G over all visible sky with occasional pulsations to NE.
- 1235 5/8. Mainly quiet (2) and (3) G. Small (3) drapery  $30^{\circ}$  SE.
- 1237 3/8. (2) G covering entire sky except for SSE - SW sector. Strongest along NW horizon. Weak ray structure in E - ENE plus (2) ray bundle  $20^{\circ}$  -  $40^{\circ}$  SE.
- 1250 5/8 and thin cloud. G visible everywhere, up to (2). Rapidly pulsating DS in NE down to  $20^{\circ}$  (waves of light, not random fluctuations). Suggestion of rays in SE.
- 1307 6/8. Scattered patches (2) G visible in Z and high in SW and SE. Clouded elsewhere.
- 1322 6/8. (1) G visible to  $40^{\circ}$  S, to  $10^{\circ}$  E and (2) G to  $30^{\circ}$  WSW. Parts of Z visible but no activity there.
- 1355 1/8. (1) bands from E to W through Z. No activity in S up to  $80^{\circ}$ . DS  $45^{\circ}$  N. Occasional pulsations.
- 1455-1510 0/8. At first no activity in S sky. (1) drapery like effect  $20^{\circ}$  NW and (1) G elsewhere in N and E. Drapery in NW brightened to (4) and activity extended to  $10^{\circ}$  SW. (2)
- BCO  
MAX.



OCTOBER 2 cont'd.

bands developed  $30^{\circ}$  NE, the bands running horizontal in the middle with the ends curving up towards, but not reaching, the Z. Drapery in W weakened, but bands in N and NE brightened to (4) at about 1505 and rippled rapidly from W to E. Meanwhile (2) drapery developed across most of S sky at  $40^{\circ}$ . All the while rapid pulsations or waves round  $20^{\circ}$  N. Display gradually lost its structure and became (2) and (3) DS in N.

1515 (3) corona in Z, rapidly fading. Elsewhere (2) G or DS and pulsations in N.

1520-1525 0/8. Corona in Z again (2) but fading. Activity elsewhere mainly diffuse but drapery structure, (2) and (3), in E, and small (3) ray bundle  $20^{\circ}$  SW.

1530 0/8. (2) corona formed by rays from  $20^{\circ}$  E and  $20^{\circ}$  W. (1) drapery  $20^{\circ}$  SW brightening to (2). Rapid pulsations continuing in N up to  $40^{\circ}$ .

1534 Corona still present though fluctuating in form and brightness. (3) rays  $45^{\circ}$  SW, fading. S and SE free.

1540 Magnificent (3) corona. (3) drapery SE - SW from  $20^{\circ}$  with rays up to corona. Pulsations in N.

1542 Corona now weaker. Drapery continues across S sky, down to about  $10^{\circ}$ . Drapery from E up to Z. Pulsations in N.

1545 Drapery in S developed into narrow ribbon. DS curved through Z, concave to N. (3) drapery  $40^{\circ}$  W.

1546 Ribbon in S became tattered motley array of draperies, (1)-(2). Drapery gone in W. DS in Z assuming rayed structure, (3). Pulsations in N.

1600 0/8. DS's in all parts of sky. Extremely rapid pulsations in all N sky.

## SEVERAL PHOTOGRAPHS TAKEN BETWEEN 1603 and 1648.

1603 (2) band, slightly rayed,  $10^{\circ}$  S, fading.

1605 Band developed into rapidly moving (4) drapery, moving from W to E and fading.

1607 Band reappeared, (3), and faded again. Pulsations very rapid in N up to Z.

1610 (2) diffuse band  $30^{\circ}$  SSW.

1611 Band developed into (2) and (3) drapery.

1615 Diffuse (2) drapery  $30^{\circ}$  NW. Still extremely rapid pulsations in all N sky. Fairly quiet in S.

OCTOBER 2 cont'd.

- 1619 Drapery now (3).
- 1620 Drapery extends from  $10^{\circ}$  NW through Z to SE. Little activity in SSW. Pulsations continuing in N.
- 1625 (3) band through Z from SE to SW.
- 1630 Band faded to (2) and much less curved - extending now from SE to W. (2) band  $5^{\circ}$  S. (1) rays SW to  $40^{\circ}$ . Pulsations continuing.
- 1631 Rays in SW very diffuse, (1). (2) band through Z. Band low in S faded. Pulsations in N.
- 1635 (1) bands curving up from E to Z and veering S.
- 1636 (2) corona formed in Z.
- 1638 (2) drapery  $20^{\circ}$  W.
- 1643 (2) drapery curving across sky from  $10^{\circ}$  SW to S forming a cusp and then curving to  $45^{\circ}$  E. Rays from SE coming up to meet the curve. Rapid pulsations continuing in N up to Z. Drapery formed low in SSE and faded. Intensity nowhere exceeds (2).
- DCO 1648 Pulsations in N. Wavy (1) and (2) bands through Z ending in small (1) drapery  $30^{\circ}$  SE. Rays  $5^{\circ}$  SSE. G  $5^{\circ}$  SW. (1) DS  $40^{\circ}$  SSE.
- 1658 0/8. Almost same.
- 1705 (2) drapery  $15^{\circ}$  S. (2) DS to  $30^{\circ}$  W, showing semblance of rays. DS's elsewhere. Bands through Z pulsating.
- 1710 1/8 scattered. DS in W became (2) drapery and extended across S sky  $30^{\circ}$  -  $40^{\circ}$  to meet drapery in S - SSE. G in most parts of remainder of sky.
- 1715 1/8. (2) drapery  $40^{\circ}$  S. DS's or G elsewhere. Sky becoming light in E and moon just appearing at W edge of Wireless Hill. No sign of sunlit features.
- 1720 No structures visible. G everywhere and pulsations continuing.
- 1725 1/8. Activity mainly in Z where bands from E to W continue to pulsate. Some activity however over entire sky. Sky becoming lighter.
- 1735 Same, but lighter.
-

OCTOBER 3.

(0740 Sunset  
 (0948 End astronomical twilight  
 (1608 Moonrise Fraction illuminated: 0.63  
 (1636 Beginning astronomical twilight  
 (1847 Sunrise

0850 6/8, still twilight. (2) DS of small extent (possibly diffuse ray bundle)  $40^{\circ}$  -  $50^{\circ}$  due E.

0940 3/8. (2) diffuse bands running E-W  $10^{\circ}$  either side of Z. (3) G low in SE - possibly HA with remainder obscured.

1002 (1) bands E to W through Z and up to  $40^{\circ}$  N.

1003 Bands changing into (2) corona.

1005 4/8. Corona disappeared. (1) isolated diffuse patches in N sky.

## SEVERAL PHOTOGRAPHS BETWEEN 1007 AND 1110.

1007 (2) G SSE. (Photographs taken near Jupiter in N).

BCO 1033 6/8. (2) rays and scattered (2) G in Z and S - E sector. Rest obscured.

MAX. 1034 6/8. (3) drapery developed from Z to  $30^{\circ}$  SE.

1035 6/8. Drapery faded. Activity now weak. (1) scattered G in S and (1) G along E horizon.

1041 Same.

1044 (1) ray bundle appeared high in S but faded rapidly. 5/8 and haze.

1047 4/8 and haze. Fairly uniform (1) G over most of S sky. (1) corona formed by long rays from ESE - NE.

1052 4/8, mistiness dispersing slightly. G over S sky almost (2). Diffuse patches and (1) rays high in ESE - NE sector and round Z on all sides. Obscured in W half of sky.

1058 3/8 and becoming clearer of mist. Patchy G over S and E sky to Z suddenly became flaming with huge irregular areas pulsing in intensity. Apparent sweep of intensity up from SE horizon. G fairly steady in S - W sector. Pulsing confined to S - NE and in Z.

1102 3/8. Pulsing continues.

1107 Pulsing (2) surfaces and bands now extend over almost entire sky. Bands irregular with E-W trend through Z.



OCTOBER 3 cont'd.

- DCO 1115 Activity faded from N sky. (2) pulsing bands of most irregular shape over E-S sector and round Z. Quieter in W sky with quiet (2) G on W horizon. 1/8.
- 1125-1135 2/8. Main activity round Z where a very distorted (2) corona is formed by pulsing bands and sheets.
- 1150 2/8 heavy and mist and haze over remainder - no stars very clear. Weak activity over entire sky.
- 1200 Two or three (1) bands, very diffuse, through Z. Diffuse G in most parts of sky.
- 1208 5/8 and fairly thick mist. Sky fairly light but no sign of auroral forms.
- 1215 Weak G visible in most parts through mist.
- 1230 4/8. (1) diffuse glow over all visible sky, (1) band (or illuminated edge of cloud) 20° W running N-S. Occasional (1) rays 45° SW.
- 1253 4/8 and possibly thin haze. No sign.
- 1323 8/8. No sign.
- 1350 Almost 8/8 - two stars visible 45° W. No sign.
- 1425 8/8 - one star in W occasionally visible. No sign.
- 1545 8/8. Very weak glow through cloud 10° SSE.
- 1630 8/8. No sign.

OCTOBER 4.

- 0900 8/8 and misty rain. Sky light and green line just discernible.
- 1105 Has remained 8/8 with misty rain since last obs. Gradually becoming darker. Line not discernible although slightly lighter sky low in S - SE may be auroral.
- 1135 Same, very dark.
- 1520 8/8, low mist. Quite light and green line distinct. Appears to be strongest in Z.
- 1645 8/8. Sky a little darker.

OCTOBER 5.

- (0743 Sunset  
(0953 End astronomical twilight

OCTOBER 5 cont'd.

(1630 Beginning astronomical twilight  
 (1717 Moonrise Fraction illuminated: 0.43  
 (1842 Sunrise

0940 8/8. Possible auroral glow  $80^{\circ}$  N. Green line just discernible.

0945 8/8. Sky light in patches all over but particularly in N sky. Green line clearly visible.

1025 Same.

1125 8/8. Fairly dark.

1210 8/8. Quite dark.

1303 Same.

1400 8/8. Quite light. Green line visible.

1438 8/8 but thinning and tending to become broken - stars occasionally visible. Patches of glow in most parts of sky (except in N-NE). Some of these patches may be stars behind thin cloud, but green line visible mainly in S.

1500 Same, but LNS.

1555 8/8 - one or two stars occasionally visible. Patches of glow in most parts of sky but green line not seen.

1605 Occasional breaks in cloud which is now fairly thin in parts. Rapidly pulsating (2) DS's seen in Z. Patches of glow in most parts. Seems certain that patches previously recorded were auroral (eyes well accustomed for this obs.).

1610 6/8 and thin haze. Rapid pulsations in Z and all N sky visible through breaks. (2) G in S up to Z.

1619 8/8. Still quite light.

1625 8/8. A little darker.

1631 8/8. Patches of glow still visible in N. No sign in S, but cloud appears thick.

1641 Almost 8/8 - two or three stars occasionally visible in N. G visible through small breaks or through thin cloud. Pulsations continuing over all N sky. Apparently steady G  $45^{\circ}$  SE.

1655 8/8. Sky still light.

1709 8/8 and drizzle. Darker.

OCTOBER 5 cont'd.

1720 8/8. Sky quite light with approaching dawn. Faint continuous spectrum but green line not visible.

OCTOBER 6.

- (0746 Sunset  
 (0956 End astronomical twilight  
 (1626 Beginning astronomical twilight  
 (1735 Moonrise Fraction illuminated: 0.34  
 (1839 Sunrise
- 0945 8/8. Sky patchily light chiefly high in S-E sector. Green line clearly visible.
- 1015 Same.
- 1031 8/8. Light irregular bands through cloud SE - NE and through Z.
- 1036 Same.
- 1140 8/8. Fairly dark and no sign of green line.
- 1220 Same.
- 1307 Same.
- 1335 3/8. (2) G above cloud bank SE - SW diminishing in intensity with height and absent above about  $40^\circ$ . Nothing elsewhere.
- 1340 2/8 in N and low in S. (1) G from SW to E right round horizon and up to  $10^\circ$ .
- 1352 2/8. (1) - (2) G from E to W up to  $40^\circ$  S, brightest low and in S.
- 1400 2/8. (1) G now less extensive - confined to SSE and SW.
- 1420 2/8. G in SSE - SW same, though cloud obscuring more of it.
- 1437 6/8 and general haze. (1) G still present in SSE to  $15^\circ$ .
- MAX. 1542 7/8 - clear low in W. Here (2) - (3) G. Also glow from most parts of sky through cloud.
- 1550 3/8 and general haze. (2) G over S sky from SSE to SW up to  $50^\circ$ . (3) ray appeared for short time  $10^\circ$  SW.
- 1610 6/8 - fairly clear low in W. (2) G with occasional rays in SW to  $20^\circ$ . Pulsations beginning  $40^\circ$  NW. Glow elsewhere in S sky through cloud.



OCTOBER 6 cont'd.

1620 2/8. (2) pulsating DS's over most of sky - mainly near Z but also in S sky to  $50^\circ$ . Stationary (2) G elsewhere in S.

1625 3/8. Pulsations continue. The direction of the waves is from NW to SE. DS quite curved near Z giving appearance of unstable corona.

SEVERAL PHOTOGRAPHS BETWEEN 1625 AND 1640.

1628 3/8. Pulsations now more random and confined to Z through to  $40^\circ$  NE.

1635 3/8. Two fairly steady (2) rays  $50^\circ$  SE (diffuse). Pulsations less general but occurring in N and NE. Structureless (2) G still present in S - SW.

1640 3/8. Fairly steady (2) corona produced by parallel rays through Z from N to S, but not extending more than  $10^\circ$  each side of Z. General G in S. Pulsations continuing in N.

1647 5/8. Occasional weak pulsations in NE near Z. (2) G in S-SE.

1650 7/8. (2) G to  $45^\circ$  SE.

1655 8/8. Glow still visible through cloud in most parts.

1700 7/8 - clear in SE where weak rays amid (2) G are present. Fairly light everywhere.

1708 7/8. Becoming light in E.

1730 Now too light to see any auroral activity.

OCTOBER 7.

(0748 Sunset  
(0958 End astronomical twilight  
(1623 Beginning astronomical twilight  
(1748 Moonrise Fraction illuminated: 0.24  
(1836 Sunrise

CO 0848 3/8. Continuous obs. during twilight. (3) drapery commenced suddenly at 0848 from ESE to Z. There had been no previous sign of forms nor of green line.

0855 Drapery has now faded to (2) after extending through Z into upper WNW sky.

0857 5/8. Region of drapery now obscured.

0904 6/8. Patches of weak glow visible high in E. (Still twilight).

OCTOBER 7 cont'd.

- 0907 6/8. (2) ray bundle  $45^{\circ}$  E - may be part of drapery. Small patch (2) G in Z through gap in clouds.
- 0919 7/8. No forms visible but green line distinct high in W sky.
- 0922 7/8 - two stars visible in N. Glow through cloud  $45^{\circ}$  SE.
- 0935 3/8. Several weak parallel bands E-W through Z. (2) RB E-W through  $40^{\circ}$ S, (3) at W end. Whole band steadily rising in elevation.
- MAX-0948 3/8 and slight haze. (3) drapery from W through Z to  $45^{\circ}$  E. Narrow at ends and very broad and diffuse from Z down to  $60^{\circ}$ . (1) HA just N of Z.
- 0956 5/8. (2) RB E-W through  $45^{\circ}$ S, almost RA, but becoming slightly irregular.
- 0959 6/8. RB faded somewhat and is now not rayed.
- 1002 5/8. Band brightened momentarily but faded again to (1) with (2) at W end only.
- 1005 5/8. Band now visible only at E and W ends, (1).
- 1007 5/8. Another (1) band (almost HA) has formed right across sky through  $85^{\circ}$ S.
- 1009 5/8, slightly hazy. Band moved to Z, brightened to (3), became irregular in W half and then spread from Z to  $50^{\circ}$ S.

PHOTOGRAPHS BETWEEN 1009 and 1613.

- 1013 (2) band appeared SE - SW through  $20^{\circ}$  and brightened to (3). Former (2) band through Z still present and very broad. Extends now almost SW - NE, not E - W.
- 1015 Band low in SE - SW still present. Broad high band has narrowed considerably and now forms a partial distorted corona. Band runs SW - NE.
- 1016 (2) DS has appeared high in NW.
- 1018 4/8 and considerable haze. Zenithal band now gone. Patchy (1) G in all W - NW, E - NE sky and in Z. (2) band, almost HA, still at  $20^{\circ}$ S.
- 1019 Short (2) band through Z appeared running in NW - SE direction and rapidly faded to (1).

OCTOBER 7 cont'd.

- 1022 Cloud decreasing but haze increasing. Band in S (2) only at SW end. E end has spread into diffuse (1) G. Patchy (1) G elsewhere over entire sky.
- 1027 Almost 8/8 thin hazy cloud. Patchy (1) G over entire sky, strongest in W - NW to Z.
- 1037 Has remained same till now, except that at 1035 a slightly brighter band (almost HA) was visible through 40° S.
- 1039 Sky clearing slightly, but patchy (1) G still everywhere. The HA at 40° S has brightened to (2).
- 1045 4/8 and haze. (2) HA has risen to 60° S.
- 1048 HA changed to band, broadened and became irregular and momentarily increased to (3). E - W trend and almost passes through Z.
- 1050 Band faded to (2). Remainder of sky still covered by patchy (1) G.
- 1053 Band now split into three diverging (2) bands at W end, joining at Z.
- DCO 1055 3/8 and haze. Band now dispersed into the general overall patchy (1) G.
- 1107 8/8 thick haze. Sky almost uniformly light. Slightly lighter band between 15° and 20° S - SW.
- 1136 8/8 haze with some stars just visible. Fairly uniform (1) G over entire sky and several weak short bands curving through Z from W to NE.
- 1142 Same, except that bands in Z and just NW of Z have begun pulsating with regular 4 second period.
- 1152 Sky clearing - only thin uniform haze. Several long diffuse (1) bands E - W through Z right across sky and several more at 45° N. (2) DS 20° SW with weak diffuse ray structure.
- 1157 1/8 and haze. Sky very light with fairly uniform (1) G everywhere and slowly and weakly pulsing bands E - W through Z and up to 45° N.
- 1230 0/8, slightly hazy. Z and sky from W through N to SE covered with weak band-like DS's pulsing regularly with period of 4 $\frac{1}{2}$  seconds. Practically no activity W - SE.



OCTOBER 7 cont'd.

- 1315 8/8 thin misty cirro-stratus. Sky still uniformly light. Three parallel diffuse very weak bands from E to Z and just beyond varying slowly in intensity.
- 1322 Cloud same. Uniform (1) G over all sky except in Z and E of Z where patchy.
- 1415 8/8. Very light, particularly in N.
- 1425 8/8 thin haze - several stars visible. Auroral light from most of sky. Bands through Z from E to W - intensity probably not greater than (2). G through cloud  $20^{\circ}$  SSE.
- 1445 8/8. Still very light.
- 1500 Same.
- 1520 Same.
- 1530 Same.
- 1550 3/8 in S and general thin haze. Many stars visible in N. Diffuse (2) patches from W to E through Z and in N sky down to  $40^{\circ}$ . Weak slow pulsations near Z. Suggestion of ray  $20^{\circ}$  W.
- 1555-1602 4/8 mainly in S. At first (2) band from E to W through Z with clearly defined S edge through  $80^{\circ}$  S, and diffuse N edge. Also (2) band  $40^{\circ}$  N. These gradually became more diffuse until a diffuse striated display developed with striations from E to W, (1) and (2).
- 1607 Three (1) bands curving through Z from E to W, convex to N. (1) G extending over all N sky down to about  $30^{\circ}$ .
- 1613 4/8 in S and haze. (1) - (2) band from E to W through Z and down to  $70^{\circ}$  N. Below this band in N sky general G down to  $40^{\circ}$  N.
- 1618 4/8 and haze. (2) band through  $45^{\circ}$  N not quite extending to E and W horizons. (2) rays occasionally  $30^{\circ}$  WSW. (2) diffuse patch - almost corona - in Z.
- 1621 8/8, thin. G visible in WNW through cloud,  $20^{\circ}$ .
- 1625 Same. Sky quite light.
- 1632 8/8. Thin enough to see band from N  $70^{\circ}$  to  $60^{\circ}$  NE and G  $30^{\circ}$  WNW.
- 1638 8/8 - very thin in N where three stars dimly visible (1) - (2) band from E to W through  $70^{\circ}$  N.

OCTOBER 7 cont'd.

- 1648 8/8. No sign of display but sky still light.  
 1700 Same.  
 1703 Green line present in most parts of sky including S.  
 1715 8/8. Sky becoming slightly light in E.

OCTOBER 8.

- (0750 Sunset  
 (1001 End astronomical twilight  
 (1620 Beginning astronomical twilight  
 (1758 Moonrise Fraction illuminated: 0.16  
 (1833 Sunrise  
 0850 3/8. Still very light. No sign green line.  
 0915 4/8. Still very light. No sign green line.  
 BCO 0937 0/8. (2) RA  $5^{\circ}$  S. (1) RA  $25^{\circ}$  S. Weak pulsing DS in Z.  
 0939 (2) RA  $5^{\circ}$  S unchanged. (1) RA at  $25^{\circ}$  has broadened and risen and is now rather scattered. Several long weak rays from ESE and due S forming partial corona. These are fluctuating in intensity.  
 0945 0/8. (2) drapery curving from S to W. Also partial (2) are below it.  
 0947 0/8. Drapery and arc merged into broad (2) DS S-W up to  $20^{\circ}$ . Few very broad faint rays in E and ESE, long.  
 0950 (2) DS still present S-SW. (1) HA  $45^{\circ}$  S, almost (2) at E end where there is a very faint ray structure.  
 0955 0/8. (2) RA's  $10^{\circ}$  and  $20^{\circ}$  S. Several long faint rays from ESE to near Z.  
 0958 Momentary (3) section in lower arc due S.  
 1003 Upper RA has faded. The lower one has broadened and split into two at approx.  $10^{\circ}$  and  $15^{\circ}$  although the separation is not distinct.

## PHOTOGRAPHS BETWEEN 1004 AND 1130.

- 1004 (1) HA formed at  $45^{\circ}$  S, slightly brighter at W end. (2) RA at  $10^{\circ}$  has faded to a diffuse (1) HA.  
 1013 1/8. (1) - (2) broad RA  $10^{\circ}$  -  $20^{\circ}$ . Weak diffuse rays E and ESE to Z. Also from W to  $45^{\circ}$  W. Single weak ray momentarily visible due S below arc.

OCTOBER 8 cont'd.

- 1019 1/8. (2) HA  $15^{\circ}$  S and (1) HA  $60^{\circ}$  S. At extreme ESE portion of the (2) HA a short arm points down.
- 1030 0/8. Main arc faded to almost (1) and risen slightly to  $20^{\circ}$ . Still has fork at ESE end. Very faint HA E-W through Z.
- 1033 Single (1) ray  $20^{\circ}$  -  $40^{\circ}$  WSW.
- 1040 0/8. Very faint broad HA's at  $20^{\circ}$  and  $70^{\circ}$  S and through Z. All very weak and diffuse.
- 1043 Same and (2) diffuse ray bundle, fairly extensive, from due W to  $30^{\circ}$  W.
- MAX. 1044 Display developed into (3) drapery from W to S,  $45^{\circ}$  at S end.
- 1045 (2) drapery has now extended right across sky and almost passes through Z. Another draperh, almost (2), through about  $70^{\circ}$  S.
- 1047 (2) drapery now very broad and diffuse in W half.
- 1048 Faded to (1) with scattered (2) sections, (1) HA at  $35^{\circ}$  S.
- 1052 0/8. (2) HA through  $40^{\circ}$  S and diffuse glow with weak ray structure over all sky above arc to Z. Fairly sharp cut-off at Z - nothing in N sky.
- 1056 (2) HA  $40^{\circ}$  S still present. (1) HA  $30^{\circ}$  S, strongest in E end. Sheet of weak rays between HA and Z. Several (1) bands E-W through Z with slight southward curvature at E end.
- 1100 (2) RA  $20^{\circ}$  S, brightest in E half. (2) RA  $35^{\circ}$  S. (2) parallel bands E-W through Z. Several isolated rays between  $50^{\circ}$  S and Z.
- 1102 W ends of both RA's faded. Bands through Z-brightened in E half and joined into (3) drapery.
- 1103 Drapery faded to (2). Small section (2) drapery very low in W.
- 1108 1/8. Now practically no structure. (1) G from an E-W line through Z down to about  $40^{\circ}$  S. (2) DS  $20^{\circ}$  SE and (1) DS  $10^{\circ}$  SE, both almost partial arcs.
- 1110 Same and short section (2) drapery low in W - WSW.
- 1112 DS in SE spread and brightened into (3) drapery, then faded to (2). (3) drapery formed low in W and extended higher up into SW sky but faded by 1113 to (2).



OCTOBER 8 cont'd.

- 1114 Now two distinct (3) draperies in W - SW, one very low, the other extending up to about  $50^{\circ}$  SW.
- 1115 Faded to (2) in WSW. (2) drapery with only weak ray structure  $30^{\circ}$  S - SE.
- 1116 (2) RB across sky through  $30^{\circ}$  S. (1) G overall up to about  $10^{\circ}$  N of Z. Weak parallel bands E-W through Z.
- 1120 (1) band-like G over all S sky, particularly in W. (2) HA  $20^{\circ}$  S - E. Weak parallel bands extend to about  $60^{\circ}$  from N horizon, and well into NE sector.
- 1125 2/8. Same, except that the (2) HA has become slightly irregular and extended right across to WSW horizon. Also elevation reduced to  $15^{\circ}$ .
- 1130 2/8 and getting slightly hazy. Band has become quite rayed (1) G over entire S sky, slightly lighter low in W - SW and extends to about  $60^{\circ}$  N.
- 1136 3/8. Band has broken up and faded almost completely. Fairly uniform (1) G everywhere with weak parallel band structure through Z and to  $60^{\circ}$  N.
- 1138 Previous band brightening again slightly at  $15^{\circ}$  SE.
- 1140 Band has spread right across sky again at  $15^{\circ}$  and is (2) at E end. Weak parallel bands in Z and N of it to  $60^{\circ}$  N have begun pulsing.
- 1142 E half of band is now (3).
- 1143 E half of band is now (2).
- DCO 1145 (2) ray bundle at E of band moved across to almost due S. Still weak pulsing bands and DS's N and NE of Z.
- 1207 2/8. Fairly uniform (1) G over almost entire sky, brightest in S and W. Weak pulsing DS's over wide area in Z and N and NE of Z.
- 1218 2/8 in N. (1) G over entire sky now very patchy.
- 1220 3/8, mainly in N. (2) DS (or perhaps G with cloud obscuring parts) in most of S sky, particularly  $45^{\circ}$  SE, and  $30^{\circ}$  SW. (1) rays  $20^{\circ}$  SE.
- 1240 8/8 and snowing. Sky noticeably lighter low in E and W than elsewhere.

OCTOBER 8 cont'd.

- 1330 8/8. No sign.
- 1400 1/8 in S and a little haze. (1) G visible at edges of cloud bank.
- 1420 8/8. Glow through cloud  $10^{\circ}$  SE and suggestion of same  $40^{\circ}$  NE. (This could be stars behind thin cloud).
- 1443 8/8 - one star dimly visible in S. Suggestion of glow through cloud  $5^{\circ}$  SSE.
- 1453 6/8 - clear in portion of S. (2) G visible  $20^{\circ}$  SSE above cloud. Also faint glow through cloud  $5^{\circ}$  SW.
- 1520 7/8 - clear in W where (1) G is visible to  $30^{\circ}$ .
- 1536 2/8 in S. (1) G over most of S sky. (2) G  $10^{\circ}$  W. (2) bands through Z from E to W pulsating in N and S directions. (2) DS pulsing in N sky down to  $60^{\circ}$ .
- 1540 (2) G now confined to  $30^{\circ}$  SE and  $10^{\circ}$  W. DS's pulsating in all N sky down to  $40^{\circ}$ , particularly in NE.
- 1545 8/8. Glow through cloud in most parts of N sky, particularly in NE.
- 1552 8/8. Glow dimly visible through cloud  $45^{\circ}$  NE.
- 1607 3/8 broken. (2) G SW to  $10^{\circ}$ , and SE to  $10^{\circ}$ . Patches of G near Z. Pulsating bands in N to  $40^{\circ}$ .
- 1611 2/8 in S. (2) DS's pulsating in all N sky, but particularly in line from W to E through Z. (1) G in most parts of visible S sky.
- 1616 4/8 mainly in S. Weak pulsations of (1) DS in NE.
- 1621 6/8 and haze - fairly clear in N. (2) G ESE to  $45^{\circ}$ . No sign of pulsations in N.
- 1626 3/8 in S and general haze. (2) G ESE to  $45^{\circ}$ . Glow through cloud S - SSE. Occasional (2) DS's in Z and pulsating DS's  $70^{\circ}$  NE.
- 1631 3/8 and haze. (2) G ESE and glow through cloud  $10^{\circ}$  SW. Occasional pulsations of (2) DS in N near Z.
- 1635 4/8 in S. (1) G in N up to  $40^{\circ}$ . (2) G in ESE to  $45^{\circ}$ . No structure or pulsations.

OCTOBER 8 cont'd.

- 1641 7/8, clear in N to  $30^{\circ}$  and low in S. Glow through cloud SSE to SSW to  $40^{\circ}$ , probably (2). Weaker glow, probably (1), in N.
- 1650 3/8 scattered. (2) G SSE to SSW to  $40^{\circ}$ . (1) G over remainder of sky - this may be twilight. LNS. Sky light low in E.
- 1700 1/8 scattered. Sky fairly light now. No sign of auroral forms although (2) features would be visible in W half if present.

OCTOBER 9.

- 1045 Till now 8/8 and dark wild wet night. Condition continues.
- 1800 Has remained 8/8 all night with no sign of aurora. Now daylight.

OCTOBER 10.

- 1330 Till now 8/8 and dark wild wet night with no sign of aurora.
- 1400 Same.
- 1407 Almost 8/8 - one star occasionally visible in W. Glow through cloud about  $80^{\circ}$  S - may be stars behind thin cloud.
- 1500 Snowing.
- 1540 Same.
- 1638 2/8 mainly in S. Appears to be (1) G  $30^{\circ}$  SW and patches of G in E. The latter may be twilight.
- 1655 8/8 again. No sign. Outline of hills can now be seen.

OCTOBER 11.

- (0756) Sunset
- (1010) End astronomical twilight
- (1606) Beginning astronomical twilight
- (1824) Sunrise
- 0920 Almost 8/8 thin cloud. Still twilight. No sign, no line.
- 1005 8/8. Light in S, low, but no sign green line.



OCTOBER 11 cont'd.

1020 6/8, clearing in Z. No sign green line.

1022-1030 During this period sky cleared to 1/8 low in S, scattered. Green line became visible at 1025. (1) diffuse glow eventually appeared in S extending to  $25^{\circ}$ .

BCO 1035 2/8 scattered in S and considerable haze in N and general mistiness. (1) G in S now extends to about  $30^{\circ}$  and is fairly uniform in intensity with height.

DCO 1050 No significant change since last obs. Cloud increased to 3/8. (1) G fades out now at about  $35^{\circ}$  S.

1230 8/8. Dark and no sign.

1320 6/8, clear round Z only. Sky light in E and SE and green line visible.

1335 8/8. Otherwise same.

1345 8/8. No sign.

1510 Same.

1545 1/8 low in S and W. Absolutely no sign.

1640 7/8. No sign. Becoming light in E.

OCTOBER 12.

(0759) Sunset  
(0900) Moonset Fraction illuminated: 0.00  
(1015) End astronomical twilight  
(1602) Beginning astronomical twilight  
(1821) Sunrise

0905 7/8. Still twilight. No sign green line.

0939 2/8, mainly low in S. (1) G SE - SW along top of cloud and extending up to  $25^{\circ}$ . Two very long weak narrow rays from SSE almost to Z.

0947 2/8. (2) G up to about  $30^{\circ}$ , above cloud bank SE - SW.

1000 4/8 and becoming slightly misty. (1) G along top of cloud bank which extends up to  $40^{\circ}$  across S sky.

1012 (1) G SE - SW. Ray in SW. Lower portion obscured by cloud.

1030 1/8. (2) rays SW to  $20^{\circ}$ . (1) rays SE.

1100 (1) - (2) arc through Z from E to W with clearly defined N edge but extending diffusely over most of S sky. Two (2) rays from S to  $45^{\circ}$ .

OCTOBER 12 cont'd.

- 1131 1/8. (1) parallel bands E-W through Z and up to  $70^{\circ}$  N. All sky S of these covered in patchy (1) and (2) G with several isolated (1) and (2) rays and (2) short RB high in SW.
- 1142 1/8. The (1) bands E-W through Z and  $20^{\circ}$  either side of it have shortened towards Z and become irregular forming a very distorted (1) corona. (1) patchy G over all S sky and many long (2) rays from all points SE - W rising from behind cloud bank low in S.
- 1154 2/8. (1) patchy G over entire S sky. Almost (2) along top of cloud bank  $10^{\circ}$  SW. Band structure through Z now almost absent. No rays.
- 1205 (1) G over entire sky to  $40^{\circ}$  N. Dark bands or gaps in G near Z running mainly in E-W direction.
- 1230-1235 1/8. (1) patchy G over all S sky and extending about  $20^{\circ}$  N of Z and almost to NE along horizon. Slightly banded structure giving general impression of diffuse sweeps up from E horizon curving over flat at about  $20^{\circ}$  elevation and continuing almost horizontal across sky and then sweeping down rather sharply at SW horizon. All very diffuse.
- 1240 1/8. (1) G over entire S sky to Z. Slight rayed structure in E to  $20^{\circ}$ .
- 1312 1/8 low in S - SW. Fairly uniform (1) G has contracted into S half of sky and bandlike structure almost gone.
- 1320 1/8. (1) G from SE to SW to  $30^{\circ}$ .
- 1400 4/8 in W half. (1) G SE to  $20^{\circ}$  and G through cloud  $10^{\circ}$  SW.
- 1425 Almost 8/8 - some stars occasionally visible. Glow through cloud in SE.
- 1555 8/8. No sign.
- 1625 5/8 in S and E. No sign.
- 1635 1/8 in SE. No sign of display unless in E where it is becoming light.
- 1715 Now fairly light.

OCTOBER 13.

- 0945 8/8. No sign.

OCTOBER 13 cont'd.

1130. Has remained same since last observation.  
1235 Still 8/8 and raining. No sign.  
1330 Almost 8/8 - one star occasionally visible in W. No sign.  
1510 8/8. No sign.  
1620 8/8. Slightly light over most of sky, but no sign of green line.

OCTOBER 14.

- (0803 Sunset  
 (1021 End astronomical twilight  
 (1230 Moonset Fraction illuminated: 0.09  
 (1555 Beginning astronomical twilight  
 (1816 Sunrise
- 0905 4/8. Still fairly light. (1) corona formed by many long rays from W, NE and E.
- 0910-0915 3/8 to 2/8. Very long (1) rays from low in N, W and all along NE - SE sector. (2) rays developed in W. No rays reach Z. Suggestion of weak red colour low in E.
- 0919 (3) ray bundle in WNW. (2) bundle WSW and (1) all along SE - N sky. Very weak round Z but partial corona formed.
- 0920-0925 2/8. Beautiful (3) corona formed by rays from all directions. Still very long (2) rays from all E sky and others from WSW - WNW. Some of these rays show the characteristic break of sunlit rays. Several rays in E show weak blue-purple colour.
- 0927 3/8. Display has now faded to (1)-(2).
- 0937 5/8, thickest in S. Remainder of sky misting up. (1) patchy G covering most of sky, especially N. Weak ray structure over all N-W sky. Still weak diffuse corona.
- 0942 6/8 and haze. Cloud obscuring anything in S. Still fairly light from twilight. Green line clearly visible. Also some lines towards blue end of spectrum vaguely visible. (1) corona present with rays extending down to 30° N.
- 0947 6/8, very thick in most of S sky. (1) G with weak ray structure over all visible N sky, from E to W. No real corona.
- 0955 7/8, odd stars visible in many parts, mainly in N. No display actually visible but green line and weak ones of shorter



OCTOBER 14 cont'd.

wavelength visible from all parts of sky.

1001 4/8. (2) corona with rays from N and W.  
(1) G or DS in E.

DCO 1010 5/8 and hazy. (1)-(2) G in all W sky and very weak and diffuse ray structure. In N activity seems to have a definite lower limit at about  $10^\circ$  elevation, like the lower edge of an arc.

1030 Sharp snow squall.

1040 3/8. (1)-(2) all around horizon, becoming patchy higher. Several long isolated weak rays towards Z. Couple of (1) DS's in Z.

1100 Sharp hail storm and 7/8. Considerable amount of patchy light, mainly in E half of sky and low in SW.

1130 7/8. Patchy light, (almost (2), low in SW) over whole sky particularly in N-W, where cloud cover less continuous.

1155 3/8. (1) and (2) rays, very long, mainly in NW and NE. (1) patchy G through cloud elsewhere.

SEVERAL PHOTOGRAPHS BETWEEN 1222 AND 1700.

1222 (3) corona and long rays over all sky. Least activity in S.

1225 Corona faded to (2), then to (1) and brightened to (2) again. Active display. Rays from corona end about  $60^\circ$  due S.

1227 (3) rays in E.

1230 7/8 and hail squall.

BCO 1246 2/8. (2) G and scattered rays all around horizon. Distorted (2) corona.

1250 (2) bands in Z.

1259 7/8. (2) G visible through cloud gaps in every part of sky.

1308 N sky covered with (1) and (2) diffuse bands and rays. Bands and rays around Z have begun pulsing. Activity in S less intense - mainly (1) G with occasional scattered weak ray structures.

1320 Substantially same, although display now more diffuse. Intensity (1) and (2). Cloud increased to 6/8.

DCO 1325 8/8 and snowing.

1335 Same.

OCTOBER 14 cont'd.

- 1405 5/8, fairly clear in S. No sign in S, but sky still quite light in N sky to Z.
- 1425 2/8 low in N and E. No sign in S. Uniform (2) G in all N sky from  $80^{\circ}$  N down - slight striations from E to W. Patchy G or DS near Z.
- 1448 2/8 in N and E. Series of (2) parallel bands through Z from E to W and in all visible N sky. No sign in S.
- 1502 6/8 - clear in part of N. (2) HA with clearly defined lower edge  $20^{\circ}$  N. Flaming in N.
- 1515 1/8 in N and E. (2) display from Z to  $10^{\circ}$  N. Flaming on N edge. Suggestion of (1) G SE. E-W striations near Z.
- 1532 1/8 scattered. (2) ray from SE horizon to Z. Weak corona in Z. No sign elsewhere in S, but G continues in N up to  $45^{\circ}$ . Not flaming.
- 1545 1/8 scattered in N. Display confined to N sky up to  $20^{\circ}$ . Mainly G, but weak rays in NE.
- 1610 1/8. (2) fan-like drapery in N from  $30^{\circ}$  to Z. (1) rays from SSW to Z. Weak corona in Z at upper end of fan. (1) drapery  $10^{\circ}$  NW. Weak flaming at  $10^{\circ}$  N just below base of fan.
- 1614 (2) drapery  $10^{\circ}$  SW with weak rays to Z. G in NW  $10^{\circ}$ . (2) drapery  $30^{\circ}$  NW with weak rays to Z. (1) corona. Flaming in N.
- 1625 (3) flaming drapery NE. Fan from  $40^{\circ}$  N to Z. (1) rays from S to Z.
- 1626-1631 (3) corona, mainly to NW of Z.
- 1634 7/8. (2) ray SW to  $10^{\circ}$ . (1) rays in NE. Sky becoming light.
- 1640 7/8. (1) rays in SW.
- 1643 4/8 scattered. (1) rays from SW to Z. (1) corona in Z. (2) band  $30^{\circ}$  NNE. Quite light in E now.
- 1644-1649 3/8 scattered. (2) corona with radiation point about  $70^{\circ}$  N. Weak rays from SE and SW to Z. (2) band through  $40^{\circ}$  N. Flaming in N.
- 1652 3/8 scattered. (2) fan NE centred  $40^{\circ}$ . (2) drapery  $30^{\circ}$  N. Now fairly light.
- 1655 Patchy (2) drapery, fairly diffuse,  $30^{\circ}$  N.
- 1700 (2) rays from SSW to Z. (2) diffuse band N-NE  $10^{\circ}$ , appearing yellow in dawn light.

OCTOBER 14 cont'd.

1705 (2) ray from  $60^{\circ}$  SW to Z. (2) yellow band (diffuse)  $30^{\circ}$  N. Only green line visible in hand spectroscope.

1710 2/8 scattered. Rays from SSE to Z. Diffuse G or DS in NNE sweeping up towards Z. Green line clearly visible in spite of it being almost "broad daylight". Appearance of DS in NNE is yellow, but no sign of any line in yellow. Considerable continuous background beginning after break on short wavelength side of green line.

1714 4/8 scattered. Ray visible  $20^{\circ}$  NNE.

1715 Ray dimly visible NNW from  $30^{\circ}$  up. Sky is now so light that any form would have to be (2) at least, probably (3).

1717 Bright band appeared and rapidly faded in E,  $60^{\circ}$ . This was probably (4), certainly (3). (2) rays from SW and NE toward Z.

1720 Now too light to see anything less intense than (4). No sign of anything.

OCTOBER 15.

(0805 Sunset  
(1024 End astronomical twilight  
(1402 Moonset Fraction illuminated: 0.16  
(1551 Beginning astronomical twilight  
(1814 Sunrise

0920 8/8. Quite light from twilight and new moon, but no sign of aurora.

1000 8/8. No sign of green line.

1100 8/8. No sign.

1123 Almost 8/8 - one star visible  $20^{\circ}$  SE. Here slight glow through cloud. Sky not completely dark.

1138 8/8. Sky light  $5^{\circ}$  SW and light in Z through thinnish cloud.

1202 8/8. Glow through cloud  $40^{\circ}$  E.

1235 7/8, clear  $20^{\circ}$  E where (1) G is present. Sky light in most parts.

1311 8/8. Glow through cloud  $20^{\circ}$  ESE.

1312-1315 7/8, clear in E - ENE. (1) G in E above edge of cloud, about  $40^{\circ}$ . Glow-visible through cloud across S sky to  $30^{\circ}$  SSW.



OCTOBER 15 cont'd.

- 1409 8/8, one star dimly visible through cloud  
30° E. Glow through cloud from E to SE,  
30°.
- 1430 8/8. Very weak glow through cloud 35° E.
- 1500 8/8. Very dark.
- 1527 Same.
- 1600 Same.
- 1628 Almost 8/8 - one or two stars occasionally  
visible in N and Z. Glow from NE to SE to  
30° - may be light from approaching dawn.  
Suggestion of glow 10° W.
- 1658 8/8. Sky now fairly light.

OCTOBER 16.

- (0806 Sunset.
- (1027 End astronomical twilight
- (1513 Moonset Fraction illuminated: 0.26
- (1548 Beginning astronomical twilight
- (1812 Sunrise.
- 0930 3/8. Still twilight. (2) RB from WSW  
horizon to E horizon through 35° S.
- 0935 5/8. RB faded out, but now patches of (1)  
G through cloud gaps in E and S and also  
two very weak rays, short, just N of Z.
- 0949 6/8. Several broad (1) and (2) rays low  
in E and ENE.
- 1004 6/8. (2) G through cloud gaps low in ENE  
and high in N. Fairly uniform (1) G N-NW,  
low. Two weak short bands through Z,  
curving in E-NW direction.

SEVERAL PHOTOGRAPHS BETWEEN 1018 AND 1105.

- BCO 1018 (3) RB in N. (3) RB's 40° and 45° S.
- 1022 (2) drapery from NE to Z and (2) distorted  
corona. (3) drapery low in E. (2) - (3)  
drapery extending from WNW towards Z, joining  
into corona.
- 1033 2/8. Since last obs. there have been (2),  
(3) and (4) draperies over all sky above 30°  
S, most active in N sky. Draperies very  
long and rays sharp. Also (3) corona.
- 1040 (2) and (3) draperies over entire sky except  
low in S. (2) distorted corona.
- 1042 (2) and (3) draperies now more patchy, more  
like ray bundles. (2) distorted corona still  
present.

OCTOBER 16 cont'd.

- 1043 Nothing above (2).
- 1048 (3) fan drapery through Z.
- 1052 3/8, all in N. Display scattered and weaker. (2) drapery low in E. (1) long rayed drapery from  $30^{\circ}$  due S. Glow through cloud in Z.
- 1053 (2) drapery in S now shortening to ray bundle.
- 1055 2/8, sky clearing slightly. (2) G low N-NW. (2) drapery high in S.
- 1056 Drapery in S has formed (2) fan-like drapery just S of Z.
- 1100 (2) G all along WNW-N-E horizon. (2) - (3) drapery low in NNW. Scattered (1) and (2) ray bundles and partial draperies and DS's over higher parts of sky.
- 1101 (3) corona formed.
- 1105 (4) draperies and corona all over E sky.
- 1108 3/8, scattered and thin in parts. (2) drapery  $30^{\circ}$  E. (2) drapery  $30^{\circ}$  N-NW. (2) band through Z from E to N. (2) rays occasionally in S. (1) G over remainder of visible sky.
- 1114 3/8. (2) drapery or RB from SE through Z to N.
- 1122 6/8. (1) G in E sky. Little of display now visible though sky quite light everywhere.
- 1127 8/8. Glow through cloud over entire sky. Moon appears to be about  $30^{\circ}$  SW.
- 1137 8/8. Patch (2) G through cloud low in E, N and NW.
- 1146 8/8. Sky light everywhere.
- 1210 8/8. A little darker than previously.
- 1215 8/8. Mainly fairly dark except along E horizon.
- 1230 8/8. Fairly dark.
- 1235 8/8. Becoming lighter, green line visible.
- 1313 8/8. Sky lightest low in E-NE and N-NW.
- 1333 8/8. Sky fairly uniformly light. Green line visible.
- 1407 8/8. Sky still quite light.

OCTOBER 16 cont'd.

- 1450 2/8 and slight haze. (1) bands and DS's all over N sky and weak variable and distorted corona. All flaming and pulsing. Fairly steady weak broad diffuse band through about 30° SE parallel with E-S horizon. Very weak extensive glow in W.
- 1500 1/8 and thin haze everywhere. (1) G over all visible sky.
- 1505 1/8. (1) DS's scattered all over N sky and others high in S sky, pulsing continuously. In addition to pulsing in intensity, those in S appear to be sweeping regularly towards Z, not flaming (by which we have meant rapid flickering in intensity).
- 1545 8/8. Sky fairly light.
- 1600 Same.
- 1627 Same.
- 1715 8/8. Sky now light from approaching dawn.
- 

OCTOBER 17.

- 1035 8/8 and no sign till now.
- 1442 8/8, very misty, and no sign.
- 1511 8/8, very misty. No sign although sky not completely dark.
- 1547 Same.
- 1640 Same.
- 

OCTOBER 18.

- 1315 Till now 8/8 and no sign of green line although sky not very dark, probably due to moon.
- 1440 8/8. No sign.
- 1615 3/8 and haze over remainder of sky. (1) diffuse bands from E-W through Z. (1) G in most of visible S sky. Flaming N of Z.
- 1632 3/8 and 8/8 haze. (2) G over most of sky. Flaming in Z where (2) bands or DS's are pulsing.
- 1640 6/8. Sky fairly light - may be (2) G or may be approaching dawn. No structures visible.
- 1650 8/8. Becoming light in E. No sign of aurora.
-



OCTOBER 19.

- (0812 Sunset  
 (1037 End astronomical twilight  
 (1536 Beginning astronomical twilight  
 (1647 Moonset Fraction illuminated: 0.59  
 (1805 Sunrise
- 0930 1/8. (2) drapery  $30^{\circ}$  SE, changing slowly to (1) G SSE and (2) rays SE.
- 0940 (3) drapery SSW from plateau to  $30^{\circ}$ . (2) rays from SW to Z.
- BCO 0950 1/8. No sign, except perhaps (1) G in S. But moon very bright.
- 0951 (2) band from E to Z, convex to N.
- 0952 (2) HA  $15^{\circ}$  S.
- 0953 (1) ray from NE to Z. (2) HA  $20^{\circ}$  S, gradually becoming rayed at W and E end.
- 0954 (2) drapery or HA appeared in SW above end of HA and extended back to  $20^{\circ}$  SSW. No sign in Z now.
- 0956 Drapery in SW gone being replaced by (1) rays  $30^{\circ}$  SW. (2) HA, or upper part of G,  $15^{\circ}$  S above the 1/8 cloud in S.
- DCO 1000 2/8 in S and N. (2) HA or G to  $15^{\circ}$  S. No sign in Z or SW.
- 1009 3/8 scattered. (2) rays to  $15^{\circ}$  SW.
- 1015 3/8, mainly low in S. (2) patch in region of previous arc visible through cloud gap due S.
- 1020 Same.
- BCO 1053 7/8. No sign of aurora anywhere through drifting cloud breaks except low in S where occasional glimpses (2) G round  $20^{\circ}$ .
- DCO 1107 Since last obs. cloud has varied between 6/8 and 7/8 with clear patches moving from NE through Z, but constant coverage in S. No sign of aurora.
- 1115 4/8, gradually clearing from N-NE. Possible auroral glow through cloud low in SE.
- 1120 5/8. Weak G through thin cloud low in S-SE, possibly HA. Nothing elsewhere.
- 1124 5/8. Portion of what appears to be (1) - (2) HA visible SSE-SE  $25^{\circ}$  and weak G to  $8^{\circ}$ .
- 1130 5/8. Top of (2) G visible  $15^{\circ}$  -  $20^{\circ}$  SE.

OCTOBER 19 cont'd.

1135 4/8. Still signs of (2) G through and between clouds from horizon to  $20^{\circ}$  SE.

1137 Extremely weak HA  $4^{\circ}$  coming up.

1140 HA (2) at E end but still very weak at apex.

PHOTOGRAPHS AT 1151 AND 1235.

1152 5/8. (2) partial HA  $15^{\circ}$  -  $20^{\circ}$  SE.

1158 5/8. Diffuse (1) remnant HA  $10^{\circ}$  SE. (1) G in S just above horizon.

BCO 1205 7/8 broken. (1) remnant HA still present in SE.

1220 6/8. Since last obs cloud cover has varied considerably and many parts of sky except N have become clear. Only signs of display are (1) HA  $30^{\circ}$  S and G low in S.

1236 7/8. Portion of (1) HA about  $25^{\circ}$  (passing through  $\alpha$ - and  $\beta$ - Centauri).

1310 Till now practically 8/8 with occasional suggestions of weak G S-SE. Moon bright. Green line scarcely visible against continuous background.

DCO 1315 Same.

1400 Almost 8/8. Definite auroral G low on SSW horizon through thin cloud. Green line just visible here.

1420 8/8. No sign, but sky still light from moon.

1440 Same.

1510 8/8. No sign. Now fairly dark.

1536 Same.

1635 8/8. No sign - almost pitch black.

1725 Now daylight.

OCTOBER 20.

(0814 Sunset

(1040 End astronomical twilight

(1532 Beginning astronomical twilight

(1659 Moonset Fraction illuminated: 0.69

(1802 Sunrise

1045 Till now 8/8 and no sign of aurora. Sky very light, but no sign of green line on continuous background spectrum.

OCTOBER 20 cont'd.

1155 Almost 8/8. No sign of aurora.

1200 Almost 8/8, some stars visible just above plateau in SSW. No sign of aurora here.

1210-1220 5/8, clearing in S. No sign of auroral activity, green line not visible. Moon bright high in W.

1225 4/8. Same.

1237 2/8. No sign.

1300 1/8. No sign.

1330 Same.

1343 Same.

1355 2/8. No sign.

1400 1/8 scattered. Absolutely no sign.

1407 0/8. No sign. Sky very clear and moon bright.

1430 Same.

1500 1/8 very low in S. No sign.

1505 0/8. No sign.

1525 3/8, mainly in W. No sign.

1555 2/8, scattered. No sign.

1610 6/8, broken. Moon now behind plateau. Possible (1) G low in E, but more likely to be dawn light.

1635 1/8 scattered. Sky fairly light but (2) display would still be visible if present. No sign.

1725 Daylight.

OCTOBER 21.

(0816 Sunset

(1044 End astronomical twilight

(1528 Beginning astronomical twilight

(1707 Moonset Fraction illuminated: 0.78

(1800 Sunrise.

1009 2/8 scattered in N. No sign. Moon bright.

1040 2/8. No sign.

1046 Ward reported (2) single long narrow ray due S.



OCTOBER 21 cont'dBCO 1047 Ray now gone.

1119 3/8. No sign.

1120 (2) draperies and rays SE-SW up to  $25^{\circ}$  formed very suddenly.

1121 Reached (3) due S.

1122 Some very sharp (3) rays low in WSW and (2) draperies across S sky with lower edge about  $8^{\circ}$ .

1125 Long weak ray from due S to Z in addition to (2) drapery low across S sky.

1127 Drapery reached (3) at W end and rapidly faded. Whole display very changeable with bright rays and partial draperies. Definitely not a uniform RB.

1129 Faded to isolated changeable (1) ray bundles across S sky,  $5^{\circ}$  -  $30^{\circ}$ .

1136 Same till now, but reached (2) due S.

PHOTOGRAPH AT 1137.

1137 Momentarily reached (3) due S.

1141 Again (3) due S momentarily in ray bundle. Display rising in sky slightly.

1146 Momentarily practically completely faded.

1147 (1) and (2) rays appeared again across S sky  $5^{\circ}$  -  $30^{\circ}$ .1149 (3) RB across S sky  $5^{\circ}$ , almost RA.MAX 1150 Reached (4) due S.

1151 Faded to (2) again. Almost RA with some very long rays.

1152 1/8 in N. Fairly regular band form gone. Now broken up into (2) ray bundles again.

1154 Momentarily (3) in SSW.

1200 (2) variable RA  $5^{\circ}$  with several long weak rays passing from below it up through it.1202 Display has been very weak since last entry. Now long (1) rays due S reaching to  $45^{\circ}$ .

1210 Faded again.

1211 Several weak rays low in SW.

1221 Has faded out almost completely. No auroral forms present but green line still visible in S. Very bright moonlight.

OCTOBER 21 cont'd.

- 1222 (2) and (1) rays again visible due S with lower edges about  $5^{\circ}$ .
- 1225 Faded.
- 1228 (2) and (1) variable RA  $5^{\circ}$ .
- 1245 0/8. Has been, and remains, same as at last entry. The RA fades almost completely occasionally and then patches of it brighten momentarily. Variable in intensity but not in position or general form.
- 1309 0/8. Display almost completely absent except for general very weak G low in SE-SW.
- DCO 1311 0/8. (2) HA  $10^{\circ}$  S. No sign of rayed structure.
- 1347 0/8. Extremely weak G low due S.
- 1418 0/8. No definite sign.
- 1420 Became weakly visible due S, (1).
- 1445 0/8. No sign. Moon still very bright.
- 1504 Same.
- 1530 Same.
- 1602 1/8 in SW. No sign.
- 1630 0/8. No sign. Moon behind plateau. Dawn light in E.
- 1650 Now fairly light.

OCTOBER 22.

- (0818 Sunset
- (1047 End astronomical twilight
- (1524 Beginning astronomical twilight
- (1714 Moonset Fraction illuminated: 0.86
- (1757 Sunrise
- BCO 0950 0/8. Twilight and bright moon. (1) HA  $15^{\circ}$  S.
- 1003 0/8. SE end of (1) HA  $10^{\circ}$  and several very weak ray bundles low in S and SW.
- 1005 Ray due S momentarily reached (2).
- 1013 Variable diffuse (1) and (2) RA,  $10^{\circ}$ .
- 1018 (2) RB  $20^{\circ}$  S, variable in intensity. Almost RA.
- 1020 0/8. E end of (2) RA visible and several weak rays S-SW along horizon.

OCTOBER 22 cont'd.

1025 Faded almost completely.

1027 (2) again in SE. (1) in SW. Very weak due S.

1030 0/8. RA  $15^{\circ}$  S, still variable between (0) and (2).

1035 (1) and (2) rays almost in line of arc, but some below and some above line of arc.

SEVERAL PHOTOGRAPHS BETWEEN 1038 and 1315.

1041 0/8. Variable (1) and (2) ray bundles almost in line of arc from S to SE. Few isolated weak rays low WSW.

1045 W end of (1) HA  $15^{\circ}$  and (1) RB above this from  $20^{\circ}$  S to WSW horizon.

1050 (1) HA  $15^{\circ}$  -  $20^{\circ}$  S and (1) RB above this to W.

1055 0/8. (2) RB developed low on WSW horizon.

1057 (1) HA appears to be broken at apex with (2) RB above W half.

1100 (1) HA low in S has now gone and is replaced by (1) HA through  $40^{\circ}$  S - centred just above Crux. Slightly diffuse at E and W ends.

1104 (1) HA centred on  $\alpha$ - and  $\beta$ -Muscae.

1105 0/8. This HA faded. Now diffuse (1) ray bundle low in SE.

1115 Display has been very faint since last entry. Signs of weak HA  $45^{\circ}$  S and several isolated weak rays low in SE. Weak G low due W, fading with height.

1120 (1) HA  $50^{\circ}$ .

1125 Same.

1130 0/8. HA moved up to  $60^{\circ}$ .

1137 HA now almost (2) and  $65^{\circ}$  S.

1140 0/8. (1) HA  $70^{\circ}$ .

1150 0/8. HA now through  $80^{\circ}$  S and is becoming brighter.

1157 Single weak ray low in ESE.

1200 0/8. (2) zenithal HA.

1210 Slight rayed structure at W end of (2) zenithal HA.

1220 HA has become (2) RB slightly S of Z.



OCTOBER 22 cont'd.

- 1225 (2) RB almost zenithal.
- 1230 Double band from E horizon to Z. Faded in E.
- 1235 0/8. (1) - (2) RB  $5^{\circ}$  S. Partial (1) HA from  $60^{\circ}$  S to W. (1) double RB from E to Z fading.
- 1238 0/8. Several weak parallel bands through Z, curving S slightly at E and W ends. Weak ray bundle low in SSE.
- 1245 Weak parallel bands from E to Z. Some also  $10^{\circ}$  N of Z. May continue W of Z, but moon too bright there to be sure.
- 1250 0/8. Display all N of Z now. Series of (1) parallel bands extending from Z to  $20^{\circ}$  N of Z.
- 1253 Same and (2) and (1) drapery very low SW-W. One ray reached (3) momentarily.
- 1258 (1)-(2) broad HA  $45^{\circ}$  N. Diffuse and broad in centre with almost ray structure.
- 1315 (2) band with diffuse ray structure E to  $45^{\circ}$  N. Several very weak rays low in SW-W.
- 1316 (1) ray  $10^{\circ}$  -  $20^{\circ}$  SSE.
- 1324 1/8. Broad (2) band  $40^{\circ}$  N - E, through Orion. Broad long (2) ray SSW, faded rapidly.
- 1340 3/8. Broad (2) band in NE is now breaking up into (1) diffuse G and extending further S along E horizon.
- DCO 1350 7/8, thin. Faint diffuse glow low in E - green line visible. No other sign.
- 1414 8/8, thin. No sign of green line.
- 1425 8/8, thin. No sign, but moon still bright.
- 1500 8/8. No sign.
- 1555 Same.

OCTOBER 23.

- 1000 8/8. No sign.
- 1020 8/8. Moon bright behind clouds. But no sign of green line.
- 1055 8/8. No sign.
- 1107 Same.

OCTOBER 23 cont'd.

- 1225 Same.
- 1330 8/8. Still quite light but green line not discernible.
- 1445 8/8 and fine rain. No sign.
- 1520 Same.
- 1630 8/8. No sign.

OCTOBER 24.

- 1045 Has been, and remains, 8/8 and very misty with no sign of aurora.
- 1310 Same.
- 1500 Still 8/8 with mist or drizzle. No sign although sky quite light from moon.
- 1600 8/8. No sign.

OCTOBER 25.

- 1030 8/8. Very light, but no sign of green line.
- 1115 Same.
- 1140 Same.
- 1200 Same.
- 1230 Same.
- 1325 Same.
- 1400 Same.
- 1610 Frequent obs. since last one. Always 8/8 but very light from moons. LNS in this interval.

OCTOBER 26.

- 1105 Till now 8/8 and no sign. No line.
- 1330 8/8 and misty rain. No sign of green line.
- 1625 Frequent obs. till now. Always 8/8 and light rain. No sign, though sky light from moon.

OCTOBER 27.

- 1800 It has been raining all night and 8/8 at every obs. No sign. Now daylight.

OCTOBER 28.

- 1100 Till now 8/8 and misty rain.
- 1440 8/8 and snowing. Sky light but no sign of green line.
- 1500 8/8. Sky light and green line clearly visible in all sectors.
- 1534 Same.
- 1610 Same.
- 1630 8/8. Sky fairly light. Green line may still be present but it is not distinguishable with certainty.
- 1645 8/8. Sky now light from approaching dawn.

OCTOBER 29.

- (0833 Sunset.
- (1117 End astronomical twilight
- (1300 Moonrise Fraction illuminated: 0.91
- (1454 Beginning astronomical twilight
- (1742 Sunrise
- 1020 2/8. No sign of green line.
- 1025 4/8 scattered. No sign of green line.
- 1040 7/8, clear in E. No sign.
- 1050 8/8. No sign.
- 1100 8/8. Light high in S sky. Green line clearly visible.
- 1110 8/8. Line distinct in S and Z.
- 1130 8/8. Dark and no sign of green line.
- 1156 Same.
- 1310 8/8. Line visible in most sectors, strongest E of Z.
- 1324 8/8. Light in patches and green line prominent from all quarters.
- 1342 8/8. Dark in S but light in Z, E and N where line clearly visible.
- 1407 4/8. (1) and (2) scattered rays from all directions to Z and (2) bands E-W through Z.
- 1410 5/8. (1) and (2) parallel bands from E to W extending from Z to N horizon. Bands curve S just W of Z. All flaming, with waves of intensity moving rapidly from N to Z.



OCTOBER 29 cont'd.

- 1418 5/8. (1) and (2) patchy G over most of sky through cloud gaps. Very weak E-W bands through Z. Several weak rays  $45^{\circ}$ - $50^{\circ}$  S. No sign of flaming.
- 1424 4/8. Short (1) and (2) bands curving through Z from NE to W, flaming very rapidly. (1) G over remainder of visible sky.
- 1430 Continuous obs. since last entry. Now 6/8. Has continued flaming in E and NE, mainly (1) DS's, (2) G low in N. (1) G low in SW through cloud gaps (1) G S-E.
- 1437 6/8 - clear in E-S sector. Steady (1) G below  $60^{\circ}$ . Above this, pulsing (1) DS in Z with waves of intensity sweeping up irregularly from top of steady G in S.
- 1443 7/8, heavily clouded in W. G visible through all cloud gaps. Almost (2) through gap  $30^{\circ}$  SSE, (1) through gaps elsewhere. Signs of varying intensity in NE.
- 1450 8/8. Sky patchily light all over, except in heavily clouded SW region.
- 1453 8/8. Patches of glow visible in parts of S sky through cloud. Sky fairly light, partly due to moon.
- 1500 Same.
- 1515 8/8. Patches of G through thin cloud  $45^{\circ}$  S. Sky fairly light.
- 1535 8/8, thin near Z where glow is brightest. Sky light elsewhere.
- 1545 8/8. Heavily overcast near Z. Elsewhere quite light.
- 1600 8/8. Stars occasionally visible through haze in SE and Z. Not possible to see form of display. Many patches of G visible through breaks in cloud, but as these are all in SE-E to  $30^{\circ}$ , they may be dawn light. If auroral, intensity is (2)-(3). Glow through cloud  $30^{\circ}$  W.
- 1620 8/8. Sky now fairly light.

OCTOBER 30.

- (0835 Sunset  
 (1121 End astronomical twilight  
 (1356 Moonrise Fraction illuminated: 0.85  
 (1449 Beginning astronomical twilight  
 (1740 Sunrise

OCTOBER 30 cont'd.

- 1145 8/8. Light earlier but now very dark.  
No sign of green line.
- 1215 8/8. Light bands across clouds running from  
N to S, mainly in W and Z, but one much  
brighter one in E.
- 1310 8/8. No sign of green line.
- 1330 8/8. No sign.
- 1420 8/8. Sky light. Lighter patches appearing  
momentarily near Z.
- 1455 8/8. No sign.
- 1600 Raining. No obs.
- 1610 8/8. Sky light, probably from approaching  
dawn.

OCTOBER 31.

- (0836 Sunset  
(1126 End astronomical twilight  
(1444 Beginning astronomical twilight  
(1447 Moonrise Fraction illuminated: 0.78  
(1738 Sunrise
- 1000 6/8. Not very light. Definite (1) DS of  
small extent low in E and what appears to  
be partial (1) HA low in SE.
- 1020 7/8. Regions where display was visible  
now clouded, but very light in E and NE  
where green line very distinct.
- BCO 1030 7/8. (1) uniform G visible  $10^{\circ}$  -  $15^{\circ}$  WNW.  
Green line very distinct in all sectors.
- 1034 6/8, clear in Z and SE sector. Uniform (1)  
G over all visible sky and light patches  
visible through partial cloud gaps over  
entire sky.
- 1045 Almost 8/8 again. (1) G visible very low  
along SSW - SE horizon and sky elsewhere  
patchily light. Very light through thin  
cloud low in E-NE.
- DCO 1051 8/8. Sky fairly light everywhere and green  
line distinct.
- 1108 Almost 8/8. (1) G visible through cloud gap  
S-SE  $10^{\circ}$  -  $15^{\circ}$ , also through small gap on  
W horizon.
- 1138 6/8. Uniform (1) G over S-SE sky and in Z,  
strongest below about  $50^{\circ}$ . Elsewhere sky  
light through patchy cloud.

OCTOBER 31 cont'd.

- 1145 7/8, Z obscured. Same in SE. Small area  
(1) G visible low in W.
- 1207 Almost 8/8. Band of (1) G, horizontal,  
through cloud rift  $15^{\circ}$  N-NE.
- 1243 Almost 8/8. (1) G visible low in SSE.
- 1256 8/8. Sky very light in patches over entire  
N sky.
- 1310 8/8. (1) G visible through cloud gap S-SSE.
- 1350 8/8. Sky uniformly light. Green line still  
visible.
- 1400 8/8. Fairly dark. Line very weak.
- 1525 8/8. No sign.
- 1600 7/8 and haze. Slight glow  $45^{\circ}$  SE.
- 1607 Slightly light from approaching dawn.
-



NOVEMBER 1950.NOVEMBER 1.

(0838 Sunset  
 (1130 End astronomical twilight  
 (1439 Beginning astronomical twilight  
 (1519 Moonrise Fraction illuminated: 0.70  
 (1735 Sunrise

0925 6/8. (2) rays  $45^{\circ}$  SSE.

0932 (2) zenithal HA, only E half visible.

0934 HA gone.

0940 6/8, no sign.

0945 8/8, no sign.

1015 Same.

BCO 1104 6/8. (1) G W-SW and also low due S through cloud gap.

1110 2/8. (1) corona and DS's in most parts of sky.

1114 2/8. Pulsing (2) bands running approx. N-S through Z. Patchy (1) and (2) G elsewhere over entire sky with weak ray structure in parts. Single distinct (2) ray low in SE.

1117 2/8. (2) wide corona formed by rays and DS's. Portions of corona flaming. Remainder of sky covered in (1) and (2) DS's and weak rays, flaming very rapidly in N.

1122 3/8. Now (1) and (2) flaming DS's all through Z and N sky. Steadier DS's and rays in S. Long (3) ray due S, faded rapidly.

1125 4/8. Same.

DCO 1130 6/8. (1)-(2) patchy G over entire sky through cloud gaps. Irregular banded structure around Z.

1141 7/8. Same.

1154 8/8 and snowing. Sky patchily light.

1230 2/8. (1) patchy G over entire sky. Irregular banded structure in Z. Flaming in Z, N and E.

1250 2/8. Pulsing and flaming (1) and (2) DS's all around Z. Fairly uniform (1) G low in S. Elsewhere patchy (1) G except below  $30^{\circ}$  in NE where there is practically no auroral activity.

1300 4/8, clouded in Z. (1) G through all cloud gaps.

NOVEMBER 1 cont'd.

1335 1/8. (1) G in S. (2) G in almost all N sky. (2) fan-like drapery in N with rays most pronounced in WNW. Apex of fan uniform (2). (2) band or arc through  $30^{\circ}$  N.

1340 Now little display in S. (2) band in N from E to W round sky at  $5^{\circ}$  extending up to  $10^{\circ}$  and merging into uniform (2) G at E. (1) rays from this band up towards Z. Flaming in N.

1344 2/8. in SW. Display all in N sky. (2) broad HA  $10^{\circ}$  N and (2) RA immediately above it. Rays extending to Z where there are several weak DS's also.

1345-1350 1/8. HA new (2)-(3) drapery at W end sweeping up from  $5^{\circ}$  to  $10^{\circ}$  WNW to NW. Band slightly rayed from NW to N and rapidly pulsating at times. Solitary (2) ray  $5^{\circ}$  S. (1) rays from most of N sky forming corona.

1351-1355 At first band developed into drapery from  $7^{\circ}$  NE curving slightly up to  $20^{\circ}$  N to meet an S-shaped drapery in NNW also curving up to N, concave up. Intensity of this almost (4), with suggestion of red. In WSW solitary (3) drapery  $10^{\circ}$ . This gradually merged into the more extensive N drapery. (1) rays from all these converged to Z to form weak corona. Gradually rays from WSW-SSW began to appear and the drapery reduced in intensity, the display being drapery-like mostly in W.

1400-1407 Display now best described as "tattered draperies", with torn pieces over most of W half of sky. Corona in Z very irregular and constantly changing, with striations running predominantly in N-S direction. Most of this (2), although S-shaped drapery  $15^{\circ}$  NW was (3). (3) ray bundle  $5^{\circ}$  S. Mainly uniform G in E. The tattered effect gradually became less pronounced and flaming became more noticeable in all N sky. A diffuse snake-like drapery or band appeared across sky from NE to SW through  $70^{\circ}$  S.

1410-1420 0/8. Remarkable flaming effect in N where the tattered drapery effect remains. Each piece is fluctuating in brightness as a wave of light passes through the array from N to S. Although the distribution of pieces is slowly changing, the display is remarkably stable by comparison with the rapidity of the flaming. Besides this an (3) diffuse patch appeared  $5^{\circ}$  WSW and gradually weakened becoming more diffuse. Also (2) S-drapery swept up from E to meet tattered drapery in N.

1422-1425 (2) flaming continues in N up to  $30^{\circ}$ , but all structures more diffuse now. (2) stable diffuse band  $10^{\circ}$  W. Weak rays from most of sky to Z. (2) G in E to  $30^{\circ}$ .

NOVEMBER 1 cont'd.

- 1427 (2) ray from  $30^{\circ}$  NE to  $60^{\circ}$ , pointing to magnetic Z. Elsewhere weak rays to Z forming a weakening corona. Flaming continuing.
- 1430-1435 (3) band  $15^{\circ}$  WSW to SSW. (2) ray bundle in NE. Elsewhere only diffuse structures, but these are in all parts of the sky.
- 1436-1438 (2) rays from most of ENE-SSE quadrant to Z. (2) band  $50^{\circ}$  W. Occasional pulsations near Z.
- 1440-1448 (2) corona in Z rapidly developed to (4) with swirling motion and vivid red and green and then weakened to (3), and stretched out into a broad striated band from E to W. Also (3) drapery from  $20^{\circ}$  WNW to SE. Pulsations of diffuse surfaces in N - almost red in colour.
- 1450-1500 (3) drapery at first confined to  $30^{\circ}$  W gradually extended out across sky forming a very elongated oval drapery from W to N and then extended across whole sky through  $40^{\circ}$  N. Meantime a corona developed and gradually the drapery extended up to meet it. The intensity then increased to (4) and after some rapid motion the display suddenly became (2) over almost entire sky. For the first time pulsations were seen in S as well as N. The pulsations were down as low as  $15^{\circ}$  S, and, although less marked than in N, were nevertheless distinct.
- 1505-1514 Only clearly defined structure is (2) ray  $10^{\circ}$  SE. Diffuse glow over entire sky with flaming in all parts, particularly in Z where a diffuse corona faded and brightened as the wave of light swept across it from S to N.
- 1515-1520 (3) drapery developed from W to  $45^{\circ}$  SE. In N (2) flaming continues. In E ray from horizon to  $60^{\circ}$ .
- 1522-1534 First light of dawn visible in SE. The drapery in S slowly migrated around the S sky until it had appeared in most parts at some stage. (2) corona developed in Z and in the S a fan-like drapery extending to Z appeared and gradually contracted till only a thin intense ribbon from E to W was visible through Z (3), almost (4).
- 1535-1540 Drapery now SE-NE through about  $50^{\circ}$  E. At first (3), but gradually brightened and became (4) when rays began to run along the curtain. Then weakened to (3) and extended to pass through Z.



NOVEMBER 1 cont'd.

- 1542-1550 Flaming continues in N, though it is far less extensive than formerly. Strands of display E-W through Z began flaming momentarily. Then horseshoe drapery, (2), developed from SSE sweeping up through Z down to E. Sky much lighter in SE from approaching dawn and the auroral light is taking on a yellower tinge in these parts.
- 1550-1555 At first some rays in ESE (but no sign of sunlit features) but these became diffuse, and the display is now much weaker and almost structureless. Flaming continues near Z.
- 1600-1605 (2) rays and small drapery low in ESE, scarcely discernible against dawn light, but appearing yellowish. Occasional flaming of a weak band  $45^{\circ}$  SE. Cloud now  $3/8$  scattered.
- 1605-1610  $6/8$ , clearest in SE where activity is dimly visible against background twilight. Not certain whether it is a rayed or diffuse structure.
- 1610-1618  $5/8$ . At first rays dimly visible in SE. Now no sign, although (2) features would be just visible in Z.

NOVEMBER 2.

- (0840) Sunset  
 (1135) End astronomical twilight  
 (1434) Beginning astronomical twilight  
 (1540) Moonrise Fraction illuminated: 0.60  
 (1734) Sunrise

- 1145  $8/8$ . Very light. Green line distinct.  
1205  $8/8$ . Fairly dark. Line not discernible.  
1240  $8/8$ , raining. Too dark to see green line.  
1320 Same.  
1400 Same.  
1430 Same.  
1500 Same.

NOVEMBER 3.

- (0843) Sunset  
 (1142) End astronomical twilight  
 (1427) Beginning astronomical twilight  
 (1554) Moonrise Fraction illuminated: 0.50  
 (1732) Sunrise

NOVEMBER 3 cont'd.

- 1030 Till now 8/8, heavy snow.
- 1040 8/8. Snow almost ceased. One star visible high in SW, but no sign of green line.
- 1104 Same.
- 1122 8/8. No sign.
- 1157 Same.
- 1232 Same.
- 1258 8/8 and snowing. No sign.
- 1330 7/8, clear in W to  $45^{\circ}$ . There (1) G with very slight rayed structure. Cloud thin in  $45^{\circ}$  SE where glow visible through cloud. Fairly light over most of S sky.
- 1332-1337 3/8 scattered and haze in N. (1) G in S to  $60^{\circ}$ . (1) pulsations in Z.
- 1343 Same.
- 1345 3/8. (1) steady G up to about  $50^{\circ}$  S. Slowly pulsing irregular (1) DS's all around Z.
- 1355 Almost same - pulsations mainly just S of Z.
- 1400 3/8. (1) G steady up to about  $50^{\circ}$  over whole S sky. Quietly pulsing DS's mainly W and NW of Z.
- 1405 1/8. (1) G round all sky to  $40^{\circ}$ . Fairly steady (1) diffuse corona in Z.
- 1415 1/8. (1) G up to  $50^{\circ}$  right round sky. Slight (1) pulsations near Z.
- 1422 Same.
- 1435 1/8. Weaker in S where intensity, although not exceeding (1) has been a little greater than in N. No sign in Z.
- 1453 4/8, clear in SE and N. In SE (1) G to  $45^{\circ}$  and in N weak G.
- 1513 2/8 scattered. (1) G SE to  $45^{\circ}$ . Weaker G in SW and NE to  $20^{\circ}$ . No sign in Z which is quite cloudless.
- 1525 Snowing - no obs.
- 1540 8/8, thin in N and W. Glow through cloud in W, N and SE.
- 1605 7/8. Sky now too light from twilight to see a display.
-

NOVEMBER 4.

(0845 Sunset  
 (1149 End astronomical twilight  
 (1420 Beginning astronomical twilight  
 (1604 Moonrise Fraction illuminated: 0.40  
 (1730 Sunrise

1015 3/8. (1), (2) and (3) rays forming corona in Z, long rays from E and W, short rays from N and S. (2) ray bundles across S sky through about  $30^\circ$ , almost drapery. (2) patches of G visible in many parts of N sky through cloud gaps.

1020 5/8. Display seems to be unchanged, though less is visible.

1025 8/8. Sky very light. Patches of glow through cloud all over N sky being particularly strong low in E and round Z. Patches weaker and more widely scattered in S sky.

1028 Almost 8/8, becoming more heavily overcast in SW. (3) rays visible through small cloud break  $30^\circ$  due E.

1038 3/8. Beautiful (4) fan-like drapery N of Z forming (4) corona with long rays from E-SE and W and shorter ones from S. Fan drapery extends right to E horizon. Predominating colour is mauve along vertical edges of some rays and particularly at the radiation point of the corona.  
1st MAX.

1040 4/8. Fan drapery now (3) and moving steadily northwards at E end and extending wider into N sky from Z down to E. (1) G visible in parts of S sky between clouds - two patches about  $40^\circ$  and  $60^\circ$  SW.

1044 6/8. Corona obscured, but portions of (3) drapery in NE still visible. Also patch (1) G due S, about  $60^\circ$ .

1051 Almost 8/8. Sky very light in NE and Z, less so low in W-SW.

1100 6/8. NE obscured by cloud, but sky very light there. (2) G along top of cloud bank  $30^\circ$  NW. Patches of (1) G visible through cloud gaps  $60^\circ$  S and  $30^\circ$  SW.

1131 4/8. Patchy (1) G over entire sky. Slight suggestion of ray structure just S of Z.

1135 5/8. (2) G low in N and also low in S, weaker towards Z, and in E and W. Single diffuse (1) N-S band through Z reaching  $10^\circ$  on either side of Z.

1210 8/8 and snowing. Sky still light in NE.

1305 7/8, thin in parts. No definite auroral forms visible but sky very light especially in W and SW.



NOVEMBER 4 cont'd.

1345 8/8. Some very light patches in Z and NE.

1352 8/8 and snowing, but sky light particularly in Z and NE.

1355 7/8. (2) rays  $30^{\circ}$  N. Glow through cloud in many parts of sky.

1410 4/8. (2) RB  $10^{\circ}$  SE-SW with short rays SW and two long (1) rays from SE to Z. (2) G round rest of sky to  $20^{\circ}$ . (1) ray from NW to Z.

1430-1435 4/8, mainly in S. (2) G  $10^{\circ}$  NW-NE becoming slightly like RB and then losing rayed structure again. (1) diffuse rays from NW to Z. (1) G through small breaks in cloud SE-SW to  $30^{\circ}$ .

1455 6/8. (2) G in N sky from NNW to NE diminishing to (1) near Z. Patches of (1) G visible in S sky.

1507-1512 4/8. At first (3) corona with fan-like drapery in N and short rays in S. Rapidly fading and disappearing. (2) G over most of N sky. Cloud obscures S.

1515 7/8 broken. (2) G in N. Ray (probably (1)) through thin cloud from  $30^{\circ}$  E to Z.

1525 8/8. Patches of glow through cloud in SE and all N sky.

1530 Snowing. No obs.

1543 8/8 and snowing. Sky not completely dark.

1600-1620  
2nd MAX. 4/8 at first, increasing to 8/8. (3) fan-like drapery in N sky, brightest in NNW. This gradually contracted and (3) horseshoe drapery formed  $20^{\circ}$  NNW. Then the fan reformed though less extensive and the corona reached (4) at 1612 with swirling reds and greens. This faded and an RB developed  $30^{\circ}$  N, partly obscured by cloud. This reached (4) about 1616 and then gradually faded and became lost in the morning light. During this display rays were occasionally seen in the NE but were difficult to discern against the light sky.

1625-1630 6/8. Sky now quite light. Patch of display visible  $15^{\circ}$  WSW, gradually fading. Later ray (or possibly HA) appeared from NW through Z - partly obscured by cloud. Green line clearly seen in N sky. This display faded.

NOVEMBER 5.

(0847 Sunset  
(1156 End astronomical twilight

NOVEMBER 5 cont'd.

(1410 Beginning astronomical twilight  
 (1613 Moonrise Fraction illuminated: 0.30  
 (1728 Sunrise

- BCO 1012 3/8 and still fairly twilight. (2) HA  $45^{\circ}$  S, with slight ray structure at extreme W end.
- 1015 4/8. (2) HA has slight irregularity  $30^{\circ}$  SW. (2) ray  $30^{\circ}$  SSW, gradually becoming diffuse.
- 1017 4/8. (2) HA  $50^{\circ}$ , centred W of S. (1) and (2) diffuse glow beneath arc in E half.
- 1023 4/8. Only W half of HA now present. Between this and down to about  $20^{\circ}$  there is an (1) diffuse G right across S sky. G has sharp lower edge about  $20^{\circ}$ .
- 1027 4/8. Display almost obscured. Small patch (2) visible between clouds low in W.
- 1031 4/8. Display appears to be slightly more diffuse in W than previously.
- 1035 4/8. Most of display obscured, but clearing slightly in W where (1) band (almost partial HA) is present. (2) drapery very low on ENE horizon, fading rapidly.
- 1038 3/8. Band in W-SSW reached (2). (1) G below it. (1) G visible through cloud gaps in SE.
- 1040 Double (1) zenithal HA appeared. Band in SW gone and now only (1) G there.
- 1045 3/8. Very weak multiple HA's from Z to  $40^{\circ}$  N. These appear to be oriented more NW-SE than usual. (2) broad band  $15^{\circ}$  -  $30^{\circ}$  SW and dipping sharply to W horizon. Lower edge quite sharp.
- 1049 At the S end of the broad band in SW a (2) diffuse area about  $30^{\circ}$  broke up into several long (1) and (2) rays reaching almost to Z. Simultaneously the W end began to drift slowly to NW. Several (1) rays closely grouped from SSE horizon to  $15^{\circ}$ . (1) G low along S-SW horizon. Very weak multiple HA's through Z and up to  $40^{\circ}$  N still present.
- 1055 2/8. Weak HA's N of Z still present. Display has now lost most of its form elsewhere. (2) G on SW horizon, (1) higher up with slight suggestion of diffuse ray structure. Weak G seems to cover most of S sky below  $30^{\circ}$ . Sky still fairly light from twilight.
- 1106 3/8. HA's through Z and N of it now diffused into broad very faint G. (1)-(2) short RB low in W pointing straight towards Z. (2) G low in SW. (1) G elsewhere in S and SW.

NOVEMBER 5 cont'd.

- 1108 RB in W brightened to (2) and spread right across sky as an RA through  $65^{\circ}$  S (measured).
- 1111 Substantially same.
- 1114 3/8. Rayed structure gone and is now very good (2) HA through  $70^{\circ}$  S. Another HA through Z, almost (2). Several more very faint HA's to  $40^{\circ}$  N from Z. (1) to (2) G between  $20^{\circ}$  and  $60^{\circ}$  across S sky. Small (2) ray bundle low in WSW horizon.
- 1118 3/8. (2) HA's still present through Z and  $70^{\circ}$  S. Also multiple weak HA's down to  $40^{\circ}$  N. (2) G low in SW now has sharp lower edge, almost like partial HA. S obscured.
- MAX. 1125 1/8. (3) band in E through Z to W, narrow in E and dividing into about four (2) bands near Z which continue to diverge in W sky.

## SOME PHOTOGRAPHS BETWEEN 1129 AND 1136.

- 1131 1/8. Main (2) band curves up from E, passing over S sky at  $60^{\circ}$ . (2) RB  $15^{\circ}$  S.
- 1136 1/8. Substantially same. (3) band now moving slightly S in centre. Very sharp narrow dark streaks E-W through the (1) G in Z and N of it appear to divide it into multiple arcs.
- 1138 Same in E - slightly weaker but still (3). W end of band now rayed and curving to point SSW from apex of band at  $60^{\circ}$ .
- 1141 Band now rayed along entire length. The curve S at the apex has drifted further SE.
- 1143 4/8 and misty in S and W sector. Only section of band now visible is from E horizon up to  $20^{\circ}$ . Now (2).
- 1145 6/8. Only very small section of (2) RB now visible from E horizon up to  $10^{\circ}$ .
- 1146 7/8, otherwise same.
- DCO 1148 Almost 8/8. (2) G just visible through last remaining misty cloud gap on E horizon.
- 1149 Snowing.
- 1213 8/8. Sky light in patches E and N of Z.
- 1300 Almost 8/8. (1)-(2) G through cloud gap low in E-ESE.
- 1323 6/8, clear only in NE and E. Only sign is (1) G very low along E horizon.
- 1330 Almost 8/8 - some stars visible in E sky through thin mist. Faint glow in SE.



NOVEMBER 5 cont'd.

134.

- 1356 5/8 and mist: Clear only from Z to ESE-ENE.  
Weak G low in E-ESE horizon.
- 1410 8/8. No sign.
- 1424 Almost 8/8 - some stars visible through  
cloud in Z and N. No sign.
- 1433 8/8, with one star occasionally visible in  
Z. No sign.
- 1450 6/8 and haze in N. (1) G through cloud 20°  
SE.
- 1510 5/8 and haze in N. Possible (1) G over all  
N sky. Glow through cloud 20° SE.
- 1537 8/8. Weak glow in E - this may be approaching  
dawn.
- 1542 Snowing - no obs.
- 1610 8/8. Sky now quite light.
- 

NOVEMBER 6.

- (0849 Sunset  
(1203 End astronomical twilight  
(1403 Beginning astronomical twilight  
(1621 Moonrise Fraction illuminated: 0.21  
(1726 Sunrise
- 1010 1/8. Still very light. (2) HA right across  
S sky through 15°, quite narrow and sharp.
- 1024 Almost 0/8. Still quite light. No sign.
- 1057 1/8. Narrow group of very weak rays on  
SW horizon.
- 1114 2/8 and misty in N. (1) G over S sky, fading  
from horizon up to about 35°. Slightly  
brighter in E than in W half of sky.
- 1141 3/8 misty in N. (1) G low across S sky from  
E to W, patchy higher up with nothing above  
50° S.
- 1156 5/8, mainly in N half of sky. (1) and (2)  
patchy G right across S sky between 20° and  
50° S. Bundle of variable (1) and (2) rays  
below this from 5° SSE.
- 1209 6/8. Otherwise same.
- 1305 Almost 8/8. (1) G through gap 15° - 30° SSE.
- 1325 8/8 and raining. No sign.
- 1330 Almost 8/8 - one star visible in S. Glow  
through cloud SE-SW to about 20°.
- 1348 5/8 and 3/8 haze from SE to Z. Suggestion of  
very faint G over SE portion and of G 15° NNE.

NOVEMBER 6 cont'd.

- 1402 6/8 and haze. G through haze and cloud 20° SE.
- 1414 4/8 and mist in N. (1) G above cloud bank right across S sky, 20° - 25°.
- 1425 7/8, fairly clear in SSE. Here (1) G to 20°. Glow through cloud 10° SW.
- 1448 5/8, quite clear in strip from SE through Z to N. (1) G 20° SSE and G through cloud 10° SW. No sign in Z.
- 1509 7/8 and haze from SE to Z. (1) G at edge of cloud bank 20° SE.
- 1525 7/8 and haze and light rain. Sky not completely dark.
- 1644 7/8 and haze. Sky now fairly light from approaching dawn, particularly in SE.

NOVEMBER 7.

- (0850 Sunset
- (1210 End astronomical twilight
- (1353 Beginning astronomical twilight
- (1630 Moonrise Fraction illuminated: 0.12
- (1724 Sunrise
- 1024 1/8. Still very light. No sign.
- 1045 1/8. Still twilight. Partial (2) RA low in SE.
- 1049 1/8. (2) RA extends from SE horizon and fades right out at 15° due S.
- 1109 1/8. (1) and (2) broad band (almost arc) across S sky through 15°. Slight diffuse ray structure.
- 1117 1/8. (2) arc through 15° S, quite well defined over E half but slightly more diffuse over W half with ray structure.
- 1130 1/8. Now only portion of previous arc present, low in SE, (1). Slight suggestion of ray bundle SSE very low, extremely faint.
- 1148 1/8. Very broad diffuse arc through 15° S, (2) at E end, (1) in SW.
- 1217 2/8. Feeble (1) G between 10° and 40° across S sky.
- 1250 1/8. Very weak extensive G over S sky below 45°.
- 1318 1/8. Only extremely weak G below 45° S.

NOVEMBER 7 cont'd.

- 1330 1/8 and haze over most of sky. (1) G SW-SE, 10° in SW and 30° in SE. Suggestion of G 15° due N.
- 1331 Same and very weak diffuse ray bundle low in SSE.
- 1350 2/8 scattered, mainly in S and W. (1) G 30° SE and (1) G 20° SW joined by G across S sky to about 10° (just along edge of plateau). Still suggestion of G 15° N.
- 1410 5/8 and haze - bright stars visible in most parts of sky. (1) G SE-SW to about 30°.
- 1426 Same.
- 1446 3/8 in S and haze. Glow SE-SW through cloud.
- 1500 4/8 and haze. Glow through cloud SW and along E-SE horizon. Presumably twilight - no sign of green line.
- 1535 No definite sign of aurora, though there is a glow along the edge of the plateau. Dawn twilight definite in E.

NOVEMBER 8.

- 1345 Till now 8/8 and misty rain with no sign of aurora.
- 1450 Same.
- 1512 8/8, thin in parts with some stars occasionally visible. No sign of aurora, although sky is not completely dark.
- 1525 8/8 thin mist with stars visible in SSE. Here glow through mist 20°, but this is likely to be twilight.
- 1545 7/8. Fairly light in SE.

NOVEMBER 9.

- 1020 4/8. Still fairly light. No sign.
- 1040 Same.
- 1100 4/8, clear in S. Still light in S-SW but no sign of green line.
- 1117 Same.
- 1131 4/8, clear in S. No sign.
- 1200 4/8 and slight mistiness, clear in S. No sign.



NOVEMBER 9 cont'd.

- 1245 6/8, thick cloud. Remainder of sky very misty. No sign.
- 1310 Almost 8/8. No sign.
- 1330 8/8 and light rain. No sign.
- 1345 Almost 8/8 - one star visible. No sign.
- 1350 Two stars visible high in SE. No sign.
- 1410 8/8. No sign.
- 1445 7/8 and haze in Z. No sign.
- 1520 Almost 8/8 - one or two stars visible through haze in Z. Sky becoming light but no sign of aurora.

NOVEMBER 10.

8/8 all night and misty rain. No sign of aurora.

NOVEMBER 11.

- 1110 8/8 thick mist. No sign.
- 1155 8/8. No sign.
- 1350 Same.
- 1500 8/8 and raining. No sign.

NOVEMBER 12.

- 1345 Frequent obs. till now. Always 8/8. No sign of green line although sky not very dark. Remained 8/8 with no sign for rest of night.

NOVEMBER 13.

- (0902 Sunset
- (1354 Moonset Fraction illuminated: 0.13
- (1713 Sunrise Twilight all night.
- 1055 6/8. Still twilight. Clear in SE. No sign green line.
- 1105 6/8. No sign of line.
- 1130 6/8. (2) drapery ESE to Z and several (1) and (2) DS's in E sky. (2) rays visible through small cloud gap very low due W. Drapery

NOVEMBER 13 cont'd.

faded fairly rapidly and another weak drapery formed in ENE towards Z, sweeping E at low end.

- 1134 7/8 - clear only in E-NE sector from  $20^{\circ}$  to Z. Two diffuse (2) bands with slight ray structure sweeping upwards from ENE and E. The more northerly one appears to continue behind clouds through about  $40^{\circ}$  N while the other disappears towards Z in cloud at  $75^{\circ}$  E.
- 1138 7/8. (2) RB sweeping from  $20^{\circ}$  E through NE sector and up towards Z.
- 1148 Almost 8/8. Possible glow behind clouds about  $45^{\circ}$  NW.
- 1154 6/8 and hazy. Very broad diffuse (2) band from WNW horizon, sweeping slightly northwards and up to Z.
- 1203 6/8 and haziness. (1) and (2) streaky patchy glow in broad band from W through  $30^{\circ}$  N and ending in diffuse G in E with several diffuse rays  $20^{\circ}$  -  $30^{\circ}$  ENE.
- 1235 6/8 and hazy. Extensive (1) and (2) G over most of N sky through patchy thin cloud. Several diffuse rays  $20^{\circ}$  -  $40^{\circ}$  ENE.
- 1254 5/8 and haze. Extensive patchy (1) G over entire N sky and extending into SE sector. Slightly banded structure E-W at Z.
- 1325 Practically same, being brightest in NE.
- 1345 7/8, clear in N. (1) G through cloud gap in N and glow through cloud from E to W across Z and in SW.
- 1400 7/8, clear in N near Z. (1) parallel bands E-W through Z and glow through cloud in E.
- 1412 8/8. Glow through cloud  $20^{\circ}$  E.
- 1430 6/8, clear from SE through Z into N sky. (1) G at edges of cloud in N, from E to W through about  $45^{\circ}$  N.
- 1445 8/8. Glow through cloud low in E sky.
- 1500 5/8, clear in E to Z and N. Fairly light in E and glow through cloud in NW sky. Glow in E probably partly due to twilight.
- 1510 5/8, S and SW heavily clouded. (1) G over entire visible sky. G streaky near Z.
- 1535 8/8. Light patches through cloud in E and W from twilight.
-

NOVEMBER 14.

(0904 Sunset  
 (1431 Moonset Fraction illuminated: 0.22  
 (1711 Sunrise. Twilight all night.

1055 0/8. Bright moon high in W. No sign.

1115 2/8. No sign.

1130 3/8. No sign.

1154 1/8. No sign.

1203 2/8. Very faint G and several very weak rays about  $20^{\circ}$  SSE. Green line visible in this sector only.

1220 3/8. SE half of extremely weak and diffuse (1) HA through  $25^{\circ}$  S, SW half obscured by cloud. Green line clearly visible in SE sector. Moonlight on clouds deceptive.

1245 3/8, mostly in S-W. Weak (1) G up to about  $30^{\circ}$  in SE sector.

1320 2/8 in SW. Scarcely perceptible G in SE sector below  $25^{\circ}$ . Green line just discernible.

1335 6/8, clear in NE near Z and occasionally low in SE. No definite sign. Slight glow at edges of cloud in SE may be reflected moonlight - moon setting behind plateau. LNS.

1347 3/8 scattered. (1) G SE to  $20^{\circ}$ .

1400-1405 3/8 scattered. (1) G in S to  $35^{\circ}$  with slightly irregular upper edge. (1) pulsations ESE from  $5^{\circ}$  to  $45^{\circ}$ .

1411 Almost 0/8. Very broad (1) HA right across sky between  $30^{\circ}$  and  $60^{\circ}$ . Another (1) HA  $80^{\circ}$  -  $90^{\circ}$  pulsing very slowly (period about 10 secs). Pulsations not synchronised in different sections of arc.

1415 Same as at last obs. and occasional pulsations of patches of (1) G in N sky.

1417 0/8. Same in S sky. Now several distinct (1) DS's in E-NE sky with suggestion of faint rays. Also broad diffuse (1) band sweeping from low to W to about  $10^{\circ}$  NNW.

1420 1/8. (1) HA in S now very diffuse, extending up to about  $60^{\circ}$  with (1) G covering nearly all S sky below it. (1) pulsations continuing in Z. Patches of (1) DS more numerous in N sky, particularly round  $40^{\circ}$  NE and  $30^{\circ}$  NW.

1425 2/8. Same in S. (1) patches in NE assuming a ray-like form pointing towards Z. In NW



NOVEMBER 14 cont'd.

patches have coalesced to form (1) band at  $30^{\circ}$  running horizontally from WNW to NNW.

- 1430 2/8 scattered. Same and weak pulsations in Z.
- 1435 3/8 scattered and haze in N. Occasional pulsations just SE of Z, (1). G in SE now indistinguishable from twilight. Patches of G in N partially obscured by haze.
- 1440 4/8 and haze. (1) G still definite in SW (and possibly in SE). (1) rays  $45^{\circ}$  ENE.
- 1445 4/8 and haze. Now no definite sign because of twilight, but believe G continues in S sky. LNS.
- 1500 4/8 and haze. (1) rays from  $60^{\circ}$  SE to Z. (1) DS's round Z forming very diffuse corona. (1) G continues in SW and possibly in SE.
- 1505 4/8 and haze. (1) corona visible through gap in thin cloud. (1) rays to Z from  $60^{\circ}$  NW partially obscured by cloud.
- 1510 Z now clear. (1) corona continues. Very blotchy in centre with diffuse patches on edges. Suggestion of rays from  $70^{\circ}$  NE.
- 1515 4/8 and haze, clear in Z. Corona gone but (1) DS present. Very slight suggestion of rays from  $60^{\circ}$  NW.
- 1520 3/8, haze gone. (1) rays from  $60^{\circ}$  NE to Z. No corona. Suggestion of DS  $60^{\circ}$  SE. Considerable twilight in SE. SW obscured by cloud.
- 1525 4/8, Z obscured by thin cloud. No definite sign.
- 1530 4/8. No sign. Sky now fairly light. LNS.

NOVEMBER 15.

- 1205 Till now 8/8 and no sign of aurora.
- 1330 Same.
- 1340 8/8. No sign.
- 1420 8/8. Not completely dark low in SW (probably moon).
- 1545 Now quite light and still 8/8.

NOVEMBER 16.

- 1040 6/8. No sign.  
 1058 6/8. Bright moon. No sign of green line.  
 1115 Same.  
 1140 7/8. No sign.  
 1300 8/8. No sign of green line. No sign during remainder of night.

NOVEMBER 17.

- (0912 Sunset  
 (1516 Moonset Fraction illuminated: 0.54  
 (1705 Sunrise. Twilight all night.
- 1115 6/8. Bright moon behind clouds. No sign of green line.  
 1145 6/8. No sign.  
 1206 7/8. No sign.  
 1220 6/8, (clear for  $20^\circ$  each side of Z). (3) RB E-W through Z, forming partial corona, formed suddenly.
- MAX. 1222 Fairly stationary (3) narrow fan-like RB through Z. (3) patch also visible  $45^\circ$  E showing that band probably continues in that direction.
- 1224 6/8. Faded to (1) partial corona. Bright (3) section of RB  $30^\circ$ - $40^\circ$  E.  
 1226 6/8, still clear only short distance either side of Z. Corona gone. Now only very faint broad band through Z like partial HA.  
 1227 6/8. Diffuse (1) multiple arcs formed from Z to  $60^\circ$  N.  
 1229 The most distinct arc through the Z (the most southerly) broadened and became momentarily (2) and faded rapidly to (1) again, becoming broader and more diffuse.  
 1231 (2) G visible through very small cloud gap  $30^\circ$  ESE. Unchanged in Z.  
 1235 5/8. Diffuse ray bundle from  $20^\circ$  ESE became (3) and faded to (2). Several diffuse bands through Z have begun pulsing in intensity, but do not exceed (1). Most southerly of these curves slightly S at W side of Z. The others run E-W.  
 1241 5/8. Seven distinct pulsing (1) arcs between  $80^\circ$  S and  $60^\circ$  N. Pulsations irregular and slow - all do not increase or

NOVEMBER 17 cont'd.

fade together - no synchronisation. Sky now clear between  $60^{\circ}$  W and about  $40^{\circ}$  E with other breaks in N sky.

- 1245-1250 4/8. (1) arcs through Z merged slowly and extended further into S sky. Now four broad (1) arcs between  $70^{\circ}$  S and  $70^{\circ}$  N. The pulsations have become less marked and appear to occur in a random fashion. No other auroral activity visible.
- 1300 Same.
- 1315 3/8. Same through Z. E ends of the weak arcs merge into (1) G which extends round to due S (up to  $30^{\circ}$  in SE).
- 1330 3/8. Same except that pulsations are almost absent.
- 1345 3/8. (1) bands through Z from E to W feebly pulsating. Suggestion of (1) G  $30^{\circ}$  S.
- 1350 4/8. Two parallel (1) zenithal arcs from E to W. G up to  $20^{\circ}$  S. Cloud mainly in S.
- 1358 2/8. (1) bands from E to W horizons through Z, somewhat irregular at Z, forming semblance of corona. G scarcely visible in S through cloud less.
- 1405 2/8. Two (1) diffuse HA's through  $45^{\circ}$  and  $60^{\circ}$  S, and (1) bands or irregular HA's through Z fluctuating slightly.
- 1415 3/8. The  $45^{\circ}$  (1) HA has distinct lower edge, but the  $60^{\circ}$  one is a little more diffuse. About four (1) parallel HA's extend from E to W through Z and about  $15^{\circ}$  each side of it.
- 1425 3/8. Almost continuous (1) G from (1) HA  $45^{\circ}$  S to  $80^{\circ}$  N with slight dark E-W striations near Z.
- 1435 2/8 in SW. (1) HA  $45^{\circ}$  S with G above it diminishing in intensity to Z.
- 1445 2/8. (1) HA  $45^{\circ}$  S. No sign in Z.
- 1455 2/8. (1) HA  $45^{\circ}$  S. Twilight increasing in SE.
- 1507 2/8. Believe (1) HA  $45^{\circ}$  S still present, though difficult to be sure with cloud obscuring SW end and twilight in SE.
- 1515 2/8. (1) HA now about  $40^{\circ}$  S and scarcely distinguishable.
- 1525 2/8. No sign. (2) display would be visible except in SE.
- 1535 2/8. No sign. (2)-(3) display would be visible.



NOVEMBER 18.

- (0914 Sunset  
 (1524 Moonset Fraction illuminated: 0.64  
 (1704 Sunrise. Astronomical twilight all night.
- 1035 8/8 thin cloud. Still quite light. No sign.  
 1116 8/8 thin. Moon bright in W. No sign of green line.  
 1133 8/8 thin. No line.  
 1148 8/8 thin. No line. Sky quite light.  
 1220 8/8 thin. No line.  
 1310 Same.  
 1400 Same, but still quite light.  
 1420 8/8. Light over entire sky, particularly in SSE. No line.  
 1450 8/8. Sky darker. No sign.  
 1530 8/8. Twilight increasing in SE.
- 

NOVEMBER 19.

- 1045 7/8. Still quite light. No sign.  
 1110 7/8. Still light from twilight and moon. No sign of green line.  
 1148 7/8. Moon bright behind clouds high in W. No line.  
 1221 7/8. No sign.  
 1247 Same.  
 1325 7/8, broken near Z. Still quite moonlight. No sign, no line.  
 1420 7/8. No sign.  
 1520 3/8. Moon just setting. Twilight increasing in SE. No sign. No line.
- 

NOVEMBER 20.

- 1105 8/8. No sign, no line. Sky light from moon.  
 1140 8/8 and raining. No chance of seeing line even if aurora were present.  
 1310 Has remained 8/8 and raining. No sign.  
 1530 Raining continuously and 8/8 till dawn.
-

NOVEMBER 21.

- 1100 8/8 and raining.
- 1215 Rain ceased. Almost 8/8 - one star visible in Z. No sign.
- 1325 8/8 and light misty rain. Sky very light, but no sign of green line.
- 1435 8/8. Quite light, particularly near Z, but no line.
- 1445-1450 Cloud varied between 5/8 and 7/8. Appears to be (1) G in S to 30° with slight suggestion of rays in SE. However green line not visible so it could be twilight. Glow in Z and N may be moonlight on thin clouds.
- 1455 Almost 8/8 - thin in N. Light rain. No sign.
- 1530 8/8. Fairly light.

NOVEMBER 22.

- 1115 8/8. Very light but no line.
- 1135 8/8. No sign.
- 1225 8/8 and rain. Quite light. LNS because of rain.
- 1350 8/8 and rain.
- 1355 Same.
- 1500 Same. Sky light.

NOVEMBER 23.

- 1120 6/8, clear in W. Very light but no line.
- 1154 4/8, clear right round sky above 40°. Quite light from moon in N, but no green line.
- 1235 7/8 broken. No line.
- 1340 5/8, clear from SE through Z to NW. No sign, no line.
- 1348 7/8. Moon bright on clouds. No sign of green line.
- 1420 Same.
- 1500 4/8. Becoming light in SE. No sign, no line.
- 1515 2/8. Quite light. No sign.

NOVEMBER 24.

- 1245 8/8 and raining. Quite light but no sign of green line.
- 1425 Has remained same since last obs.
- 1500 5/8. Sky light in E. No sign.
- 1515 3/8. Now quite light. No sign.

NOVEMBER 25.

- (0926 Sunset
- (1048 Moonrise Fraction illuminated: 1.00
- (1653 Moonset
- (1655 Sunrise. Astronomical twilight all night.
- 1130 2/8. No auroral forms evident but green line just visible low in N sky.
- 1135-1145 8/8 thin haze with several stars visible through it. At first fan-like drapery in Z with fan to S. Difficult to be sure of intensity due to haze, but there appeared to be colours indicating (4); Intensity certainly not less than (3). After the fan disappeared, a drapery or band appeared from SE to S through  $30^\circ$ , (2). This disappeared. Occasionally (1) bands appeared in Z and (2) rays low in SE. Green line distinct from most parts of sky including N.
- 1150 8/8 thin haze. No sign of structures but green line distinct.
- 1200 7/8, moon visible in N and one or two stars visible through haze in Z. No forms visible but green line distinct in Z.
- 1207 7/8 thin haze - several stars visible (2) HA through  $10^\circ$  N passing very close to bright moon. Green line distinct over all S sky, but no forms visible through haze.
- 1225 General haze thinning - many stars visible over all sky. Several long almost (2) rays from S and SW and sheet of (1)-(2) striated G in W and NW sweeping up to form diffuse partial corona.
- 1245 Haze same. Glow in Z with occasional striations appearing.
- 1305 Haze same. Very weak (1) diffuse patches in N sky near Z, particularly in NE and NW.
- 1320 Almost 8/8 thin haze. Weak-uniform (1) G visible through haze  $10^\circ - 30^\circ$  S-SE.
- 1345 8/8, no stars visible. No sign. Line not distinguishable.



NOVEMBER 25 cont'd.

- 1410 8/8 and light rain. No sign no line.  
 1438 8/8. No sign.  
 1500 Same.

NOVEMBER 26.

- (0928 Sunset  
 (1153 Moonrise Fraction illuminated: 0.98  
 (1654 Sunrise. Astronomical twilight all night.
- 1055 1/8. No sign of green line. Still very light.
- 1115 3/8 and still quite light. Green line just discernible low in N from what appears to be a very weak diffuse HA about  $15^{\circ}$  N. This appears to be a very faint cream in colour - similar to the HA in the 1207 obs. Nov. 25.
- 1125 2/8. HA  $15^{\circ}$  N now definite and almost (2). Still cream in colour (may be sunlit). Only green line visible on continuous background spectrum.
- 1135 2/8. (2) HA  $20^{\circ}$  N. Same colour. Green line not visible elsewhere.
- 1145 7/8. Lower edge of HA  $20^{\circ}$  N visible just below cloud.
- 1210-1230  
MAX. 2/8, 4/8. (3) fan-like drapery just S of Z became (4) and spread out right from E to W with very long rays. Very distinct mauve colour at the apex of the partial corona thus formed. None of the rays appear broken as sunlit rays are said to be, but the main colour is more cream than the usual greenish white. Display varied rapidly with fan-like drapery (3) and (4) sweeping into N sky leaving S sky practically clear. The original HA in N spread into extensive (2) creamy green glow up to about  $50^{\circ}$  N. Above this long-rayed draperies (fairly steady) reach towards Z. At 1220 the display again extended into the S sky with (3) and (4) long-rayed draperies right across the sky.
- 1230 3/8. Fairly uniform (2) G over entire visible sky. Slightly more intense in NE about  $30^{\circ}$  where (3).
- 1235 4/8. Entire sky covered with (2) and (3) patchy G right down to all visible horizons. Slightly rayed structure in NE.
- 1237 6/8. Rays visible below cloud  $10^{\circ}$  SW, (3). G continues elsewhere.

NOVEMBER 26 cont'd.

- 1238 Rays in SW faded to (1).
- 1245 3/8 and haze. Patchy (2) G over most of sky. Occasional structures in Z giving appearance of corona. (3) band  $20^{\circ}$  SSW.
- 1250 Same. Band now (3) RB and extends from SSE to SW through  $20^{\circ}$ .
- 1255 1/8 scattered. Patchy (2) G over all sky. Diffuse corona in Z. Patchy (2) G over all sky. (2)-(3) patch visible through small gap in cloud  $10^{\circ}$  S.
- 1305 1/8. (1) striations from  $45^{\circ}$ E to  $45^{\circ}$ W through Z. Patch of (3) RB visible  $15^{\circ}$  SSW through cloud. G continues over all sky. Moon has risen above Wireless Hill in N.
- 1310 2/8. G now brightest in WNW where (2). Bundle of bands from W through Z and to  $20^{\circ}$  N and S of Z into general (1) G in E.
- 1320 1/8. (1) parallel but slightly irregular bands through Z from E to W. G in N  $20^{\circ}$ , near moon.
- 1330 1/8. (2) patch of G  $10^{\circ}$  NE. (1)-(2) HA  $20^{\circ}$ N. (1) Zenithal HA, slightly irregular near Z. Green line not discernible elsewhere in sky.
- 1347 5/8 patchy. (2) band through Z from NW to SE, partly obscured by cloud. No definite sign elsewhere, though G through cloud in N may not all be moonlight.
- 1355 7/8 patchy. No definite sign. LNS.
- 1410 8/8. Green line just discernible, particularly  $45^{\circ}$  NE.
- 1435 2/8. Twilight increasing. Green line discernible in many parts of sky and diffuse 'clouds' visible  $50^{\circ}$  SW,  $50^{\circ}$ N and  $50^{\circ}$  NE.
- 1445 7/8 patchy. No sign. LNS.
- 1500 2/8. Weak rays from  $45^{\circ}$  NE and E to Z. Diffuse patch just N of Z. Intensity probably (2).
- 1510 3/8 and haze. No definite sign. Green line not discernible on background of continuous spectrum.
- 1535 Quite light. No sign of either auroral forms or green line.

NOVEMBER 27.

- 1102 8/8 and mist and light rain. Quite light but green line not discernible.

NOVEMBER 27 cont'd.

- 1210 8/8. Fairly dark - moon not up. LNS.  
 1305 8/8. No sign. No lin.  
 1335 Same.  
 1438 8/8. Sky light from moon but no sign of green line.
- 

NOVEMBER 28.

- 1055 8/8 and raining. Sky quite light, but no green line.  
 1435 Raining most of night since last obs. Now 8/8, thin in parts with stars occasionally visible in N. and SE. Green line faint but definite from many parts of sky. Twilight increasing in SE.  
 1440 8/8. Light but LNS.  
 1455 8/8. Green line not definitely seen, but may be present.  
 1510 8/8. Quite light. Green line not discernible on background spectrum.
- 

NOVEMBER 29.

- (0933 Sunset  
 (1343 Moonrise Fraction illuminated: 0.83  
 (1651 Sunrise. Astronomical twilight all night.  
 1105 6/8. Just becoming dark enough to see stars. No sign of green line.  
 1114 4/8. (2) band from WNW horizon up to  $25^{\circ}$  SW and there spreading into (1) diffuse glow sweeping towards Z. Still quite light and band appears creamy in colour.  
 1125 4/8. (2) diffuse band from WNW up through Z.  
 1128 2/8. (2) and (3) patch forming  $25^{\circ}$  SSE. Diffuse G near Z in NE.  
 1137 3/8. (1) G over most of S sky below about  $30^{\circ}$ ; visible only through cloud gaps. LNS.  
 1147 7/8. No sign. LNS.  
 1200 5/8. (1) and (2) diffuse broken bands sweeping from E horizon slightly NE and then to Z.  
 1207 5/8. (1) diffuse G streaking up from E to ESE, also low in W. Not photographable.  
 1215 7/8. (1) and (2) diffuse G from E to W through Z seen through thin cloud.



NOVEMBER 29 cont'd.

- 1221 6/8. Fairly general (1) and (2) G through clouds over all E, S and W sky.
- 1225 6/8 and hazy. Same as above and diffuse (1) HA  $30^{\circ}$  N (only W half visible).
- 1227 6/8 and raining. Cloud now continuous over most of S sky. (1) HA still present  $30^{\circ}$  N - centre half now visible.
- 1237 Almost 8/8: G through cloud (probably (2)) mainly from E to W through Z.
- BCO 1246 5/8. (1) parallel HA's from E to W through Z.

## SEVERAL PHOTOGRAPHS BETWEEN 1256 AND 1305.

- 1250-1300 5/8 to 3/8. Several parallel (1) HA's through Z and to  $40^{\circ}$  N. Broad (2)-(3) band in W with slight ray structure. Spread into (2) RA  $50^{\circ}$  and then shortened into E sky. Rays in this RA in rapid motion towards E end.
- 1300-1305 4/8. Display weakened but spread more into N sky with many parallel arcs from Z down to pronounced one at  $25^{\circ}$  N. Slight irregularities in arcs in Z.
- 1310 3/8. (2) G very low on S horizon. Multiple (1) E-W bands still in Z and N of it, although becoming patchy especially on N side. Pulsating DS's in N  $25^{\circ}$ - $40^{\circ}$ .
- 1315 2/8. (3) G right along S skyline and decreasing in intensity upwards through (2) to (1) at Z and (1) in all N sky down to  $15^{\circ}$ .
- 1320 1/8. Has continued much the same as at last obs. Now N sky and Z are covered with almost uniform (1) G which is subject to rapid flaming - intensity fluctuates in rapid sweeping motion from N to Z.
- DCO 1330 2/8. Pulsing and flaming now ceased. All sky now covered with almost uniform (1) G, (2) low in S.
- 1340 2/8. (2) G over all S sky, diminishing to (1) near Z where pulsations are occurring.
- 1345 1/8. Same, with feeble pulsations in Z. Probably (1) G in N sky.
- 1355 3/8. Z obscured. (2) G persists in S.
- 1405 2/8. Uniform (1) G over all sky.
- 1415 2/8. Same.
- 1430 4/8. Green line still visible in most parts of sky. Twilight increasing.

NOVEMBER 29 cont'd.

- 1450 6/8. Green line very feeble in SW. Not definitely present elsewhere.
- 1520 3/8. Now quite light. No sign of green line.

NOVEMBER 30.

- 1100 8/8, thin in parts especially in S. Still quite light. No sign of green line.
- 1128 8/8. Sky light in patches but no line.
- 1205 Same.
- 1300 Raining and sleeting. No obs.
- 1415 8/8. Quite light but green line not seen.
- 1450 Raining and sleeting. No obs.

DECEMBER 1950DECEMBER 1.

(0937 Sunset  
 (1411 Moonrise Fraction illuminated: 0.67  
 (1649 Sunrise  
 (Astronomical twilight all night

1120 7/8. Still quite light. No sign of green line.

1134 Almost 8/8. No sign.

1150 8/8. Still light but no line.

1235 5/8 and haze. (1) G in S to about 50°. Green line just visible.

1250 8/8. Patches of G visible through cloud in SE and E.

1310 8/8. Feeble glow through cloud from most parts of sky. Line visible weakly.

1330 Same.

1400 Same.

1425 Same.

1540 Still 8/8. Now daylight.

DECEMBER 2.

1115 8/8. Still quite light. No line.

1155 8/8 and light drizzle. Still quite light but no sign of line.

1209 8/8 and fog and drizzle. No sign.

1310 Same.

1415 Same.

DECEMBER 3.

(0939 Sunset  
 (1428 Moonrise Fraction illuminated: 0.47  
 (1647 Sunrise  
 (Astronomical twilight all night.

1115 7/8. Still fairly light. No sign.

1137 4/8 - clear in E half. Still fairly light. No sign.

1145 7/8. No sign.



DECEMBER 3 cont'd.

- 1200 8/8. No sign, but not dark yet.
- 1215 7/8. Still slightly light. Green line not distinguishable. N.B. Campbell Island reports slight G.
- 1230 8/8. No line.
- 1255 5/8 and haze. No line visible, although still light.
- 1310 Almost 8/8. Not dark but no sign of line.
- 1325 7/8. Green line visible in S. Patches of (1) and (2) G seen through breaks in cloud in S up to  $40^{\circ}$ .
- 1340 5/8 and haze. (1) and (2) G continues in S, and probably up to Z. Sky nowhere completely dark - may be (1) G over entire sky, but too weak except in S to see green line.
- 1355 5/8 - 7/8 and haze, varying very rapidly. (1) and (2) G in SE and possible (1) G everywhere else.
- 1412 7/8. Same.
- 1430 7/8. Twilight increasing in SE, low. Green line not visible.
- 1455 5/8. Quite light. Green line not visible.

DECEMBER 4.

- (0941 Sunset  
(1435 Moonrise. Fraction illuminated: 0.36  
(1647 Sunrise  
(Astronomical twilight all night.
- 1130 6/8. Still quite light. No sign.
- 1145 5/8. Clear in S-E sector. (1) HA through  $20^{\circ}$  S.
- 1150 3/8. No sign of previous HA.
- 1210 3/8. No sign. No line.
- 1222 4/8. Still twilight. No sign.
- 1235 5/8. No sign. LNS.
- 1250 5/8. No sign.
- 1300 5/8. Green line visible in SW and in all parts of S sky not obscured by cloud. Intensity of G almost (2).

DECEMBER 4 cont'd.

- 1320 1/8. (1) HA through  $30^{\circ}$ S. (1) DS  $50^{\circ}$ S. Green line distinct from HA and DS and from patch  $10^{\circ}$  SW, but demarcation of HA not clear to unaided eye because of twilight.
- 1330 3/8, mainly in S obscuring HA and DS. No sign elsewhere LNS.
- 1347 6/8, clear low in SE. Green line visible  $15^{\circ}$  SE - probably end of HA.
- 1405 5/8 and haze. Light rain beginning. No definite sign. LNS.
- 1423 3/8, haze cleared. Quite light on S and SE horizon from approaching dawn. No sign of green line.
- 1525 Daylight.

DECEMBER 5.

- 1130 2/8. Quite twilight. No sign.
- 1200 3/8. Still rather light in S. No sign.
- 1215 4/8. Light low in S. No sign. No line.
- 1242 4/8. Otherwise same.
- 1320 1/8. No sign. No line.
- 1335 1/8. Southern sky quite light, but no sign of aurora.
- 1400 1/8. No sign. No line.
- 1440 4/8. Now fairly light. No sign green line.

DECEMBER 6.

- (0944 Sunset  
 (1456 Moonrise Fraction illuminated: 0.16  
 (1645 Sunrise  
 (Astronomical twilight all night.

- 1120 3/8 and slight haze. Still very light over S sky. No sign.
- 1140 2/8 and slight haze. Green line clearly visible in S, Z and NE, but no sign of any forms. Must be weak G lost in the twilight and haze.  
 N.B. Campbell Island reports good aurora - corona etc.

DECEMBER 6 cont'd.

- 1155 1/8 and haze. Green line mainly present at elevations above  $30^{\circ}$  in all parts of sky, but may be present lower down.
- 1213 2/8 and thick haze (bright stars just visible). Still very light low on S horizon. No sign of any auroral forms, but green line just visible over most of S sky and in Z and NE.
- 1235 8/8 thick haze with bright stars just visible. Sky not dark anywhere. Green line just visible in Z.
- 1305 8/8. No sign. Too dark to see green line.
- 1337 8/8, mainly thick haze - couple of stars visible in Z. Light low on S horizon. No sign of green line.
- 1415-1425 1/8. Now quite light in S. At first a very faint suggestion of ray or partial HA in E towards Z. This gradually developed into a complete HA which, though it appeared weak, must be (2) to be visible on the light background. Very faint multi-arcs developed down to  $60^{\circ}$ N. Green line clearly visible.
- 1430 Same and definite weak HA  $20^{\circ}$ S.  
PHOTOGRAPH AT 1446.
- 1435-1450 1/8. HA in S now gone. Those in Z at first MAX. weak, then slowly became more distinct, the most southerly one curving into SW sky from Z. The E half of this main arc slowly developed ray structure which increased to (3) and gradually contracted to E end, fading almost completely by 1450 into the dawn light. At 1448 (3) ray bundle appeared in SSW  $15^{\circ}$ - $25^{\circ}$  and faded again fairly rapidly. By 1450 no sign of any forms - sky very light with only the brightest stars visible. Nothing strange in the colours of this display, although possibly slightly more yellow than usual.
- 1500 1/8. No sign. No line.

DECEMBER 7.

- 1145-1150 Almost 8/8. Sky still light, but no sign of green line.
- 1210 8/8. Patches of light visible through thin cloud mainly in SE, but no sign of line.
- 1325 8/8. Sky not dark, but line not visible on background spectrum.
- 1415 Same.
- 1520 8/8. Now quite light.



DECEMBER 8.

8/8 and extremely foul weather all night.

DECEMBER 9.

- 1220 Has been 8/8 and fairly dark till now.  
No sign.
- 1310 8/8. Too dark to see anything through  
spectroscope.
- 1530 Has remained 8/8 with no sign. Now fairly  
light.

DECEMBER 10.

- (0949 Sunset  
(1136 Moonset. Fraction illuminated: 0.01  
(1644 Sunrise  
(Astronomical twilight all night.

- 1120 Almost 8/8. Still quite light in S. No sign.
- 1130 4/8. No sign.
- 1135 Almost 8/8. No sign.
- 1145-1157 3/8. Still twilight. (2) HA  $45^{\circ}$ S, yellow  
in colour.
- 1206 5/8, thick cloud in S. No sign.
- 1219 Almost 8/8. No sign.
- 1240 5/8. Weak HA still at  $45^{\circ}$ S. Only E half of  
it visible.
- 1248 5/8. Display seems to have contracted into  
SE and is now (2) DS with weak ray structure  
low in SE. This DS or diffuse ray bundle  
is subject to variations and momentarily  
reached (3).
- 1305 Almost 8/8, very thin in some parts. Patches  
of glow in all S sky up to  $45^{\circ}$  and in NE and  
NW. (3) patch visible  $45^{\circ}$  S through very  
thin cloud, but no sign of structure.
- 1320 Almost 8/8 - some stars occasionally visible  
in Z. (3) ray bundle visible through small  
break in cloud  $20^{\circ}$  ESE. (2) G through cloud  
in S, NE and NW and (1) G in Z.
- 1348 Almost 8/8 - stars occasionally visible in  
SE. (2) G in SE and glow through cloud  
 $30^{\circ}$  NE and W.
- 1412 8/8 with stars occasionally visible in N.  
Glow through cloud in S, SE, NE and NW  $30^{\circ}$ ,  
but green line not visible.

DECEMBER 10 cont'd.

1455 8/8. No sign.

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DECEMBER 11.

1205 8/8. Still twilight. No line.

1300 7/8 and haze. Stars visible in Z. Too dark to see anything through spectroscope.

1325 5/8 and haze. Sky light low in S, but no sign of green line.

1407 3/8. No sign.

1425 4/8. No sign.

1500 7/8. Quite light.

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DECEMBER 12.

1225 Almost 8/8, some thin haze. No sign.

1340 1/8 and general haze. No sign.

1440 1/8 scattered. Twilight, but no sign of green line.

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DECEMBER 13.

8/8 all night. No sign.

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DECEMBER 14.

(0954 Sunset

(1323 Moonset. Fraction illuminated: 0.27

(1643 Sunrise

(Astronomical twilight all night.

1140 3/8. Still very light in S, but weak HA at  $20^{\circ}$  S visible. Green line not distinguishable on continuous background spectrum.

1208 3/8 and general thick haze. No sign.

1250 3/8 and haze. Appearance of (1) parallel bands through Z. Also appearance of G in S to  $30^{\circ}$ , but no sign of green line anywhere.

1310 4/8 and haze. Possible weak G in S, but no sign elsewhere.

1335 8/8. No sign.

1420 8/8. Light patches, mainly in E, but too dark to see anything through spectroscope.

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DECEMBER 15.

- 1345 Till now 8/8 and misty rain. No sign.  
1440 8/8 and drizzle. Sky becoming light.
- 

DECEMBER 16.

- 1600 No sign all night. 8/8 at most observations, but stars seen once.
- 

DECEMBER 17.

- 1120 7/8. Still very light. No sign of green line.  
1140 Almost 8/8 - one star visible in Z occasionally. Still quite light. No line.  
1210 4/8 scattered. No sign. No line.  
1240 3/8. No sign. No line.  
1304 4/8 scattered. No sign.  
1315 6/8. No sign.  
1345 4/8. Light in E but line not visible.  
1445 Almost 8/8. Twilight in E. Line not visible.  
1455 7/8. No sign. LNS.
- 

DECEMBER 18.

- (0958 Sunset  
 (1353 Moonset. Fraction illuminated: 0.67  
 (1644 Sunrise  
 (Astronomical twilight all night.  
1105 2/8. Still quite light. No sign. No line.  
1130 1/8. Same.  
1154 2/8. Twilight and moonlight. No sign. No line.  
1206 1/8. Very clear and fairly light but no sign of green line.  
1234 2/8. No sign. No line.  
1246 5/8. No sign.  
1300 Almost 8/8. One star occasionally visible in SE. Fairly dark. No sign.  
1335 6/8, clear in SE. No sign. No line.



DECEMBER 18 cont'd.

- 1357 7/8. No sign.  
1422 5/8, clear in S. No sign.  
1442 7/8, clear in SE. No sign.
- 

DECEMBER 19.

8/8 and raining all night.

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DECEMBER 20.

- 1200 Till now 8/8 with no sign.  
1420 3/8. No sign. No line.  
1450 4/8. No sign.
- 

DECEMBER 21.

- 1230 Till now 8/8 with no sign of aurora.  
1330 5/8 and haze. Moon low in W. No sign.  
1346 4/8 and haze. No sign.  
1505 7/8. Almost daylight. No sign.
- 

DECEMBER 22.

- (1000 Sunset  
 (1454 Moonset. Fraction illuminated: 0.95  
 (1645 Sunrise  
 (Astronomical twilight all night.
- 1140 Almost 8/8. Still very light. No sign of green line.  
1215 8/8. Fairly light but no line.  
1245 8/8. Fairly dark - too dark to see anything through spectroscopic.  
1318 8/8. Sky light and green line distinct over entire sky.  
1340 Same.  
1410 8/8. Sky light, but no sign of green line.  
1435 Same.
-

DECEMBER 23.

(1001 Sunset  
 (1529 Moonset. Fraction illuminated: 0.98.  
 (1646 Sunrise  
 (Astronomical twilight all night.

1215 3/8. Still quite light. (2) bands through Z, irregular and quite variable.

SEVERAL PHOTOGRAPHS ROUND 1234.

1225-1240 4/8. At 1225 weak (2) fan-like drapery formed S of Z, extending to about  $30^{\circ}$  on E and W sides of Z. Several weak irregular bands to N of Z down to about  $45^{\circ}$  (but moon bright low in N). At 1227 display in Z flared into (3) and then brilliant (4) seething corona, fairly narrow in N-S direction, but extending to about  $20^{\circ}$  on E side of Z and about  $30^{\circ}$  on W side of Z. Colours pale green, bright red and very thick creamy colour. Extremely rapid motion and horribly distorted. At 1232 (4) ray bundle appeared between two cloud banks low in SE, but rapidly faded to (2) and had gone by 1235. Activity in Z quietened to (2) and by 1240 to (1).

1245 7/8, clear in SE. (2) ray low in SE. (3) glow through cloud.  $30^{\circ}$  NE. Green line very distinct in Z.

1250 7/8, broken in Z. Sky still very twilight. No forms evident, but green line very distinct everywhere.

1255 Same.

1300 7/8, flocculent thin cloud in Z. Only visible sign is patch of G  $15^{\circ}$ - $20^{\circ}$  NE, but green line is still distinct.

1302 Same, except that cloud is becoming thicker.

1312 7/8. Green line still visible everywhere, strongest in Z. Display is evidently not brilliant since cloud is broken and stars are visible occasionally, yet no forms are visible.

1320 Same.

1330 7/8, thin. Green line weaker generally, being strongest high in NNW.

1340 Same.

1350 7/8. Green line visible over entire sky, being strongest in N sky. More intense than at 1330.

1352 (3) ray bundle visible very low in W.

DECEMBER 23 cont'd.

- 1355 Activity in W spread for  $20^{\circ}$  towards SW and became diffuse (2), gradually rising in sky, now extends up to  $25^{\circ}$  through thin haze.
- 1356 6/8, clearing in S and thin flocculent cloud elsewhere becoming thinner. In W-SW, (2) area extended into (2) RB from  $20^{\circ}$  SW to W horizon.
- 1357 Portion of this broke away and swept up to form (3) RB across sky at  $70^{\circ}$  with extremely rapid eastward motion of rays within band.
- 1358 Band rapidly swept across sky, curving up from S into SSW sky and then back through  $70^{\circ}$  fading out at about  $40^{\circ}$  SE.
- 1400 6/8. Band now entirely faded into general weak glow, except for original section in W which is slowly weakening.
- 1405 3/8. S sky now fairly light. N-NW sky light from almost full moon. (2) diffuse ray bundle low in W merging upwards into several weak parallel bands through Z. Display quiet.
- 1408 Same.
- 1410 2/8. Bands have brightened to (2) and have moved S and arc curving almost as arcs centred SW, disappearing in light sky at about  $20^{\circ}$  SSE.
- 1415 4/8. Faded to (1) in W. Bands have again moved back towards Z and now form (2) multiple arcs between  $80^{\circ}$ S and  $80^{\circ}$ N, the S ones being well defined.
- 1417 5/8. Getting fairly light in S and SE. (1) and (2) parallel arcs through Z. W end seems very weak, but moon is bright in NW. Arcs can be seen down to about  $15^{\circ}$  in the light ESE sky.
- 1425 5/8 with most of S and E sky obscured. Several parallel bands, (2) in W, sweep up through Z where (1) and disappear behind cloud just E of Z.
- 1440 5/8, clear again over most of SE sky. Weak parallel bands still discernible in Z and down to about  $15^{\circ}$  in ESE. Intensity must be at least (2) to be just visible in twilight.
- 1500 2/8. Now quite light. No sign of green line on background of continuous spectrum.
-



DECEMBER 24.

- 1245 8/8 and mist and light rain. Sky light but green line is not discernible.
- 1330 Mist and light rain. Sky darker.
- 1343 8/8 and misty rain. Too dark to see line.
- 1415 8/8 and mist and rain. Sky light but no line visible.
- 1500 8/8 and mist and rain. Quite light. Line not visible.

DECEMBER 25.

8/8 with mist and drizzle all night. Sky usually dark. Too dark to seek green line.

DECEMBER 26.

- 1130 8/8 and misty. Still quite light. No sign of green line.
- 1200 8/8 and misty rain. Sky light in patches near Z and in NE but line not visible.
- 1345 8/8 and misty rain. Sky light, particularly near Z, but no sign of green line.
- 1450 8/8 and misty rain. Sky fairly light but no green line.

DECEMBER 27.

- 1155 8/8. Fairly light. No sign of green line.
- 1230 8/8. Fairly dark. No line.
- 1330 8/8. Sky light in patches but no line.
- 1420 8/8. Fairly light but no line.
- 1450 Same.

DECEMBER 28.

- 1154 8/8. Fairly light. No line.
- 1300 8/8 and light rain. Still light but no line.
- 1430 7/8. Completely overcast in all but Z and N-NW where cloud is broken and many stars are visible. No sign of green line.

DECEMBER 29.

1230 Till now cloud has varied between 5/8 and 7/8. At present almost 8/8. No sign of green line.

1330 8/8. Fairly dark. No sign of green line.

1425 Same.

DECEMBER 30.

8/8 and raining all night. LNS.

DECEMBER 31.

(1001 Sunset

(1243 Moonrise. Fraction illuminated: 0.63

(1653 Sunrise

(Astronomical twilight all night.

1200-1210 4/8, mainly around E, N and W horizons. Still fairly light in S sky. No sign.

1220 4/8. No sign.

1222 4/8. (2) ray bundle low in SSE, developed into (2) RB (almost RA) from S-SSE disappearing into cloud at about  $15^{\circ}$  due S.

1224 4/8. RB faded and (2) HA through  $25^{\circ}$  formed rapidly. This developed a slight irregularity SSE and rapidly changed to (2) RB.

1225 Portion of this RB in SE end brightened to (3) then to (4). Remainder from SSE to S quite weak. The rays in the RB were all quite sharp and subject to rapid movement. There were no special features which may be due to display being sunlit, as it almost certainly would be.

1226 Whole display faded quite rapidly.

1227 4/8. No visible forms.

1230-1240 Same.

1240 Green line probably present on background of continuous spectrum from light S sky.

1310 Almost 8/8 - small clear patch  $5^{\circ}$  due S. Light in patches but no sign of green line.

1327-1330 Almost 8/8 - clear patch in S, low. No visible sign. LNS.

DECEMBER 31 cont'd.

- 1335 7/8, clear patch low in S. Green line visible on bright background continuous spectrum.
- 1336 (2) ray bundle appeared about  $5^{\circ}$  due S.
- 1337 This extended towards SSE in short (2) RB.
- 1338 Same.
- 1339 Contracted behind cloud very low in SSE. Green line just discernible although no forms visible.
- 1340 7/8 - clear patch low in S. Line just visible.
- 1345 7/8. No sign of green line against continuous spectrum.
- 1405 7/8. Clear in S and thin in patch in NE where moon is appearing behind hills. No sign of green line.
- 1430 8/8. No sign of green line.
-



JANUARY 1951JANUARY 1.

- (1002 Sunset  
(1251 Moonrise. Fraction illuminated: 0.52  
(1655 Sunrise  
(Astronomical twilight all night.
- 1140 8/8. Twilight. No sign of green line.  
1217 8/8. Too dark to see anything through spectroscope.  
1255 8/8. Dark and no chance of seeing line.  
1320 8/8 and raining. No sign.  
1344 Same.  
1424 Same.  
1515 8/8 and still misty with light rain.  
Twilight. No sign of green line.
- 

JANUARY 2.

- 1225 8/8 and mist. Sky not dark but no sign of line.  
1350 8/8 and mist. Fairly dark - too dark to see anything through spectroscope.
- 

JANUARY 3.

- 1400 Till now 8/8 and raining. Now 8/8 and misty with light rain. Too dark to seek green line.  
Remained 8/8 and misty with light rain all night.
- 

JANUARY 4.

- 1150 8/8 stratus and foggy. Quite light over all sky but no sign of green line.  
1300 8/8. Fairly dark and no sign of line.  
1345 8/8 and raining.  
1420 Same.  
1545 8/8 and raining. Sky now light.
-

JANUARY 5.

1345 Till now 8/8 whenever obs. were made. Now some patches of thin haze through which some stars are visible mainly in Z. Elsewhere overcast. No sign of auroral forms or of green line though sky fairly light.

JANUARY 6.

No obs. made, but Met. log showed continuous 8/8 and fog.

JANUARY 7.

1220 8/8 and misty. Too dark to see green line.

1410 Same.

JANUARY 8.

(0958 Sunset  
(1100 Moonset. Fraction illuminated: 0.00  
(1703 Sunrise  
(Astronomical twilight all night.

1205 2/8. Still light. No sign of green line.

BCO 1230 4/8 and thick haze near Z. (2) band from E to W through Z. Rapidly faded out, or was blotted out by haze, in Z but remained in drapery-like form in E and W.

1237 1/8. Haze gone. (1) multiple zenithal arcs from E to W with main irregularities near Z.

1239 Same and (2) ray bundle  $30^{\circ}$  SW.

SEVERAL PHOTOGRAPHS BETWEEN 1243 AND 1335.

1243 Irregular bands through Z from E to W brightened slightly to (2). (2) ray bundle continues in SW.

1245 Rays in SW weakened to (1).

1248 2/8 in S. Green line visible over all S sky but not in N. Ray bundle in SW has extended and become (2) drapery through  $20^{\circ}$  SW. (1) irregular zenithal band continues.

1250 Sky still slightly twilit. Difficult to tell what is auroral and what is not in S sky with haze present. Bands through Z more regular curving down to W and becoming diffuse to E. Drapery in SW faded.

JANUARY 8 cont'd.

- 1255 2/8 in S. Green line visible down to  $45^{\circ}$ N but no sign of forms there.
- 1259 (1) HA  $60^{\circ}$  N as well as irregular (2) band through Z.
- 1305 1/8 in S. At the upper edge of this bank (through  $20^{\circ}$  S) green line is visible on background continuous spectrum suggesting (1) G behind this cloud. (2) striated band through Z from E to W. Diffuse (1) patch SW to  $20^{\circ}$ . (1) HA continues in N  $60^{\circ}$ .
- 1310 1/8 in S. Same through Z. Glow in SW became (3) drapery.
- 1315 (2) zenithal display much more regular - almost triple HA, though the arcs are somewhat broad. Arcs extend down to  $50^{\circ}$ N. Drapery in SW faded and then (2) ray bundle appeared.
- 1319 1/8 in S. Solitary (2) ray appeared above cloud  $20^{\circ}$  SSW and faded. Then many (1) diffuse rays became visible right across S sky from SW to SSE, probably indicating an RA or RB behind cloud. Display in N now down to  $45^{\circ}$  and does not extend back to Z - now double HA with the lower one through  $45^{\circ}$ N quite narrow and well defined and the upper one more diffuse.
- 1327 2/8. Rays  $20^{\circ}$  SE-SW above band of cloud developed to (3) and faded again. HA through  $60^{\circ}$  N brightened considerably to (3), being yellowish or creamy in colour.
- MAX. 1335 The  $60^{\circ}$  HA developed into (4) display extending back to Z where a broad corona formed. This diminished in intensity and the display separated into two more or less distinct parts with a drapery curving from Z through N sky to E, considerably rayed at E end, and at the W end of the display a fairly diffuse (3) drapery.
- 1340 Display now weakened to (2) and has become more diffuse but is mainly through Z from E to W. (2) HA  $45^{\circ}$ N continues.
- 1350 Cloud has rapidly increased from 1/8 to 5/8 scattered. (2) G visible through gaps in cloud in Z and in N down to  $45^{\circ}$ .
- 1351 6/8. S sky completely obscured. (2) G through gaps mainly in NW and E.
- DCO 1354 Cloud broken sufficiently in NW to reveal that glow is from (2) double HA which would pass through about  $50^{\circ}$ N. Cloud thin in Z where there is no sign of display.



JANUARY 8 cont'd.

- 1400 8/8. Glow through cloud in SW and in patches of N sky.
- 1412 5/8 broken and haze. (2) broad HA  $50^{\circ}$ N still present broadening slightly at E end into broad diffuse patch low on E horizon.
- 1430 1/8. (1) double HA  $50^{\circ}$ N with drapery-like (1) irregularity at W end. (2) RB  $15^{\circ}$  SSW.
- 1440 1/8. (2) irregular band from E to W through Z.
- 1458 4/8. Sky quite light from twilight. No sign.
- 1508 5/8. Short (2) RB low in WSW, extended up a little and then faded out.
- 1510 (2) band  $15^{\circ}$  WSW and (2) ray  $20^{\circ}$  W. No sign elsewhere, but sky very light from dawn. Green line not visible even in WSW on background continuous spectrum.
- 1520 1/8. No sign.

JANUARY 9.

- (0958 Sunset  
(1121 Moonset Fraction illuminated: 0.02  
(1705 Sunrise  
(Astronomical twilight all night.
- 1135 2/8. Still quite light in S. No sign.
- 1145 5/8 scattered. No sign.
- 1156 6/8 broken. No sign.
- 1214 7/8 - small clear patch SSE. Still light. LNS.
- 1300 7/8 - clear along S skyline from SE to SW to  $15^{\circ}$ . No sign of green line.
- 1332 2/8 scattered. Sky still light in S. No sign of green line.
- 1403 3/8. Light in S. No sign of green line.
- 1435 Heavy snow squall. No obs.
- 1500 1/8. Quite clear and becoming light. No sign.

JANUARY 10.

- (0957 Sunset  
(1130 Moonset Fraction illuminated: 0.07  
(1706 Sunrise  
(Astronomical twilight all night.

JANUARY 10 cont'd.

- 1150 1/8. Still fairly light especially in S.  
No sign.
- 1200 5/8 scattered. No sign.
- 1217 Same.
- 1235 0/8. No sign, no line.
- 1238-1242 Cloud increasing to 3/8. Prolonged search for green line in what appeared to be N-S arcs, one in W and two in E, failed to reveal any sign. Must be thin cloud banks.
- 1307 2/8. No sign.
- 1329 0/8. (1) partial RA in WSW, rapidly brightened to (2) and extended to  $25^{\circ}$ S.
- BCO 1334 Display in form of diffuse (1) and (2) partial RA (west half only) rising to about  $35-40^{\circ}$  SSW. At SSW end quite long broad diffuse ray. Rays sharper very low in W.
- 1336 Broad ray in SSW from  $30^{\circ}$  brightened momentarily and faded almost right out.
- 1338 0/8. Display now appears very weak, although it must be almost (2) due to fact that sky is fairly light. Display has contracted into W with only a diffuse remnant HA reaching up towards Z.
- 1342 1/8. Has remained substantially the same with what appears to be very diffuse (1) ray bundle low in W-WSW. One ray reached (2) momentarily at 1341.
- 1345 1/8. Short diffuse RA, (1), extending upwards from W to WSW. (2) ray at W end rising from  $5^{\circ}$  to  $15^{\circ}$  W.
- 1349 1/8. Display only just discernible against fairly light sky. Appears as a faint glow in the region of the previous ray bundle.
- DCO 1354 Green line just visible against background continuous spectrum in W, S and SE. In S and SE green line is strongest at about  $30^{\circ}$  possibly due to weak HA or merely to G. The form is indistinguishable due to twilit sky.
- 1405 4/8 broken. No sign of forms. LNS.
- 1412 Same.
- 1430 0/8. Green line still present  $15^{\circ}$  WSW but no sign elsewhere.
- 1447 0/8. Sky quite twilight. Green line in SW up to about  $30^{\circ}$ . No forms visible.
- 1510 1/8. Quite light. No sign of green line.
-

JANUARY 11.

- 1220 8/8 and fairly dark.  
1255 8/8. Too dark to seek line.  
1338 Same.  
1500 8/8. Sky slightly lighter. LNS.
- 

JANUARY 12.

- 1217 8/8 and light rain. Sky dark.  
1345 Has been 8/8 and raining fairly heavily since last entry.  
1445 Has remained same.  
1500 Rain ceased. Sky becoming lighter.  
1530 Still 8/8 but quite light from approaching dawn.
- 

JANUARY 13.

- {0955 Sunset  
 {1152 Moonset Fraction illuminated: 0.30  
 {1711 Sunrise  
 (Astronomical twilight all night.

BCO 1310 Very frequent obs. till now. Always 0/8 with absolutely no sign of aurora. At 1310 began to take photos of various constellations beginning with Orion and Canis Major when a display suddenly commenced.  
 (The following notes were entered after photos of the display were taken).

MAX 1315 0/8. (2) RA suddenly appeared through 20°S. Rays moving along RA from W to E.

1319 Arc broken into several distinct features with (2) ray bundle (almost small drapery) at SE end.

1320 This feature faded somewhat, but arc still possessed non-uniform features.

DCO 1326 (1) remnant arc in WSW.

1330 Same.

1335 Remnant in WSW now very faint.

1338 Remnant in WSW brightened a little and extended back from WSW to SW.

1345 0/8. No sign of structure but green line weakly visible in all S sky where RA was.

1350 No sign.



JANUARY 13 cont'd.

- 1354 (1) HB sloping up from  $20^{\circ}$  SSE to  $25^{\circ}$  SE.  
(But see next obs.)
- 1404 Green line visible in SW but not discernible in S against background continuous spectrum. The above noted HB may have been a layer of thin cloud since a similar formation is now present further to the E and no green line is visible in it.
- 1410 1/8 scattered. Suggestion of weak G WSW. No sign of thin cloud in SE.
- 1435 1/8 in S. No sign of green line on background continuous spectrum.
- 1445 1/8 scattered. No sign. LNS.
- 1515 1/8 scattered. Now quite light. No sign. LNS.

JANUARY 14.

- (0054 Sunset  
(1156 Moonset Fraction illuminated: 0.40  
(1712 Sunrise  
(Astronomical twilight all night
- 1200 Till now 8/8 and foggy with slight drizzle. No sign.
- 1255 8/8. Fog lifted slightly. No sign. LNS.
- 1355 6/8 and haze. Fairly clear in SE. Green line distinct in SE up to Z. No sign of structure - probably (1) G, although intensity may be (2). It is impossible to tell with the perpetual twilight.
- 1407 7/8 and haze. Green line distinct in SE. Light streak from W to SW at about  $15^{\circ}$ , at base of heavy cloud but stars not visible through it or beneath it. Suggests that intensity of display is not less than (2).
- 1423 6/8 and general haze. Fairly clear in WNW from  $30^{\circ}$  to  $60^{\circ}$  where there is a suggestion of (1) rays on uniform G. Green line present there and also in S-SE.
- 1430 Raining. No obs.
- 1442 3/8 scattered. (2) display in all S sky with diffuse arcs near Z from E to W scarcely detectable on background of fairly uniform G.
- 1445 5/8 obscuring all of display. Haze in W.
- 1446 Raining.

JANUARY 16 cont'd.

- 1240 8/8 and mist. Too dark to see anything through spectroscope.
- 1310 8/8 and misty drizzle. Fairly dark.
- 1407 8/8. Quite dark.
- 1420 Same.
- 1510 8/8 and mist and light drizzle. Fairly light.

JANUARY 17.

- 1200 3/8. Moon near setting. Still fairly light. No sign of green line.
- 1220 Almost 8/8 and starting to rain. No sign of line.
- 1300 3/8 scattered. No sign of green line.
- 1400 7/8. No sign of line.
- 1440 Raining. No obs.
- 1455 0/8. No sign.
- 1530 1/8. Fairly light, but bright stars still distinct. No sign.

JANUARY 18.

- (0949 Sunset
- (1240 Moonset Fraction illuminated: 0.77
- (1720 Sunrise
- (Astronomical twilight all night.
- 1145 8/8 and raining.
- 1220 7/8. No sign of green line.
- 1258 6/8 and haze. Fairly clear from SE through Z to NW. Green line present in SE where there seems to be (1) G.
- 1320 8/8. No sign of the green line.
- 1348 8/8. Patches of light in S and SE. Green line present.
- 1403 8/8. No sign.
- 1415 8/8. No sign of green line.
- 1420 8/8. Raining.
- 1435 8/8. Too dark to see anything through spectroscope.

JANUARY 14 cont'd.

- 1455 2/8 scattered. (1) diffuse arcs from W across S sky becoming lost in twilight in SE. Uppermost passes through Z and the lowest through about 45°S. Below this there is a uniform G. Green line visible in SE.
- 1512 0/8. Quite twilight. Green line present in all S sky but no sign of structure.
- 1524 1/8. Green line just visible in W but not discernible on background continuous spectrum in SE.
- 1540 3/8 scattered. Green line not discernible.

JANUARY 15.

- (0953 Sunset  
(1203 Moonset Fraction illuminated: 0.50  
(1715 Sunrise  
(Astronomical twilight all night.
- 1134 8/8. Still fairly light. No sign. LNS.
- 1220 8/8 but fairly light. Green line clearly visible in S-SE and in Z.
- 1234 Almost 8/8 with stars occasionally visible through haze in SE. Green line visible over all sky but strongest in SE.
- 1248 8/8 and beginning to rain. Too dark to see green line.
- 1305 8/8. Lighter in W but still too dark to see green line.
- 1325 3/8 and thick haze through which only bright stars are visible. Green line not seen in SE but is feeble in SW.
- 1350 6/8 and thick haze. Green line feebly visible in SE.
- 1420 8/8. Too dark to see green line.
- 1425 Raining. No obs.
- 1453 8/8 with bright stars occasionally visible. Fairly light. Green line visible in all S sky but not in N.
- 1520 8/8. Fairly light. Green line not visible.

JANUARY 16.

- 1135 8/8 and mist. Still light. No sign of green line.



JANUARY 18 cont'd.

- 1500 8/8. Becoming fairly light. Believe green line is still present on background of continuous spectrum.
- 1530 8/8. Green line not visible on background continuous spectrum.

JANUARY 19.

- 1200 8/8 and mist and drizzle. Not absolutely dark, but green line not visible on feeble background continuous spectrum.
- 1240 8/8 and mist. Fairly dark.
- 1300 8/8 and mist. Green line seen dimly in Z.
- 1305 8/8 and mist. Line very weak in Z only.
- 1337 Same.
- 1420 8/8. Fairly light. Green line very weak and in Z only.
- 1510 8/8. Fairly light. LNS.

JANUARY 20.

- 1115 Still fairly light. Light N-S bands in E sky, but these are due to a strange cloud formation. LNS.
- 1135 8/8. Sky patchily light in N-S streaks in E half. These look auroral but are almost certainly remains of rather odd cloud effect of similar form which has persisted since late afternoon. LNS.
- 1150 8/8. No sign. LNS.
- 1240 8/8; heavily overcast and misty. LNS.
- 1307 Same.
- 1320 Same.
- 1331 Same.
- 1345 Same.
- 1410 Same.
- 1415 Seems to be more heavily overcast. LNS.
- 1450 8/8 and mist. Green line very distinct (first obs. with spectroscope tonight).
- 1525 8/8 and mist. Fairly light. Green line not visible on background continuous spectrum.

JANUARY 21.

- 1410 Till now 8/8 and mist all evening and fairly dark. LNS till now. Sky not now completely dark, but green line not definitely present on background continuous spectrum.
- 1500 8/8 and mist. Green line present in S sky up to Z.
- 1528 8/8 and mist. Green line still present in S sky up to Z.
- 1543 Same, but sky lighter.
- 1600 8/8 and mist. Fairly light. Green line not visible on background continuous spectrum.

JANUARY 22.

- (0944 Sunset  
(0952 Moonrise Fraction illuminated: 0.98  
(1033 End civil twilight  
(1620 Moonset  
(1728 Sunrise  
(Astronomical twilight all night.
- 1032 2/8. Still very light with only  $\alpha$ -Canis Major,  $\alpha$ -Orionis,  $\alpha$ -,  $\beta$ -Centauri etc. visible. Very long ray from WNW horizon almost to Z - visible in almost broad daylight.
- 1033 This ray disappeared and band appeared curving from W slightly NW and then to Z. This rapidly changed to multiple drapery form, converged to form distorted corona and swept rapidly into N-NE sky. Intensity must have been definitely (4). Reddish tint in display when draperies formed and swept to Z. Green line very distinct against bright continuous background.
- 1034 Display not now visible to naked eye.
- 1038 No sign. LNS.
- 1040-1045 2/8. No sign. LNS.
- 1048 2/8. No sign. Green line not visible on bright background continuous spectrum.
- 1052 No sign. No line.
- 1053 2/8. Suddenly (4) RB, almost RA, formed centred  $20^{\circ}$ S but E and W ends obscured. Faded rapidly to (3), (2) and then lost to sight.
- 1055 2/8. (4)-RB, almost RA, again appeared through  $30^{\circ}$ S and again faded rapidly contracting to S-SE section.

JANUARY 22 cont'd.

- 1056 Faded from S-SE area.
- 1057 Brightened to (3) in S-SW section. Still approx. 30°.
- 1058 Faded completely. Line not visible. N.B. Sky still very light.
- 1100 3/8. cloud increasing in N-E and S-W sectors. Moon just appearing from behind Wireless Hill. Green line clearly visible in SE sector being brightest about 40° SSE. No forms visible.
- 1102 4/8. S-W obscured. Line still visible in S-SE to about 50°.
- 1104 5/8. Otherwise same.
- 1105 6/8. Otherwise same.
- 1107 6/8. Line still just visible in S sky and also low in W.
- 1109 6/8 - most of E sky now obscured. Clear N-W and also high in SW. Line still visible in W and SW.
- 1111 5/8. Line clearly visible from W-Z. Very faint suggestion of slightly light bands sweeping upwards from W.
- 1115 5/8 mainly N-SSE and SSW-W. Scattered elsewhere. Green line clearly visible SSE and W-NW up to Z.
- 1117 Same.
- 1119 5/8. Line visible over entire S sky and also in NW. Distinct in Z.
- 1120 5/8. Practically clear N-W-S-SSE. Line very distinct wherever sky is clear. Distinct long rays just visible in WNW-WSW.
- 1121 4/8. Broad diffuse double  $\frac{1}{2}$ -arc from W to 70° and 80°N going behind cloud at apex.
- 1123 3/8. Green line still distinct in SSE, but no visible forms there. Arcs from W to near Z still present.
- 1125 3/8, mainly in SE-N. Double arc still visible. Must be (2). Small DS at 20° SSE appeared and then disappeared quite rapidly.
- 1128 3/8. Arcs seem to be fluctuating in intensity irregularly and slowly. Now suggestion that there are more arcs other than just the two brightest, but they are all between Z and 75°N.



JANUARY 22 cont'd.

- 1131 3/8. Definite fluctuations from almost (0) to (2) of the now rather diffuse arc group. Line still visible in SW-SE. Still a salmon-coloured sunlit cloud low in S.
- 1135 3/8. Now a narrow strip of clear sky low along E horizon and line clearly visible here. Line clearly visible everywhere except low in N near moon. Multiple diffuse arcs through Z-75°N still persist and continue to fluctuate in intensity.
- 1143 3/8. (3) RA suddenly appeared through 12°S. Arcs continue to fluctuate.
- 1144 RA reached (4) and then rapidly faded.
- 1145 Practically no sign of RA.
- 1146 RA brightened to (2) again and disappeared.
- 1148 Still no visible sign in S. Multi-arcs still through Z to 70°N and fluctuating slightly.
- 1149 (2) RA again appeared through 15°S. Not a very uniform arc. Contracted into isolated ray bundles.
- 1150 RA disappeared.
- 1152 4/8 with scattered cloud obscuring sections of the multiple zenithal arc group. E ends visible through cloud gap. Line still visible everywhere except low in N. Clearest E-W through Z. (Now possibly a lot of scattered green light from broken cloud)
- 1158 (2) ray bundle 3°- 15° SE.
- 1200 5/8 scattered. Ray bundle now (1).
- 1201 No sign of ray bundle. Portion of one of the arcs from Z to 80°N increased to (3) about 20°W where arc is clearly defined.
- 1202 Two (1) ray bundles 15° SSW, rapidly increased to (2) and to elevation of 30°.
- 1202<sup>1</sup> (3) RB SSW linked with these ray bundles appeared. Increased to (4) and faded rapidly.
- 1203 Fairly uniform (3) RB 15° WSW-S with extremely long rays at extreme S end lost in cloud at 80°S.
- 1204 No sign of RB. Faint suggestion of rays due S 15° - 30°.
- 1205 Multiple zenithal arcs now very weak.
- 1206 Two very long very weak rays from SW horizon to Z.

JANUARY 22 cont'd.

1206<sup>1</sup> 3/8. E-W arcs through Z almost non-existent.

1207 Long rays from SW have moved to S and extend from 40°S to diffuse area near Z.

1208 3/8. Green line now distinct in all sections of sky except in vicinity of moon at 10°N.

1209 Diffuse sweep from Z to 40°S still present. Also short very irregular pulsing sections in Z. One of these sections is bent to form a right angle one arm of which points N, the other E. The pulsations are of intensity.

1211 Diffuse patch from Z to 40°S became streaky and began to pulse in intensity.

1211<sup>1</sup> (2) diffuse ray bundles from behind plateau in SW.

1213 2/8. Flaming diffuse surfaces in NW from 10° to Z flickering quite rapidly up to (2).

1214 Very irregular fluctuations in intensity of striated sheets in entire NW sky.

1215 Distinct small dark patch in Z which remains un-illuminated but which moved from Z fairly quickly to E drifting about 20° in five seconds.

1217 (2) RB suddenly appeared from SW horizon to SE through 15°S and suddenly became (4).

1218 RB now (3) and split into multiple bands. Rays in SE extend to 40°.

SEVERAL PHOTOGRAPHS BETWEEN 1219 AND 1527.

1220 E end of RB faded. Activity same as previously in NW and Z.

1221<sup>1</sup> RB given place to long diffuse (2) ray bundles over all S sky.

1223 1/8. Diffuse patchy G of maximum intensity (2) over all S sky with vague suggestions of rays. Green line clearly visible up near to moon. Pulsations continue in Z.

1224<sup>1</sup> Same.

1225 Very weak HA 30°N. Moon still very bright 10°N.

1227 1/8. (2) ray up to 10°SE. Long weak (1) rays to Z mainly from S-W quarter.

1228 Small (2) ray bundle 20°SW. Rays in SE now down to (1) but extend well towards Z.

1229 Very weak but distinct HA 30°N.

JANUARY 22 cont'd.

- 1230 (1)-(2) RB formed  $30^{\circ}$  SSE-SSW, formed rapidly and died away to (1) within  $\frac{1}{2}$  minute.
- 1231 1/8. Diffuse (1)-(2) band effect from  $10^{\circ}$  WNW through Z and curving from there towards SSE.
- 1233 Band still present but very diffuse.
- 1235 (2) RB came up in SE-SSW, maximum elevation  $15^{\circ}$ S. Intensity increased to (3) and then diminished to (2).
- 1236 Long diffuse rays from  $20^{\circ}$  S-SW to Z.
- 1238 Band first noted at 1231 now shifted to WSW-ENE through slightly N of Z, fluctuating between (1) and (2). Whole display is now tenuous and subject to much fluctuation.
- 1239 1/8. (3) bundle short rays  $10^{\circ}$  -  $15^{\circ}$  SSW.
- 1240 Sharp narrow ray bundle ENE reached (2) and faded.
- 1241 (2) RB appeared rapidly in W sky, coming up from SW, extending northwards to WNW and then curving sharply back on itself through SW sky towards SE where it is faint. RB not well-defined.
- 1242 RB has become fairly diffuse over entire length.
- 1243 The lower portion of the RB has now moved well into the WNW sky and from the hairpin bend several weak close arcs cross N sky between  $40^{\circ}$ - $50^{\circ}$ N.
- 1244 1/8 in ESE. (2) ray group appeared  $10^{\circ}$  ESE and then faded to (1).
- 1245 Previous RB almost diffused out, but new (2) one has appeared in S-SW almost horizontally through  $10^{\circ}$ - $15^{\circ}$ .
- 1246 New RB faded to (1).
- 1247 Several clearly defined striations from  $15^{\circ}$  WNW up to about  $10^{\circ}$  N of Z disappearing behind high cloud in ESE. Irregular round Z.
- 1248 RB which appeared at 1245 developed into very long diffuse (1) rays from S and SW to Z.
- 1249 Almost partial corona, (1).
- 1250 Several rays from about  $10^{\circ}$  SSE-SSW brightened momentarily and rapidly from (1) to (3) and then faded.



## JANUARY 22 cont'd.

- 1253 Ray bundles in S spread out into SE with rays from  $20-45^\circ$ . No forms visible in Z - only weak G without pulsations. Moon still very bright in N where no forms are visible. Green line distinct and strong everywhere.
- 1254 Diffuse (2) band sweeping from SW northwards till it is due W then up through Z and down S again.
- 1255 Band rapidly faded. Ray bundle in SE brightened momentarily to (2).
- 1257 (3) drapery  $15-30^\circ$  ESE. Sharp and diffuse rays running parallel from  $30^\circ$  SE up through Z where a partial corona is present.
- 1258 Drapery faded. (2) HB fairly horizontal  $20^\circ$  SW-WNW.
- 1259 Distinct (2) corona, fairly complete. Longest rays from SE-SW.
- 1301 Quite sharp (2) ray in SW momentarily. Others there fairly diffuse.
- 1303 Whole sky covered in fluctuating weak bands and long rays with weak semi-corona. Display subject to very frequent changes in form and fluctuations in intensity up to (2) and occasionally (3).
- 1305 Diffuse (1) bands through Z from due S to NNW.
- 1306 Rapid fluctuations of intensity of N-S streaks through Z up to (2). Considerable pulsations, almost reaching (3), of DS near Z. Period about 10 seconds.
- 1308 Whole of display in N subject to pulses or bursts in which illumination lasts for very short time.
- 1309 (1)-(2) V-shaped structure in Z with apex to N, fluctuating.
- 1310 2/8 mainly in NW. Extensive (2) DS with sharp lower edge about  $10^\circ$  S and irregular upper edge, about  $20^\circ$  wide but not extending into SE sky.
- 1311 Formation in S has lifted at SSE end and merged into long diffuse rayed structure in SSE which "streaks" to Z. (Good meteorite high in SSW.)
- 1313 3/8, mainly in N. No sign of S structure. Marked fluctuations in rays from S sky to Z.
- 1314 Fairly steady (2) striated sheet in Z merging into weakly pulsing band which curves down into SSE. Short (1) rays  $5^\circ$  S.

JANUARY 22 cont'd.

- 1315 Very narrow (3) RA through  $3^{\circ}\text{S}$ , rayed in E half only. About  $1^{\circ}$  above this another identical RA. Rapidly diffused to form (2) rays.
- 1316 Distinct (2) corona, rapidly became diffuse.
- 1316<sup>1</sup> ~~1316~~ RB reappeared suddenly and gradually extended into SE sky from behind plateau in SSW.
- 1319 2/8. RB still present in S. No sign of anything in Z. Odd isolated diffuse rays in N. No fluctuations noticeable.
- 1320 RB in S broken up into isolated patches with diffuse ray structure.
- 1320<sup>1</sup> ~~1320~~ Streaky diffuse rays reappeared in W-SW sector and extend up to Z. Fluctuating slowly in intensity with maximum (1).
- 1322 3/8 mainly in N. Striated structure in Z with striations running SSW-NNE.
- 1323 Isolated diffuse scattered ray bundles remain in S, low. No structure in Z - diffuse patch only.
- 1324 Flaming DS's high in NW, sweeping from  $60^{\circ}$  to Z. One reached (2). Striations in Z changed round to E-W.
- 1325 E half of (1) HA through  $40^{\circ}\text{N}$ , the other half clouded. More diffuse HA  $30^{\circ}\text{N}$ .
- 1326 E end of HA through  $40^{\circ}\text{N}$  drifted to SE and turned into HB from SE to E.
- 1327 HB became RB with no change in position - from SE horizon to  $20^{\circ}\text{E}$ .
- 1329 RB gradually diffusing. Rays weaker and longer, reaching almost to Z.
- 1330 3/8 mainly in NW. No activity in S sky.
- 1331 Short single (2) ray  $10^{\circ}\text{SE}$ .
- 1332 Fluctuating irregular (1) sheets in entire NE sky.
- 1333 Tenuous glow in Z, no intensity exceeding (1).
- 1336 2/8 in NW. Fairly uniform and extremely faint G over all S sky with suggestion of rays. Series of weak diffuse parallel bands from E horizon "streaks" across NE sky fanning out towards Z.
- 1338 (2) diffuse rays  $20^{\circ}\text{SW}$ .
- 1340 (2) ray bundle  $25^{\circ}\text{SW}$ . Faded slowly to (1).
- 1341 Long (1) rays from most of S sky to Z forming weak irregular corona.

JANUARY 22 cont'd.

- 1342 (2) diffuse ray bundle  $40-50^{\circ}$ S moving E and fading to (1). Striations from E to W through Z.
- 1344 2/8 in NW sector. Appears to be little activity in NW.
- 1345 (2) RB  $30^{\circ}$  SSE, momentarily reached (4) with extremely rapid motion.
- 1346 RB now (3) and drifting to E.
- 1347 (4) HB From E to S, up to  $20^{\circ}$  at SE. Rapidly changing to RB with very rapid motion of rays.
- 1348 RB broken into (4) ray bundles and contracting to E.
- 1350 (1) rays in SE sector. Long (1) rays from most of S sky to Z forming irregular (1)-(2) corona.
- 1352 Two (2) parallel horseshoe HB's, one through Z from SW to S and one through about  $60^{\circ}$  SSW.
- 1354 HB's faded.
- 1355 (1)-(2) fan-like drapery  $60^{\circ}$  SW with rays almost to Z.
- 1356 Fairly homogeneous (2) band from  $60^{\circ}$ W to  $50^{\circ}$ S. Multiple (2) bands through Z from  $25^{\circ}$ E to  $25^{\circ}$ W.
- 1400 (4) drapery from  $45^{\circ}$ W to Z and then coiling back into W sky. Gradually diffused and lost its curl and turned into (3) band from E to W through Z with weaker bands running parallel.
- 1405 Multiple bands now (2).
- 1410 (2) RB  $10^{\circ}$ S. (1) HA's  $20^{\circ}$ S and  $30^{\circ}$ S. (1)-(3) drapery  $30^{\circ}$ W. (1) RB  $10^{\circ}$ E. (1) multiple arcs through Z.
- 1413 Medley of auroral forms from E to W through Z from  $20^{\circ}$  each side of Z. Mainly irregular bands with multiple curved portions in W, like draperies. HA's  $20^{\circ}$  and  $30^{\circ}$ S and diffuse RB in S all gone.
- 1425 Display gradually changed to become: Irregular (2) arch from ESE to SSW horizons highest point  $30^{\circ}$  SE, pulsations in Z, Irregular bands from W horizon upwards in general direction of Z and S of Z. Colour much more creamy in E than previously.
- 1427 All S sky medley of diffuse bits and pieces. Moon still bright.



JANUARY 22 cont'd.

- 1428 Nothing exceeds (1) except small (2) ray bundle  $5^{\circ}$ - $15^{\circ}$ SE.
- 1430 Quite rapid fluctuations in N-NE sky. Flaming.
- 1435 (2) diffuse ray bundle  $5^{\circ}$ - $10^{\circ}$  ESE. (1) broad diffuse HB all over S sky. Little activity in N. E-W trend to striations through Z. Pulsations continue.
- 1438 1/8. (2) diffuse patch in SE with slight ray structure.
- 1441 Nothing above (1). Pulsations in NE. Ragged diffuse ray bundles sweeping up from SW are the most distinctive features.
- 1449 1/8. Ragged (1) sheets over most of sky. Pulsing in NE.
- 1504 1/8. Very little change occurring. Diffuse (1) HA  $30^{\circ}$ S. Diffuse patches in S sky near Z. Pulsations in NW.
- 1509 1/8. Diffuse (1) HA through  $30^{\circ}$  seems to have swung round so that its centre is now about SSW. Below this and running parallel is a similar rayed arc or band with (2) rays due S. Patches remain near Z.
- 1518 1/8.  $30^{\circ}$  HB has slowly increased in elevation to  $60^{\circ}$  and now runs from  $20^{\circ}$  SSE to  $20^{\circ}$ W. Great flaming DS's in Z and NE, (2). Twilight increasing.
- 1520  $60^{\circ}$  band slightly rayed.
- 1524 Band has continued to increase in elevation. Now runs from  $20^{\circ}$  SSE to  $20^{\circ}$  WNW, max. elevation  $80^{\circ}$  SW. Became distinctly rayed and then rayed structure disappeared. Similar unrayed band running parallel through Z.
- 1526 Two bands have almost merged through Z, running from WNW to SE.
- 1529 1/8. No pulsations visible and nothing exceeds (1).
- 1539 1/8. Display practically gone. Semblance of former zenithal band. Green line present.
- DCO 1554 Green line only visible across Z from E to W where semblance of former band remains.
- 1606 1/8. No sign of forms. Green line visible through Z from W towards E, but continuous spectrum too strong in E to see it.
- 1623 2/8 scattered. Only bright stars visible. Green line not visible on background continuous spectrum.

JANUARY 23.

- 1040 8/8 thin cloud and light drizzle. Still quite light. No sign of green line.
- 1050 Same.
- 1140 8/8. Still light - partly from moon. No sign of green line.
- 1232 Same.
- 1325 8/8 but not very dense. Quite light in patches, but no sign of green line.
- 1500 8/8. Fairly light generally but no sign of line.
- 1546 Same.
- 1625 Raining since about 1600. No obs.

JANUARY 24.

- (0941 Sunset
- (1027 Moonrise. Fraction illuminated: 0.99
- (1732 Sunrise
- (Astronomical twilight all night.
- 1050 4/8. S half of sky clear. Still fairly light. No sign of activity or of green line.
- 1055 Same.
- 1107 8/8, thin. No sign of green line.
- 1135 Same.
- 1154 Same.
- 1219 Raining. No obs.
- 1225-1230 3/8. Uniform (1) G along S-W horizon (SE obscured). Green line clearly visible in this sector and very weak up to Z. G not distinguishable from twilight above  $30^{\circ}$  from S-W skyline.
- 1245 6/8 and mist. Green line distinct about  $30^{\circ}$ S, but cloud obscuring the form. Occasionally clear in Z but no definite sign of forms or of green line.
- 1303 8/8, thin in parts. Still very light, partly from moon. Green line not visible.
- 1332 Almost 8/8 - small breaks in N through which bright full moon visible. Green line not seen on background of continuous spectrum in S sky.
- 1355 7/8 and haze in SW. Green line not visible on background continuous spectrum.

JANUARY 24 cont'd.

1440-1446 4/8 mainly in N, but scattered. Appearance of definite series of arcs (HA's) from 30°S to about 80°N, but green line not present anywhere except about 30°SSW. Arcs may be thin misty cloud, but they definitely look to be auroral. Green line is difficult to distinguish from background continuous spectrum due to moonlight.

1450-1455 'Arcs' gradually diffused. Green line still visible 30° SSW, till obscured by cloud. No sign of forms in twilight and moonlight. Cloud increased to 7/8 and haze by 1455.

1507 7/8. No sign of forms. LNS.

1525 8/8. Green line not visible.

1605 8/8. Green line not visible on background continuous spectrum.

JANUARY 25.

1100 8/8 low stratus, but thin and apparently fairly clear above. Fairly light but no sign of green line.

1120 8/8, stratus now thicker. No sign of line.

1130 8/8 and mist and drizzle. No sign of line.

1305 8/8 fairly heavy mist and drizzle. No sign of line.

1348 8/8 and drizzle. LNS.

1530 8/8 and drizzle. No sign of green line.

JANUARY 26.

1100 8/8 and fog and drizzle. Sky light but no sign of line.

1140 Same.

1245 8/8 and fog and drizzle. Cloud thin and sky light but no sign of green line.

1315 Cloud heavier. No sign of line.

1335 5/8 - 6/8, varying very rapidly. Slightly misty. No sign of activity or of green line. Z and SW only clear sections.

1357 Almost 8/8 with stars dimly visible occasionally between gaps rapidly changing cloud. Patches of cloud brightly lit by moonlight. No sign of green line.

1418 8/8 and mist. Sky still light. No sign of green line.



JANUARY 26 cont'd.

- 1457 8/8. Quite light so cloud evidently not thick. Green line not visible.
- 1552 8/8. Quite light. Suggestion of green line, but not definite.
- 1600 Suggestion of green line remains. No colours visible through spectroscope - hence 'line' not likely to be the false auroral line.
- 1625 8/8. Line not visible on background continuous spectrum.

JANUARY 27.

- (0937 Sunset  
(1053 Moonrise. Fraction illuminated: 0.86  
(1738 Sunrise  
(Astronomical twilight all night.

- 1030 0/8. No sign.
- 1045 0/8. Still very light. No sign.
- BCO 1050 0/8. (2) RA through  $25^{\circ}$ S with slight irregularity in SSE.

## SEVERAL PHOTOGRAPHS BETWEEN 1056 and 1223.

- 1057 0/8. RA has reached (3) and is varying in intensity along its entire length. RA reaches from horizon to horizon and is centred almost due S through  $25^{\circ}$ . Separate (2) ray bundle  $30^{\circ}$  SE.
- 1059 RA faded in sections and is now almost gone.
- 1101 (2) and (3) RB  $10^{\circ}$  WSW, variable in intensity.
- 1105 0/8. No sign.
- 1106 (2) RB (or remnant RA)  $10^{\circ}$  WSW dipping S at W end. Extremely difficult to see against twilight sky.
- 1107 RB still present. Green line not distinct. Weak ray appeared  $10^{\circ}$  S of W, under RB.
- 1108 (2) broad diffuse ray bundle  $20^{\circ}$  SSW.
- 1109 Sections of (2) RA again appearing right across sky through  $25^{\circ}$ S.
- 1110 (2) RA now almost complete.
- 1112 RA (2) at E end, (3) at W end.
- 1113 0/8. E half of RA has now broken up, but W end still (2). Quite broad ray bundle  $25^{\circ}$  -  $40^{\circ}$  due S.

JANUARY 27 cont'd.

- 1115 0/8. (2) RA right across again, but more patchy and rays not sharp.
- 1117 0/8. Bright moon just rising behind hills. RA (2) in SW-W section only. Very faint (1) sections of remainder of arc visible over into SE sky.
- 1118 Several very long very weak rays from W horizon to Z.
- 1119 (2) diffuse ray  $20^{\circ}$  -  $40^{\circ}$  ESE, faded rapidly.
- 1120 RA reappeared again along its entire length, except below  $30^{\circ}$  SE. More irregular. Still brightest in W-SW.
- 1121 Elevation of (2) RA has now increased to  $40^{\circ}$ .
- 1122 (1) parallel rays from S of E horizon to Z.
- 1123 These 'rays' linked up across Z with others from W forming (2) double HA.
- 1126 Single (2) HA from E to W through  $85^{\circ}$ N. Original RA now almost perfect HA through  $60^{\circ}$ S, rayed in W.
- 1129 Zenithal arc now narrow multiple arcs from  $80^{\circ}$ N- $85^{\circ}$ N.
- 1130 Fairly diffuse (1) HA  $75^{\circ}$ S.
- 1132 0/8. Multiple zenithal arcs extending from  $70^{\circ}$ S to  $80^{\circ}$ N. Fairly diffuse and nothing exceeding (1).
- 1136 N limit of arc system clearly defined through  $80^{\circ}$ N. S side diffuse and patchy running approximately through  $80^{\circ}$ S. Suggestions of diffuse rays at W end.
- 1138 N limit almost exactly half way between Sirius and Canopus.
- 1142 0/8. Multiple arcs still present but fluctuating slowly from three clearly defined arcs to a broad diffuse arc. Ray from  $15^{\circ}$  SE to arc system and from  $30^{\circ}$  SSE towards Z.
- 1146 0/8. Rays faded. (1) arc system now all in N sky, from  $75^{\circ}$  -  $85^{\circ}$ N. Bright moon  $7.5^{\circ}$  NE.
- 1151 0/8. (1) arc varying slightly in position with S edge migrating from Z to  $80^{\circ}$ N and N edge remaining about  $75^{\circ}$ N. Occasional pulsations in Z.
- 1155 Arc fairly steady from  $80^{\circ}$ N to  $70^{\circ}$ N, (1).
- 1159 (1) ray from WSW to Z, running like chord across arc.
- 1202 Arc developing irregularities near Z and fold beginning  $20^{\circ}$ W.

JANUARY 27 cont'd.

- 1205 Folds losing diffuseness in W and assuming drapery form, (2).
- 1208 Distinct (2) drapery  $45^{\circ}$ W.
- 1210<sup>1</sup> Rayed structure, almost corona,  $15^{\circ}$ N of Z.
- 1211 Broad sheet (2) diffuse rays  $25^{\circ}$  WNW.
- 1212 Semi-circular band in N sky NE-NW, (3) at NW end.
- 1213 Fan drapery developing in W towards Z, reached (3). Corona in Z also (3). Drapery  $20^{\circ}$ E reached (4), but no red colours.
- 1216 Display continued as at last obs. spreading into S sky. Drapery (4)  $40^{\circ}$  SE.
- 1218 (4) horse-shoe drapery  $30^{\circ}$ W fading to diffuse (2) in S.
- MAX. 1220 Drapery in W remained (4) sweeping up almost to Z and covering most of SW sky.
- 1222 0/8. Horse shoe drapery broadened sweeping to Z forming (3) semi-corona.
- 1224 Display more ragged and (2) extending up from  $10^{\circ}$  SSE through N of Z and back towards W horizon, fading away.
- 1225 2/8 flocculent cloud evenly distributed over S sky. (2) and (3) drapery in E sweeping towards NE.
- 1227 Bright moon low in NE. Remnants of previous drapery curving from Z in NE sky and round toward SE. (2) DS N of Z. Weak remnants in W.
- 1230 4/8 scattered. Display almost faded. (1) and (2) rays  $20^{\circ}$  -  $50^{\circ}$  in E sky.
- 1233 4/8 scattered over entire sky - no large areas clear. Vague suggestion of ray low in ESE.
- 1234 Green line distinct in line from E to W through Z. Forms not visible.
- 1240 4/8. Green line still visible in E up to Z but weak in W. No sign of forms, though sky is clear enough to see them if present.
- 1245 Green line visible over entire S sky being brightest in E where patch (1) G visible. Form of some kind visible through thin cloud  $30^{\circ}$ S - probably ray bundle.
- 1255 6/8 scattered. Green line still present from E to W through Z being strongest in E where the cloud is most sparse. No bright features have become visible since last obs.



JANUARY 27 cont'd.

- 1300 6/8 scattered. (1) diffuse G  $30^{\circ}$  ESE gave rise to (2) narrow ray. No other indications of structure.
- 1306 5/8. Fairly clear strip from E to Z. Green line clear in this region - either faint glow or DS.
- 1308 (1) pulsing diffuse rays  $30^{\circ}$  -  $80^{\circ}$  E. Slowly faded out.
- DCO 1322 6/8 scattered. No features seen since pulsating rays died away. Green line still present E-W through Z, but now strongest in W to Z.
- 1335 6/8. Green line distinguishable against continuous background spectrum only from Z down to W.
- 1400 8/8. Green line visible from E to W through Z.
- 1455 Almost 8/8 - one star visible in S. No sign of green line.
- 1510 Almost 8/8 - thin in parts with many small gaps. No sign of green line.
- 1538 7/8 - clear patch in S. No sign of line.

JANUARY 28.

- 1200 8/8 and raining till now. Bleak night, fairly dark. No sign of aurora.
- 1505 Night has remained the same most of the time. Not now raining but still 8/8. Sky light but no sign of green line.
- 1620 8/8. Howling gale. Sky light but no sign of green line.

JANUARY 29.

- (0934 Sunset  
(1108 Moonrise. Fraction illuminated: 0.68  
(1741 Sunrise  
(Astronomical twilight all night.

- BCO 1035 5/8 scattered. Narrow (2) band through Z, running more ENE-WSW than E-W.
- 1040 Band faded, but (2) ray or remnant of arc in ENE sky.
- 1045 Faded completely.
- 1050 Single (2) ray high in SW.

JANUARY 29 cont'd.

- 1051 Ray faded. Several isolated weak rays appeared  $30^{\circ}$  -  $80^{\circ}$  in E-SE sky.
- 1053 (2) sheet of diffuse rays appeared high in E-ESE sky. Green line distinct. Ray sheet has an orange-yellow colour.
- 1054 No visible forms.
- 1055-1100 5/8 scattered. Still fairly light in S. Green line clearly visible over most of S sky being strongest in SE.
- 1100-1106 Cloud concentrated more in N sky.  
DCO Otherwise same.
- 1110 Line now distinguishable only in SE. Otherwise same.
- 1120-1125 5/8 - very little cloud in S-W and Z. No forms visible but green line clear over S sky and brightest in W-WSW.
- 1130 4/8 scattered mainly low around horizons and in NE sector. Remainder very thin haze. Green line now much stronger and visible over all sky. No forms visible.
- 1135 Same.
- 1140 5/8. Line still clear over all sky but no forms visible.
- 1145 6/8. Cloud becoming heavier - clearest in Z and in area S of Z. Line still distinct but no forms visible.
- 1150 7/8 and becoming denser. Line now visible only in Z where cloud is thinnest.
- 1204 Almost 8/8 - one star occasionally visible near Z. Green line distinct from E to W through Z.
- 1225 Almost 8/8. Green line distinct over all S sky and strongest E-W through Z.
- 1255 8/8, fairly thick. Green line very faintly visible in Z.
- 1345 8/8, fairly thick. Green line not definitely present.
- 1455 Almost 8/8 - one or two stars just visible. No sign of green line on continuous background spectrum after thorough search.
- 1555 8/8. Sky becoming light. No sign of green line.
-

JANUARY 30.

(0932 Sunset  
 (1119 Moonrise  
 (1745 Sunrise  
 (Astronomical twilight all night.

- 1030-1100 0/8 to 2/8 at end of period. Just dark enough at 1030 to see bright aurora if it were present. No sign of auroral activity and no sign of green line.
- 1100-1120 Cloud increasing slowly (mainly in N). Now 4/8. No sign. No line.
- 1120-1135 4/8. No sign. No line.
- 1145-1155 4/8. Green line clearly visible to about  $30^{\circ}$  in SW but not elsewhere. Sky slightly lighter in this section than in SE and it seems likely a uniform G is present.
- 1205-1220 4/8 in N and round horizons. (1) G over all S sky up to about  $30^{\circ}$ . Green line distinct.
- 1230 8/8. Green line not visible.
- 1300 8/8. Quite dark. Line not visible.
- 1335-1340 1/8 in NE and wisps of cloud in S. Green line weakly visible in S sky. (1) ray appeared in SE  $10^{\circ}$ - $30^{\circ}$  at about 1346 and then gradually diffused away. (1) ray  $10^{\circ}$ - $30^{\circ}$ S became visible at 1352.
- 1413 1/8 in N. (1) ray  $5^{\circ}$ - $30^{\circ}$ SSE, quite steady.
- 1416 Ray scarcely discernible.
- 1430 4/8 (N obscured). (1) diffuse broad ray in SSE. Very faint G along SW horizon.
- 1450 8/8. Sky light but green line not visible.
- 1515 3/8. LNS.
- 1555 3/8, mainly in N. Green line extremely feeble  $15^{\circ}$ W. Not visible in S on background continuous spectrum.
- 1625 Same.
- 1655 5/8. Quite light. Green line not visible on background spectrum.

JANUARY 31.

- 1045 Almost 8/8. No sign of green line.
- 1145 8/8. Fairly dark, but some light patches near Z. Green line visible in region of Z.



JANUARY 31 cont'd.

- 1215 8/8. Too dark to see anything through spectroscop.
- 1315 Same.
- 1355 8/8. Some light patches in N, E, S and Z. Green line visible in these light patches.
- 1430 8/8. Quite dark. No sign of line.
- 1500 8/8. Line extremely weak.
- 1507 Same.
- 1555 8/8 and light rain. Sky slightly lighter. Green line not visible.
- 1608 8/8. Green line not visible.
- 1650 8/8. Quite light. Green line not seen on background continuous spectrum.
-

FEBRUARY 1951.FEBRUARY 1.

- (0927 Sunset  
 (1202 Moonrise. Fraction illuminated: 0.35  
 (1320 End astronomical twilight  
 (1412 Beginning astronomical twilight.  
 (1750 Sunrise
- 1145 8/8 and misty till now. Still 8/8. Sky fairly dark but green line weakly visible.
- 1315 8/8. Sky fairly dark but green line weakly visible.
- 1505 8/8. Too dark to seek green line.
- 1650 8/8 and mist. Quite light. Green line not visible on continuous background spectrum.
- 

FEBRUARY 2.

- 1105 8/8. Still fairly light. Green line not visible.
- 1245 8/8. Too dark to seek green line.
- 1510 8/8. Some light patches but still too dark to seek green line.
- 1655 5/8 - clear in E and W. Quite light. No sign of green line.
- 

FEBRUARY 3.

- 1615 8/8 and raining all night. It has been very dark with no sign of auroral. Cloud now thinning in E and some stars are visible. Sky becoming light. No sign of green line.
- 1645 8/8. Fairly light. LNS.
- 

FEBRUARY 4.

- (0921 Sunset  
 (1242 End astronomical twilight  
 (1441 Beginning astronomical twilight  
 (1518 Moonrise. Fraction illuminated: 0.07  
 (1756 Sunrise
- BCO 1055 6/8. Still fairly twilight. Extensive (2) G low in SW-W sector visible between clouds. Suggestion of diffuse ray structure low on WSW skyline.
- 1058 4/8. Patchy (1) and (2) G covers entire sky. Irregular in Z where a series of bands running roughly E-W are pulsating weakly and slowly.

FEBRUARY 4 cont'd.

- 1100 4/8. Very diffuse ray structure with very long rays in entire E-SE sector. Remainder of sky right down to N horizon covered with patchy (1) and (2) G.
- 1103 4/8. (3) ray bundle low in WSW and (3) G visible through cloud gap about 30°SE. The cloud is scattered, but the G does not appear to be part of an arc or band.
- 1105 4/8. Ray bundle still present on WSW horizon, varying between (2) and (3). Several patches (2) and (3) G between cloud gaps in SE. General patchy glow over entire sky still present. Weak pulsations remain in Z.
- 1110 1/8 and general haze. Patchy G has gradually given place to long diffuse (1) and (2) rays from all horizons to Z forming corona.
- 1113 1/8 and haze. Rayed structure now more diffuse. Most distinct rays are (2) from due S. Other rays, particularly in N sky have diffused into quite uniform (1) G.
- 1116 1/8 and slight haze. Rayed structure entirely absent. Fairly uniform (1) G over S sky, but patchy in N sky and around Z. Pulsations not now evident.
- 1120 Same.
- 1125 1/8. Display broken up over entire E sky. High in E-S sector several extensive (2) DS's rapidly fluctuating in intensity (flaming). In E-N sector semblance of (2) diffuse drapery sweeping from NNE horizon to Z. This is also flaming. In W sky still fairly uniform (1) G, (2) low in SW.
- 1130 1/8. Entire display now broken up into (1) and (2) DS's and diffuse scattered rays, the latter especially in NW-SW. Everything in N sky pulsating regularly with period of 11 seconds. Shapes maintained at each pulse. (The shapes are quite irregular).
- 1135 1/8. Pulsations now irregular and extend over entire sky. Most definite DS's are high in W-N-E sky. Max. intensity reached is (2).
- 1140 1/8. Becoming quieter. in S sky. W-N-E sky still covered with pulsating (1) and (2) DS's.
- 1145 Same.
- SEVERAL PHOTOGRAPHS BETWEEN 1144 AND 1340.
- 1150 1/8. Display has continued over all N sky being strongest in region of Orion, Canis Major, Canis Minor and in Z (i.e. in N-NW).
- 1151 DS's now brighter and more distinct high in S sky.



FEBRUARY 4 cont'd.

- 1155 1/8. Entire sky still covered in (1) and (2) DS's, brightest and most distinct in W-N-E sky and high in SW. Pulsations slow and irregular with periods between 5 and 20 seconds.
- 1200 1/8. DS's now becoming more irregular in shape and becoming more extensive.
- 1204 1/8 and very clear. Entire display in N sky (2) with rapidly flaming DS's. Flickering motion roughly towards Z, but tendency for a northward sweep in E sky in addition to sweep towards Z. DS's quieter in S sky and merge into uniform (1) G below about  $50^{\circ}$ S.
- 1205 Display has lifted up from N horizon and lower limit is now almost arc shaped at elevation of about  $15^{\circ}$ N.
- 1209 2/8. Flaming given place again to quieter irregular pulsations most marked in N-E sky.
- DCO 1215 4/8 and closing in from SW. Display still of same nature over all visible sky except that there is no activity below  $15^{\circ}$ N.
- 1225 5/8 and raining. Display same through cloud gaps in NW and NE.
- 1234 4/8. -Narrow (2) multiple arcs E-W through Z, (3) at W end. DS's still present elsewhere.
- 1237 4/8. Multiple arcs (3) in E and W through cloud gaps.
- 1245 4/8. Arc now double and slowly moving into N sky. (2).
- 1250 5/8. Arc in N obscured by cloud.
- 1253 7/8. (2) ray SSE.
- 1259 7/8. (2) patch through cloud gap in SE. May be portion of (2) ray.
- 1300 8/8.
- 1320 8/8.
- 1321 6/8. (2) rays in SW.
- 1325 5/8. (2) curved multiple bands from SW through Z and disappearing behind cloud in E sky.
- 1330 4/8. Bands moving N.
- 1333 3/8. Bands continuing to move N. Partial corona in Z.
- 1336 2/8. Entire sky, except for an elliptical region N of Z covered with diffuse G, (2) at horizons and (3) near Z.

195.

FEBRUARY 4 cont'd.

- 1343 2/8. Rays from SSW to Z. Swirling bands from E to W through Z. Diffuse (2) G in N.
- 1348 2/8. Rays from S and SE. Diffuse G in N. Twisty band in N through 40°. All (2).
- 1352 2/8. (2) corona. (2) band and diffuse G in N.
- 1400 4/8. (1) and (2) DS's over all sky.
- 1405 5/8. (2) DS in N.
- 1415 5/8. Overcast in N. Nothing visible.
- 1430 2/8. (2) DS in N and (1) G in S.
- 1437 3/8. (2) DS in N and (2) DS from SSE through Z to SW.
- 1443 2/8. (2) DS's in band from SE to W through 70°N.
- 1450 2/8. DS's in N again pulsating.
- 1500 8/8.
- 1506 3/8. (1) and (2) DS's forming irregular band from SE through 70°N to W.
- 1515 3/8. (1) diffuse multiple band from SE to W extending in width from 70°N to Z.
- 1525 Same.
- 1535 4/8. Diffuse multiple bands through as at last obs. (2) striated band running E-W and extending from 80°S to Z.
- 1550 5/8. No sign.
- 1610 7/8. Green line visible in Z and S sky.
- 1625 4/8. No sign of green line.
- 1700 4/8. Quite light. No sign of green line on continuous background spectrum.
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FEBRUARY 5.

- (0920 Sunset
- (1233 End astronomical twilight
- (1448 Beginning astronomical twilight
- (1654 Moonrise. Fraction illuminated: 0.03
- (1758 Sunrise
- BCO 1010 1/8. Still fairly light - only bright stars visible. No sign.
- 1030 1/8. Several very diffuse light bands high in NW but no sign of green line.

FEBRUARY 5 cont'd.

- 1045 Same. Bands probably thin cloud haze but appear like weak auroral bands. Line definitely not visible.
- 1053 1/8. (2) HA from E to W horizons through  $80^{\circ}\text{S}$  with slight curvature to S at W end.
- 1056 2/8. HA has faded slightly and has broadened and moved right up to Z.
- 1058 2/8. (2) arc has become more diffuse and not very homogeneous being broader and split in E half. W end still appears to curve slightly to S.
- 1103 2/8 and slight haze particularly around horizon. (1) arc still zenithal. E and W ends appear more like narrow ray bundles merging into general arc.
- 1105 Green line definitely visible in region of Orion in NW where weak diffuse bands mentioned earlier (1030) still persist. These still look whiter than the main arc and may still be merely thin cloud.
- 1110 1/8. (1) arc fairly diffuse; width  $80^{\circ}\text{N}$ - $65^{\circ}\text{N}$ . Bands in region of Orion now not distinguishable.
- 1115 1/8. Display now much more diffuse and has lost clear arc structure. It is striated and patchy extending from E to W horizons and from  $85^{\circ}\text{S}$  through Z to  $70^{\circ}\text{N}$ .
- 1117 1/8. Display breaking up into partial rayed structure forming partial corona.
- 1120 1/8. Display brightened and activity spread into wide strip E-W through Z about  $40^{\circ}$  wide ( $20^{\circ}$  each side of Z). Dark strip E-W through Z  $10^{\circ}$  wide.
- 1121 (2) rays towards Z from everywhere in  $40^{\circ}$ -wide strip. Reached (3)  $60^{\circ}\text{NE}$ .
- 1123 Very broad strip through Z in E-W direction extending to  $50^{\circ}\text{S}$  and  $65^{\circ}\text{N}$  with (2) corona at about  $80^{\circ}\text{N}$  formed by rays from all sections of this E-W strip.
- 1127 Display still in broad strip from E to W horizons and extending from  $60^{\circ}\text{N}$  to  $35^{\circ}\text{S}$  (not so clearly defined at S limit as at N limit). (3) rays now in E and high in NW. Lower edges of diffuse ray groups (3) but upper parts only (2).
- 1130 Display still much the same but maximum intensity (2).



FEBRUARY 5 cont'd.

- 1131 Lower limit in S sky now about  $20^{\circ}\text{S}$ . N edge is (2) band showing very little rayed structure. Above this is a region almost free of display. (2) rayless band from E to Z. (1) and (2) long rays from SW sector to Z.
- 1132 Band on N limit again rayed. Diffuse band from E to Z showed more rayed structure and then diffused again.
- 1133 Reached (3) right across along N edge.
- 1135 (3) fan-like drapery over N sky. (2) RA  $25^{\circ}\text{S}$ .
- 1141 Snake-like drapery through Z with (4) rayless structure in Z. Distinct creamy colour until edges became fringed with red. Display extends over same regions as previously and is (2) except in Z.
- 1144 S edge of display now almost separate from the remainder and consists of (2) RA.
- 1145 (1) HA  $25^{\circ}\text{N}$  as well as rest of display as previously.
- 1150 Broken irregular band  $30^{\circ}\text{S}$ . Between this and Z several (2) RB's sweeping up from W sky. Very diffuse (1) HA  $25^{\circ}\text{N}$  still present. Main activity in W is almost (3) broad sheet of diffuse rays sweeping towards Z diffusing into (1) G at Z.
- 1155 Still very broad diffuse HA  $25^{\circ}\text{N}$ . Semblance of tattered RA  $30^{\circ}\text{S}$  with rays in ESE. Very broad sheet with rayed structure sweeps up from W horizon fading out towards Z, (3)  $20^{\circ}\text{WNW}$ .
- 1158 Arc in N becoming more and more diffuse and still (1). Now only E half of patchy tattered (2) RA.
- 1201 Practically same.
- 1204 Partial RA through  $30^{\circ}\text{S}$  reformed, (1). Uniform (1) G right across sky and from Z to  $25^{\circ}\text{N}$ . Sheet sweeping up from W now faded to (2) low in W.
- 1209 E half of (2) RA through  $40^{\circ}\text{S}$  with fairly long rays almost reaching Z. Long scattered (1) rays in SW almost reaching Z.
- 1210 (3) rays in E. Uniform (1) broad arc width from Z to  $30^{\circ}\text{N}$ .
- 1213 RA complete across S sky. Intensity varying from (1) in E half to (2) in W half. Other long rays from WSW to Z.

FEBRUARY 5 cont'd.

- 1215 Rayed structure in N sky from  $45^{\circ}\text{N}$  to Z forming (2) half corona.
- 1218 Partial corona reached (4) momentarily.
- 1219 Activity still confined to broad strip  $45^{\circ}$  each side of Z. Display in Z now more diffuse.
- 1221 Rays right across S sky reaching to Z, max. (2). Fairly diffuse in N sky with no rays, (2).
- 1222 (3) high in S. Dark 'ray' from  $50^{\circ}$  ESE to Z, quickly disappeared.
- 1223 Display now diffuse sheet from fairly well defined N limit through  $40^{\circ}\text{N}$  to  $45^{\circ}\text{S}$ . Practically without any rayed structure.
- 1225 (2) arrow-head formation in Z formed from broad sheets from ESE and W. (2) RA forming  $30^{\circ}\text{S}$ . N limit risen to  $50^{\circ}\text{N}$ .
- 1228 Fairly regular 'HA' as N edge of display passing exactly over Spica in E and Bellatrix in W, (2).
- 1229 (3) drapery up to  $20^{\circ}\text{W}$ .
- 1232 Display faded in SW and again increased to (3).
- 1234 Semi distorted partial corona near Z. Faded to (2) everywhere.
- 1235 N 'HA' still has lower edge through Bellatrix and Spica. (2) ray from WNW to Z.
- 1237 N limit still same, ending in (1) 'HA'. Display streaky in Z. (2) diffuse drapery from W horizon curving slightly SW and then up to Z. Very weak diffuse patchy arc with very weak ray structure through  $45^{\circ}\text{S}$ , (2) at ESE end.
- 1239 (3) drapery high in WSW.
- 1241 (2) fan-like drapery just S of Z, rapidly moving into SW sky.
- 1242 This drapery amalgamated with general diffuse drapery structure in W sky.
- 1244 (3) RB from WSW horizon up through Z to  $45^{\circ}$  ESE. Rapidly split into double RB drifting about in W sky.
- 1245 Faded out in all parts of E sky. Fairly steady drapery from W horizon to Z.

FEBRUARY 5 cont'd.

- 1248 SW display now split into two draperies. One waving up from W to Z becoming diffuse. The other from W horizon up  $10^{\circ}$  then curving sharply in almost straight line to  $30^{\circ}$  WSW, (2). N limit of display in N sky still same.
- 1254 N border remains same with Bellatrix and Spica still on edge of 'HA'. Diffuse (2) ray sheet from W up to Z. Diffuse scattered ray bundles across S sky above  $70^{\circ}$ S.
- 1301 0/8. N limit arc has dropped slightly to about  $20^{\circ}$ N (Bellatrix in W half and Spica in E half now almost in middle of arc). (1) G above this to Z. Practically clear in S sky. Some isolated weak rays low in ESE and WSW. No ray structure elsewhere.
- 1309 (2) drapery from ESE horizon to  $45^{\circ}$ E. N edge of HA remains same as at last obs. (1) RA from SW to SE through  $60^{\circ}$ S. (2) band through Z from E to W.
- 1314 S sky almost free of display. HA through  $20^{\circ}$ N. Beautiful fan-like drapery across all N sky above arc with (3) rays ending in (4) partial corona.
- 1315 Lower limit passes approximately through  $20^{\circ}$ N and extends down towards W veering along  $5^{\circ}$  above W horizon disappearing behind plateau in WSW. Definite red tinge in W.
- 1318 Display much the same but rayed parts now more diffuse. Semblance of (2) drapery sweeping from W horizon to  $20^{\circ}$ WSW.
- 1321 (4) fan-like drapery from  $40^{\circ}$ S to Z with very sharp rays in rapid motion. (4) corona in Z with mauve tints.
- 1322 Fan faded to (2).
- 1324 Fan over all S sky down to  $20^{\circ}$ S with S edge of fan arc-shaped. Very sharp rays in rapid motion in SE sector. Reached (3).
- 1326 Display again (4) in S. Lower limit in S  $15^{\circ}$  and in N  $20^{\circ}$ N.
- 1327 Reached (4) with several bursts of rapid motion in SE sector.
- 1332 Fans continue over entire sky, (2). N limit through  $20^{\circ}$ N but now rayed and no longer arc-like.
- 1334 Rayed structures now more diffuse.



FEBRUARY 5 cont'd.

- 1340 Display much the same with N limit  $15^{\circ}$ N and S limit  $8^{\circ}$ S. Occasional (3) ray bundles in SE and S. Distorted diffuse corona continues. Fairly extensive 'dead' area from Z down to about  $50^{\circ}$ SE.
- 1343 Tendency for streaks in distorted corona to run N-S instead of E-W, but fairly irregular.
- 1349 S limit  $10^{\circ}$ S, N limit  $15^{\circ}$ N. Remainder of sky covered in patchy (1) and (2) G with weak ray structure only in SE-NE section. (2) G fairly uniform in region of Z.
- 1353 0/8. Has become banded again in Z, with general NE-SW tendency. (2) and (3) variable RB  $5^{\circ}$  due S running horizontally. Another more diffuse but parallel RB  $20^{\circ}$  due S.
- 1406 Faded in S to almost uniform (1) G extending over practically all S sky. Still band-like with NE-SW trend in Z. Weak diffuse rayed structures E and W. (1) and (2) quiet DS's over all N sky.
- 1414 Diffuse (1) and (2) patches over all sky. Some rayed structures in S sky.
- 1425 0/8. Still much the same with (1) and (2) DS's and faint ray structures over entire sky.
- 1438 Same, with rays particularly in SW.
- 1447 0/8. Entire sky still covered with (1) and (2) sheets, weak diffuse rays and DS's. Quiet. General E-W trend in short zenithal bands.
- 1457 0/8. E-W striations and diffuse bands in Z and N sky. Scattered DS's and weak ray bundles in S sky with rays right down onto S horizon. Brightest portion of display is broad (2) sheet  $30^{\circ}$  wide E-W through Z. No activity below  $10^{\circ}$ N. No rapid changes - display very quiet.
- 1528 0/8. Display has slowly contracted into broad (1) and (2) sheet running E-W and from Z down to  $40^{\circ}$ N, striated and patchy. No features in S sky and only activity there is a possible very faint uniform G.
- 1535 Same.
- 1541 0/8. Display slowly becoming a fairly definite multiple arc system through Z to  $40^{\circ}$ N.
- 1558 0/8. Trend of multiple arc system changed slowly, E end swinging slightly S and W end slightly N. E half has now diffused and the only definite structure at present is in W below  $45^{\circ}$ .

FEBRUARY 5 cont'd.

- 1615 0/8. Now double (1) arc through Z with Procyon on N edge and  $\alpha$ -Centauri on N edge in Z.
- 1623 0/8. Becoming quite light. Arc continues with same trend. (1) in E half and (2) low in W.
- 1625 W end of arc now consists of very clearly defined (3) ray bundle to  $15^{\circ}$ W, gradually fading and diffusing along the arc. Beyond Z arc is scarcely visible in the increasing twilight.
- 1635 0/8. Arc practically gone. Fan (probably (2) in the twilight) just SW of Z, fluctuating in intensity.
- 1637 Fan now changed to homogeneous band from  $70^{\circ}$ SW curving smoothly through Z to  $70^{\circ}$ SE.
- 1643 Band now faded. Only very vague suggestion of former arc through Z. Green line seems to be just visible on background spectrum.
- 1700 Green line not visible on background continuous spectrum.

FEBRUARY 6.

- (0918 Sunset  
(1227 End astronomical twilight  
(1455 Beginning astronomical twilight  
(1759 Sunrise
- 1046 4/8 - thick bank low in SW sector. (2) diffuse ray appeared  $25^{\circ}$ SW.
- 1047 Ray brightened to (3).
- 1048 Ray faded to (2) and slowly spread into (2) RB extending from  $20^{\circ}$ SSW to  $35^{\circ}$ W. (2) ray appeared  $3^{\circ}$ -  $10^{\circ}$  due S.
- 1052 SSW end of RB rose up almost to Z and became diffuse, the activity rapidly contracting to low in W.
- 1055 Sheet of (2) rays appeared  $20^{\circ}$ -  $50^{\circ}$  SSE-SE.
- 1056 Ray sheet rapidly brightened to (3) and spread into continuous drapery right across sky from W through  $10^{\circ}$ S of Z over to SE horizon. Very little rapid movement in it. (1) HA  $20^{\circ}$ S formed. (1) ray bundle below arc in SSE by S.
- 1057 Drapery gradually moving N, now passing through  $5^{\circ}$ N of Z.

FEBRUARY 6 cont'd.

- 1059 Drapery now broadened and forms (2) partial corona. E half has broadened and fans out into extensive sheet of (1) and (2) rays over almost all S-E sky. Short (2) drapery very low in S. HA gone. Several scattered broad ray bundles in SW sky.
- 1101 Display has become diffuse everywhere and does not exceed (2).
- 1102 3/8 - scattered cloud in all N sky and in E. Very heavy cloud bank from W to S up to  $30^{\circ}$ . Still fairly light. (3) ray bundle  $5^{\circ}$ SE. Display weakened to (1) in Z and through SE.
- 1106 (2) RB, almost RA, developed through  $20^{\circ}$ S. W portion obscured by cloud except for long rays above cloud.
- 1107 (3) ray sheet  $10^{\circ}$ -  $20^{\circ}$ SE. Very feeble activity over most of visible S sky.
- 1108 (2) horseshoe drapery maximum elevation  $20^{\circ}$ SSE, curving sharply down and disappearing below SE horizon. Gradually diffusing.
- 1109 (1) glow over all visible N sky with striations near Z.
- 1111 (4) horseshoe drapery developed again, fading to (3) at SSW end and to (1) in SSE.
- 1113 Drapery broke in middle and contracted to SSW with very long (3) ray bundle. (2) G above cloud bank  $20^{\circ}$ W with diffuse ray structure reaching to Z.
- 1114 Contracted in SSW to narrow (2) ray bundle. Weak patchy G over all N sky down to  $40^{\circ}$ N with cloud obscuring the remainder of the sky.
- 1115 Faded completely in SSE and almost completely in SSW.
- 1119 4/8 light and scattered except for heavy bank along SW horizon. (2) G with weak ray structure along upper edge of this bank SSW to WNW. Also (1) patchy G over N sky visible down to  $40^{\circ}$ N where lost in cloud. Extends also over SE-NE sky.
- DCO 1123 Same general pattern. Irregular pulsations commenced in the patchy (1) and (2) G above the cloud bank in SW-NW.
- 1129 3/8. (1) and (2) DS's in semblance of broad E-W bands in strip from W to Z about  $40^{\circ}$  wide. All pulsating fairly regularly with periods of approx 5 seconds. Pulsations not synchronised in phase.
- 1132 Same type of display now extends through Z and down to  $30^{\circ}$ E.



FEBRUARY 6 cont'd.

- 1144 3/8. (1) short E-W bands and DS's in strip about  $20^{\circ}$ N of Z to  $10^{\circ}$ S of Z right across from E to W. All pulsating weakly and quietly with periods of about 5 seconds.
- 1157 5/8 and getting hazy. Now only (1) uniform G E-W through Z about  $30^{\circ}$  wide, centred through actual Z. (2) ray bundle low due S.
- 1206 6/8. Some stars visible near Z and towards SW. Glow at edge of cloud  $30^{\circ}$  WSW.
- 1212 Same.
- 1215 Same.
- 1232 Almost 8/8. Some stars feebly visible high in E-SE where G is present. Also weak patch of G low on SSE horizon.
- 1300 8/8 and fairly dark except for thin patch in SE where G still evident.
- 1317 8/8. Some light patches particularly in E. Green line clearly visible.
- 1420 8/8, fairly heavily overcast. Green line just visible in Z.
- 1500 8/8. Too dark to see anything through spectroscope.
- 1542 8/8. Too dark to seek green line.
- 1624 8/8. Sky lighter but green line not present on background continuous spectrum.
- 1720 8/8. Quite light. Green line not visible on background spectrum.

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FEBRUARY 7.

- 1035 7/8, clear low in S only, but elsewhere cloud very thin. No sign.
- 1040 Same.
- 1045 7/8 thin cloud, clear low in S. No sign of green line.
- 1050 Same.
- 1055 Same.
- 1100 Same.
- 1142 8/8. Too dark to see anything through spectroscope.
- 1224 8/8. Quite dark. No sign of line.
- 1320 Same.

FEBRUARY 7 cont'd.

- 1405 Same.
- 1455 8/8. Too dark to seek line.
- 1555 Same.
- 1640 8/8 and light drizzle. Sky light but no sign of green line.

FEBRUARY 8.

- 1030 8/8 and misty rain. No sign. LNS.
- 1150 8/8 and misty rain. Has remained same since last obs. Green line is now clearly visible. (First time sought).
- 1300 Has remained the same. Line is still visible over all sky, strongest in Z.
- 1410 5/8 and haze (the latter from Z down to SE). (1) G in SE to  $10^{\circ}$ .
- 1510 8/8 thin. Sky very light and green line very distinct over whole sky.
- 1520-1525 Cloud thinned in Z and part of display could be seen. (2) flaming DS with fairly rapid flaming could be seen through haze to extend down to  $15^{\circ}$ NE and also in E and W sky down to  $30^{\circ}$ .
- 1546 Almost 8/8, but occasional patches of (2) flaming visible W and NW of Z.
- 1617 8/8. Green line clearly visible.
- 1650 8/8. Green line very dimly seen on background continuous spectrum.
- 1714 8/8. Quite light. Green line not seen on background spectrum.

FEBRUARY 9.

- 1045 8/8. No sign of green line.
- 1215 Almost 8/8. Stars occasionally visible  $50^{\circ}$ SE. Numerous patches of light through cloud in E, W and S. Green line quite distinct.
- 1245 Almost 8/8, thin particularly in NE sector and Z. Four stars just visible in Z. Green line distinct. Appears to be (1) or (2) fairly uniform G over NE sector but almost absent in Z.
- 1315 8/8. Light patches mainly in E, NE and Z. Green line distinct.

FEBRUARY 9 cont'd.

- 1350 8/8 thin. Light patches E-W across sky just S of Z. Green line distinct everywhere.
- 1435 8/8. Light patches  $50^{\circ}$  NE and NW. Stars occasionally visible in NE. Green line distinct. Intensity of display probably not greater than (2) in the NE region.
- 1525 8/8 and darker than previously but still patches of light sky over most of sky. Green line distinct.
- 1545 8/8. Quite light in patches over all sectors. Line distinct.
- 1625 8/8. Sky becoming light from twilight. Line distinct.
- 1712 8/8. Sky quite light. Green line not visible on background continuous spectrum.

FEBRUARY 10.

- 1600 Frequent obs. till now. Always 8/8 and very dark. Now 3/8 in N, E and SW with no sign of aurora. Twilight in SE.

FEBRUARY 11.

- (0908 Sunset  
(1015 Moonset. Fraction illuminated: 0.23  
(1158 End astronomical twilight  
(1524 Beginning astronomical twilight  
(1809 Sunrise
- 0930 8/8. Still fairly light. No sign of green line.
- 1110-1115 4/8 mainly in W. Appears to be general diffuse glow in SE.
- 1119 3/8 in W. Green line distinct in SE. (1) HA  $25^{\circ}$  S, W end obscured. Suggestion of diffuse rays at SE end.
- 1128 2/8, mainly in S. Patches of (1) glow through cloud gaps. HA obscured.
- 1140 3/8 in S. Patches of glow in SE through cloud gaps.
- 1200 4/8 mainly in SW and Z. (2) G in SE - may be upper part of  $25^{\circ}$  HA whose lower edge is obscured. Patches of glow through cloud gaps in SW.
- 1225 1/8, scattered in S. G over all S sky to  $80^{\circ}$ . (2) at E and W edges but (1) in due S portion.
- 1234 Same.



FEBRUARY 11 cont'd.

- 1253 1/8. (1) G over all S sky. Multiple bands through Z and to  $80^{\circ}\text{N}$ , (1). Slight irregularity round Z.
- 1300 2/8 in S. G now extends to  $50^{\circ}\text{N}$ . Multiple zenithal arcs obscured by cloud.
- 1314 1/8 in S. (1) G up to  $45^{\circ}\text{S}$ . No sign in Z or N sky.
- 1336 Same and slight suggestion of ray in SE.
- 1430 1/8, mainly in SW. (1) double HA  $25^{\circ}\text{S}$ .
- 1450 1/8 in SW. HA now quadruple with lower edge at  $45^{\circ}\text{S}$  and upper edge about  $60^{\circ}\text{S}$ , (1).
- 1500 7/8 - clear low in E. (1) G visible low in ESE.
- 1515 2/8, mainly in E. (1) HA with clearly defined lower edge through  $30^{\circ}\text{S}$  but diffuse above this and ending in a double HA through Z and  $85^{\circ}\text{N}$ . These latter are gently pulsating in N-S direction, (2).
- BCO 1520 2/8 mainly in E. Multiple arcs extend down to  $45^{\circ}\text{N}$ . S edge of display now not so regular, being more concave down than an HA, (2). Pulsations continue in all N sky and into S sky.
- 1527 4/8 in S and E. (3) band  $10^{\circ}\text{SE}$  and (3) band  $45^{\circ}\text{SSW}$ . Pulsations continue in Z and N.
- 1530 4/8. S limit of display increased to  $50^{\circ}\text{S}$  and increased in intensity to (3) in all SE sector. SW sector obscured by cloud.
- DCO 1535 6/8. All but E end of display obscured. (3) band in SE continues.
- 1550 2/8 scattered. S limit now  $30^{\circ}\text{S}$  with (2) HA. General (1) and (2) G above this to Z where multiple arcs, mainly (1), continue to pulsate down to  $60^{\circ}\text{N}$ .
- 1613 1/8 scattered. (2) HA  $30^{\circ}\text{S}$ . Short (1) ray  $10^{\circ}$ - $15^{\circ}\text{S}$ . General (1) G above HA to Z. (2) flaming DS's from  $30^{\circ}\text{N}$  to Z.
- 1614 HA in S developed slight rayed appearance in SE, S and SSW.
- 1629 2/8. (3) RB  $40^{\circ}\text{S}$ , (3) portion being in SW with the remainder (2).
- 1632 Intensity of RB decreased in SW and increased to (3) in SE with rays moving from W to E along the S edge of the RB. Became diffuse in SW. Diffuse E-W band through  $80^{\circ}\text{S}$ .
- 1635 (3) rays at ESE and W ends of RB, about  $20^{\circ}$ .

FEBRUARY 11 cont'd.

- 1637 2/8 in S. (1) DS's again pulsating in Z.
- 1640 3/8 in S, obscuring most of display. (3) yellowish patch just above edge of cloud, 50°. (Intensity may be (4) below cloud). Sky quite light in SE from twilight.
- 1645 Raining. No obs.
- 1654 3/8, mainly in S and E, No forms visible but green line distinct in SE.
- 1704 3/8 scattered. No sign of green line on background continuous spectrum.

FEBRUARY 12.

- 1100 8/8 heavily overcast till now. LNS.
- 1115 8/8 and very dark.
- 1130 8/8 and raining. No hope of seeing line.
- 1205 Same.
- 1234 Same.
- 1300 Same.
- 1445 Has remained 8/8 heavily overcast and raining. Almost pitch dark with no hope of seeing green line.
- 1520 Same.
- 1625 8/8 and still raining. Green line very distinct after eyes long accustomed to the dark.
- 1700 8/8 and raining. Green line not visible on background continuous spectrum.
- 1730 Same.

FEBRUARY 13.

- 1110 8/8 and foul weather (pressure 956 millibars). Sky fairly light and green line distinct.
- 1200 8/8. Line still visible.
- 1300 8/8, filthy night. Line still visible but more feeble.
- 1348 8/8. Green line visible.
- 1420 8/8. Fairly light. Line distinct.
- 1507 8/8. Fairly light. LNS.
- 1558 8/8. Darker than at last obs. LNS.

FEBRUARY 13 cont'd.

1715 8/8. Quite light.

FEBRUARY 14.

(0902 Sunset  
(1055 Moonset Fraction illuminated: 0.51  
(1144 End astronomical twilight  
(1538 Beginning astronomical twilight  
(1816 Sunrise

1105 6/8 - clear only in NW sector. No sign of green line.

1120 3/8 mainly in S. (1) G to 20°S. Green line distinct.

1139 3/8 mainly in S. Patches (1) G visible through cloud gaps in S.

1147 Heavy snow squall.

1152 2/8. (1) G low on SSE horizon to 10°.

1213 6/8 heavily overcast in S. No sign of display and line not visible.

1240 4/8 mainly in N. (1) area of G still visible in SSE between horizon and 10° with fairly sharp upper edge, although faint.

1305 8/8. Slightly light patch of cloud in SE to 10°. LNS.

1323 7/8. Light patch in SSE. LNS.

1330 2/8. (1) G along E to SE horizon up to 20°. Line present very feebly.

1400 6/8 - clear in SE and through Z. (1) G in all parts of visible S sky and in Z.

1429 5/8 and haze. Fairly clear in E half. (1) G in SE to 30°.

1504 6/8 and haze in E and NE. Glow through cloud in SE.

1535 7/8 and haze in Z. Glow through cloud in SE. Green line visible.

1630 8/8 and beginning to rain. Green line very feeble.  
Rain continued for remainder of night. No further observation made.

FEBRUARY 15.

(0901 Sunset  
(1122 Moonset Fraction illuminated: 0.61  
(1140 End astronomical twilight  
(1542 Beginning astronomical twilight  
(1818 Sunrise



FEBRUARY 15 cont'd.

- 0935 4/8 scattered. Almost dark enough to see bright display if present. No sign.  
1000 2/8. No sign.  
1007 3/8. No sign.  
1015 3/8 mainly in S. Moon low in NW. No sign of green line on continuous background spectrum.  
1020 Same.  
1030-1035 3/8 scattered. Appears to be weak G up to about  $40^{\circ}$  over S sky. Green line just discernible.  
1054 7/8 thin. Green line weakly visible over S sky.  
1125 Almost 8/8 thin. Green line weak in S.  
1205 3/8 and haze. Patches of glow through cloud in S sky up to  $30^{\circ}$ . Green line feeble.  
1228 3/8 and no haze. (1) G up to  $20^{\circ}$ S, symmetrical about due S direction.  
1317 7/8 and haze near Z. Green line very feeble in SW. Too dark elsewhere to see anything through spectroscope.  
1346 6/8, thin in parts. (1) G visible through gaps in cloud in S sky up to about  $50^{\circ}$ .  
1430 Almost 8/8, fairly thin. Very weak G visible through small gaps up to  $45^{\circ}$ S. Green line weak but distinct.  
1507 8/8. Darker than previously. LNS.  
1545 8/8. Fairly dark. Green line feeble.  
1700 8/8. Fairly light. Green line not visible on background continuous spectrum.

FEBRUARY 16.

- 1045 8/8 and mist. Sky light but no sign of green line.  
1208 8/8 and misty rain. Sky not completely dark but no line.  
1240 Same.  
1350 8/8 and misty rain. Now fairly dark.  
1500 Same.  
1640 8/8 and misty rain. Sky slightly lighter but no sign of green line.

FEBRUARY 17.

(0855 Sunset  
 (1131 End astronomical twilight  
 (1300 Moonset. Fraction illuminated: 0.78  
 (1549 Beginning astronomical twilight  
 (1822 Sunrise

0930 6/8. Still fairly light. No sign.

0945 5/8 scattered. No sign.

1025 3/8 scattered and a little mist. No sign of green line.

1040 2/8. No sign of green line.

1055 2/8. No sign.

1110 3/8. No sign. No line.

1115-1120 Same.

1123 3/8. (1) G up to  $20^{\circ}$ S. Line weak but definite.

1130 3/8. (1) G extends up to about  $25^{\circ}$ S.

1150 3/8 in W. Otherwise same.

1240 5/8 scattered. G still present. Green line visible in S only.

1330 1/8. (2) patchy G over most of S sky. (2) fan drapery NE to Z.

1335 3/8 mainly in S. Drapery now (1). (2) G in all parts of visible sky except NW.

1353 6/8, clear from SSE to Z. (2) G over all visible parts.

1404 1/8 low in S. (2) G from E to W round S sky up to  $40^{\circ}$ S with weak rays in E. Very feeble above  $40^{\circ}$ S to Z.

1432 2/8 scattered. (1) G to  $30^{\circ}$ S.

1455 4/8 in NW to SW. (1) G to  $30^{\circ}$ S.

1510 1/8 in S. (1) G to  $20^{\circ}$ S. G appears to be getting weaker at each observation.

1600 Same.

1630 1/8 in S. Twilight in SE. Green line weakly visible.

1700 1/8 scattered. Fairly light. No sign of green line on background continuous spectrum.

FEBRUARY 18.

(0853 Sunset  
 (1127 End astronomical twilight

FEBRUARY 18 cont'd.

(1411 Moonset. Fraction illuminated: 0.85  
 (1557 Beginning astronomical twilight  
 (1825 Sunrise

1035 7/8, clear in NE. (3) band NE to Z.

1036-1042 7/8. Only stars visible are in NW. (4) drapery visible through haze or thin cloud from  $20^{\circ}\text{SW}$  towards Z and another patch visible  $45^{\circ}\text{E}$ .

1044-1048 6/8 - stars now visible in ESE as well as in NW. (4) drapery visible through haze visible mainly in E sector. Appears to be from Z to ESE horizon, convex to N and entering NE sky. Considerable amount of light in N and W sky and near Z, that in the N sky partly due to moonlight. LNS.

1050 6/8 - clear in E and NW. Only part of display visible is diffuse edge of (3) feature convex to horizon extending from ESE to ENE at about  $20^{\circ}\text{E}$ . Odd (3) rays visible through thin cloud in SE.

1054 Almost 8/8. Small patch of display visible  $20^{\circ}\text{E}$ . Intensity is probably (2).

1055 8/8 and raining. No sign of auroral forms, but sky quite light.

BCO 1105 6/8. Clear parts in NW, SE and SW. Rays visible  $15^{\circ}\text{E}$ ,  $20^{\circ}\text{SW}$ . Green line visible even in N, but this may be due to scattered auroral light rather than direct light from a display in N sky. Moon bright in N.

1107 6/8 thin and the rest hazy. (2) RB gradually developed from ray bundles in ESE and extended to Z. Elsewhere patchily light through cloud.

1108 6/8. RB developed into (3) drapery extending from ESE horizon up to Z with a few waves. Motion in drapery not rapid.

1111 6/8. Became (4) and assumed a perfect curtain-like structure. Very bright green with weak red tinge along lower border. Curtain waving slowly.

DCO 1115 Drapery has gradually faded and contracted into ESE sky, low. Now (2) ray bundles near ESE horizon. Green line very distinct everywhere.

1120 Almost 8/8. Patchily light over all sky. Most of the light in N-NW probably due to moon. Green line very distinct.

1137 Same.

1145 Almost 8/8. Small portion of (3) ray bundle or drapery visible  $5^{\circ}\text{ESE}$  through small cloud gap.



FEBRUARY 18 cont'd.

- 1214 8/8 and thicker. Line still distinct.
- 1240 Almost 8/8. Small section of (3) drapery visible  $10^{\circ}$ ESE.
- 1320 8/8 thicker. Line still distinct everywhere although strongest in SE.
- 1352 8/8. Many light patches mainly in N sky. Green line distinct.
- 1452 8/8, thin in patches. Appears to be (2) G in E and NE. Green line distinct.
- 1525 8/8 and patchily light. Line distinct everywhere.
- 1545 4/8, mainly in S and haze elsewhere. (1) multiple arcs through Z. Evidence of activity in most parts of S sky through gaps in cloud. Green line present in N but no forms visible there.
- 1554 4/8 and haze. (2) G in S weakening to (1) near Z and extending into N sky down to  $45^{\circ}$ NE. Parallel arcs at first diffuse and then changed to (2) fan  $50^{\circ}$ ESE.
- 1557 4/8 mainly in W and haze elsewhere. (1) and (2) G over all S sky. No definite forms visible.
- 1610 Same with slight suggestion of rays  $5^{\circ}$ W.
- 1625 5/8 and haze. Patches (1) G visible through gaps in cloud in all S sky.
- 1644 3/8 scattered. Becoming light. Green line still distinct in S.
- 1715 7/8 - clear in SE. Green line not seen on background continuous spectrum.

FEBRUARY 19.

- (0850) Sunset
- (1119) End astronomical twilight
- (1531) Moonset. Fraction illuminated: 0.92
- (1601) Beginning astronomical twilight
- (1828) Sunrise
- 0940 7/8 patchy and misty. No sign.
- 1010 Same. No sign of green line.
- 1035 Same.
- 1040 5/8 and misty. Section of what appears to be (2) HA visible at  $65^{\circ}$ S - only apex visible. Slight suggestion of diffuse ray structure but difficult to tell because of mistiness.

FEBRUARY 19 cont'd.

- 1045 HA(?) moved to Z and split now into definite multiple (1) arcs, E-W. These appear to be centred slightly E of S, but the ends cannot be seen clearly.
- 1046 5/8 and haze. Same and diffuse (2) ray bundle very low due S visible through thin mist.
- 1047 Another small (2) ray bundle very low in SSE. Both became lost in cloud.
- 1042 5/8 and haze. Display much weaker in Z. No forms visible but green line visible everywhere.
- 1055 8/8 but very thin in parts. Line visible everywhere. Few light patches in N sky probably due to moon although green line just as strong in N as in S.
- 1100 Same.
- 1115 8/8. Moon bright through thin cloud low in N. Line clear everywhere.
- 1135 8/8 thin in parts. Several stars weakly visible high in NW. Line distinct but no forms visible.
- 1208 5/8 and mist. Sky very light but green line not distinct. May be present on background continuous spectrum.
- 1237 8/8, thin in parts. No sign of green line after close scrutiny.
- 1308 Almost 8/8. Fairly light in patches. No line.
- 1318 7/8 and haze near Z. Green line present in S and up to Z. In Z there appears to be a band from E to W, probably (2).
- 1332 8/8. Quite light in patches. Continuous spectrum visible but green line extremely weak if present at all. At one stage appeared to be a very vague suggestion of it in SE but not certain.
- 1403 8/8. Light all over sky with lighter patches near Z and in SE. Green line visible.
- 1430 8/8. Light patches, but green line not visible.
- 1445 8/8 and light drizzle. Line just visible in E.
- 1504 8/8. Sky still fairly light. Line not definitely seen.
- 1521 Same.
- 1537 8/8. Sky light. Green line weak but definite.

FEBRUARY 19 cont'd.

- 1552 8/8. Too dark to seek line.  
1607 Same.  
1635 8/8. Sky appears light only after long  
 accustoming of eyes. Green line not  
 seen on diffuse continuous background  
 spectrum.  
1715 8/8 and mist and light drizzle. Twilight.  
 No sign of green line on background  
 spectrum.
- 

FEBRUARY 20.

- 0940 8/8. No line.  
1012 Same.  
1020 8/8. Uniformly light. No line.  
1030 Same.  
1045 Same.  
1100 8/8. Not very dark. No green line.  
1125 Same.  
1152 Same.  
1258 Same.  
1350 Same.  
1420 Same.  
1600 Same.  
1725 8/8. Now fairly light but no sign of  
 green line on continuous background  
 spectrum.
- 

FEBRUARY 21.

- 0930 8/8. No sign.  
1045 8/8. Fairly light. No sign. LNS.  
1130 8/8. Fairly light. No sign of green line.  
1205 Same.  
1235 Same.  
1255 Same.  
1326 Same.  
1358 Same.  
1440 Same, though slightly lighter - probably  
 due to moon.



FEBRUARY 21 cont'd.1525 Same.1615 Same.1715 Same.FEBRUARY 22.0930 8/8 and mist. Sky fairly light. LNS.1015 Same.1045 Same.1055 8/8 and mist. Sky fairly light. No sign of green line.1155 Same.1300 Same.1405 Same.1500 8/8 and light rain. No green line.1615 8/8 and raining. Quite light. No line.FEBRUARY 23.

(0840 Sunset

(0902 Moonrise. Fraction illuminated: 0.99

(1104. End astronomical twilight

(1614 Beginning astronomical twilight

(1835 Sunrise

0930 8/8 and misty rain. No line.0940 Same.1030 8/8. Mist lifted slightly. No line.1043 Same.1200 8/8. Fairly light. No line.1232 8/8. Fairly light, but no sign of green line on weak continuous background spectrum.1327 Same.1425 8/8 but patchy and thin in parts. Very light and green line now distinct in all sectors, particularly in Z and E. Moon bright behind clouds in N.1440 Almost 8/8 - small clear patch 5°WSW where (2) patch visible.1447 Almost 8/8. Same and clear patch 30°SW where one star visible. No sign of aurora here.

FEBRUARY 23 cont'd.

- 1500 Almost 8/8. Small hazy patch  $5^{\circ}$ - $15^{\circ}$ WSW and moon visible through thick haze in NNW. (2) HB rising apparently from horizon and curving N at about  $5^{\circ}$ . Gradually diffusing and fading.
- 1520-1525 8/8 haze with moon and only very few stars visible. (3) RB  $45^{\circ}$ NE suddenly appeared through haze. This faded and patches appeared near Z developing into (3) partial corona which faded. (3) RB developed from  $45^{\circ}$ E to  $80^{\circ}$ N and curved S to Z. This faded and an (3) ray bundle appeared  $30^{\circ}$ ENE. (2) ray appeared  $5^{\circ}$ WSW when first of display in NE was seen. These intensities may have been (4) but bright moon and haze made determinations difficult.
- 1530 Almost 8/8 haze. Few stars visible through haze in Z but no sign of auroral forms here or elsewhere.
- 1536 Green line may be visible on background continuous spectrum in Z.
- 1545 General haze with stars visible in many parts of sky particularly in Z and SW. Green line distinct in Z and most of S sky. Appears to be an HB from  $50^{\circ}$ WSW to  $45^{\circ}$ S, but could be cloud although line quite distinct. If auroral its intensity is (2).
- 1551 Green line still visible in S sky, particularly round  $40^{\circ}$ SW.
- 1605 Patches which could be (2) aurora about  $45^{\circ}$ SW. Green line still visible.
- 1607 (2) HA appeared from  $5^{\circ}$ W through  $80^{\circ}$ S becoming lost in haze in E sky. Green line distinct as spectroscope is swept across arc.
- 1609 Now also (2) triple HA through Z. Cloud and haze almost everywhere but Z and SW sky still clearest.
- 1612 Only multiple zenithal arcs now visible in W and Z. Believe  $80^{\circ}$  HA faded.
- 1615 Multiple arcs began to diffuse in W and then HA with clearly defined S edge appeared at  $75^{\circ}$ S and persisted for a few minutes and then faded out. Multiple arcs reappeared.
- 1620 Still hazy over entire sky, thinnest in Z and due S.  $75^{\circ}$  HA reappeared and faded again. (3) ray bundle appeared  $5^{\circ}$ W and faded.

FEBRUARY 23 cont'd.

- 1630 Patches of RA across S sky following  $40^\circ$  path. Brightest patch in SW where intensity may be (4), certainly (3). Also patch due S and another patch SE. SW segment occasionally in rapid motion with rays travelling from W to E.
- 1634 Only remaining sign of RA is (3) segment  $30^\circ$ SE. Broad diffuse HA's through Z and down to about  $40^\circ$ N. Intensity must be (2), but they are very difficult to see. Haze has cleared considerably in S.
- 1638 4/8 scattered, mainly in N. Moon bright. All that can be definitely seen is the ends of three diffuse HA's from W horizon to  $30^\circ$ SW.
- 1640 Green line visible over all S sky. Three broad arcs continue and can be seen in W sky to due S becoming lost in cloud in the E sky. Elevations are  $40^\circ$ S,  $60^\circ$ S and through Z.
- 1646 The three (2) HA's now visible almost in their entirety.
- 1648  $40^\circ$  HA fairly distinct and almost (3). Irregularity developed in E W end of arc and began to be rayed at E end shortly after. Zenithal arc now through  $80^\circ$ N and  $60^\circ$  are through  $80^\circ$ S.
- 1700 Zenithal arcs continue from  $80^\circ$ N to  $70^\circ$ S.
- SEVERAL PHOTOGRAPHS BETWEEN 1648 AND 1706.
- 1705 Extraordinarily bright band through Z with vivid reds and greens, in rapid rippling motion from W to E. Suddenly ceased and then began again, contracting to E sweeping up from  $50^\circ$ SW. Another (4) drapery developed  $30^\circ$ W.
- 1710 Another (4) band developed from W to E passing through  $80^\circ$ S and curving sharply back on itself at the E end and passing back through  $70^\circ$ S. Rapid rippling again in both E and W directions. Contracted to E again. Small (4) ray bundle appeared  $15^\circ$ SW.
- 1716 Remnant of (3) RA  $30^\circ$ SE.
- 1720 Remnant RA  $15^\circ$ SE seen against twilight. Possibly DS from  $45^\circ$ NE to Z. Green line visible in most parts of sky.
- 1725 (2) HA  $15^\circ$ S, rapidly fading.
- 1728 (2) HA reappeared  $15^\circ$ S.
- 1731 HA now faded. No sign of green line on background continuous spectrum.



FEBRUARY 23 cont'd.

- 1737 Cloud has gradually diminished and is now 1/8 scattered. Line not visible.
- 1748 Now very light although some bright stars still visible. No sign of green line.

FEBRUARY 24.

- (0837) Sunset  
 (0909) Moonrise. Fraction illuminated: 0.95  
 (1100) End astronomical twilight  
 (1617) Beginning astronomical twilight  
 (1837) Sunrise

0935 7/8 broken. Still twilight. No line.

0958 7/8. Line distinct in S and Z. Moon bright low in E.

BCO 1025 6/8 scattered. (2) RB visible from SE horizon to 35°S between cloud banks. RB is diffuse and variable in intensity.

1027 5/8 broken. RB faded to (1) and SE end now risen to about 30° ESE.

1033 6/8, clear in SE. (1) ray bundle 10°-30° SE, remnant of RB.

1038 6/8 broken. (3) ray sheet visible very low on WSW sky-line. Light band visible through cloud across sky at 35°S.

1040 Ray sheet faded to (1).

1043 5/8. Again (2) low on WSW skyline. (1) and (2) glow low in S, apparently sheet of diffuse rays.

1045 Small (2) DS appeared for a few seconds 80°S. (2) ray sheet still present on WSW skyline below cloud bank.

1049 4/8, mainly in E, N and NW. (1) fan drapery to Z from line right across S sky at 70°S, forming partial corona. (1) and (2) isolated rays and short RB's over practically all of the low S sky below about 50°S.

1050 One of these low in S reached (3) momentarily. Corona and fan drapery faded. Several very long (2) rays almost to Z from 50°SSE.

1053 Short (2) E-W band appeared in Z for few seconds only.

1054 Rays in S have joined into perfect (2) RA at 20°S.

FEBRUARY 24 cont'd.

1100 Has gradually clouded over to 6/8 again, but broken everywhere except in NE sector. (2) HA gradually faded right away. Now (2) and (3) activity visible through very narrow cloud gap right on SW skyline, i.e. at  $80^\circ$ .

1105 Almost 8/8, broken slightly in parts of S sky. (2) activity still present on SW-WSW skyline. Several sections of (2) G across S sky - possibly parts of arc or band.

DCO 1113 Cloud now thicker where previous signs of arc or band were. Has remained much the same otherwise with (2) activity still present along SW skyline.

1120 Same.

1125 Same.

1145 8/8. No forms visible. Line distinct over S sky.

1220 8/8. LNS.

1235 8/8. Line distinct.

1250 Same.

1320 6/8 broken with clear patches in SE and Z. Line distinct in S sky particularly in SE where there appears to be a fairly uniform (1) G below  $20^\circ$ .

1405 5/8 scattered. Green line present in E and W and in N sky. Moon very bright in N but close observation reveals broad diffuse HA, probably double, with lower edge about  $50^\circ$ N and upper edge about  $80^\circ$ N. Only the W parts can be seen at all.

1424 6/8, clear in Z and NE. Only E end of N HA visible. Intensity may be (2). Green line distinct in NE but not seen elsewhere. Elevation of HA about  $50^\circ$ N.

1500 8/8. No sign of line on background continuous spectrum.

1525 Same.

1555 Same.

1630 Same.

1714 Same.

FEBRUARY 25.

- (0835 Sunset  
 (0918 Moonrise. Fraction illuminated: 0.89  
 (1057 End astronomical twilight.  
 (1622 Beginning astronomical twilight  
 (1840 Sunrise
- 0920 1/8 scattered. No sign. LNS.
- 0930 Same.
- 0944 0/8. Perfect (1) HA through  $20^{\circ}$ S right across sky.
- 0946 HA now appears to be double with lower edges through  $20^{\circ}$  and through  $23^{\circ}$ .
- 0955 Has remained same.
- 1003 0/8. Double (2) HA  $20^{\circ}$ S and double (2) HA  $40^{\circ}$ S.
- 1015 0/8. Double (1) HA  $25^{\circ}$ S.
- 1020 Same and remnant (1) HA from WSW to about  $25^{\circ}$ SW.
- BCO 1032 4/8 scattered. Partial corona formed by (1), (2) and (3) rays from E, S and W. Some (3) activity through small cloud gap low in SW.
- 1034 Short drapery E of Z reached (4) and faded into series of very narrow bands through Z, (1), (2) and (3).
- 1036 Faded to (2) and display is mainly one E-W band for short distance either side of Z and several tattered ray bundles high in E, W and S. Not much resemblance to corona.
- 1040 (1) HA through Z. Patch visible  $5^{\circ}$ E beneath cloud - moving from S to N and reached (4).
- 1042 Patches of (3) activity through gaps in cloud about  $15^{\circ}$ S. Probably HA or HB. (2) rays visible above cloud  $70^{\circ}$ S. (2) fan drapery developed in S near Z then faded to (1) and disappeared.
- 1045 5/8 broken. Band in S appears to have broadened from  $10^{\circ}$  up to  $30^{\circ}$ S. Has varied in intensity between (2) and (4) and has shown rayed features.
- 1046 (4) band in W with (4) part moving towards E end.
- 1048 Band moved so that SW end is now about SSW, (3).
- 1050 Band now (4) and extends from SSW sloping up to  $20^{\circ}$ SE. Occasionally shows rayed features with rippling from W to E. (2) ray bundles low in W.



FEBRUARY 25 cont'd.

- 1052 Band now (3) with rippling from E to W. No activity in Z.
- 1054 Band now broad sheet of (2) rays from S horizon to Z. Very long (1) rays from W and NE to Z, those from NE fading.
- 1055 Ray sheet in S has formed double (2) drapery from S straight up to Z and forms fan on E side of Z.
- 1058 Fan gradually moved westwards. Fading and is now diffuse (2).
- 1059 2/8. Weak diffuse activity with slight suggestion of rays in S-SSE to  $20^{\circ}$ .
- 1100 (2) ray sheet  $20^{\circ}$ - $30^{\circ}$ SSE with very long rays reaching almost to Z.
- 1102 2/8 scattered. (2) diffuse sheet of long rays moved up from SSE and gradually moved more S. (2) ray  $40^{\circ}$ - $60^{\circ}$ NE.
- 1104 2/8 scattered. (1) diffuse sheet of rays from  $20^{\circ}$ S almost to Z. Gradual westward shift continues.
- 1105 (1) diffuse patch  $30^{\circ}$ SSW developed and faded out.
- 1106 Now only very weak G low in S. Green line very distinct in S fading out towards Z and not present in N sky.
- 1108 (2) HA  $10^{\circ}$ S partly hidden by haze. (1) rays beneath HA.
- 1112 HA centred SSW with apex behind plateau probably through  $8^{\circ}$ .
- 1114 Arc now rayed.
- 1117 RA now remnant in SE, elevation at S end about  $15^{\circ}$ .
- 1120 3/8 scattered with thin haze to  $15^{\circ}$ S. (3) RB from WSW horizon to  $30^{\circ}$ S where it fades out. This developed out of fairly uniform (2) activity just visible above top of plateau. Motion of RB from W to E.
- 1122 RB now faded to (2).
- 1123 Band now (1). Remnant (2) broad HA  $15^{\circ}$ S to SE.
- 1125 (1) remnant HA  $15^{\circ}$ S to SE. (1) HA  $35^{\circ}$ - $40^{\circ}$ S with semblance of rays at W end. Very faint rayed activity below remnant right down to horizon in S.
- 1126 Remnant HA gone. (2) ray on S horizon.

FEBRUARY 25 cont'd.

1128 (1) HA 25°S and (1) HA 40°S.

1129 (2) HA 25°S.

SEVERAL PHOTOGRAPHS BETWEEN 1130 AND 1132.

1130 (3) HA about 20°S.

1132 SW end has drifted towards S, but still in form of arc, centred SSE.

1134 Intensity down to (1). Long (1) rays under arc very low in SSE.

1138 3/8 broken, mainly in N. Green line present over all S sky. Long (1) rays from S gradually diffusing towards Z.

1140 (1) G over most of S sky. Difficult to see upper limit because of bright moon.

1142 (1) ray 10°SE gradually fading away.

1146 (1) ray sheet from S to SE reaching up to (1) HA through 40°S. Also very diffuse (1) HA's 50°S and 70°S.

1150 Now only one (1) HA, through 60°S with three broad diffuse (1) bands sweeping up from S and SE to HA.

DCO 1201 0/8. Fairly uniform (1) G over S sky with isolated diffuse rays occasionally.

1213 2/8 scattered mainly in Z and SW. No forms visible but (1) G continues.

1233 7/8 broken. No sign of green line on continuous background spectrum.

1246 7/8. Section of (3) RB visible very low in W below cloud bank.

1318 3/8 scattered mainly in S. Green line present in all S sky. Appears to be activity behind cloud 10°S.

1329 7/8 broken. Line not visible on background spectrum.

1420 Almost 8/8. Line not visible.

1455 7/8 broken. Line not visible.

1555 0/8. (1) HA 10°S. Several diffuse patches in SW from 15° to 80° and possibly in Z and NE, (1). Green line feeble in these but very distinct across HA.

1612 0/8. (1) HA now through 20°S and perhaps a little brighter than at last obs. (1) patches in SW occasionally assuming ray form. (1) pulsations over most of S sky. Not visible in N where moon is brilliant.

FEBRUARY 25 cont'd.

- 1623 1/8 scattered. Great (1) DS's in S sky, mainly round  $45^{\circ}$ S and  $45^{\circ}$ WSW. Pulsations not seen.
- 1638 1/8 scattered. (1) HA  $15^{\circ}$ S, (1) HA  $20^{\circ}$ S. (1) rays in SSE beneath arcs. (1) DS's to  $45^{\circ}$ S occasionally weakly pulsating.
- 1650 0/8. (1) HA  $12^{\circ}$ S. (1) DS's much less extensive but still discernible. No pulsations visible.
- 1704 0/8. Perfect night. (1) HA's  $15^{\circ}$ S and  $20^{\circ}$ S. No sign of DS's.
- 1716 0/8. (1) HA  $15^{\circ}$ S. Green line still seen there although HA is difficult to see in brilliant moonlight and increasing twilight.
- 1724 Same.
- 1737 0/8. No sign of green line on continuous background spectrum.

FEBRUARY 26.

- (0834 Sunset  
(0928 Moonrise. Fraction illuminated: 0.81  
(1054 End astronomical twilight  
(1625 Beginning astronomical twilight  
(1842 Sunrise
- 0930 Almost 8/8. No sign of green line.
- 1010 2/8 in S and NE. No sign. No line.
- 1030 Same.
- 1108 7/8. (3) patch  $10^{\circ}$ SE at edge of cloud bank.
- 1115 8/8. No sign. LNS.
- 1240 8/8. Line not visible on faint continuous background spectrum.
- 1308 Same.
- 1357 Same.
- 1510 Same.
- 1600 Same.
- 1650 Same.



FEBRUARY 27.

- (0831 Sunset  
 (0943 Moonrise. Fraction illuminated: 0.72  
 (1050 End astronomical twilight  
 (1628 Beginning astronomical twilight  
 (1844 Sunrise
- 0920 8/8 and mist. No sign of green line.
- 1045 Display reported from Lusitania Bay.  
 No sign here.
- 1115 8/8 and mist. Green line visible.
- 1140 8/8 and mist. No green line.
- 1200 Same.
- 1223 Same.
- 1247 Same.
- 1314 Same.
- 1335 8/8 and mist. Moon occasionally visible in  
 E through cloud. No sign of green line.
- 1400 8/8 and mist. No green line.
- 1427 Same.
- 1500 Almost 8/8. Moon dimly visible through  
 cloud. Sky very light. Green line may be  
 present on background continuous spectrum  
 but not definite.
- 1522 7/8 - some clear patches in N, E and in  
 S near Z. Green line visible low in SE  
 but form not discernible.
- 1531 7/8 - small breaks in most parts of sky.  
 Green line visible over most of S sky,  
 but very feeble.
- 1545 4/8 and haze in S. Green line distinct over  
 most of S sky but form not clear. May be  
 weak HA or G.
- 1553 5/8 and haze. Appears to be (1) HA 40°S.  
 Too indistinct with the haze to be photo-  
 graphable.
- 1600 7/8 with a few stars visible. Green line  
 feeble in S.
- 1610 7/8, mainly thick haze particularly in S.  
 Green line very distinct. Believe HA is  
 present about 40°S. Brighter patch, (2)-(3),  
 present 30°W.
- 1619 7/8. Green line still distinct in S but  
 forms not visible through thick haze.

FEBRUARY 27 cont'd.

- 1630-1641 7/8. Green line distinct in S. There could be (1) rays in Z and (2) patch  $10^{\circ}\text{W}$ .
- 1642 6/8. (1) pulsations in Z. Green line over all S sky. May be HA  $20^{\circ}\text{S}$ .
- 1650 6/8 fairly thin in Z. Green line distinct but impossible to tell which is auroral and which is thin cloud.
- 1700 6/8 and haze. No forms visible. No pulsations definitely seen although there are occasional suggestions of pulsations in Z.
- 1708 6/8 and haze. Green line visible in S only. No forms visible.
- 1718 7/8 and haze in Z. No forms visible but green line distinct.
- 1730 Almost 8/8. Very few stars visible through haze. Green line feeble in Z.
- 1750 Almost 8/8. Now quite light. Green line not visible on background continuous spectrum.

The following obs. are from Lusitania Bay.

- Till 1125 Almost 8/8 with occasional glimpses of auroral glow in E-S sky but nothing photographable.
- Till 1430 Has remained overcast with occasional slight breaks. Patchily light, but bright moon may be responsible.
- Till 1525 Has gradually cleared to 3/8 scattered. May be some extremely faint activity in Z but nothing else. Moon still high and bright.
- 1545 7/8 to 8/8, varying.
- 1610 4/8 and clearing. No sign.
- 1630 6/8 high cloud. Clear in E. No sign.
- 1645 6/8 very high cloud.
- 1700 7/8 high cloud. No sign.
- 1720 Almost 8/8, cloud thicker.
- 1748 Same.

FEBRUARY 28.

- (0820 Sunset
- (1005 Moonrise. Fraction illuminated: 0.61
- (1046 End astronomical twilight
- (1631 Beginning astronomical twilight
- (1845 Sunrise

FEBRUARY 28 cont'd.

- 0915 8/8 and misty. Line not visible.  
0950 8/8 and mist. Line feeble in S and Z.  
1040 8/8. Very dark.  
1130 Same.  
1145 Same.  
1210 Same.  
1234 7/8 - one star visible near Z. No green line.  
1300 7/8. Clear between Z and moon in NE. No sign of green line.  
1310 6/8. Clear in NE sky to Z. No green line.  
1321 8/8. No sign.  
1344 Same.  
1400 8/8 and mist.  
1420 8/8 and mist. Line not visible.  
1450 8/8, heavy mist.  
1513 Same.  
1520 Same.  
1530 8/8 and heavy mist. No green line.  
1600 Same.  
1623 Same.  
1631 Same.  
1653 Same.  
1750 8/8 and mist. Line not visible on background continuous spectrum.  
 The following obs. are from Lusitania Bay.  
1030 Some (1) and (2) rayed activity through haze over most of S sky.  
1100 Very faint activity over all S sky and in Z. Suggestion of very diffuse arcs.  
1125 Very weak fluctuating bands in Z.  
1145-1400 8/8. No sign.  
1415 0/8. Very weak activity in Z and possibly very low in S.  
1430-1440 0/8. (1) HA 15°S.



FEBRUARY 28 cont'd.

By 1505 Faded. Very weak activity in region of  
previous HA.

1530-1730 8/8. No sign.

8/8 all night with no sign of green line.  
Obs. were made at the following times: 15:30, 15:45, 16:00, 16:15, 16:30, 16:45, 17:00, 17:15, 17:30, 17:45, 18:00, 18:15, 18:30, 18:45, 19:00, 19:15, 19:30, 19:45, 20:00, 20:15, 20:30, 20:45, 21:00, 21:15, 21:30, 21:45, 22:00, 22:15, 22:30, 22:45, 23:00, 23:15, 23:30, 23:45, 24:00.

Also 8/8 all night at Hawaiian Bay.

MARCH 1.

1000 3/8. (2) RA in SE. Since last obs. cloud has varied between 1/8 and 3/8. No sign of green line.  
1010 3/8. (2) RA in SE and slight G. line visible.  
1024 3/8 and mist. (2) RA in SE.  
1030 Same.  
SEVERAL PHOTOGRAPHS BETWEEN 1001 AND 1030.  
1042 3/8. (2) RA in SE.  
1053 3/8. mainly in W and S. (1) diffuse G with semblance of rayed structure in SE to W.  
1100 3/8. (1) RA in SE and SW portions obscured by cloud.  
1105 (1) RA still present.  
1112 RA now (2) and through 15° S.  
1120 W and E ends of RA obscured by cloud. Slow motion of rays in arc from W to E.  
1127 Same.  
1137 RA now almost (3) and has long rays from S towards E.

MARCH 1951.MARCH 1.

(0827 Sunset  
 (1041 Moonrise. Fraction illuminated: 0.50  
 (1043 End astronomical twilight  
 (1633 Beginning astronomical twilight  
 (1847 Sunrise

8/8 all night with no sign of green line.  
 Obs. were made at the following times :-

0915, 1016, 1115, 1140, 1215, 1245,  
 1315, 1345, 1415, 1445, 1515, 1727.

Also 8/8 all night at Lusitania Bay.

MARCH 2.

(0824 Sunset  
 (1039 End astronomical twilight.  
 (1138 Moonrise. Fraction illuminated: 0.38  
 (1636 Beginning astronomical twilight  
 (1849 Sunrise

BCO 0910 2/8. Still fairly light. No sign of display.

0945 Since last obs. cloud has varied between 1/8 and 6/8. No sign of green line.

1003 4/8. (2) RB's in SSE.

1010 5/8. (2) RB in SSE and slight G. Line visible.

1024 5/8 and mist. (2) RB in SE.

1030 Same.

SEVERAL PHOTOGRAPHS BETWEEN 1031 AND 1316.

1042 3/8. (2) RB in SE.

1053 3/8, mainly in W and S. (1) diffuse G with semblance of rayed structure in SSE to 15°.

1100 3/8. (1) RA 10°S. SE and SW portions obscured by cloud.

1105 (1) RA still present.

1117 RA now (2) and through 15°S.

1120 W and E ends of RA obscured by cloud. Slow motion of rays in arc from W to E.

1125 Same.

1127 RA now almost (3) and has long rays from S towards Z.

MARCH 2 cont'd.

- 1128 RA momentarily (4). Cloud obscuring part due S.
- 1150 6/8. (1) G visible through breaks in cloud in S. No features visible at present. There have been occasional rays since last entry.
- 1200 7/8. No sign.
- 1216 7/8. Patches of (1) G visible in S through cloud gaps.
- 1230 6/8. Patches of (1) G visible through occasional cloud gaps in S.
- 1259 (2) HA through  $10^{\circ}$ S and RA through  $5^{\circ}$ S.
- 1305 4/8. (2) HA still present.
- 1316 (1) HA  $15^{\circ}$ S. Glow in SW.
- 1321 Pulsating bands sweeping in S to N direction from  $15^{\circ}$ S to  $45^{\circ}$ N.
- 1330 Same and slight glow from SE and SW to about  $50^{\circ}$ . HA possibly still present.
- 1339 (1) pulsations still present from S to about  $45^{\circ}$ N. (1) G in S.
- 1350 Same.
- DCO 1410 7/8. No sign.
- 1435 Almost 8/8. Green line still visible.
- 1455 7/8 and haze in SW. Green line visible but no forms.
- 1525 Almost 8/8. Green line not visible.
- 1550 7/8. Clear patch in Z and cloud thin in S. Green line visible in S. There may be a band or HA  $10^{\circ}$ S through haze.
- 1600 7/8 and haze. LNS.
- 1625 6/8 and haze in S. Green line present in S. May be (1) G to  $15^{\circ}$ .
- 1640 Same.
- BCO 1655 1/8. Green line present low in S where (1) G visible.
- DCO 1712 1/8. No sign. LNS.
- 1722 1/8. Line not visible. Twilight increasing in E.
- 1730 5/8 scattered. No sign of green line on background continuous spectrum.



MARCH 2 cont'd.

1748 3/8 scattered. No sign of green line.

1755 3/8 scattered. Still dark enough to see  
(2) display if one were present. No sign.  
LNS.

The following obs. are from Lusitania Bay.

Till 1045 Cloud has been thin and has varied  
between 7/8 and 8/8. Signs of weak  
general glow through broken cloud to  
45° or 50°S.

1100-1120 5/8 and variable haze. Appears to be weak  
G in S through broken cloud.

Till 1215 3/8 mainly in S and variable haze else-  
where. Otherwise same.

Till 1325 2/8. Diffuse (1) G over S sky with upper  
edge extremely diffuse. Has now commenced  
to fluctuate with very regular (1 sec.)  
waves right across sky moving rapidly one  
after another from G in S through Z and  
continuing right into N sky in N direction  
being lost at about 45°N. Waves are in  
form of complete regular arcs centred on  
N-S line.

1335 G now extends nearly to Z, being patchy  
high up. Waves now more rapid and slightly  
less regular (three or four per sec.) but  
still sweeping northwards through Z to  
about 40°N.

SEVERAL PHOTOGRAPHS BETWEEN 1355 AND 1505.

1355 HA through 5°S.

1400 (1) HA now through 10°S.

1401 Waves weaker now but still running from S  
to N right into the N sky.

1405 (1) HA still present 10°S.

1412 (2) band 10°S.

1415 Band faded to (1).

1417 (2) HA about 15°S.

1420 (1) patchy activity around 15°S.

1422 Display in S now only uniform G. Some  
fairly rapid flaming (1) round Z and into  
N sky. Motion now appears to be from  
N to Z.

1500 Has continued to be about 2/8 scattered  
low in E and S. (1) display now very  
active with huge sheets pulsating and  
flaming over entire sky down to 30°N.  
Edges diffuse and not stationary.

MARCH 2 cont'd.

- 1505 Perfect night. Weak flaming continues.
- 1540 1/8. Display has slowly weakened and contracted to S. Now weak almost uniform G below  $30^{\circ}$ S. Now no sign of pulsations.
- 1640 2/8. Perfectly calm crystal clear night. Display has continued to fade slowly and now may not be present although sky light in S.
- 1720 0/8. Dawn approaching. No sign.

MARCH 3.

- (0822 Sunset  
(1036 End astronomical twilight.  
(1255 Moonrise. Fraction illuminated: 0.27  
(1639 Beginning astronomical twilight  
(1851 Sunrise

- 0915-1000 Cloud has varied between 8/8 and 1/8. No sign of green line or auroral forms.
- 1026 4/8. (2) HB  $30^{\circ}$ S indistinct through cloud.
- 1043 8/8. Patches of light sky. Green line visible in S.
- 1051 8/8. Glow visible through cloud about  $25^{\circ}$ SW.
- 1100 6/8. Diffuse rayed structure visible in SE and SW through cloud.
- 1118 3/8. All visible sky except part low in N covered with (1) glow. Diffuse bundle of (2) rays superimposed on G in SSE.
- 1121 3/8. G covers entire sky except for portion up to  $15^{\circ}$ N where the edge is fairly clearly defined.
- 1133 6/8. Faint glow visible in S.
- 1152 8/8. No sign.
- 1210 1/8 in S. No distinct features visible. May be (1) G in S.
- 1211 Green line visible over most of S sky.
- 1218 1/8 in S. No forms visible LNS.
- 1231 1/8. No definite features visible (1) G extends to about  $30^{\circ}$ S. Green line distinct.
- 1240 Almost 8/8 - stars occasionally visible  $80^{\circ}$ SW. Patches of glow visible in SE and near Z. The latter may be scattered light.

MARCH 3 cont'd.

- 1303 6/8, clear in Z. No sign.
- 1319 6/8 and rain. Clear patch near Z. No sign.
- 1330 8/8. No sign of green line.
- 1403 8/8. No sign.
- 1408 Heavy rain or hail. No obs.
- 1425-1445 0/8 most of the time, increasing to 2/8. Very feeble G or HA to  $5^{\circ}$ S. Far too feeble to photographable - appears less intense than the milky way.
- 1453 2/8. No sign.
- 1500 (1) ray bundle through thin cloud  $5^{\circ}$ S.
- 1500-1508 1/8 in S. (1) ray bundle visible occasionally in S but not very distinct through haze.
- 1514 4/8 in SE, S and W. No sign. LNS.
- 1520 Raining. No obs.
- SEVERAL PHOTOGRAPHS BETWEEN 1530 AND 1640.
- 1530 (2) HA through  $20^{\circ}$ S, partly obscured by cloud.
- 1531 HA being obscured by cloud.
- 1533 Raining.
- 1538 4/8 scattered. HA obscured.
- 1542 6/8 scattered. HA obscured.
- 1555-1605 (2) HA through about  $20^{\circ}$ S occasionally visible through breaks in cloud. Obscured by 2/8 cloud at end of obs. period.
- 1608-1614 2/8 in S obscuring all photographable features of (2) HA or G extending to about  $25^{\circ}$ S. Lower edge not visible.
- 1620 Same.
- BCO 1625 (1) pulsations over most of S sky.
- 1630 1/8. Pulsations continue over all S sky.
- 1640 Diffuse ray sheet in W to  $30^{\circ}$ . DS  $70^{\circ}$ NNW. Diffuse G continues in S. No rapid pulsations.
- DCO 1645 2/8 and haze. No features visible.
- 1650 7/8. No sign.
- 1655 8/8. No sign.



MARCH 3 cont'd.

- 1700 Raining.
- 1708 1/8 in E and S. (1) G continues in S to 15°.
- 1715 4/8 scattered. No definite sign. LNS.
- 1725 1/8 scattered. Twilight increasing in E. Line not visible.
- 1735 6/8. LNS.
- 1745 5/8 scattered. No sign.

The following obs. are from Lusitania Bay.

Till 1100 Has been almost 8/8 most of the time. Vile night. Some signs of G to S. At 1045 section of a definite arc became visible for short time about 15° SSE but was rapidly lost again in cloud.

Till 1130 Has remained 8/8.

- 1145 Cleared to 2/8. Possible faint G in S.
- 1215 Almost 8/8. No sign.
- 1300 Same.
- 1330 5/8 - 6/8 broken. Clear patches in S. No sign of activity.
- 1400 5/8 and haze. No sign.
- 1435 1/8. No sign.
- 1505 5/8. No sign.
- 1605 5/8. Appears to be very weak G low in S between broken cloud.

MARCH 4.

- (0820) Sunset
- (1033) End astronomical twilight
- (1426) Moonrise. Fraction illuminated: 0.18
- (1642) Beginning astronomical twilight
- (1853) Sunrise

1135 Frequent obs. till now. Always hazy or cloudy with no sign of aurora. LNS. Now 8/8 haze. No sign of green line. Sky not completely dark.

1200 Almost 8/8, mostly thin. Stars visible through haze from E to W through Z. No sign of display.

1245 8/8 haze. Green line visible in S. May be (1) G or (1) HA through about 40° S.

MARCH 4 cont'd.

1300 8/8 haze. Line not visible but believe (1) HA or G continues.

1325 8/8 haze. E end of (2) RA which would pass through about  $25^{\circ}\text{S}$  visible.

1343 8/8 heavy haze. Patches of glow visible in S through thin parts of haze.

1400 8/8 haze. No forms visible LNS.

1440 Haze now thinner. (1) G over most of S sky, or may be (1) HA from  $20^{\circ}\text{S}$ .

1512 0/8 with very slight haze. (1) HA  $15^{\circ}\text{S}$ , very diffuse.

1536 0/8. Arc appear double with one through  $15^{\circ}\text{S}$  and one just visible above plateau through  $8^{\circ}\text{S}$ .

SEVERAL PHOTOGRAPHS BETWEEN 1551 AND 1557.

1551 (2) HA, almost (3) at W end, through  $15^{\circ}\text{S}$ .

1555 (2) HA continues. (1) rays under arc at SSE end.

1603 HA now more diffuse and (1).

1622 0/8. HA still diffuse and (1) along most of its length but (2) at W end.

1629 Same.

1637 HA now (1).

1700 0/8. Very feeble G in S to  $15^{\circ}$ .

1720 Same.

1800 1/8. Quite light. No sign of green line on continuous background spectrum.

The following obs. are from Lusitania Bay.

1015 3/8 and haze. Suggestion of extremely weak G low in S and extremely weak HA about  $15^{\circ}\text{S}$ .

1035 Appears to be remnant (2) HA low in SSE visible through haze.

1050 Hazy. (1) G or perhaps broad remnant HA low in SSE.

1100 Hazy. Region of weak G seems to have shifted to S-SSW below about  $15^{\circ}$ .

1120 0/8 but hazy. Dark. No sign.

1130 Same.

1245 Same.

MARCH 5.

- (0818 Sunset  
 (1030 End astronomical twilight  
 (1600 Moonrise. Fraction illuminated: 0.10  
 (1645 Beginning astronomical twilight  
 (1855 Sunrise
- 0915 Almost 8/8. No sign. LNS.
- 1130 Almost 8/8 - some stars visible in W near Z. G visible through cloud or thick haze 15°WSW. Green line visible.
- 1150 Same.
- 1210 8/8. Possible weak glow through cloud 10°SW. LNS.
- 1240 8/8. Very dark. LNS.
- 1315 Same.
- 1335 Raining. No obs.
- 1420 8/8 and beginning to rain again. Too dark to see anything through spectroscope.
- 1607 Same.
- 1712 Cloud began to thin over most of sky during obs. revealing what is either (2) G or (2) HA about 20°S with G extending to about 40°S.
- 1730 8/8 again. Patches of light in most parts of sky. Probably twilight. LNS.
- 1755 8/8. Fairly light. Green line not visible on background continuous spectrum.

MARCH 6

- (0815 Sunset  
 (1027 End astronomical twilight  
 (1647 Beginning astronomical twilight  
 (1731 Moonrise. Fraction illuminated: 0.04  
 (1857 Sunrise
- 0920 0/8. No sign. No line.
- BCO 0929 2/8. (2) rays from 40°SE and 40°NE to Z forming fan drapery. Rapidly fading.
- 0931 (2) ray from 70°W to Z.
- 0940 (2) multiple HA from ENE to W through 80°N. (2) short-diffuse ray 30°SE.
- 0945 1/8 in S. HA developing slight irregularity near Z. Ray in SE not visible.
- 0947 Arcs became somewhat diffuse but now very distinctly double from E to 45°W and triple from 45°W to about 10°W.



MARCH 6 cont'd.

- 0949 Multiple arcs now fused in W half showing a few striations along length. Very broad and diffuse over E half. N limit passes through Corvus in NE and the triangle of Canis Major in N and Lepus in NW.
- 0953 N edge becoming diffuse and irregular from E to Z. Base of E part passes through Corvus at N edge and to S of  $\alpha$  and  $\beta$  Centauri at S edge. Diffuse in between.
- 1002 E portion now extends from NE to SSE. W half still fairly narrow.
- 1005 1/8. Multiple (2) HA through about  $70^{\circ}$ N still same. Signs of weak activity across S sky below  $20^{\circ}$ .
- 1008 1/8. (1) HA now formed through  $20^{\circ}$ N.
- 1015 (2) multiple arc about  $70^{\circ}$ N with slight distortions towards Z. (1) HA  $25^{\circ}$ N. (2) ray bundles across S sky at about  $10^{\circ}$  - almost RA.
- 1020 0/8. (1) HA in N has risen to  $40^{\circ}$ N. (2) multiple arc has now risen to between  $80^{\circ}$ N and Z. Has spread into very broad sheet up from E horizon. Ragged diffuse (2) RA at  $15^{\circ}$ S. Some very long weak rays from SE section of this reach almost to Z.
- 1025 Practically no change.
- 1030 Same.
- 1032 Main zenithal display still (2) but has broadened along its entire E-W length to approx.  $20^{\circ}$  wide (from Z to  $70^{\circ}$ N) and now has appearance of striated sheet.
- 1037 (1) HA at  $45^{\circ}$ N still extremely weak. (2) E-W striated sheet through Z would be almost regular arc shape if there were not a slight smooth dint southwards at Z. (2) ragged ray bundles in S form almost double RA, one at  $15^{\circ}$ , the other partially overlapping rays of first and passing through about  $25^{\circ}$ S.
- 1038 Reached (3) momentarily in SSE.
- 1048 Has remained practically same as at 1037 entry. Main zenithal display now slightly less irregular through Z.
- 1056 Display in S same (double diffuse (1) and (2) RA  $15^{\circ}$  and  $25^{\circ}$ ). (1) HA  $40^{\circ}$ N. Main (2) display now moving N and almost HA centred about  $65^{\circ}$ N with (1) G from it up to Z.

MARCH 6 cont'd.

- 1105 (2) HA still moving steadily N and now passes through about  $50^{\circ}\text{N}$  with quite sharp lower edge. Some weaker striated activity E-W between this main arc and Z. Activity in S has risen and is now single irregular and diffuse (2) RA at  $30^{\circ}\text{S}$ .
- 1109 (2) arc still moving slowly N. Now through  $40^{\circ}\text{N}$ . (1) HA  $25^{\circ}\text{N}$ . S sky now covered with scattered-ragged (1) and (2) ray bundles above  $30^{\circ}\text{S}$ . Momentarily (3) in a ray sheet on WSW horizon.
- 1110 Short (2) drapery now formed low in WSW.
- 1114 (2) tattered drapery in WSW has extended right across to  $30^{\circ}\text{SSE}$ . (3) low in WSW where it is more of a ray sheet. (2) HA  $30^{\circ}\text{N}$ . (1) HA  $20^{\circ}\text{N}$ . (1) HA through Z merges into ray sheet in W.
- 1116 Drapery now fairly diffuse in W.
- 1123 (2) HA through Z from E to W horizons, some striations and irregularities in W portion and double at about  $45^{\circ}\text{E}$ . N edge of (2) HA through  $30^{\circ}\text{N}$  lies exactly on Spica and Betelgeuse. (1) HA  $20^{\circ}\text{N}$ .
- 1128 (2) HA through Z has moved to  $75^{\circ}\text{N}$ . Slight irregularity at apex and ends in (3) ray sheet  $10^{\circ}\text{W}$ . (2) HA at  $30^{\circ}\text{N}$  moved to  $40^{\circ}\text{N}$ . (1) HA  $25^{\circ}\text{N}$ . (1) diffuse RA  $40^{\circ}\text{S}$  becoming indistinct towards E end.
- 1135 Four HA's through  $25^{\circ}\text{N}$ ,  $40^{\circ}\text{N}$ ,  $60^{\circ}\text{N}$  and Z.
- 1137 (3) ray sheet  $10^{\circ}\text{W}$  to  $60^{\circ}\text{W}$ .
- 1138 0/8. (2) fan drapery or RA across S sky through  $20^{\circ}\text{S}$  with rays extending to Z. HA's still present in N.
- 1142 (2) HA  $40^{\circ}\text{N}$  developing irregularity in NE with part sweeping up towards Z, the lower edge remaining regular. (1) HA  $25^{\circ}\text{N}$ . Diffuse (2) RA with long rays  $30^{\circ}\text{S}$ .
- 1147 0/8. (2) HA  $40^{\circ}\text{N}$  not now irregular. N edge right on Spica and Bellatrix. (2) RA in S with apex in SSW on Achernar, about  $30^{\circ}\text{SSW}$ . Very long rays.
- 1149 RA reduced to ray bundles in SE and W extending to Z forming partial (2) corona. (1) HA  $25^{\circ}\text{N}$ , very faint.
- 1155 0/8. Display in Z became diffuse (2) patch and faded to fairly uniform (1) G. (2) ray from W to Z, (2) HA  $40^{\circ}\text{N}$  remains.

MARCH 6 cont'd.

- 1158 (2) corona formed from rays coming out of diffuse upper part of (2) HA through  $40^{\circ}$ N. (3) ray sheet in W from  $20^{\circ}$ . Some (2) rays from  $70^{\circ}$ S.
- 1203 0/8. Ray sheet in all SW sector forming fan drapery, (3) in SW, (2) in S and W and fairly diffuse in W. (2) HA in N now through  $30^{\circ}$  and rayed in NE. (1) G over most of sky where definite features do not appear.
- 1210 Main HA now dissolved into (1) and (2) flaming DS's stretching up towards Z. N limit  $15^{\circ}$ N. Diffuse sheet with slight rayed structure low in W. Several diffuse (1) and (2) rays in SE. Short (1) band NW-SE through Z.
- DCO 1218 0/8. Display now ragged. N sky above  $10^{\circ}$  covered with pulsating (1) and (2) diffuse rayed structure and DS's. Same in W sky. Fairly steady diffuse (1) and (2) ray sheet  $15^{\circ}$ - $50^{\circ}$  SSE-SSW.
- 1230 No change.
- 1247 0/8. (1) variable and weakly pulsating DS's over section of sky from WSW through N to E with nothing above  $40^{\circ}$  in any direction.
- 1305 Fairly thick haze over all sky, thinnest near Z. Patches of (2) DS in E and W about  $30^{\circ}$ . (2) band or DS joining them via  $30^{\circ}$ S. (2) diffuse corona in Z.
- 1311 0/8 but very hazy. Weak G around Z and also in line SE to W horizontally across S sky at about  $10^{\circ}$  (patchy).
- 1330 4/8, mainly in N. (2) patchy G over all visible S sky.
- 1345 7/8 and haze. Patches of (2) G visible through thin cloud  $30^{\circ}$ S.
- 1355 7/8 and haze in S. (2) HA  $30^{\circ}$ S with patches of G below it across all S sky.
- 1421 8/8. No sign. LNS.
- 1445 8/8 but thin in wide band across sky from E to W through Z. Here patches of G visible. Line distinct.
- 1455 8/8. Fairly light. LNS.
- 1525 8/8. Fairly dark but green line visible feebly.
- 1600 Raining heavily. No obs.
- 1700 Still raining. No obs.
- 1720 Rain now lighter. Sky dark. LNS.
-



MARCH 7.

- (0812 Sunset  
 (1024 End astronomical twilight.  
 (1650 Beginning astronomical twilight  
 (1859 Moonrise Fraction illuminated: 0.01  
 (1859 Sunrise (in eclipse)
- 0900 8/8. Fairly dark. Howling gale and very poor observing conditions.
- 0915 8/8. Sky lightish in SE. Green line visible.
- 0945 8/8 but thin. Seems to be patchy G over all S sky. Line distinct.
- 1000 6/8 and haze and hurricane. Definite diffuse rayed structure in SE and patches of glow through cloud low in W and in Z.
- 1030 Same.
- 1045 5/8 scattered and haze. (1) and (2) diffuse rayed activity over all sky from NE to S and (2) G low in WSW. Short (1) E-W band through Z.
- 1055 Same and (3) activity visible through haze low in WSW. Ray sheet over E-S sky reaches almost to Z.
- 1100 6/8 and haze. Air thick with sea spray. Activity in WSW hidden by cloud. Patchy (1) G extends over all N sky as well as S. (2) G with very diffuse ray-structure from E-SE horizon up to 40°.
- 1115 Almost 8/8. Fairly clear round horizon from W through N to S where (2) activity is visible through haze.
- 1135 Same.
- 1155 Almost 8/8. Fairly thick over all S sky but slightly broken over all N sky where patchy G is visible.
- 1215 Patches of G visible in N and S sky.
- BCO 1240 5/8 broken and haze. (3) activity in W, E and Z with remainder of visible sky covered with (1) and (2) diffuse patches.
- 1242 (4) seething corona formed and spread to join up with (4) ray sheets in E and (3) in W. Elsewhere (1) and (2) G.
- MAX.
- 1243 Very rapid seething in Z. (4) fan drapery S of Z.
- 1245-1255 Extremely vivid (4) RB low in W with N-S trend. Very vivid reds along lower border and greens in upper portions. Rapid motion of rays predominantly S to N, but some both ways. Activity elsewhere only (1) and (2) patchy G.

MARCH 7 cont'd.

- 1258 Display in W moved up at WSW end and then faded rapidly to (2) becoming diffuse.
- 1300 4/8 scattered and light and slight haze. (3) ray sheet covering all NE sky. (2) G with weak ray structure over entire remaining sky with two parallel short (2) E-W bands in Z.
- 1305 Little change. Brightest activity (3) low in E and NE.
- 1307 1/8. Now nothing exceeding (2). From NW a very broad ray sheet sweeps up and curves through Z in form of multiple bands and then curves into NE sky in another broad diffuse ray sheet. All low N sky covered with (2) tattered draperies and ray sheets. Only odd diffuse rays in S sky.
- 1309 1/8. Display flared up into (3) tattered and extensive corona. The sheet which was originally in NE drifted into whole of SE sky forming tattered (2) and (3) draperies. Broad (2) sheet in NW and Z.
- 1314 Again becoming thinly clouded, with only a few stars visible. Display faded to (1) and (2) diffuse ray sheets over entire sky.
- 1315 Small (3) section visible between cloud low in W.
- 1317 7/8 thin. G over entire N sky appears to be fairly uniform (2) extending right down to horizons. Some (2) rayed activity low in SE. SW section clouded. (3) activity through cloud gaps 15°W.
- 1320 The (3) activity in W suddenly spread towards Z and formed very extensive (3) corona with great and rapid variations visible through thick haze.
- 1322 (3) activity has moved right over into E sky. Rayed structure fairly diffuse. Remainder of N and S skies covered with diffuse (1) and (2) ray sheets.
- 1327 7/8 thin and broken and being swept from W to E at a furious rate in the hurricane. (3) activity again swept up rapidly from W apparently forming diffuse corona before spreading S and E and fading to (2). Whole display blurred by thin cloud.
- 1330 7/8 thin and broken. Some (3) activity high in SE revealed momentarily. Elsewhere (2) G over entire sky wherever cloud is broken or thin.
- 1335 7/8 thin. Nothing above (2) and display appears quieter although entire sky still covered with activity.

MARCH 7 cont'd.

1337 6/8 thin and hazy cloud, moving rapidly. Twin E-W bands in Z brightened momentarily to (3) and then faded rapidly. Nothing above (1) in S sky. Entire N sky covered with (2) patchy G and diffuse ray structure. Brightest low in WNW and ENE.

1343 5/8, clearing in N. Same over N sky. (3) activity visible through cloud gap 20° SSE.

1346 5/8. (3) rayed activity still visible over small area 5°-15° SSE. Rayed structure over N sky now almost completely gone and uniform (2) G from W via N to E horizons fading gradually until only (1) in Z.

1348 Same except that activity in SSE is now only (2). SW sector fairly heavily clouded.

1350 Broken up in NW sector into huge diffuse (3) rayed sheet stretching up into Z. Fairly definite upper border at about 15° to (3) G right round N horizon. (2) G through cloud low in S.

1352 Rapidly changed to (3) HB right across N sky through 45° which became diffusely rayed.

1353 2/8. Has broken up into broken triple band with weak ray structure. (2) drapery low in WSW. (2) ray sheet low in SSE. (2) G up to 15° all along N horizon. (1) diffuse corona.

1357 Complete ring drapery 15° diameter between 5° and 20° ESE, (3).

1358 This broke and faded to (2) tattered drapery.

1400 (3) G coming up low in WNW.

1402 3/8. This spread into (3) RB, almost perfect RA, centred through 30° NNW.

1404 Faded to (2). (1) diffuse corona. (2) G still present along N horizon. (2) G visible through cloud gaps NE, E, SE and W.

1406 4/8. Corona gone. (2) G along N horizon up to 20°. (2) G patchy above this in NW. Diffuse scattered (1) and (2) rayed activity low in SSE. SW obscured.

1411 6/8, clouding over from SW. (2) G from 30° N right down, becoming lost in haze at 2° or 3° N. Suggestion of diffuse ray structure in this in NW sector. Elsewhere fairly heavily clouded.

DCO 1415 7/8. Clear only low in NNE where (2) G visible.

1427 8/8, fairly thick. No forms visible but



MARCH 7 cont'd.

1440 Same.  
 1455 Same, but green line weaker.  
 1515 Line still visible.  
 1535 8/8 heavy cloud. Line still visible but very weak.

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MARCH 8.

(0810 Sunset  
 (1020 End astronomical twilight  
 (1653 Beginning astronomical twilight  
 (1901 Sunrise

BCO 0905 6/8. Still light. No sign. LNS.  
 0910 5/8, very rapidly changing cloud with 60 m.p.h. wind. E half of (2) arc through  $70^{\circ}$  visible and (2) diffuse ray  $20^{\circ}$ - $60^{\circ}$ SE under arc.  
 0915 6/8, clear only in W. No sign in W but signs of activity through cloud high in E.  
 0920 3/8 in N. Perfect triple (2) HA through  $40^{\circ}$ S,  $50^{\circ}$ S and  $60^{\circ}$ S, all narrow. The upper two are complete from horizon to horizon, the lowest one has only the E half present.  
 0923 0/8. Arcs bent into slightly irregular triple (3) RB. These spread out covering entire SE sky with multiple (4) RB's with a general E-W trend.  
 0925 0/8. RB's still (4) low in SE. (1) HA forms N limit of display E-W through Z.  
 0926 0/8. (3) in SE. Bands now broken and tattered. Multiple (2) E-W bands (not arcs) through Z and down to  $70^{\circ}$ N. SE sky still covered with RB's two of which extend right across in almost arc form to W horizon.  
 0928 0/8. Multiple arcs between  $80^{\circ}$ S and  $70^{\circ}$ N, (1). Activity below this now confined mainly to two close (3) E-W bands between  $30^{\circ}$  and  $40^{\circ}$ S with apices due S. Upper edge of top band is very sharp. Rayed structure low in ESE only.  
 0930 0/8. (3) bands right across from E to W between  $25^{\circ}$ S and  $45^{\circ}$ S. The lower one is a perfect HB, (4) with reds along lower border. The colour of the display so far has been creamy with faint tinge of green, except where reds have appeared in (4) sections. Still fairly twilight.

MARCH 8 cont'd.

0932 Still (4) in double continuous bands right  
1ST MAX across from E- to W between  $20^{\circ}\text{S}$  and  $35^{\circ}\text{S}$ .  
 (2) multiple zenithal arcs.

DCO 0936 3/8. Faded to (2) G along SW-W horizon. (1)  
 G in SE. (1) multiple zenithal arcs.

0945 4/8. Fairly uniform (1) G below  $25^{\circ}\text{S}$ . (1)  
 multiple arcs from Z to  $45^{\circ}\text{N}$  (in E-W  
 direction).

1005 2/8. Same.

1015 3/8. Same.

1020 8/8 and rain squall.

1035 2/8. (1) G below  $40^{\circ}\text{S}$  right across S sky.  
 Diffuse (1) multiple zenithal arcs (MZA).

1045 3/8 broken and haze. (2) G uniform over all  
 S sky. In Z and N sky there appears to be  
 (1) uniform G with diffuse E-W striations,  
 but this could be in the haze only.

1055 Same.

BCO 1110 4/8 broken. Still (1) G with E-W striations  
 between  $70^{\circ}\text{S}$  and  $60^{\circ}\text{N}$ . Very slow weak  
 pulsations in Z. (2) HA  $20^{\circ}\text{S}$ , partly hidden.  
 (2) ray bundle under this due S.

1115 No change.

1119 (2) HA in S became weakly rayed (only E half  
 visible). G in Z brightened to (2) with  
 narrow long dark bands E-W through it  
 becoming very distinct.

SEVERAL PHOTOGRAPHS BETWEEN 1120 AND 1404.

1120 (2) G in broad sheet E-W through between  $80^{\circ}\text{S}$   
 and  $70^{\circ}\text{N}$  with extremely well defined narrow  
 dark striations. These reach almost right  
 across the sky. In the E there must be  
 twenty or thirty extremely fine "filaments"  
 parallel to one another.

1125 4/8 mainly in S. Zenithal display has  
 slowly diffused and moved northwards, now  
 extending in broad E-W band from Z to  $60^{\circ}\text{N}$ .  
 Still (2) but striations less distinct.

1130 6/8 broken. Broad diffuse (2) HA right  
 across between  $25^{\circ}\text{N}$  and  $50^{\circ}\text{N}$ . Display in  
 S apparently remains same, although fairly  
 heavily clouded there. Only (1) G in Z.

1131 Semblance of weak rayed structure low at  
 W end of northern arc.

MARCH 8 cont'd.

- 1135 Arc in N still (2) but becoming sharper. Lower edge through  $25^{\circ}$ N. G in E brightening and becoming (3) ray sheet.
- 1136 3/8. (3) drapery over E sky running up towards Z.
- 1137 (4) drapery spread rapidly across towards W from E at  $60^{\circ}$ S and formed a partial long-rayed corona. Motion of rays within drapery from E to W.
- 2ND MAX
- 1138 Drapery became tattered but still (4).
- 1139 Drapery down to (3).
- 1140 Very distinct (2) HA right across N sky through  $25^{\circ}$ N centred on  $\alpha$ -Leonis.
- 1143 Multiple (2) draperies through cloud low in E. (2) remnants of previous drapery in W.
- 1145 Some (2) rayed activity low in W and above WNW section of main (2) HA.
- 1147 HA in N breaking up. Sections of (3) drapery visible through cloud from  $40^{\circ}$ S over to ESE horizon.
- 1150 4/8. Display in N sky now broken up into large (2) DS's pulsating slowly with slow wavelike increases of intensity towards Z. Still sections of (3) drapery low in ESE.
- 1155 3/8. Same in N sky. (3) fan drapery S of Z rapidly formed and faded. Rippling of rays in E to W direction.
- 1158 (3) HA through  $20^{\circ}$ S, E half only.
- 1159 (2) DS's slowly pulsating over all E, N and SW sky.
- 1200 (3) HA still low in S.
- 1203 HA became double and developed a slight irregularity becoming double (3) HB.
- 1204 (4) in S. Vertex swept rapidly towards W along the lower band.
- 1205 A few long (2) rays from most parts of S sky not quite reaching Z. Changing rapidly. N sky still same.
- 1210 Faded to (2) in S where band has become diffuse.
- 1215 3/8. Display nowhere exceeds (2). Whole N sky right down to the horizon is covered with strongly pulsating DS's and occasional diffuse rayed sheets. A few DS's and diffuse (1) and (2) ray sheets visible between cloud in S.



MARCH 8 cont'd.

1215-1230 Slowly clouding over to 5/8 at end of period. Has remained substantially the same with (1) and (2) pulsating DS's over entire N sky. (1) and (2) pulsating G E-W through Z with E-W striations. (1) G has become slightly more uniform and now covers entire S sky.

DCO

1250 2/8. Fairly uniform (1) G over entire sky except for below arc-shaped diffuse lower edge at  $25^{\circ}$ S. G is almost (2) here, definitely brighter than in N.

1320 4/8 - 6/8, changing rapidly. (1) G over all N sky. (1) striated G through Z with striations running ESE-WNW and not E-W. Striations reach from horizon to horizon. Lower border to G in S at  $40^{\circ}$  where (2) and diffuse. Signs of (2) HA in S through about  $5^{\circ}$ , but partly cloud covered.

1345 4/8, almost all in S. Broad striated (2) E-W band from horizon to horizon through Z.

1356 5/8 in S and Z mainly. (3) draperies in W. Band from E to W through Z, obscured by cloud in Z.

1400 4/8. (2) pulsating RB in S from  $30^{\circ}$  up to Z. Irregular (2) E-W band through Z.

1405 (4) draperies in ESE with motion from W to E. (2) HB through  $30^{\circ}$ S. (2) multiple bands about  $10^{\circ}$ N of Z.

1410 3/8. (2) wispy glow over most of sky, continuously changing. Evidence of ill-formed draperies in SE and W.

1413 2/8. Entire sky now covered with (2) DS's with some diffuse ray structure on background of (1) G. Rapid flickering in N sky towards Z with some less marked pulsations in S sky.

1423 2/8. (2) drapery in ESE. (2) pulsating multiple bands through Z and into N sky degenerating into DS's about  $40^{\circ}$ N. (2) ray in SW.

1428 1/8. (2) pulsating patches over most of N sky. (2) drapery in ESE.

1432 1/8. Very pronounced (1) and (2) flaming over entire N sky. Much weaker flaming high in S sky. Lower limit of display at about  $25^{\circ}$ S. Occasional diffuse ray structures particularly in W.

1435 Intensity slightly less but flaming continues over entire N sky. Semblance of distorted corona formed by fine striations and weak rays around Z.

MARCH 8 cont'd.

- 1440 2/8. Flaming continues in N. (3) diffuse drapery low in ESE, fading rapidly to become (2) G.
- 1443 4/8 scattered. Display in N sky more scattered and less active although weak flaming continues. Fairly uniform (2) G in ESE and WSW with (1) G over remainder of S sky.
- 1450 4/8, mainly in S. (1) and (2) flaming continues over entire N sky. Steady (1) G from Z gradually brightening to (2) down to 40°S where obscured by cloud.
- 1500 3/8. (1) and (2) flaming in N and extending into S sky to about 60°S where display is quieter.
- 1513 Almost 8/8. One star visible in Z. Faint glow discernible through cloud.
- 1530 6/8, clear in Z. Diffuse band in ESE, mainly obscured by cloud.
- 1545 3/8. Patchy (1) glow over most of sky.
- 1600 Raining lightly. Patchy (1) G over most of visible sky.
- 1615 3/8. (1) G in S. Isolated (1) patches elsewhere slightly pulsating.
- 1645 Same.
- 1715 3/8. (2) band from ESE through 35°S to SW. A few patches in N.
- 1745 2/8 and becoming light. No sign.
- 1815 2/8. Fairly light. No sign.
- The following obs. are from Lusitania Bay.
- 0910 6/8. (3) multiple HA through Z.
- 0920 7/8. Fairly diffuse drapery sheet to 10°S. Remainder obscured.
- 1141 (3) band through Z.
- 1151 (3) drapery through Z. HA in N, partly obscured by cloud.
- 1200 (3) HA through 30°S.
- 1205 4/8, rapidly changing. (3) HB in S.
- 1215 (2) DS's pulsating in N sky.
- 1222 Pulsating arc through Z.
- 1241 Diffuse HB in NE.

MARCH 8 cont'd.

- 1330 8/8 with intermittent rain since last entry.  
1352 (3) multiple arcs through Z, (3) at W end.  
1405 (2) striations through Z.  
1415 Same.  
1420 (2) HB through  $50^{\circ}$ S.  
1426 (2) Drapery or RA in SE.  
1441 (3) drapery in SE. Extremely rapid flaming in NE.  
1450 Almost 0/8. Pulsations and flaming over all N sky. No very distinct features in S.  
1500 Fairly diffuse HB  $25^{\circ}$ SE.  
1515 Clouding over. Only small patches of drapery visible in S. Flaming continues in N.  
1545 Still fairly overcast. No features visible in S sky where there is little cloud, but uniform (2) G present.  
1620 Less cloud now, but no distinct features visible. Merely G over all visible sky. Heavy cloud obscuring all but glimpses of HB in S through about  $30^{\circ}$ S.  
1650 Still clouded. Fairly uniform (2) G seen through cloud gaps.  
1710 (2) DS and upper edge of (2) G visible near Z.  
1711 (2) DS in E.  
1715 (2) DS (almost a partial corona) near Z.  
1745 Now fairly light. No forms distinct although pulsations are continuing.

MARCH 9

- (0807 Sunset  
 (0816 Moonset. Fraction illuminated: 0.01  
 (1017 End astronomical twilight  
 (1655 Beginning astronomical twilight  
 (1903 Sunrise
- 0910 1/8 and slight haze. Still twilight. No sign.  
0915 Same.  
0920 1/8. (1) MZA.  
0925 1/8. (1) MA from Z down to  $50^{\circ}$ N.



MARCH 9 cont'd.

- 0930 1/8 MZA now confined to 10° either side of Z. Main middle one (2).
- 0935 1/8 + haze. Middle arc down to (1) but form unchanged.
- 0940 Same.
- 0947 1/8. Spread out rapidly into (3) diffuse fan drapery N-NE of Z.
- 0952 2/8 + haze. Drapery faded completely. Now only (1) E-W band through Z.
- 1000 8/8 thin cloud. Drapery again vis. high in NE behind cloud.
- 1015 8/8 and light misty rain. Line vis.
- 1030 8/8 fairly thick cloud. Line vis. but weak.
- 1045 8/8 and light rain. LNS.
- 1100 8/8. Green line just visible.
- 1130 Same.
- 1145 Same.
- 1156 Almost 8/8, thinner with one or two stars dimly visible in Z. Green line very feeble.
- 1230 8/8. Fairly dark. Presence of green line doubtful.
- 1300 8/8 and rain. LNS.
- 1330 Same.
- 1345 Same.
- 1400 Same.
- 1430 8/8. Rain ceased. Fairly dark. LNS.
- 1500 0/8. (2) band through Z from ESE to SW.
- 1509 5/8. Multiple bands through Z from ESE to SW pulsating.
- 1525 Same and (2) pulsating DS's N of Z.
- 1535 6/8, heavy cloud in S, scattered in N. Multiple bands through Z from ESE to SW. Pulsating DS's in N. All (2).
- 1600 7/8. DS's visible through cloud gaps in N.
- 1615 7/8. Patchy glow visible through cloud in Z and N.
- 1630 4/8, mainly in W. Pulsating (1) DS's in Z.

MARCH 9 cont'd.

1700 2/8. (1) G in S. No sign elsewhere.

The following obs. are from Lusitania Bay.

Till 1050 7/8 to 8/8 with no sign of display. Now 7/8. Patch of (2) G visible in ESE.

1145 Clouded over soon after last entry and has remained so. But the sky is light indicating the presence of a display.

1330 Has remained 8/8.

SEVERAL PHOTOGRAPHS BETWEEN 1500 and 1717.

1500 (2) MZA.

1511 Pulsations in N sky.

1521 Cloud has been 2/8 scattered but is now increasing. (2) MZA continue.

1536 Zenithal display fairly diffuse.

1546 Band through Z fluctuating.

1555 Diffuse HA in E

1601 Flaming in NE.

1610 Pulsations and flaming continue. No distinctive features.

1625 7/8. No features visible.

1626 SE end of (2) diffuse HA (almost G) visible.

1645 Somewhat diffuse (2) HA in S.

1700 (2) HA continues, Fairly diffuse.

1717 DS's in SW.

1725 0/8. Display consists mainly of pulsating DS's.

1735 0/8. Twilight increasing. Only occasional glimpses of feeble activity.

1750 Clouding over.

1800 Hailing.

1900 Snowing.

MARCH 10

(0805) Sunset

(0824) Moonset Fraction illuminated: 0.05

(1014) End astronomical twilight

(1658) Beginning astronomical twilight

(1905) Sunrise

MARCH 10 cont'd.

- BCO 0900 2/8. Still twilight but dark enough to see an (2) display if present. No sign.
- 0905 4/8. Same.
- 0910 6/8. No sign.
- 0925 4/8 mainly in N. (1) G below 25°S.
- 0935 Same.
- 0942 7/8. (1) G low in S visible in patches.
- 1000 3/8. (1) G low in S.
- 1005 1/8. (1) MZA and (1) G low in S.
- 1010 1/8. (2) MZA right from E to W horizons. (1) HA 45°N.
- 1012 1/8. The most southern of the MZA (the one through 85°S) has become rayed. Also broad ray structures at E and W ends.
- 1013 0/8. Rapidly developed into (4) draper which swept to cover all S sky with vivid rapidly moving draperies. At first very detailed ray structure with rapid internal ray motion from W to E in each drapery. Then merged into perfect convoluted curtain forms which waved rapidly in an irregular manner.

SEVERAL PHOTOGRAPHS BETWEEN 1014 AND 1154.

- 1016 0/8. (4) draperies still in rapid motion over all S sky. Vivid deep reds and bright creams but very little green. Between 1015 and 1017 perfect (4) ring drapery low in SE. Northern limit of display about 10°N of Z formed by fairly quiet (1) E-W band.
- Till 1024 Display continued (4) covering entire S sky with curtains and bands with only diffuse rayed structure. Several whirls ran rapidly eastwards along several of the draperies and bands.
- 1025 0/8. Quietened rapidly to patchy (2) and (3) activity over S sky. Double broad (2) zenithal band right across sky with sharp narrow gap between the two bands.
- 1040 Has remained same since last entry. Now brightened to (3) in the southern of the two zenithal bands. Almost narrow fan drapery form close to Z.
- 1041 0/8. In few seconds flared up again into vivid (4) draperies covering entire S sky. Diffuse rays moving irregularly both E to W and W to E, some seeming to cross in the same draperies. Also several vortices some of which ran to E and some to W along the draperies. Fairly sharp N limit to display in (1) E-W arc through Z.



MARCH 10 cont'd.

- 1047 0/8. Draperies now dispersed leaving patchy (2) G above 30°S and (1) MZA but brilliant (4) E-W band through 20°S. Diffuse rayed patches to 60°N forming diffuse corona.
- 1057 0/8. (4) HB faded. (2) MZA. Broken (1) and (2) bands E-W across all S sky. Nothing in N sky below 80°N.
- 1105 (4) RA 15°S with slow motion of rays both ways. Semblance of very fine filamented structure within broader more diffuse rays.
- 1110 Display split now into (3) double HA 15°S and 20°S with only (1) G above this up to Z. Extremely faint HA 40°N.
- 1115 Faded to ragged broad (2) bands low in S with only odd diffuse rayed structure.
- 1116 (2) G in S sky has become filamented by extremely fine and close ray structure all pointing to Z. Nothing in N sky.
- 1122 2/8. G now separated into two very broad and diffuse (2) bands right across sky at 20°S and 60°S. Filamented structure gone.
- 1125 (3) HA 40°S (perfect arc).
- 1130 (3) draperies developed from irregularities at SE end of arc.
- 1138 0/8. (4) draperies low in SE. (3) HA has become an irregular band. (1) E-W bands still present in Z.
- 1142 0/8. Sharp (4) RB right across S sky through 15°S. Arc through 40°S dispersed.
- 1143 (4) RB low in S broken up into multiple (3) bands. Still same in Z.
- 1144 (4) again in scattered patches in S.
- 1145 1/8. Still (4) very low in SE and SW (some cloud in this region). (2) band E-W through Z, faded rapidly to (1).
- 1148 Still (4) in SE, S and SW, spreading upwards. Diffuse rayed movement in random directions.
- 1151 (2) and (3) long rays developing from all over S sky forming partial corona.
- 1155 These faded into (1) patches round Z and down to (3) patchy G low along SE to W horizon. Variable diffuse rays from 50°-70°NW give effect of diffuse corona.
- 1157 Now uniform (2) G below 35°S. (2) rayed activity in narrow belt from low in W to Z.

MARCH 10 cont'd.

- 1200 1/8. Very uniform (2) G spreading slightly upwards. Some (1) patches high in N sky now pulsating.
- 1205 The (2) G has receded slightly and has become somewhat patchy in SW sector. Single diffuse (2) ray bundle  $15^{\circ}$ - $50^{\circ}$ S. Very weak DS's slowly pulsating down to  $40^{\circ}$ N in N sky.
- 1208 Ray bundle in S gone. G again uniform in S, being most intense near horizon and diminishing to (1) about  $60^{\circ}$ S. Pulsations in N sky now down to  $30^{\circ}$ N.
- DCO 1225 There has been no change since last entry.
- 1235 5/8 haze. Diffuse (3) ray sheet from low in ESE up to  $30^{\circ}$ ESE. Nothing exceeds (1) elsewhere.
- 1250 Clearing again. (1) and (2) bands over S sky. Pulsating (1) DS's in N sky down to  $30^{\circ}$ N.
- 1300 1/8. (1) and (2) pulsating DS's over N sky down to  $20^{\circ}$ . Several diffuse (2) draperies scattered over S sky. No activity in Z.
- 1313 3/8 in S and SW obscuring part of what appears to be (2) drapery. No activity in Z. (2) DS's in N sky both pulsating regularly and flaming
- 1325 5/8, clear in Z and E. (1) G visible through cloud gaps in S and E. (1) flaming visible just N of Z.
- 1335 Same.
- 1344 6/8. Same.
- 1355 8/8 thin cloud. Faint glow in Z.
- 1415 8/8 heavy cloud. No sign.
- 1430 8/8 heavy cloud. No sign. No line.
- 1445 Same.
- 1500 3/8 in S and E. Faint glow in S. Nothing visible in N sky although sky is clear.
- 1515 5/8 in S and W. Broad diffuse (1) band from SE to about  $65^{\circ}$ S becoming lost in cloud in W sky. Clear in Z, but no sign of display there.
- 1530 8/8, dense in S. Faint glow in Z.
- 1545 Same.
- 1615 6/8. (1) G in S up to about  $60^{\circ}$ . Pulsating patches in Z and N.
- 1630 8/8. No sign.

MARCH 10 cont'd.

1700 8/8 and rain. No sign.

1730 Same.

1800 8/8. No sign.

1830 8/8. Becoming fairly light. No sign.

The following obs. are from Lusitania Bay.

SEVERAL PHOTOGRAPHS BETWEEN 1017 AND 1300.

1021 Spectacular (3) and (4) display in Z.

1035 Striations through Z.

1045 Almost 8/8. Small patches of very intense (4) activity visible in E and SE.

1101 (3) RA 15°S.

1106 RA continues.

1131 (3) HB 30°S.

1200 Fairly cloudy. What display is visible is fairly diffuse.

1256 Fairly hazy.

1300 Partial corona just N of Z.

1315 Pulsations in N sky.

1425 8/8.

1440 Haze and some cloud. No sign of auroral features.

1515 Display beginning to show features again in SE, but haze makes outlines very indistinct.

1600 Since last entry it has been mainly 8/8. Some stars now visible in Z. Patches of DS in Z and pulsations in N sky.

1745 8/8 at most obs. since last entry. Now becoming light

MARCH 11

(0802) Sunset

(0833) Moonset Fraction illuminated: 0.10

(1011) End astronomical twilight

(1700) Beginning astronomical twilight

(1907) Sunrise

0900-0920 8/8 and misty rain. LNS.

0928 8/8 and misty rain. Line clearly visible in Z.



MARCH 11 cont'd.

0945 Same.  
1015 Same.  
1050 Same.  
1120 Same.  
1140 Same.  
1210 8/8 and misty rain. Line somewhat weaker.  
1245 8/8 and misty rain. Line fairly distinct.  
1315 8/8 and misty rain. Line just visible.  
1350 8/8 and misty rain. LNS.  
1410 8/8 but much thinner and sky much lighter. Few stars simply visible round Z. Semblance of weak E-W bands there. Green line very distinct.  
1430 Same.  
1500 8/8. No stars visible. Sky fairly dark. Green line faint.  
1530 8/8 heavy mist. Green line not visible.  
1600 8/8 and rain. Green line not visible.  
1630 Same.  
1700 Same.  
1730 Same.  
1800 Same.  
1830 8/8 and rain. Sky light. No sign of green line.

The following obs. are from Lusitania Bay.

1315 Till now almost always 8/8 with mist. Occasionally stars visible in Z through haze. Aurora present.  
1420 Appears to be pulsating in Z, but very hazy.  
1426 Appears to be parallel (2) HA's through Z.  
1755 It has been 8/8 almost continuously since last entry. Now becoming light. Raining lightly.

MARCH 12

(0800 Sunset  
 (0844 Moonset

Fraction illuminated: 0.17

MARCH 12 cont'd.

(1008 End astronomical twilight  
 (1703 Beginning astronomical twilight  
 (1909 Sunrise.

Till 1300 8/8 and misty rain. LNS.

1300 Same, but green line distinct. (First obs. with spectroscope).

1315 Heavy rain and hurricane. LNS.

1345 Same.

1445 Rain ceased. Line just visible.

1510 3/8. Pulsating DS's over most of visible sky, (2).

1520 6/8. (2) PDS's visible in Z and N of Z. Rest of sky obscured by cloud.

1530 Almost 8/8 - a few stars visible. Glow in SE and SW.

1600 8/8 with a few stars dimly visible. Glow through cloud in SE, S and SW.

1630 8/8 and rain. Nothing visible.

1700 8/8. Faint glow in SW.

1745 8/8. Very dark. No sign of green line.

1800 Same.

The following obs. are from Lusitania Bay.

Till 1545 Almost always 8/8. Earlier there was considerable mist which has slowly lifted. Now quite a few stars visible but light cloud is rapidly varying. Although there is an (2) display there are no distinctive features.

Till 1800 Soon after the previous entry the sky again became completely overcast and remained so, although it was evident that the display continued.

MARCH 13

(0757 Sunset  
 (0859 Moonset Fraction illuminated: 0.25  
 (1004 End astronomical twilight  
 (1705 Beginning astronomical twilight  
 (1911 Sunrise

BCO 0900 0/8. No sign.

0905 Same.

0910 Same.

MARCH 13 cont'd.

- 0915 Same.
- 0925 0/8. Diffuse (2) band right across through  $45^{\circ}\text{S}$ . Another band very low in S. Several long rays from E and W towards Z.
- 0935 (3) rayed structure in  $45^{\circ}$  band. Otherwise same.
- 0940 (4) in main band with motion from W to E. Brilliantly coloured (4) seething corona.
- 0955-1000 Display spread rapidly into N sky with scattered (3) draperies and varying bands.

SEVERAL PHOTOGRAPHS BETWEEN 0943 AND 1707.

- 1004 (3) multiple RB from SE to W across S sky.
- 1017 0/8. (1) band E-W through  $80^{\circ}\text{N}$ . Diffuse (2) draperies in ESE and SW joined by RB through about  $30^{\circ}\text{S}$ .
- 1020 Draperies in S (3) and (4) for a short while. (1) and (2) bands and DS's in N sky down to  $30^{\circ}\text{N}$ .
- 1030 0/8. Two (3) RB's through  $20^{\circ}\text{S}$  and  $30^{\circ}\text{S}$ . (1) HB through  $80^{\circ}\text{N}$ .
- 1040 (2) band through  $30^{\circ}\text{S}$  from ESE to SW. Wavy band through Z down to  $40^{\circ}\text{N}$ .
- 1044 0/8. (4) HB  $20^{\circ}\text{S}$ .
- 1046 Faded to (2).
- 1047 Brightened to (3). (1) HA  $15^{\circ}\text{N}$  forms N limit of display. (2) band E-W through  $70^{\circ}\text{N}$ .
- 1047 $\frac{1}{2}$  (4) again low in SE.
- 1100 0/8. Faded to (1) over all S sky. Very extensive (1) and (2) corona with finely striated sheets from all directions is main part of display. Fairly definite N limit at  $20^{\circ}\text{N}$ .
- 1105 0/8. No change in general nature of display.
- 1110 Practically no change. Most of the striated structure forming the distorted corona is in very broad sheets from E and W horizons. (2) diffuse ray low in S, rapidly faded.
- 1112 Slow waving around of striations and irregular bands in Z.
- 1115 Sharp arc-like N limit of display diffusing somewhat.



MARCH 13 cont'd.

- 1117 (2) again along N limit. More uniform E-W trend of zenithal fibrous structure. Very diffuse (2) band across S sky through  $40^{\circ}\text{S}$  on background of almost uniform (1) G.
- 1124 Now (2) in Z.
- 1125 A considerable amount of slow steady streaming and waving motion in Z, mainly towards E.
- 1127 0/8. Now streaming slowly towards W with slow general drift of structures through Z towards N. Most of the distorted corona is made up of diffuse and striated sheets from E, W and high in N. Slightly non-uniform (1) G over entire S sky.
- 1130 Very weak scattered ray structures low in S. (1) G over remainder of S sky. Striated sheets in Z are mainly from W-NW and E-NE with short ones from high in N. DS's in N sky. Everything (2) in N sky.
- 1135 0/8. S sky almost clear of G. Display extends over all N sky down to diffuse arc through  $15^{\circ}\text{N}$ . More continuous multiple zenithal bands with striations limited to below  $45^{\circ}\text{E}$  and W.
- 1144 Definite MZB's (2) close parallel RB's in N sky with slow even drift of rays in opposite directions.
- 1148 0/8. (2) rayed structures again scattered over all S sky.
- 1149 Momentarily reached (3) high in SW.
- 1150 Rapid changes in Z brought general N-S trend of striations.
- 1152 (3) band very low in S-SE. Zenithal effects now more E-W again. Fairly general slow easterly drift in Z (like drifting mists).
- 1154 (3) in sheet NE of Z, faded to (2) rapidly. (2) drapery low in S-ESE in general N-S direction. N limit of display still diffuse (2) arc at  $15^{\circ}\text{N}$ .
- 1210 0/8. Main Z display has dispersed. (2) HA  $15^{\circ}\text{N}$  and scattered weak rays in various parts of S sky and (2) RB through  $5^{\circ}\text{S}$ .
- 1215 Same and narrow (2) rayed sheet to Z from SE horizon.
- 1216 Now almost drapery from SE horizon to Z. HA through  $15^{\circ}\text{N}$  is perfect and regular.
- 1220 (2) RB low in S. (1) and (2) long scattered rays, mainly in SE. (1) diffuse partial corona. Perfect (2) HA  $15^{\circ}\text{N}$ . (1) band E-W through  $60^{\circ}\text{N}$ .

MARCH 13 cont'd.

- 1222 W half of arc spreading upwards in broad striated sheet. (2) RB gone from low in S.
- 1230 The whole NW sky is covered with a huge sheet of finely striated (2) G with striae towards Z. E half is still perfect  $\frac{1}{2}$ -arc to  $15^{\circ}$ N.
- 1235 O/8. Same and many very weak long rays over all S sky.
- 1240 Same.
- 1245 Irregularity in N arc moved slightly more eastwards and the whole structure is now band-like. Just below the edge of the main band is a weak band pulsating very slowly, appearing and then merging up into main band and repeating this process at about seven second intervals. This is only evident in the middle section of the band.
- 1250 Practically no change. Band in N is almost (3).
- 1300 Practically no change. (2) scattered rayed activity low along SE-W horizon and (1) activity round Z. Still slow pulsating in small band just below centre of main N one, with the same motion of it up into the main arc after each appearance.
- 1310 O/8. Partial (1) and (2) corona. Tattered (2) drapery from WSW horizon to  $10^{\circ}$ W. Main band in N sky broken up still more although lower edge at  $15^{\circ}$  still fairly distinct. Upper part a succession of (2) DS's with some very slow weak pulsations (about twenty second period, but not regular).
- 1320 1/8 (first cloud of the night). Distorted corona formed by a few variable (2) and (3) bands. Short (2) tattered draperies over most of S sky. (3) drapery  $5^{\circ}$ S. Broad (2) band right across N sky between  $15^{\circ}$  and  $35^{\circ}$ . Broad (1) and (2) striated sheet covering most of W-NNW sky.
- 1325 1/8. Weaker in Z but otherwise same as at last entry.
- 1340 1/8. Broad diffuse patchy (2) band across N sky between  $15^{\circ}$  and  $40^{\circ}$ . Slightly broader striated structure in NW, (1). Scattered (1) ray bundles over all S sky, variable. One or two short (1) zenithal bands. No sign of pulsations.
- 1350 Broad double diffuse (2) band between  $20^{\circ}$ N and  $45^{\circ}$ N with wide curve at W end. Only weak isolated rays and diffuse surfaces over S sky.

MARCH 13 cont'd.

- 1408 3/8. (2) wavy multiple bands in Z. Two (2) rays in S. A few (2) rays in E. (1) G over most of sky.
- 1424 2/8. (2) pulsating DS's in N. Wavy (2) band through Z. Diffuse (1) RB in S.
- 1441 3/8. (2) stratified bands and surfaces over entire sky in fairly rapid motion.
- 1442 (3) horseshoe drapery in W became (4) and moved rapidly up to Z where it remained for about two minutes in an E-W line. Vivid crimson-lilac and green. Very rapid surges of rays both E and W and rapid vibrations and waving. Extended right to E horizon and then joined up with another drapery coming up from the S forming another horseshoe pointed ESE, and moved off in that direction. (3).
- 1445 Swirling (4) bands and draperies in Z moving at a great rate. Green.
- 1448 (4) RB in E with green and yellow colouring. (2) DS's over remainder of sky.
- 1452 (2) striated 'wispy' surfaces. Band in E now (2) and being obscured by cloud. Looks decidedly green-yellow.
- 1500 3/8. (2) striated wispy surfaces.
- 1515 3/8. (1) pulsating DS's over most of sky.
- 1530 Diffuse multiple wavy bands and surfaces through Z extending about  $100^\circ$  in all directions from Z.
- 1600 5/8. (1) diffuse band in Z with its E and W ends obscured by cloud. (1) glow in E.
- 1630 6/8. (2) diffuse band through Z.
- 1635 6/8. (2) diffuse band through Z has no sharp edges but several dark bands run along it E-W through Z.
- 1640 (2) band still present, but N-edge obscured by cloud. Band subject to some movement.
- 1700 6/8. Rapidly moving (3) drapery in and around Z. (2) HA  $35^\circ$ N with its lower edge obscured by cloud.
- 1710 5/8. (2) rays, DS's and band around Z. (1) HA  $35^\circ$ N.
- 1717 5/8. (1) HA  $35^\circ$ N. Little evidence of anything in S or Z.
- 1730 8/8. Glow through cloud in Z and N.



MARCH 13 cont'd.

1745 6/8. Becoming light. No sign of green line.

The following obs. are from Lusitania Bay.

0951 (3) HA 25°S.

1011 (3) drapery near Z.

1015 (3) corona.

1040 (2) HA 45°N.

1041 (3) RA in S, partly obscured by cloud.

1115 Display has deteriorated into a mass of striations up from E through Z. Very diffuse HA (almost G) in N. Signs of HA in S through cloud.

1145 Diffuse (2) HA 30°N.

1218 (2) rays in SE.

1240 (2) HA 30°N still present.

1305 Little cloud. Display becoming active in N and NE. Elsewhere weak and diffuse.

1320 (1) and (2) corona.

1321 HB in SSE.

1355 Fairly uniform (2) sheet in NE.

1400 (4) corona in rapid motion.

1406 (3) drapery in ESE.

1430 Little cloud. No distinctive features.

1435 (3) drapery just N of Z.

1442 Spectacular (4) band came up from W into Z, swirling rapidly.

1445 Still (4) and in motion.

1505 (1) and (2) striated sheet just NE of Z, in motion.

1510 Slight fluctuations in Z.

1540 For some considerable time the display has been pulsating and flaming, being nearly always diffuse.

1605 Striations in Z.

1645 Considerable amount of cloud, but variable. Most of S obscured. Visible parts of display diffuse and (2).

1650 Diffuse (2) arcs 45°N.

MARCH 13 cont'd.

- 1731 Thin cloud. (2) patch visible 60°ESE. (3) patches quite frequently become visible.
- 1755 Practically completely overcast. Dawn approaching.

MARCH 14

- (0754 Sunset  
(0922 Moonset Fraction illuminated: 0.34  
(1001 End astronomical twilight  
(1708 Beginning astronomical twilight  
(1913 Sunrise
- 0900 1/8. No sign.
- 0910 Same.
- 0915 Same.
- 0920 Same.
- 0923 Same.
- 0945 2/8. (3) drapery sweeping up from W horizon and diffusing into broad (2) band at 30°S. Some (3) rayed activity low in ESE visible between clouds. Some very long rays from drapery in W reach Z. No breaks visible in rays.
- 1000 2/8. Not much change although rayed structure in main (3) band from W horizon across into cloud at 45°S has diffused. (1) HA 20°N. Several (1) MZB.
- 1007 3/8. (3) band now (3) HA 60°S.
- 1011 3/8. (4) band low in SE visible through cloud gap.
- 1011½ (4) right across and multiple.
- 1012 (3) RB's and draperies in broad sheet from 30°S to Z over all S sectors.
- 1016 5/8 in Z and S. (3) multiple draperies 15°. Quiet (2) RB 30°SEW.
- 1028 Little change.
- 1030 (3) multiple drapery in S sky from W to E. (2) MZB.
- 1035 (3) MB in S. (2) MZB, extending down to 45°N.
- 1050 3/8 in S. Wavy (4) band E-W through Z. Diffuse wavy (2) band from Z to 30°N. (1) RB visible through cloud in S.

MARCH 14 cont'd.

- 1100 (4) swirling folded band through Z, spreading SW.
- 1105 (3) drapery in E. (2) multiple bands in broad zone from Z down to  $30^{\circ}\text{N}$ . The (4) band moved S and faded to (2) quite suddenly.
- 1110 Band in S now (1). Same in N as at last entry.
- 1123 1/8. (1) MZA. Broader (2) MA down to  $25^{\circ}\text{N}$ . Nothing in S sky.
- 1133 Extensive broken (2) and (3) fan drapery S of Z forming partial corona. (2) HA  $25^{\circ}\text{N}$ .
- 1135 Faded to non-uniform (1) G over S sky. (1) and (2) MB in Z. (2) ray bundles low in E and W. (2) HA  $25^{\circ}\text{N}$ .
- 1137 (3) drapery low in ESE. Otherwise same.
- 1140 0/8. Arc in N becoming multiple and more diffuse. Slightly non-uniform (1) G over entire S sky. Diffusely banded structure in Z.
- 1155 Almost no change. Some weak (2) rayed activity in sheet low in W.
- 1158 Tattered long (3) fan S of Z.
- 1159 Now (2).
- 1200 Narrow (3) fan from NW to slightly SE of Z.
- 1204 Reached (4) in fan just N of Z. Rapid changes.
- 1205 Fan down to (2) and (3). Another narrow (3) drapery coming up from NW and joining in Z with another coming up from SW.
- 1206-1207 (3) draperies over SW sky. Double fan close to Z. Long rays in E. Strong flaming commenced in (1) and (2) banded DS's over all N sky down to horizon.
- 1208 (2) diffuse draperies over all S sky.
- 1214 Same and some very long (2) rays right from W horizon to Z.
- 1220 0/8. S sky covered with diffuse (1) and (2) remnant draperies. Striated (2) structure in Z. Very strong flaming in N down to  $40^{\circ}\text{N}$ , strongest in NE. The (2) DS's that are flaming have very little of their band-like structure left. Flaming towards Z.



MARCH 14 cont'd.

- 1225 0/8. Now very intense flaming in huge tortuous sheets over all N sky and in Z. Quiet (1) and (2) G over S sky and weak diffuse ray sheets. Short diffuse (2) drapery low in W.
- 1230 1/8. Centre of flaming activity shifted to NW sky. Same elsewhere as at last obs.
- 1245 4/8 thin but rapidly clouding over from W. (3) band with very diffuse ray structure from cloud at 45°SW right across at 80° into diffusely rayed sheet low in ESE. Signs of flaming still visible through cloud in N sky, but apparently weaker.
- 1250 5/8 broken. (3) band from 80°S towards E then curving low into SE sky.
- 1302 Almost 8/8. Signs of (2) activity over most of S sky and of (1) activity over most of N sky.
- 1325 8/8. Green line clearly visible.
- 1335 Same.
- 1400 Same.
- 1435 Same.

The following obs. are from Lusitania Bay.

- 1025 Considerable amount of cloud but Z clear. Good (3) display.
- 1030 (3) arc through Z.
- 1031 (3) RA through 60°SE.
- 1036 Considerable cloud. (3) RA still present.
- 1101 Brilliant display.
- 1103 (4) SE of Z.
- 1204 (4) RA in N.
- 1217 (2) RA near Z.
- 1233 Pulsations in most of N sky.

MARCH 15

Till 1345 8/8 and very dark. LNS.

Till 1730 Same.

MARCH 16

(0750 Sunset  
 (0956 End astronomical twilight  
 (1046 Moonset. Fraction illuminated: 0.52  
 (1713 Beginning astronomical twilight  
 (1917 Sunrise.

0850 0/8. Still light. No sign.

0910 1/8. No sign.

0925 Same.

0932 1/8 in SW. (2) remnant HA through 15°S, E half.

0947 2/8 in SW. Same.

0943 Almost 8/8. Patches of G in SE.

1000 7/8 clear in NW only. No sign. LNS.

1012 4/8 in S. (1) triple HA through Z. Suggestion of (1) rays 15°SW above cloud.

1020 5/8. (1) MZA (1) G in SE visible between clouds.

1035 1/8. (1) MZA. (2) HA 30°N.

1040 1/8 in SW. Only sign of display is (2) HA 20°N. No MZA.

1050 2/8 in S and SW. Perfect (2) HA 20°N. Signs of (2) activity low in S.

1115 2/8. (1) MZA. (2) HA 20°N, slightly more diffuse.

1120 3/8. (1) MZA. Broad broken (2) HA rising slightly in N - now through about 30°N.

1125 5/8 broken. (1) MZA. (2) double diffuse arc at 45°N. Signs of activity low in SE between clouds.

1200 3/8 in NW. (1) MZA from Z to 70°N.

1230 8/8. No sign.

1255 0/8. (1) MZA from Z to 60°N, brightest at N edge.

1320-1325 0/8. Zenithal arc developed into (3) drapery from W to Z and (2) partial corona in Z. Considerable motion in Z. (3) band in E.

1340 3/8, mainly in S. Display faded to (2) HA through Z.

1415 2/8, mainly in S. (1) remnant HA from W to 70°S. Suggestion of HA in Z. G through cloud in E.

MARCH 16 cont'd.

1454 0/8. E half of (1) HA through 30°S. (2) RB 15°SE-S.

1540 1/8. (1) G just above cloud in SE, approx 10°.

1610 8/8. No sign. LNS.

1700 8/8 and light rain.

Till 1750 Has continued to rain steadily since last entry. No obs.

MARCH 17

(0748 Sunset  
(0953 End astronomical twilight  
(1151 Moonset Fraction illuminated: 0.62  
(1716 Beginning astronomical twilight  
(1919 Sunrise

Till 1540 Always 8/8 and usually raining. Sky sometimes slightly light but LNS. Now some light patches and green line visible.

1640 2/8 in S and slight haze. (1) G to 30°S, mainly obscured by cloud. Could be (1) HA.

1702 8/8. No sign. LNS.

1720 Raining heavily. No obs.

1810 7/8 - clear patch in E. Quite twilight. No sign. LNS.

MARCH 18

(0745. Sunset  
(0950 End astronomical twilight  
(1308 Moonset Fraction illuminated: 0.71  
(1718 Beginning astronomical twilight  
(1921 Sunrise

0910 6/8. Sections of sharp narrow (2) zenithal HA visible. Some (1) and (2) rayed activity at about 40°SE.

0920 7/8. Only short section of (2) ZA visible high in W. Signs of (1) and (2) activity low in SE.

0940 2/8 in S. Triple (2) arc between Z and 70°N.

0942 3/8. Most northerly arc became rayed along its entire length.



MARCH 18 cont'd.

- 0945 The two southern arcs became irregular round Z and diffused into broad sheet in E. N one now passes through  $60^{\circ}\text{N}$  and is still rayed. Momentarily (3) in E.
- 0949 5/8. Display is much the same in form as previously but the N limiting arc passes through  $50^{\circ}\text{N}$  and is slightly less intense.
- 0955 (2) and (3) fan drapery and corona in Z.
- 1007 Almost 8/8. Patches of (2) glow through cloud low in E and just N of Z.
- 1031 1/8. (1) MZA.
- 1035 Same.
- 1040 Same.
- 1045 2/8. (1) MZA.
- 1100 4/8. Same.
- 1110 3/8. Same.
- 1120 Same.
- 1200 Same.
- MAX 1310 4/8 mainly in N. (3) drapery in S margin into (4) RB  $20^{\circ}\text{SW}$ . (2) multiple arc or band  $80^{\circ}\text{N}$  (through Lupus).
- 1313 4/8. (1) MZA. (2) HB from W horizon to  $25^{\circ}\text{S}$  curving back on itself in wide sweep to form a horseshoe-like structure. This bisected by another (2) HB from W horizon to  $20^{\circ}\text{SSW}$ .
- 1330 3/8 scattered. (1) ZA. (1) G through cloud  $10^{\circ}\text{WSW}$ . (1) DS's in N sky down to  $15^{\circ}$  weakly pulsating.
- 1352 4/8 in N and Z. (1) G  $10^{\circ}\text{E}$  and W.
- 1422 1/8. (1) MZA.
- 1455 5/8. (1) G in SE. (2) G in SW. Nothing in Z.
- 1515 1/8. Patchy (1) G over entire sky with occasional flaming in E near Z.
- 1532 Raining. No obs.
- 1550 1/8. Patchy (1) G over entire S sky. Slow pulsations of (1) DS in N.
- 1710 2/8 scattered. (1) G to  $20^{\circ}\text{S}$ . (1) G in E to  $10^{\circ}$ .
- 1750 4/8 mainly in S. Twilight in E. No sign.
- 1845 2/8 mainly in S. Quite light. No sign.

MARCH 19

(0945 Sunset  
 (0947 End astronomical twilight  
 (1430 Moonset Fraction illuminated: 0.79  
 (1720 Beginning astronomical twilight  
 (1923 Sunrise

0905 5/8, clear in Z and SE. No sign.  
0935 Almost 8/8. No sign of green line.  
1000 Almost 8/8. No sign. LNS.  
1040 7/8 - clear patches low in S. (3) RA 10°S.  
1055 7/8. No sign. LNS.  
1108 6/8, fairly heavily overcast in S. No sign of green line.  
1140 6/8, clear in NE sector. No sign. LNS.  
1220 1/8 scattered. No sign.  
1253 0/8. Moon bright low in NW. No sign and no trace of green line.  
1350 0/8. No sign.  
1420 2/8 mainly in S. (1) G to 20°S.  
1500 4/8 in N. (1) G low in S.  
1600 1/8 in S and haze. (1) G to 15°S.  
1625 Almost 8/8 - stars occasionally visible near Z. Patches of glow visible through cloud low in S and possibly in E.  
1657 3/8 and haze. Glow through cloud in SSE.  
1750 8/8. Very dark except for first sign of dawn low in E.  
1817 2/8 scattered quite twilight. No sign.

MARCH 20

0900 8/8 and misty. No sign of green line.  
0935 8/8. No line.  
1030 Same.  
1045 8/8 but cloud not very thick. No line.  
1125 8/8 thin haze. Bright moon. No sign of green line.  
1208 2/8 cloud in 6/8 thin haze. No sign. No line.

MARCH 20 cont'd.

1340 Same.  
1400 8/8. Not dark but no sign of green line.  
1428 Same.  
1445 8/8. Not completely dark. LNS.  
1500 Same.  
1520 8/8 and very light rain. Fairly dark.  
1540 Same.  
1640 8/8 and still raining.  
1720 Same.  
1745 Same.  
1820 8/8 and mist and rain. Twilight. LNS.

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MARCH 21

(0738 Sunset  
 (0941 End astronomical twilight  
 (1719 Moonset Fraction illuminated: 0.93  
 (1724 Beginning astronomical twilight  
 (1926 Sunrise  
0915 8/8 fairly thick. No sign of green line.  
0930 7/8. No sign. LNS.  
0940 5/8 - 7/8, broken and rapidly varying. No sign. LNS.  
1010 6/8 broken. No sign.  
1030 Same.  
1044 7/8. Same.  
1050 8/8 and raining. Thin and light low in S. Possibly (1) G low in S. LNS.  
1110 4/8. G in S and SE below 15°. Green line distinct.  
1120 6/8. Line still visible low in SE but not present elsewhere.  
1130 Snowing.  
1200 6/8. Line just visible in SE.  
1214 2/8. Brilliant moonlight. Very weak G along S-E horizon. Green line feeble there.  
1230 8/8 and raining.



MARCH 21 cont'd.

- 1250 2/8 scattered. No definite sign distinguishable from moonlight on cloud. LNS.
- 1254 7/8. No sign. LNS.
- 1325 5/8. Green line doubtful against continuous background spectrum.
- 1340 1/8. Brilliant moon. Green line not definitely distinguishable and no visible sign of display although there could be a weak G low in S.
- 1420 2/8. No sign. ('Moonbow' in SE.)
- 1435 2/8. (2) remnant RA through 30°S, brightest low in W.
- 1443 5/8 scattered. Clear in SE where green line is visible and where there is a suggestion of the outline of an arc through 30°S.
- 1520 4/8 mainly in S. No sign. Line not visible on background.
- 1600 3/8 scattered. Same.
- 1640 Fairly frequent obs. between 1520 and now. Never any visible sign. Now 3/8 scattered. No sign of green line on continuous background spectrum.
- 1659 3/8 scattered. Moon near setting. No sign. LNS.
- 1718 3/8 scattered. (1) G to 30°S. Line distinct.
- 1735 3/8 mainly in S and haze. Patches of (1) G visible through cloud gaps in S.
- 1805 3/8 scattered. Twilight. No definite sign of green line on continuous background spectrum.

MARCH 22

- (0735) Sunset
- (0938) End astronomical twilight
- (1727) Beginning astronomical twilight
- (1845) Moonset Fraction illuminated: 0.97
- (1928) Sunrise
- 0835 5/8. Still light. Moon bright in NNE. No sign.
- 0900 1/8. No sign.
- 0915 2/8 in S. No sign. LNS.
- 0940 3/8. Same.

MARCH 22 cont'd.

- 1010 7/8. Same.
- 1048 Almost 8/8. (3) patches visible 40°S and SSE. (Probably band.) Green line brilliant.
- 1052 Almost 8/8. (3) patch visible 40°E. Green line strong only in E.
- 1106 8/8. Beginning to rain. No sign. LNS.
- 1120 8/8 and snowing.
- 1132 4/8 mainly in N. Green line distinct. Appears to be uniform (1) G over entire S sky. No forms present.
- 1207 8/8. Line quite distinct particularly in SE.
- 1230 2/8 mainly low in N. Green line clear in E and Z but no forms visible. Moon very bright, but G is definitely weak.
- 1300 5/8 broken. Green line not visible.
- 1318 3/8 scattered. Green line not visible.
- 1355 2/8 scattered. Same.
- 1425 3/8 scattered and variable. Rays from S to 70°S. Green line just visible on background continuous spectrum.
- 1445 1/8 in S. Green line not visible.
- 1450 1/8. HA through 80°N, very difficult to see but green line is definite as spectroscope is swept across it.
- 1453 (2) ray sheet 25°E. HA 30°N and HA 80°N. Impossible to tell how far the HA's extend into W sky even with spectroscope because of moonlight.
- 1456 2/8 in S. (3) patch through cloud 15°ESE. HA's 30°N and 70°N, intensities probably (2).
- 1502 2/8 scattered. (2) and (3) ray sheet from ESE to SE and from 25° almost to Z. Double HA 80°N.
- 1504 2/8. Ray sheet has faded. HA through 80°N and probably HA through 40°N.
- 1506 2/8 scattered. HA now double and passes through Z, breaking up into ray bundle 45°ESE.
- 1507 4/8. 40°N HA obscured. Zenithal display faded.
- 1511 5/8. No sign. LNS.

MARCH 22 cont'd.

- 1519 4/8 scattered. Green line distinct in N. Appears to be a diffuse band from E up to N sky and moving back towards Z from about  $50^{\circ}$ ENE.
- 1528 3/8. No features visible. There may be a diffuse G around  $80^{\circ}$ NE, but LNS.
- 1558 2/8. HA through  $80^{\circ}$ N from E to W horizons. Intensity probably (2).
- 1616 2/8. Moon behind cloud in W - hence sky darker. (2) HA  $55^{\circ}$ N with lower edge merging into slightly fainter HA  $45^{\circ}$ N. The upper HA passes over Antares.
- 1630 8/8. No sign.
- 1655 1/8. (2) rays from most of N sky to Z.
- 1720 7/8 - clear patch in E. No sign.
- 1735 5/8. Activity over all visible S sky and in Z. Double (2) band from W to Z curving sharply S at Z. Flaming over all S sky.
- 1750 3/8. (2) MZA with waves coming up to Z
- 1805-1810 (2) double arc from SE through Z to W. (3) ray bundle  $40^{\circ}$ S. (3) RB from W to NW through  $10^{\circ}$ .
- 1819 1/8. (2) MA from SE through Z to W. (3) RB from W to NW  $30^{\circ}$ .
- 1823 RB not now so rayed and extends from NW to SW at  $40^{\circ}$ . (3) in NW and (2) in SW where it is fairly diffuse.
- 1827-1829 RB moved up towards Z and formed fan drapery which reached (4) at 1828 and then formed (4) partial corona. Then display became narrow (3) and (4) band through Z in NW-SE direction and gradually faded out.
- 1831 RB  $80^{\circ}$ E, scarcely discernible in twilight. Probably (2).
- 1833 4/8 scattered. (3) ray bundle  $30^{\circ}$ SE diffusing into (2) HB to Z.
- 1835 6/8. No sign. LNS.
- 1837 6/8, clear only in E. No sign of green line on continuous background spectrum.
- 1843 5/8. No sign. LNS.
- 1900 1/8. Very light. No sign.
-



MARCH 23

(0733 Sunset  
 (0935 End astronomical twilight  
 (1729 Beginning astronomical twilight  
 (1930 Sunrise  
 (2011 Moonset Fraction illuminated: 1.00

Till 1145 8/8. Wild wet night. No sign of green line.  
 Till 1320 Has remained the same. Line not visible.  
1345 8/8 and light rain. No sign. LNS.  
1420 8/8. Sky very light but no sign of green line.  
1448 Same.  
1545 Same.  
1620 8/8. Sky light. LNS.  
1710 Almost 8/8. Some very small breaks in SE. One star occasionally visible. No sign of display. Green line not visible from (2) display in SW.  
1740 8/8, heavy. No sign of green line.  
1900 Still 8/8. Now fairly light.

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MARCH 24

(0731 Sunset  
 (0932 End astronomical twilight  
 (1731 Sunrise  
 (2142 Moonset Fraction illuminated: 1.00

0850 8/8. No sign of green line.  
0920 Same.  
 Till 1600 Always 8/8 and very light but no sign of green line. Now almost 8/8 with some very small breaks in N sky. Cloud generally thinner. Green line visible 20° SSE.  
1610 Almost 8/8. Green line visible with difficulty on background continuous spectrum in SSE.  
1640 8/8 heavy. Line not visible on background spectrum.  
1705 Same.  
1735 Same.  
1825 Twilight. Green Line not visible on background spectrum.

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MARCH 25

(0728 Sunset  
 (0736 Moonrise Fraction illuminated: 0.97  
 (0929 End astronomical twilight  
 (1734 Beginning astronomical twilight  
 (1933 Sunrise

0835 3/8. Dark enough now to see (2) display and possibly (1) if present. No sign.

0855 2/8 and thin haze. No sign.

0915 0/8. Slight haze. Bright moon in NE. (3) diffusely rayed band ESE-WSW at  $35^\circ$  with short double sections at each end.

0924 0/8. Slight haze. Display substantially unaltered. Band double over short section at apex ( $40^\circ$ ). (1) and (2) parallel zenithal bands, not visible over lower eastern section in moonlight.

MAX 0930 0/8, hazy. Fairly narrow (3) band (almost HA) through  $40^\circ$ S with very diffuse rayed structure. (2) broken diffusely rayed band  $15^\circ$ S. Very weak parallel zenithal arcs, not visible near moon low in E.

0940 3/8 scattered and haze. Band now regular (3) HA through  $40^\circ$ S. Signs of (2) activity through cloud in region of previous  $15^\circ$  band. No sign of zenithal arcs.

0955 0/8. Slightly hazy. Arc has become slightly irregular and is now (3) HB right across sky through  $35^\circ$ S with ragged WSW end. (2) HA  $10^\circ$ S. No zenithal arcs.

1020 0/8. No sign. LNS.

1038 0/8. (1) DS or thin moonlit cloud  $20^\circ$ SW. Green line visible on continuous background spectrum.

1050 0/8. No forms visible although green line is.

1110 Same.

1120 1/8. Hazy and moon very bright. No forms visible although green line is.

1140 3/8 scattered. Line weak on continuous background spectrum.

1200 5/8 scattered. Line weak on continuous background spectrum, brightest low in S.

1225 1/8. Hazy. (1) MZA. Line distinct.

1300 8/8. Snow squall.

1330 7/8. No sign of green line.

1420 0/8. (2) HA  $80^\circ$ S. (1) HA through Z.

MARCH 25 cont'd.

1444 5/8 broken. No forms visible but green line visible weakly.  
1505 3/8 scattered. No sign. LNS.  
1530 6/8. No sign. LNS.  
1605 0/8. No sign. No line.  
1652 6/8. No sign. LNS.  
1724 3/8. Moon still brilliant. No sign of green line.  
1800 1/8. Same.

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MARCH 26

(0725) Sunset  
 (0749) Moonrise Fraction illuminated: 0.92  
 (0925) End astronomical twilight  
 (1736) Beginning astronomical twilight  
 (1935) Sunrise  
  
0830 6/8. No sign of green line.  
0920 8/8. No sign.  
0940 8/8. No sign of green line.  
0955 6/8. Same.  
1005 4/8 scattered. Same.  
1027 5/8 scattered. (2) patches visible between clouds 15°S - SSE. (2) diffuse rayed sheet just SW of Z.  
1040 5/8. No forms visible. Green line visible in S.  
1055 6/8. Same.  
1105 7/8. No forms visible. Green line feeble in S.  
1130 6/8. Short irregular double (1) band just E of Z. Difficult to distinguish in moonlight but green line weakly visible.  
1212 4/8 scattered. Series of irregular (2) bands across S sky from 25°S up to (1) MZA.  
1255 7/8 light and broken. No sign of green line.  
1330 6/8, mainly very thin. Green line visible feebly on background continuous spectrum.  
1345 2/8. Pulsating (2) DS's WNW-NW extending to Z. W end of (2) HB or HA visible at edge of cloud bank 10°W.



MARCH 26 cont'd.

- 1400 1/8. (2) DS's over all S sky and in NW with pulsations particularly in Z.  
1415 1/8 in S. (2) pulsations in S near Z.  
1432 0/8. No forms visible but green line visible weakly on background continuous spectrum in all S sky.  


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1515 1/8. No sign of green line.  
1542 1/8 scattered. Green line visible in S to about 30°. Probably (1) G.  
1610 1/8. No forms visible in bright moonlight. LNS.  
1650 1/8 in S. Green line visible 35°S. May be HA but impossible to discern form in bright moonlight.  
1723 1/8 in S. Perfect night. Line not visible.  
1750 Same.  
1810 1/8. First of twilight in E. Line not visible.  


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1900 1/8 in S. Fairly light. Perfect morning.

MARCH 27

- (0722 Sunset  
 (0809 Moonrise Fraction illuminated: 0.84  
 (0922 End astronomical twilight  
 (1739 Beginning astronomical twilight  
 (1938 Sunrise

Till 1035 8/8 heavy mist and rain. Clearing slightly now. Green line not visible.

1115 8/8 heavy mist and rain again.

1215 Same.

1325 Rain ceased. Sky lighter but no sign of green line.

1415 8/8. Sky light. No sign of green line.

1515 Same.

1605 Same.

1640 Same.

1740 7/8 broken. Moon very bright. No sign of green line.

MARCH 27 cont'd.

1815 7/8 broken. Green line visible on background spectrum  $20^{\circ}$ SE and possibly in SW.

1845 Almost 8/8. Twilight in E. Green line not visible on background continuous spectrum.

MARCH 28

Till 1200 8/8 and raining. Still the same. No sign of green line on continuous background spectrum.

1330 Same.

1430 Same.

1530 8/8. No sign of green line on background spectrum.

1621 Same.

1855 8/8. Raining lightly. It has remained the same all night. Now twilight.

MARCH 29

(0716 Sunset  
(0914 End astronomical twilight  
(0931 Moonrise Fraction illuminated: 0.64  
(1744 Beginning astronomical twilight  
(1942 Sunrise

1050 8/8 all the evening. Sky light and green line distinct.

1200 8/8. Green line just visible.

1235 Almost 8/8. Moon visible in E through thin cloud. Line not visible.

1257 8/8, thinning slightly in E. Line just visible.

1345 8/8. Thin E-SE up to  $10^{\circ}$ . Line visible in SE.

1425 Almost 8/8 - some stars visible in NNW, Green line visible in most parts of sky. Strongest round  $30^{\circ}$ NNW where there seems to be (2) glow through the haze.

1505 4/8, mainly in N and E. (2) striations running through Z in NNW-SSE direction from  $35^{\circ}$ NNW and fading into diffuse (1) band  $20^{\circ}$ SSE. (2) drapery visible through thin cloud  $15^{\circ}$ WNW.

MARCH 29 cont'd.

- 1510 4/8, mainly in W and E. Short (2) ray  $10^{\circ}\text{S}$ . Diffuse (2) ray sheet WNW to NNW with rays extending to Z. Diffuse (1) G over SW sky.
- 1522 7/8 - small clear patches in Z, E and NNW. (2) pulsations in Z. Appears to be general diffuse (2) display over most of sky.
- 1532 7/8 - clear in Z. Double (2) band in E-W direction convex to N curving through  $80^{\circ}\text{N}$ . No pulsations visible. Patches of glow through cloud in W sky.
- 1548 2/8 scattered. (2) DS's over entire sky except for small region up to  $30^{\circ}\text{N}$ . DS's slightly rayed in SE where pulsations are most noticeable. Slow pulsations in Z.
- 1557 1/8, mainly in W. Display now more striated with striations running from WNW horizon to Z and then curving to SE. Slow flaming from N to Z. (1) in NE and (2) elsewhere.
- 1608 6/8 - clear in Z and NW. (2) striations through Z gradually merging into (2) diffuse glow  $30^{\circ}\text{NW}$ .
- 1622 5/8, clear mainly in NW sector. (2) HB curving from  $5^{\circ}\text{W}$  to  $25^{\circ}\text{N}$ , concave upwards. Lost in moonlight and cloud in NE.
- 1633 1/8 in S. (2) diffuse band from SE horizon into N sky through  $25^{\circ}\text{N}$  and merging into diffuse (3) drapery in WNW. This latter extends from the horizon to  $40^{\circ}$ , (2) rays beginning to appear at the upper edge of the drapery.
- 1638 1/8, mainly in S. (2) band from SE into N sky now less homogeneous and more diffuse. Extends to  $50^{\circ}\text{N}$ . (3) drapery extends to Z with clearly defined edge through Z running in NE-SW direction.
- 1642 1/8 scattered. Display now consists of (2) broad sheets in ESE and WNW narrowing into diffuse band which joins them through Z. WNW sheet consists of curved vertical bands at about  $20^{\circ}$ , convex to N.
- 1703 3/8, mainly in S. (2) multiple HA with lower edge through  $30^{\circ}\text{N}$ , becoming more diffuse with altitude and extending to about  $60^{\circ}\text{N}$ .
- 1718 2/8 scattered. Multiple HA now extends from  $30^{\circ}\text{N}$  back to Z. (3)  $15^{\circ}\text{WNW}$ , (2) elsewhere. (1) rays to Z from  $30^{\circ}\text{S}$ .
- 1729 0/8. (4) ray bundle  $5^{\circ}\text{SE}$ . (1) and (2) multiple arc from  $30^{\circ}\text{N}$  to  $80^{\circ}\text{S}$ , fairly diffuse.



MARCH 29 cont'd.

- 1744 5/8 scattered. (2) ray bundle visible through cloud gap 5°SE. (2) diffuse RB 10°WNW-W.  
1808 5/8 scattered. Diffuse (1) patch through cloud breaks in W. LNS.  
1826 0/8. Twilight in E. (1) MZA.  
1840 5/8 scattered. Green line not visible.
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MARCH 30

- (0713 Sunset  
 (0911 End astronomical twilight  
 (1042 Moonrise Fraction illuminated: 0.53  
 (1746 Beginning astronomical twilight  
 (1944 Sunrise
- Till 0900 8/8. Sky quite dark. No sign of green line.  
0940 Same.  
1100 8/8. Sky a little lighter but no sign of green line.  
1130 Heavy rain.  
1255 1/8. Moon bright in E. (2) diffusely rayed arc right across S sky through 35°S. SW half of remnant (2) RA through 15°S.  
1307 2/8. Arc has lost rayed structure and now passes through 40°S and is (2) only at W end. Signs of second (2) arc at about 8°S through cloud gaps in SSE.  
1319 Same.  
1335 0/8. Only sign of display is (1) HA through 35°S.  
1348 0/8. Broad diffuse (1) HA through 30°S ending in diffuse (2) ray sheet low in W.  
1400 0/8. No sign of features but green line very feebly visible in S sky.  
1412 0/8. No sign. LNS.  
1427 Same.  
1446 0/8. No features visible. Green line visible feebly round 30°S.  
1510 1/8 scattered. Line not visible.  
1533 4/8 scattered. Same.

MARCH 30 cont'd.

1602 Same.  
1632 1/8 scattered. No sign. No line.  
1650 2/8, mainly in N. No sign. No line.  
1703 2/8 scattered. No sign. LNS.  
1721 1/8 scattered. Same.  
1738 0/8. Same.  
1752 1/8 in S. Same.  
1805 5/8m ckearest in N. Line not visible.  
1820 Almost 8/8. No sign of green line.  
1905 7/8, clear low in E. Quite light. No sign.  
 LNS.

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MARCH 31

(0711 Sunset  
 (0909 End astronomical twilight  
 (1309 Moonrise Fraction illuminated: 0.41  
 (1748 Beginning astronomical twilight  
 (1946 Sunrise

0830 0/8. Haze. Sky not very dark. No features visible. LNS.

0838 (2) ray sheet from 40°S to 10°E with rays extending almost to Z from S. Lower ends of rays follow the path an RA would, but the rays are too sparse to be either an RA or RB.

0845 0/8. Hazy. Ray structure gone. Display appears more like a remnant (1) HA from ESE horigon up to 50°S. No other sign.

0900 0/8. Very hazy. Quite dark. E half of remnant (1) HA to 50°S.

0910 8/8 very thick haze with only a few stars weakly visible. No definite sign of display. LNS.

0925 8/8. Green line visible.

0940 8/8. Line weak.

1000 8/8. Line visible.

1017 7/8. Line just visible.

1045 8/8. LNS.

1055 Same.

MARCH 31 cont'd.

1110 8/8. Fairly dark. Line weakly visible.  
1125 8/8. Green line just visible.  
1140 Same.  
1220 8/8. Very dark. Line not visible.  
1320 Same.  
1410 8/8 and raining. Line not visible.  
1500 Same.  
1615 8/8 and fine rain. Sky light but line not visible.  
1705 Same.  
1755 8/8. Sky light. No sign of green line.  
1900 8/8. Fairly light. Line not visible.

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APRIL 1951APRIL 1

(0708 Sunset  
 (0907 End astronomical twilight  
 (1345 Moonrise Fraction illuminated: 0.31  
 (1750 Beginning astronomical twilight  
 (1948 Sunrise

0930 8/8. Very dark.

Till 1115 8/8 with no sign of display. Mist now lifting and sky appears light. LNS.

1135 7/8, clearing in W and thinning generally. Stars dimly visible in Z and S. Glow to 30° from S to SE. Believe cloud is thin enough to see any bright forms if present, but none visible.

1200 8/8. Fairly dark, but light enough to see outlines of hills.

1225 8/8. Very dark.

1320 Same.

1405 Same.

1500 Same.

1555 Same.

1650 8/8. Sky slightly lighter in N but too dark to seek line.

1715 8/8. Light in N and E from moon. Too dark to seek line.

1805 Same.

APRIL 2

(0706 Sunset  
 (0903 End astronomical twilight  
 (1511 Moonrise Fraction illuminated: 0.21  
 (1752 Beginning astronomical twilight  
 (1950 Sunrise

0845 8/8. Fairly dark.

0915 8/8. Very dark.

Till 1115 8/8 and light drizzle. Sky now slightly lighter. LNS.

1130 8/8. Line visible very weakly everywhere.

1200 8/8 and drizzle. Sky slightly light. LNS.

1250 8/8 and drizzle. Sky light. Line visible.

APRIL 2 cont'd.

1410 8/8. Sky light. Line extremely feeble.  
1508 Same.  
1610 Same.  
1700 8/8 and raining. Sky still light. LNS.  
1800 Raining. No obs.  
1900 Still raining. Fairly light.

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APRIL 3

(0703 Sunset  
 (0901 End astronomical twilight  
 (1638 Moonrise Fraction illuminated: 0.13  
 (1754 Beginning astronomical twilight  
 (1952 Sunrise

0745 7/8 - clear patch in W. Still very light.  
 No sign.

0800 7/8 - clear patch 20°- 25° SW to WNW. Three  
 rays due W and patch of display SW. Sky is  
 still blue, so intensity must be at least  
 (3).

0805 Cloud same. Rays still present in W.

0816 7/8 - small clear patch in W. Some stars  
 visible in NW, Z and SE. No definite sign,  
 but light patch 30°SSW. LNS.

0832 Almost 8/8. Green line visible in W and  
 SSW 20°.

0900 Almost 8/8, thin from W to Z. (3) band  
 from W to Z. (3) patch 10°SW. Glow through  
 cloud in SW round 40°.

0912 4/8 in N and E and thick haze in SW half.  
 (3) patch 10°S - may be part of drapery.

0915 4/8 and haze. (1) G over most of S sky to  
 60°S.

0940 Same.

1110 1/8 and haze. (1) G 10°SSE.

1130 Frost reported display covering entire sky.

1140 Frost reported (4) drapery 15°WSW. Display  
 spreading rapidly to Z and into N sky.  
 Suggestion of corona in Z.

1215 (2) over most parts of sky.

APRIL 3 cont'd.

- 1230-1240 1/8 in S and haze. (1) and (2) display over most parts of sky. (1) structureless G throughout S sky. (2) band from E to W through Z. (2) diffuse ray sheet in E to 40°. (2) DS's in N sky up to 40°, particularly in NE where they are beginning to pulsate.
- 1248 2/8 scattered and haze. (2) diffuse ray sheet continues in E to 40°. (2) flaming in NNE to 30° (then lost behind cloud). Single (2) ray from 20°S to 60°S. General (1) G extends over most of N sky to 60°. Z almost completely free of display.
- 1305 2/8 scattered and haze. (2) multiple zenithal bands slightly irregular in W and Z and gently pulsating in Z. (2) PDS's in NE to 30°. (1) G over most of S sky with occasional suggestion of pulsations.
- 1320 2/8 scattered and haze. S sky almost free of display. Irregular bands across sky from E to W in all N sky from Z down to 10°N. (2) flaming in all N sky.
- 1338 5/8, mainly in Z, S and NW. Haze. (2) ray sheet in E (possibly E end of multiple zenithal bands). Slow pulsations in NE.
- 1405 7/8. (2) patches visible from E to W through Z and in NE through small breaks in cloud.
- 1432 1/8 and haze. (1) and (2) MZA from 80°S to 80°N.
- 1500 1/8 and haze. Multiple arcs from 70°N to 40°S, (2) to 15°W and E and (1) elsewhere. Slow pulsations of arcs in Z and N.
- 1523 1/8 in E and haze. HA through 40°S, (2) in W gradually fading out towards E. Upper portions very diffuse and extending back to Z. DS 40°ENE appearing occasionally and rapidly fading.
- 1548 1/8. (2) HA through 40°S extending up to 60°S. HA through Z appearing and fading.
- 1610 (2) diffuse sheet in all N sky with fairly distinct edge through Z from E to W. Fluctuating a little, occasionally appearing striated in E-W direction.
- BCO 1627 (2) flaming in N to 30°. (2) diffuse band from E to W horizons through Z with fairly well defined S edge and extending down to fairly well defined N limit at 30°N. (3) 10°E and W.



APRIL 3 cont'd.

- 1629 2/8, mainly in W. Display gradually brightened and by 1629 became (4) in Z with rapid seirling motion and with reds, mauves and yellow-greens. Form of horseshoe gradually migrating E and leaving behind diffuse (3) sheets with sharp edge  $70^{\circ}\text{W}$ .
- 1632 Horseshoe now  $20^{\circ}\text{E}$  and still (4).
- 1635 Sharp (4) HB from NW through Z becoming (4) drapery in SE where it turns sharply through E and back into N sky through  $30^{\circ}\text{N}$  and into W sky as (3) HB.
- 1636 Band now rayed in Z with rays rippling in E to W direction.
- 1638 (3) HB through  $30^{\circ}\text{N}$  now rayed with rays moving E to W. (2) ray bundles  $20^{\circ}\text{SW}$ .
- 1639 RB in N has risen to  $80^{\circ}\text{N}$ , curving down through NE becoming (4) drapery  $40^{\circ}\text{NE}$  with rippling towards E.
- 1642 Display now fairly diffuse (2) in most parts of sky. (2) ray bundles in SE suddenly became (4) and began to sweep into NE sky with red at the leading edges and green at the trailing edges. The faded to (2). (2) flaming has continued all this while in N to  $30^{\circ}$ .
- 1647 Display became diffuse (2). Then at 1647 (4) horseshoe drapery developed  $10^{\circ}\text{W}$  and (4) rays swept across from S to SE with their lower edges at  $40^{\circ}$ . All these faded fairly quickly.
- 1649 Brilliant (4) fan drapery developed from  $40^{\circ}\text{SW}$  to Z, deep grass-green and red, in rapid motion. Rapidly faded away leaving (2) diffuseness.
- 1653 3/8 and haze. Another (4) drapery W-SW  $20^{\circ}$ - $60^{\circ}$ . Diffuse (2) in E.
- 1656 4/8 and haze. (3) diffuse ray sheet E-ESE to  $40^{\circ}$ . (3) drapery W-WNW  $20^{\circ}$ . Flaming appears to continue in N, but cloud obscures most of it.
- 1658 7/8. (2) patches visible in E and W through cloud gaps.
- 1700 6/8, clear patches in E and S. (2) patches visible in E and W.
- 1702 As well as (2) patches in E and W, (2) drapery dimly visible through thin cloud  $15^{\circ}\text{S-SSW}$ .
- 1705 Tubular drapery in S became (3) and moved to SW.

APRIL 3 cont'd.

- 1707 6/8 and haze. Drapery faded to (2). (2) patches still visible in E up to  $20^{\circ}$  through cloud gaps.
- 1711 Same.
- 1713 (2) waves (flaming from W to Z.
- DCO 1716 6/8 and haze. Clear in W. Flaming continues from W to Z. Cannot see flaming in E because of cloud obscuring most of display there.
- 1731 6/8 and haze. Clear across S sky up to  $25^{\circ}$ . (2) diffuse glow with suggestions of rays in SSE and SW.
- 1746 7/8 - clear  $15^{\circ}$ S and thin in many parts of S. (2) G to  $20^{\circ}$ S and probably (1) in remainder of S sky.
- 1801 Almost 8/8. (2) patches visible  $5^{\circ}$ SE, S and SW. Also light patch  $10^{\circ}$ ENE, probably due to moon.
- 1825 Almost 8/8. (1) glow through thin cloud  $20^{\circ}$ WNW. Sky light in E and S. Green line visible in W but not in SE.
- 1854 Almost 8/8. Sky fairly light in E. Line not visible in W.

APRIL 4

- (0701 Sunset
- (0859 End astronomical twilight
- (1756 Beginning astronomical twilight
- (1801 Moonrise Fraction illuminated: 0.06
- (1954 Sunrise
- 0828 8/8. Sky not completely dark. LNS.
- 0845 8/8 thin - stars very dimly visible in NW. Sky slightly light. Green line just visible.
- 0930 Same.
- 1035 8/8. Sky slightly light generally. Line just visible.
- 1125 8/8 mist. Stars dimly visible from Z down to  $60^{\circ}$  in all directions. Appears to be general (1) G over entire sky with little structure.
- 1131 Short (2) band developed through Z in NW-SE direction and quickly faded.
- 1135 (2) DS's  $80^{\circ}$ SW. Elsewhere general (1) G.

APRIL 4 cont'd.

- 1200 8/8. Sky not completely dark. LNS.  
1225 Same.  
1255 Same.  
1333 8/8. Fairly dark.  
1410 8/8. Sky not completely dark, but too dark to seek line.  
1450 Same.  
1540 Has been raining for last half hour. No obs.  
1555 8/8. Sky light and green line weakly visible.  
1705 8/8. Sky light. LNS.  
1720 8/8. Green line just visible.  
1752 8/8. Sky still slightly light. LNS.  
1835 2/8 scattered and haze. Twilight. Green line feebly visible in SW. May be (1) G to 30°  
1850 8/8, mainly very thin. Stars visible in SW. Green line not visible on background continuous spectrum.
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APRIL 5

- (0658 Sunset  
 (0856 End astronomical twilight  
 (1758 Beginning astronomical twilight  
 (1922 Moonrise Fraction illuminated: 0.02  
 (1956 Sunrise
- 0750 8/8. Sky still very light. Green line not visible.  
0840 8/8. Sky not completely dark, but too dark to see anything through spectroscope.  
0935 8/8. Sky light. Green line visible.  
1100 8/8. Sky quite light. Green line very distinct.  
1135 8/8. Sky light. LNS.  
1220 Same.  
1300 8/8. Light generally, particularly round 45°N. Line distinct.  
1335 8/8. Sky light LNS.



APRIL 5 cont'd.

- 1403 Same.  
1435 Same.  
1520 8/8. Sky light, though somewhat darker than before. Line visible dimly.  
1545 8/8 and light drizzle. Sky darker. LNS.  
1705 8/8. Sky slightly light, but too dark to see anything through spectroscope.  
1740 Same.  
1830 8/8. Fairly dark - too dark to seek line.  
1840 8/8. Sky now lighter. Green line not visible on continuous background spectrum.
- 

APRIL 6

- (0656) Sunset  
 (0854) End astronomical twilight  
 (1800) Beginning astronomical twilight  
 (1958) Sunrise  
  
0925 Almost 8/8 - some stars dimly visible in NW. Sky light particularly in W and E. Green line visible.  
0935 8/8. Sky light. LNS.  
1005 Almost 8/8 - stars visible 60°W. Sky light but no auroral forms visible. LNS.  
1120 1/8. Parallel bands in E-W direction in all S sky and up to 70°N. (3) 20°SW.  
1130 Same forms but (2) everywhere.  
1140 Same.  
1152 1/8. Parallel bands and draperies across all S sky. Drapery through 20°S, (4) 20°SW with motion of rays from W to E.  
1157 (2) in all S sky and into N except for (3) area in SW.  
1215 Display extends from 30°N, with (2) HA, back to S horizon. Great mass of (2) striations in E-W direction through Z to 70°N. Diffuseness between HA through 30°N and 70°N. In S main activity is draperies in SE, S and SW round 20°, (2).

APRIL 6 cont'd.

- 1225 1/8 in S. Display now extends to 20°N. Fairly uniform (2) G above 20°N to Z with dark band in E-W direction sweeping up from N to Z at approx. 3-4 second intervals. Striated mass more diffuse. Irregularity in Z where striations turn sharply at about 85°NE to run in N-S direction. (3) diffuse band sweeping up from SW horizon to Z with clearly defined S edge. (2) drapery in SE to 20°.
- 1226 Irregularity in S developed into diffuse corona.
- 1232 (3) tiered drapery SE-S to 20°, Activity continues over nearly all sky.
- 1235 Tiered drapery in SE-S became diffuse and increased to (4) with the reddish colouration quite clear. In E (2) bands sweep up and curve into S sky forming shallow horseshoes. Diffuse (1) and (2) G in N and S with flaming continuing in N.
- 1240 Diffuse drapery developed into well defined  
MAX. (4) snake-like RB from SSW skyline curving through 40°W into NW sky, gradually migrating westwards. Also (3) band developed in SE towards Z and gradually built up into (4) corona with rapid swirling in Z.
- 1245 Has now become diffuse (2) everywhere except in SW-W where two parallel (3) bands run from SW to NW through 20°W. No flaming in N.
- 1250 1/8. (2) and (3) band continues in W, but now passes through 15°W.
- 1254 Entire sky covered by G; (1) in N and (2) in most of S except for (2) rays 45°S and (2) band 15°W.
- 1300 Diffuse G over entire sky, (2) in S to about 40° and (1) over remainder of sky.
- 1308 Slight haze. Same.
- 1320 1/8 and slight haze. Display very feeble in N if present at all.
- 1330 6/8, clear in S to 30°. (2) G over all visible S sky.
- 1342 1/8 and haze. Diffuse (1) HA 20°S. Above this (1) diffuse G to Z where diffuse (1) MZA are present and extend to 75°N. (1) PDS's occasionally visible 30°ENE.
- 1355 Same but no sign of PDS's.
- 1410 1/8 in S. (1) G to 45°S.

APRIL 6 cont'd.

1425 3/8 in S and haze. (1) and (2) patches visible in S sky through cloud gaps, mainly below 45°S.

1438 1/8 in S and haze. Very diffuse (1) arcs from 15°S to Z - almost uniform G.

1455 2/8 in S to 35° and haze. (1) G visible at edges of cloud.

1525 1/8 in S and haze. HA 30°S with (1) G extending above it to 60°N ending in HA.

BCO 1545 Fairly uniform (2) G from 35°SSW to Z with suggestion of arcs crossing it. (1) and (2) DS's in all N sky down to 20°N with slight pulsations. (2) MZA, fluctuating considerably.

1550 1/8 in N. (2) MZA from ESE through 80°S to WNW, extending to 75°N. (2) pulsations in remainder of N sky down to 20°N.

1553 MZA now from Z to 70°N. In WNW MZA end in small (2) horseshoe drapery 15°.

1556 MZA irregular in Z. Horseshoe drapery migrating N and now is almost (3).

1558 The S limit of the display consists of well defined (3) sections in NW and E joined by diffuse bulge into Z. Pulsations continue in N.

1602 Display now more diffuse. Point of highest elevation is 80°NE where diffuse band curves through from WNW to SSE.

1605 (4) drapery developed through 70°N with rapid rippling towards E.

1607 Cloud rapidly increasing to 4/8 in N, W and Z.

1609 4/8. (3) sections of band visible 30°E and (2) patches visible in W through cloud gaps.

1612 3/8, mainly in N. (2) RB developed 15°WSW and main band in E spread into S sky through 70°SE and became (4) again with rapid motion towards E.

1616 2/8 and haze. (1) patches 40°S and SSE. (2) diffuse MZA ending 5°ESE in small (3) HB. (1) patches in N sky but no sign of pulsations there. Flaming in Z.

1619 Flaming in N, particularly round 45°. Nothing above (2).



APRIL 6 cont'd.

- DCO    1620    (2) RA developed through  $30^{\circ}\text{SSW}$  and gradually faded away. (1) HA through  $45^{\circ}\text{S}$  merging into general (1) diffuse G above it over rest of S sky. (2) diffuse MZA continue. Flaming continues in N sky.
- 1634     $1/8$  in S. (2) PDS's in N and NE. (2) diffuse G over most of S sky with little sign of structure. (1) diffuse band through Z from E to W.
- 1650     $2/8$  in S and W. (2) G in all parts of visible S sky. (2) pulsations near Z in N and NW.
- 1715     $3/8$  and fairly thick haze. Diffuse (2) patches visible in all S sky and (1) patches in N. No definite features visible.
- 1738     $1/8$  in S and haze. (2) HA through  $10^{\circ}\text{SSW}$  and (2) HA through  $15^{\circ}\text{SSW}$ , the latter increasing to (3) over the E half. Fairly diffuse over W half. Occasionally (1) DS's appear and disappear in N sky.
- 1742     $15^{\circ}$  arc faded to (2) and is very diffuse. (1) DS's round  $70^{\circ}\text{NW}$  converging towards Z.
- 1755     $0/8$ . Haze. (1) G, somewhat patchy, to  $40^{\circ}\text{S}$ . (1) DS's  $70^{\circ}\text{WNW}$ .
- 1818     $0/8$ . Haze. (2) HB (almost HA) through  $25^{\circ}\text{SSW}$  ending in diffuse (2) sheet in W. Flaming (2) DS's in SW sky up through Z into NW.
- 1833     $1/8$  and haze. (2) band  $15^{\circ}\text{S}$  with its lower edge fluctuating in form and its upper part merging into general (2) G over S sky. (2) flaming in all sky down to  $15^{\circ}\text{N}$ .
- 1844    (3) RB developed  $10^{\circ}\text{S-SSE}$ . DS's still present in W sky. Twilight in E prevents seeing anything there.
- 1846    RB in SSE increased to (4) at 1845 with rippling towards E. Has now faded away.
- 1848    DS's pulsating over W half of sky. (3) ray  $5^{\circ}\text{SSE}$ .
- 1852    (2) DS's pulsating in Z, S, W and NW.
- 1855    Same. Green line visible on background continuous spectrum over all sky down to  $45^{\circ}\text{E}$ .
- 1903     $1/8$  scattered. Very light. No forms visible and green line not visible on background continuous spectrum.
-

APRIL 7

(0653 Sunset  
 (0851 End astronomical twilight  
 (1802 Beginning astronomical twilight  
 (2000 Sunrise

0745 2/8 in SW. Quite light. No sign. Line not visible on continuous background spectrum.

0800 1/8 in W. No sign.

0815 3/8 in S and W. No sign.

0830 2/8 in S. (2) G at edges of cloud 25°SE-SW. Increased to (3) in W and ESE with patch of drapery visible.

NB. Radio Australia on 15.3 mc/s was being received well. At 0830 the signals suddenly began to flutter and reception became very poor.

0835 1/8 in S. Fairly diffuse (2) ray bundles 5°- 20°W and 20°ESE joined by diffuse (1) band

NB. Reception of Radio Australia on 11.8 mc/s almost perfect - very slight fading.

0840 1/8 scattered in S sky. (1) HB (almost HA) through 35°SSW, (2) at ESE end. W end mainly obscured. Suggestion of MZA, particularly in E, extending into N sky.

0843 1/8, mainly in W and E. HA through 35°SSW (2) in E half to SSE and (1) over remaining portion. Parts of W end obscured. Suggestion of fan of remnant zenithal arcs continues in E.

0852 1/8. Broad band from ESE to W through 35°S, (2) ESE-SE and (1) elsewhere. Only patches visible in W but intensity seems to be (2) there. No sign of remnant zenithal arc fan in E.

0900 1/8. HA through 60°S, (3) in E and (2) elsewhere. (2) RA below this through 40°S.

0904 (2) HA now through 50°S and RA through 30°S.

0910 (3) G in SE sector with (3) band 10°S. This latter developed an (4) patch. (1) and (2) MZA from E to W horizons. (2) HA through 40°S.

0914 1/8 in S and W. Single (1) arc through Z. (1) HA 40°S. (2) G to 30°S.

0916 1/8, mainly in W. Fairly uniform (2) G in SE sector to 30°S, (1) in SW sector. No activity in Z. Suggestion of glow in E to 25°.



APRIL 7 cont'd.

0925 1/8 in S and W. (2) G over SE sky to 30°.

0935 7/8. (2) patches visible through breaks in SE.

0958 8/8. Glow through cloud in SE.

1035 4/8. (2) band from E to W through 75°N. Momentarily (4) 15°W. (3) G E-SE to 30°.

1045 5/8. (3) draperies in E and W and through 75°N. Partial (3) corona. (4) drapery in SW.

1105 2/8 scattered. (3) band from ESE through Z to 40°WNW and curving from there sharply to W. Swaying motion in E half. (3) band 10°SE-S.

1108 4/8 in S. (3) irregular band through Z in E-W direction. (2) glow through cloud in S.

1114 0/8. (2) ragged ray sheet in SE to 50°. (2) ray sheet to 20° SW-W.

1119 3/8 and haze. (2) draperies in SE. (2) ray 60°ENE. Clear in Z where there is no sign of activity.

1134 4/8. (1) G in S. (1) band E-W through Z.

1146 3/8. (2) rays in SE.

1155 (1) arcs in E-W directions from 70°N to 40°S.

1201 3/8. (1) band in E to Z.

1228 3/8 and haze. (1) patch 30°S. (2) multiple bands E to W, from Z to 70°N. (2) rays in SW.

1245 1/8 in W. Display over entire sky except in SW up to 30°. (3) bands through Z and (3) drapery 45°SSE. Elsewhere diffuse (2) G.

1305 2/8. (2) draperies in SW. Broad irregular (2) band E-W through Z and about 40° wide.

1309 2/8 and haze in S (1) band through Z. Pulsating diffuse patches over entire visible sky.

1321 1/8 in S. (1) G over S sky. (3) pulsations in N sky, particularly in NE.

1345 6/8 and haze. Patch of (2) G visible in SSE and patches of (1) over most parts of sky. Pulsations in N.

1414 8/8. Sky not completely dark. LNS.

1431 Same.



APRIL 7 cont'd.

- 1454 Same.  
1524 2/8 scattered and haze. (1) G (may be HA) 20°S. (1) pulsations 45°ENE.  
1535 1/8 in W (1) HA 20°S with G above it to 45°S. (1) DS pulsating in NE.  
1549 3/8, mainly in W, and haze. Same.  
1600 7/8 - clear in SE. (1) G or end of HA in SE.  
1612 5/8 and haze (all W sky obscured). (1) patchy G over E-S quadrant.  
1623 8/8 and light drizzle. Sky not completely dark.  
1635 Same.  
1655 Almost 8/8 - one star occasionally visible in E. Patches of glow visible through cloud in most of E sky, particularly round 30°.  
1709 8/8. Not completely dark. LNS.  
1724 Same.  
1745 Same.  
1812 8/8. Sky quite light after long accustoming of the eyes. Green line distinct.  
1840 8/8. Sky light. Line dimly visible on background spectrum.  
1902 8/8 and drizzle. Line not visible on background continuous spectrum.
- 

APRIL 8

- (0652) Sunset  
 (0850) End astronomical twilight  
 (1803) Beginning astronomical twilight  
 (2001) Sunrise  
  
0800 8/8. Fairly light. Green line not visible on background spectrum.  
0825 2/8 and haze. (1) G in SE to 30°, visible at edges of cloud.  
0838 3/8 and haze. Glow visible through cloud 5°SE.  
0903 3/8 and haze. Patches (1) G in SE sky to 45°.  
0913 8/8 and light drizzle. Sky not completely dark. LNS.

APRIL 8 cont'd.

- 0930 8/8 and haze in SW sector. Glow through haze  $5^{\circ}\text{W}$ .
- 0935 4/8 and haze. (2) patch  $10^{\circ}\text{SSE}$  at edge of cloud. (1) G over SE sky to  $40^{\circ}$ .
- 0950 7/8. Patches of (2) G over SE sky to  $70^{\circ}$ .
- 1007 5/8 - clear band through Z from E to W. (2) patches visible in S. sky to  $70^{\circ}$ .
- 1033 2/8 in SW. (2) glow in S.
- 1100 3/8 in SW. (1) G in S and SE.
- 1218 8/8, thin in SE. Ray and glow visible in ESE.
- 1234 8/8. No sign.
- 1310 8/8. No definite sign. May be slight glow through cloud in E.
- 1335 6/8 - clear in Z. No sign of activity in Z. Glow through cloud SW to E.
- 1345 3/8, mainly in S, and haze. (1) G over most of sky, (2) in SE to  $30^{\circ}$ . (1) pulsations in Z.
- 1355 4/8. Glow through cloud from SW to E.
- 1410 2/8 and haze. (1) G above cloud banks  $15^{\circ}\text{SE}$  and  $15^{\circ}\text{W}$ . No sign in Z.
- 1419 Same.
- 1435 Almost 8/8 - some stars visible in N and E. Glow through cloud  $10^{\circ}\text{W}$  and  $40^{\circ}\text{S}$ .
- 1442 6/8 - clear in Z. Glow through cloud in SW and E, but no sign of activity in Z.
- 1500 8/8. Sky light generally. Patches of glow in SE and W (fairly bright in W).
- 1513 2/8, mainly in W, and haze in N. HB (almost HA) from ESE to W through  $40^{\circ}\text{S}$ ; (2) in E and W to  $20^{\circ}$ . Above this, diffuse (1) G with suggestions of HA's to  $80^{\circ}\text{N}$ .
- 1525 1/8. (2) HA through  $70^{\circ}\text{SSW}$  with slightly feebler HA's above it merging into general G extending back to  $75^{\circ}\text{N}$ .
- 1530 Curvature of arc very great - rises from SSE, curves uniformly through  $70^{\circ}\text{S}$  and down to SW.
- 1532 (2) arc gradually becoming non-uniform in curvature. Greatest curvature in SE, flatter in SW where it merges into diffuse (2) G.
- 1535 Same and feeble flaming in NNE.

APRIL 8 cont'd.

- 1536 Display has gradually extended down in S sky. "Arc" now rises steeply in ESE, curves through 45°S and continues down into diffuse (2) G. Diffuse everywhere above arc.
- 1543 (2) HA through 35°S with ill-defined edge. Original "arc" has contracted into ESE forming (2) HB to about 20°SE. Pulsations round 70°NE.
- 1549 HA is (2) from WNW end to SW and is (1) and fairly diffuse from 40°S to SSE. Multiple arcs above this to 80°N. Pulsations in Z and flaming in N.
- 1557 2/8, mainly in W, and haze. (2) MZA from 75°S to 60°N. Slightly irregular in W where intensity is greatest. Pulsations in N.
- 1600 Display extending further into S sky, the lower edge, passing through 45°S, being fairly diffuse.
- 1605 Band from ESE through 60°S to 20°WNW, there curving sharply to W horizon. (3) over most of length. Diffuse (2) above band to Z. (1) flaming continues in N.
- 1610 3/8 broken, mainly in S. Band from W to S section, ending at 50°S in diffuse (3) patch. Rippling from W to E along band.
- 1615 (3) sections of band visible through cloud gaps in W. Passes through 50°S and becomes (2) in E. Whole sky above this covered by display, gradually becoming weaker in N sky. Pulsations increasing in N sky.
- 1623 4/8 broken and scattered. (3) HB from ESE through 80°S to 20°W and then curving sharply back to SW skyline.
- 1625 Band (4) along whole length with rippling  
MAX. from W to E. Perhaps slightly more intense in E than elsewhere. Flaming and pulsations continue in N.
- 1629 Diffuse (2) from 35°S to 30°N with semblance of MZA. (2) PDS in N.
- 1635 2/8 and haze. (1) G over most of S sky, becoming (2) and patchy in N. Occasional flaming in N.
- 1643 3/8 scattered. (1) and (2) G in all visible S sky.
- 1704 7/8, clear in SSE. (2) tubular drapery in SSE, rapidly increasing to (3) and becoming a ray bundle and then fading to diffuse (2) patch.



APRIL 8 cont'd.

- 1713 8/8. Glow through cloud  $10^{\circ}$ SSE. Sky light generally.  
1720 Same.  
1735 8/8. Sky light. LNS.  
1750 Same.  
1805 Almost 8/8. Sky light, particularly in E where stars visible occasionally. Line visible dimly.  
1818 8/8. Sky light. LNS.  
1837 2/8 and haze. Line not visible on background continuous spectrum.  
1900 2/8 and haze. Fairly light. No forms visible.
- 

APRIL 9

- (0651) Sunset  
 (0704) Moonset Fraction illuminated: 0.06  
 (0849) End astronomical twilight  
 (1804) Beginning astronomical twilight  
 (2002) Sunrise  
  
0750 5/8. Green line may be present on continuous background spectrum, but not definite.  
0812 2/8 and haze. Line present on background spectrum in SSE. Not definitely present elsewhere.  
0827 1/8 in S and haze. Green line from SE to SW. Appears to be (1) G to  $30^{\circ}$ S.  
0846 1/8 in S. (1) G in S to  $30^{\circ}$ .  
0910 1/8 in S and haze. (1) patches visible in SE to  $30^{\circ}$ .  
0930 1/8 and haze. Diffuse (1) HA through  $20^{\circ}$ S.  
0955 6/8 and haze from E to Z. No forms visible, but general (1) G in E.  
1019 8/8. Glow through cloud about  $60^{\circ}$ .  
1036 7/8. Same.  
1101 5/8 - clear round Z. Glow through cloud in S and SW.  
1110 7/8 - clear in S. Band from E to W through  $25^{\circ}$ S, (3) in S and (2) elsewhere.

APRIL 9 cont'd.

1119 5/8 and haze. Band now extends to 40°S and  
 is rayed 10°SE.  
1123 7/8. Glow through cloud in S and E.  
1145 8/8. No sign.  
1157 8/8. Sky light. LNS.  
1210 Same.  
1230 8/8. Slight glow in S.  
1253 8/8. Very weak glow through cloud along  
 E to S horizon.  
1319 8/8. No sign.  
1330 8/8. Sky slightly light. Line visible  
 very feebly.  
1334 8/8 and drizzle. No sign.  
1400 8/8 and light rain. Sky not completely  
 dark. LNS.  
1423 8/8. Too dark to seek line.  
1500 Same.  
1537 Same.  
1600 Same.  
1640 8/8 and drizzle. Sky light. Line distinct.  
1710 Same.  
1800 Same.  
1840 8/8 and drizzle. Green line visible after  
 long accustoming of eye.

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APRIL 10

(0648 Sunset  
 (0724 Moonset Fraction illuminated: 0.12  
 (0847 End astronomical twilight  
 (1806 Beginning astronomical twilight  
 (2004 Sunrise  
0810 8/8. Sky light but green line not visible.  
0855 8/8. Too dark to seek line.  
0935 8/8. Sky light. Line visible feebly.  
1015 8/8 mist. Glow in SE, S and SW.

APRIL 10 cont'd.

- 1054 6/8 and haze. (2) draperies in SW. (2) band from W to Z where it is obscured by cloud.
- 1126 Almost 8/8 - some stars occasionally visible. Glow through cloud in SE, S and SW.
- 1205 8/8. Light in S sky.
- 1215 3/8 and thick haze. (2) fan drapery from N to Z. Double (2) band from E to W through Z, momentarily reached (3) 80°W.
- 1223 Almost 8/8. Patches of glow visible through thick haze in Z and NE.
- 1245 6/8 and thick haze. (1) patches visible 30°E, S and W.
- 1306 8/8. Sky light, particularly in SE.
- 1333 8/8. No sign.
- 1405 8/8. Sky light. LNS.
- 1505 8/8. No sign.
- 1555 8/8. No sign.
- 1650 8/8. Sky fairly dark - too dark to seek line.
- 1720 8/8. Very dark.
- 1830 Same.

APRIL 11

- (0646) Sunset
- (0753) Moonset      Fraction illuminated: 0.19
- (0845) End astronomical twilight
- (1808) Beginning astronomical twilight
- (2006) Sunrise
- 0755 2/8 in S. Green line visible in S to 30°. Appears to be (1) G to 30°S, but it is mainly behind cloud.
- 0834 1/8 and haze. (2) HA 25°S.
- 0858 (3) band in S, elevation 15° over SW half. Double from S to SE with Lower edge through 10°.
- 0911 1/8 and haze. (2) G to 20°S. (1) patch 20°SE.
- 0930 (2) G to 20°S.
- 0945 (2) G to 15°S.
- 1039 2/8 obscuring horizons. No sign.



APRIL 11 cont'd.

- 1110 2/8 mist around horizons. (1) G in S and E.
- 1120 2/8. (2) HA through  $30^{\circ}\text{S}$ . (1) rays in SW.
- 1130 (2) RA  $30^{\circ}\text{S}$ .
- 1239 4/8, clear in Z. (1) glow in E (may be broad band). (1) glow in S through cloud.
- 1313 2/8 and haze around horizon. (2) diffuse band in E. (1) glow in SW.
- 1330 (1) G over all S sky terminated by fairly well defined HA through Z.
- 1350 Since last obs. the HA has gradually broken up and the main part of the display consists of (2) DS's pulsating in Z and N sky.
- 1400 3/8. (1) DS's in Z and N sky. (1) G in E.
- 1417 1/8 scattered. (1) G over most of S sky. (1) PDS's in N sky, particularly round  $45^{\circ}\text{NNE}$ . (1) DS or diffuse glow  $30^{\circ}\text{E}$ .
- 1436 Display confined to S half of sky which is entirely covered. (2) PDS's in Z. (2) flaming, mainly from  $60^{\circ}\text{SW}$  to Z. Elsewhere in S (1) and (2) diffuse G.
- 1447 2/8. (2) PDS's in E, SW and Z.
- 1500 (2) PDS's in E-NE round  $45^{\circ}$  and through Z. (1) and (2) patchy G over all S sky. Semblance of (1) band from E  $50^{\circ}\text{E}$  to Z.
- 1510 0/8: Fan of (2) DS's from  $30^{\circ}\text{ENE}$  to  $30^{\circ}\text{SE}$  converging to Z (2) HA  $15^{\circ}\text{S}$ . (2) DS  $30^{\circ}\text{NW}$ .
- 1520 (1) diffuse patch where fan was. (2) HA  $15^{\circ}\text{S}$  continues but is somewhat patchy. (2) PDS's  $30^{\circ}\text{W}$  and S.
- 1535 2/8 in S and W and haze. (1) patchy G over most of N sky, particularly in NW. (1) G in all S sky.
- 1558 1/8 and haze. (1) close parallel arcs  $15^{\circ}\text{S}$ . (1) HA  $30^{\circ}\text{S}$ . No sign elsewhere.
- 1610 Same.
- 1620 Same and (1) HA from ESE to WNW through  $40^{\circ}\text{N}$  (very feeble).
- 1639 1/8 in S and haze. (1) glow round cloud to  $30^{\circ}\text{S}$  (HA may still be present). HA in N probably passes through  $30^{\circ}\text{N}$ , but is extremely feeble.
- 1700 Thick haze. Glow through haze  $10^{\circ}\text{S}$ .

APRIL 11 cont'd.

- 1725 8/8. Sky not completely dark. LNS.  
1755 8/8. Sky slightly light. Green line visible feebly.
- 

APRIL 12

- (0643) Sunset  
 (0836) Moonset Fraction illuminated: 0.27  
 (0842) End astronomical twilight  
 (1810) Beginning astronomical twilight  
 (2008) Sunrise
- 0740 Almost 8/8. Still light. LNS.  
0800 8/8. Green line not visible.  
0830 8/8. Fairly dark. LNS.  
0935 8/8. Too dark to seek line.  
1030 8/8 and rain. Very dark.  
1100 8/8. Sky appears light after long accustoming of eyes. Green line visible very feebly.  
1230 8/8 and rain. LNS.  
1310 Same.  
1342 Same.  
1410 8/8 and rain. Sky slightly light, but too dark to seek line.  
1450 Same.  
1512 Same.  
1650 8/8 and rain. Very dark.  
1800 8/8 and heavy rain. Sky very dark - too dark to seek line.
- 

APRIL 13

- (0641) Sunset  
 (0840) End astronomical twilight  
 (0935) Moonset Fraction illuminated: 0.36  
 (1812) Beginning astronomical twilight  
 (2009) Sunrise
- 0750 8/8. Fairly dark. LNS.  
0900 8/8. Very dark.

APRIL 13 cont'd.

- 0940 8/8 and drizzle. Very dark.  
1040 8/8 and drizzle. LNS.  
1045 8/8. Sky light. Line distinct.  
1142 8/8 and drizzle. LNS.  
1158 8/8. Sky very light. Patches in NE and NW became lighter momentarily.  
1218 8/8. Glow through cloud in NE.  
1229 8/8. Very light - lightest 45° SSE.  
1305 8/8. No sign.  
1326 8/8. Very light. LNS.  
1355 8/8. Considerably darker, but not completely dark.  
1430 Same.  
1456 8/8. Sky slightly light. LNS.  
1510 Same.  
1615 8/8. Green line visible.  
1645 8/8. Sky light generally. Patches of glow visible through cloud in W.  
1740 8/8 and very light drizzle. Sky slightly light. LNS.  
1825 8/8. Sky light after long accustoming of eyes. Green line visible.  
1850 8/8. Fairly light. Green line not definitely present on background continuous spectrum.
- 

APRIL 14

- (0639) Sunset  
 (0838) End astronomical twilight  
 (1047) Moonset Fraction illuminated: 0.45  
 (1814) Beginning astronomical twilight  
 (2011) Sunrise  
0715 6/8 - clear in W. No features visible. No sign of green line on background continuous spectrum.  
0745 8/8. Line not visible on background spectrum.  
0751 Same.  
0815 8/8. No sign of green line.



APRIL 14 cont'd.

- 0845 Same.
- 0919 8/8. Light patches in N half, but too dark to see anything through spectroscope.
- 0940 Almost 8/8 - one star occasionally visible in SE. Sky light generally and light patches in SE where green line is distinct.
- 1020 2/8 and haze. Green line distinct. Appears to be uniform (1) G over entire sky, but it is difficult to tell with the haze and the moon low in NW.
- 1025 2/8. (1) G over entire sky. Some very weak E-W bands through Z.
- 1030 2/8. G breaking up slightly into (1) and (2) diffuse long-rayed sheet in SE sector. Suggestion of very weak fan just N of Z.
- 1040 4/8. (1) G practically uniform over entire visible sky except for short weak banded structure E-W in Z.
- 1055 6/8. (1) G visible in all sectors through cloud gaps.
- 1100 8/8. Several light patches in SE.
- 1115 6/8 - clear in N and NW. Many light patches in S sky, particularly in SE. Intensity of display must be at least (2).
- 1120 6/8. Patches of G visible over entire sky through cloud gaps, (2) in SE and (1) elsewhere.
- 1130 4/8. Uniform (2) G in SE sector fading to (1) towards Z and extending over all remaining sky.
- 1220 Almost 8/8. Green line distinct. Glow visible through thin patches of cloud. apparently extends over all sky. Strongest in SE where display must be (2).
- 1250 8/8 and snowing.
- 1340 8/8. Possible glow in Z.
- 1400 7/8 - clear in Z. Glow through cloud 40°S.
- 1415 7/8 - clear in Z. Glow visible between 20°S and 45°S through cloud.
- 1446 8/8. No sign.
- 1505 8/8 and rain. Sky light and green line distinct.
- 1600 8/8 and rain.

APRIL 14 cont'd.1640 8/8. Very dark.1730-1735 6/8 at first with clear band from NE through Z to SW but this clouded over again. Slight amount of light on edges of cloud but green line not visible.1757 4/8, mainly in W half, and haze. (1) G in S to 20°.1811 8/8. Very dark.1835 3/8, mainly low in E and W. (1) SSE-S to 30°S. Line visible.1850 3/8, mainly in E and SW sector. Sky light in E. G obscured. LNS.1905 5/8 scattered. Line not visible on background continuous spectrum.APRIL 15

(0636 Sunset  
 (0836 End astronomical twilight  
 (1206 Moonset Fraction illuminated: 0.54  
 (1816 Beginning astronomical twilight  
 (2013 Sunrise

0730 7/8. Sufficiently dark to see (2) display if it were present. No sign. LNS.0750 3/8 scattered. Moon low in N. No sign. No sign of green line.0810 2/8. No sign. No line.0820 2/8. No sign. LNS.0835 7/8. No sign. No line.0850 8/8. No sign. LNS.0910 8/8. Sky light but line not visible.0925 8/8. Line not visible on background spectrum.0945 Same.1015 8/8. Fairly dark. No line.1035 Same.1055 Same.1125 8/8. Green line very faintly visible.1150 8/8. Line not visible.

APRIL 15 cont'd.

- 1225 Has remained 8/8. No sign of green line.  
1242 Almost 8/8 - stars dimly visible in SW. Sky light generally and line dimly visible.  
1315 8/8. Line not visible.  
1355 Same.  
1415 8/8. Very dark.  
1510 Same.  
1600 Same.  
1650 8/8. Slightly light patches in E and W round  $30^\circ$ , but too dark to see anything through spectroscope.  
1720 5/8 and haze from S through Z into N. (2) patchy G to  $35^\circ$ S and (1) G over remainder of S sky. (1) pulsations  $60^\circ$ SE. May be (1) G in N sky.  
1739 7/8 and haze  $60^\circ$ SW. Patches of glow through cloud mainly low in W. Appears to be diffuse (1) ray through haze in SW.  
1755 3/8 and haze. Patches of (2) G to  $20^\circ$ S visible through cloud gaps. (1) G over rest of S sky. (1) DS's in Z and NW of Z. (These may be pulsating occasionally, but not definite).  
1800 8/8, thin in parts. Patches of glow through cloud mainly in SE quadrant.  
1821 6/8 and haze in Z and S. Patches of (2) G in S and glow through cloud in S and W.  
1843 8/8. Fairly dark in S. LNS.  
1854 8/8. Fairly light low in W and E. Line not visible in W. LNS in E.  
1900 8/8. Beginning to rain. LNS.
- 

APRIL 16

- (0634 Sunset  
 (0833 End astronomical twilight  
 (1329 Moonset Fraction illuminated: 0.64  
 (1817 Beginning astronomical twilight  
 (2015 Sunrise  
  
0745 3/8. No sign of green line.



APRIL 16 cont'd.

- 0755 3/8. No sign.  
0820 Same.  
0840 5/8 scattered. No sign.  
0855 2/8. Green line just visible low in S where there appears to be (1) G below  $15^{\circ}$ S.  
0916 3/8. No sign of line.  
1025 3/8, mainly round the horizons. No sign.  
1058 4/8. (1) HA  $14^{\circ}$ S and (1) G very low in S. Green line distinct in this region.  
1102 7/8. HA now (2).  
1117 3/8. No sign of HA. (1) G below  $15^{\circ}$ S.  
1133 3/8. No sign.  
1210 7/8 - clear in W. No sign.  
1230 3/8. (1) G below  $15^{\circ}$ S.  
1300 3/8 in S and E. Possible G in S. (Radio reception poor).  
1330 6/8 broken. (1) G below  $15^{\circ}$ S.  
1405 5/8 and haze from Z into SE sector. Sky light generally, particularly in S and SE. Intensity of display in S must be at least (2).  
1425 1/8 and haze. (2) G to  $40^{\circ}$ S.  
1452 3/8 mainly in S and haze. Patches of (2) G visible to  $40^{\circ}$ S.  
1505 2/8 in S. (1) G visible above cloud in S to  $40^{\circ}$ .  
1525 2/8 in E and S and haze. (1) G to  $15^{\circ}$ SW. Cloud very slightly light in S.  
1549 Almost 8/8 - stars dimly visible in Z and low in N. Sky slightly light. LNS.  
1605 Same. Sky lightest low in S.  
1635 2/8 in SE and NW and haze. (1) G in SW to  $15^{\circ}$ . Suggestion of G in S.  
1652 Almost 8/8 - stars dimly visible in E and N. Fairly dark.  
1713 8/8. Fairly dark.  
1740 1/8 and haze. (1) G (very feeble) in SSE-W to  $15^{\circ}$ .

APRIL 16 cont'd.

- 1818 Almost 8/8. Too dark to seek line.  
1842 8/8. Light patches low in W and NW, but too dark here and elsewhere to see anything through spectroscope.  
1905 8/8. Line not visible on background spectrum.
- 

APRIL 17

- (0632 Sunset  
 (0831 End astronomical twilight  
 (1452 Moonset Fraction illuminated: 0.73  
 (1819 Beginning astronomical twilight  
 (2017 Sunrise
- 0740 8/8. LNS.  
0800 8/8. No sign of green line.  
0825 8/8. LNS.  
0835 8/8. Green line visible low in S.  
0915 8/8. Line distinct over all S sky.  
0940 8/8. Line not definitely present.  
1013 8/8. No sign of green line.  
1040 8/8. No sign.  
1050 8/8. Line just visible on background spectrum.  
1109 8/8. No sign.  
1130 8/8. Line just visible.  
1149 8/8. Glow through cloud in S.  
1200 8/8. Line just visible.  
1222 8/8. No sign.  
1240 8/8. Line just visible.  
1257 8/8. No sign.  
1330 Same.  
1345 8/8. Line just visible on background spectrum.  
1425 Same.  
1455 8/8. Sky slightly light. Line just visible.

APRIL 17 cont'd.

- 1610 8/8. Verydark.  
1720 8/8. Sky appears light after long  
 accustoming and line is just discernible.  
1820 8/8. Sky slightly light after long  
 accustoming, but too dark to see anything  
 through spectroscope.  
1840 Same.
- 

APRIL 18

- (0630 Sunset  
 (0828 End astronomical twilight  
 (1616 Moonset Fraction illuminated: 0.82  
 (1821 Beginning astronomical twilight  
 (2019 Sunrise
- 0725 8/8. Line not visible.  
0815 8/8. No line.  
0900 Same.  
1025 8/8 and drizzle. No sign.  
1050 8/8. No sign.  
1102 8/8 with low stratus over plateau. Some  
 stars occasionally visible. No sign.  
1126 6/8 - clear in SE. (2) ray in ESE.  
1132 7/8 broken. (3) ray bundle 100°W.  
1140 8/8 and drizzle. No sign.  
1157 5/8 and haze. (2) patch visible 20°E.  
1210 4/8 and haze. Moon bright. No sign of  
 green line.  
1215 8/8. No sign.  
1244 Same.  
1310 Same.  
1335 8/8. Green line not visible on background  
 continuous spectrum.
- 1425-1430 8/8 at first, thinning out to 6/8 and haze.  
 Green line at first not seen in S or Z, but  
 visible in W (near moon) at 1426. Then fan  
 drapery developed near Z with long (3) arms  
 down in E and W sky and short rays to 70°S.  
 This fan became (4) momentarily at 1427 with  
 red tinges and then faded away to (2).



APRIL 18 cont'd.

1435 8/8 again and light drizzle.

1457 8/8. No sign. LNS.

1513 8/8 and drizzle. Line very dimly visible on continuous background spectrum.

1530-1535 Mainly 8/8, but cleared for a short time from Z to E where (2) display visible (probably MZA).

1616 8/8. Sky light, particularly 15°NE-SE. Green line distinct.

1645 8/8, mainly thin. (2) diffuse glow in E. (2) flaming in N. Diffuse (2) corona in Z.

1658 8/8. Sky light. LNS.

1730 8/8 and drizzle. Sky slightly light. LNS.

1745 Same.

1816 8/8. Fairly dark, but not completely. LNS.

1837 8/8. Sky slightly light, but too dark to see any-thing through spectrocope.

1900 8/8. Sky light. Believe green line is present feebly on continuous background spectrum.

1910 8/8. Line not visible on background spectrum.

APRIL 19

(0625 Sunset

(0826 End astronomical twilight

(1741 Moonset Fraction illuminated: 0.89

(1823 Beginning astronomical twilight

(2021 Sunrise

Till 1100 8/8 and drizzle. Sky light. Frequent obs. have revealed no sign of green line on continuous background spectrum.

1135 8/8. No sign.

1200 8/8. Rain has now ceased. No sign. LNS.

1230 6/8. Moon bright. No sign of green line.

1235 6/8 - some clear patches in S. No sign.

1254 8/8. No sign.

1315 8/8. Sky light but no sign of green line.

1330 Same.

1346 Same.

APRIL 19 cont'd.

- 1400 8/8. Sky lightest in S and SW. LNS.  
1420 8/8. No sign of green line.  
1453 8/8. No sign.  
1507 8/8. No sign.  
1545 8/8. No line.  
1722 8/8. Slightly light but nothing visible through spectroscope.  
1825-1835 8/8. Sky appears light after long accustoming of eyes. Green line very feeble.
- 

APRIL 20

- (0625 Sunset  
 (0824 End astronomical twilight  
 (1824 Beginning astronomical twilight  
 (1909 Moonset Fraction illuminated: 0.95  
 (2022 Sunrise
- 0745 0/8. Moon very bright. No sign.  
0746 Very feeble rays appeared high in W.  
0747 (2) curtain right across sky from ESE to due W passing just S of Z formed rapidly.  
0748 Reached (4).  
0749 Moving slightly N - now passes directly through Z.  
 1st  
MAX. 0752 Still (4) along entire length and fairly quiet - some slow waving in Z. Only faint reddish tinges along lower edges, due to brilliance of moon.  
0755 Faded to (3) and losing sharp outlines.  
0758 0/8. Drapery faded completely. Suggestion of several (1) patches around 50°S, but very faint.  
0808 1/8. (1) diffusely rayed arc through 60°S, (2) near ESE end.  
0830 0/8. (2) band with very diffuse ray structure in W, maximum elevation 60°S and three S shaped convolutions in S to ESE.  
0834 0/8. ESE section of band as before except that it is more diffuse. Another convolution slowly formed at W end; W end ray structure now (3).

APRIL 20 cont'd.

- 0848 0/8. (3) band with diffusely rayed structure from SE horizon to WSW horizon, maximum elevation  $40^\circ$ . The only fold is now low in SE.
- 0900 0/8. Band is now an almost perfect (2) HA through  $35^\circ\text{S}$ .
- 0923 0/8. (2) RB, almost RA,  $25^\circ\text{S}$  with distortions at SE end. Single (2) ray  $20^\circ$ -  $40^\circ\text{ESE}$ .
- 0945 0/8. (3) band from E to SW through  $20^\circ\text{S}$ .
- 0959 0/8. (4) band from E to SW through  $35^\circ\text{S}$ . (1) band from E to SW through  $25^\circ\text{S}$ . (1) drapery  $15^\circ\text{S}$ .
- 1015 0/8. (3) band from E to SW through  $10^\circ\text{S}$ . Two (2) bands  $15^\circ\text{SW}$ .
- 1040 (2) band from SE to  $8^\circ\text{S}$ , being obscured there by plateau.
- 1052 0/8. (1) HA's through  $8^\circ\text{S}$  and  $15^\circ\text{S}$ . Multiple bands in E-W direction from Z to  $70^\circ\text{N}$ , fading and reappearing with maximum intensity (1).
- 1110 0/8. (1) MZB. (2) remnant HA through  $5^\circ\text{S}$  (E half). Several very diffuse (1) and (2) rays to S of Z forming diffuse partial corona. Appears to be (1) G over most of S sky, but moon is very bright.
- 1123 0/8. (1) HA  $12^\circ\text{S}$ . (1) MZB.
- 1137 0/8. (1) MZB.
- 1157 1/8. No sign.
- 1200 1/8. No forms visible but green line is weakly visible in SE and low in W.
- 1220 3/8 mainly low in N and S. No sign.
- 1235 2/8. No forms, but line visible in SE.
- 1252 5/8. No sign.
- 1315 4/8. (1) and (2) MB from E to Z. (1) ray WSW.
- 1330 4/8. (2) MB from ESE through Z.
- 1346 4/8. (2) MB from E to Z, convex towards S.
- 1415 2/8. (2) MZB. E half visible but cannot distinguish them in W where moon is bright. Line visible in W.



APRIL 20 cont'd.

- 1445 1/8. (3) band through Z from E to W horizons. Clearly defined S edge, more diffuse N edge. Green line visible in most of N sky but not visible in S sky.
- 2nd  
MAX. 1450 (4) brilliant green irregular band E-W through Z. (4) draperies in SW with RB extending from the draperies to pass through 35°S and into SE sky.
- 1453 Rapid W to E motion in (4) band which is contracting to E.
- 1455-1500 2/8 scattered. Band broken up into many diffuse (2) patches mainly near Z giving suggestion of corona. (3) patch 15°ESE. (2) RB 30°S. (3) RB then developed 15°W with rays rippling towards E. RB in S became (3) with rippling from W to E.
- 1503-1505 2/8. RB in W became (4) horseshoe drapery from W to WSW at 30°. This gradually spread towards S curling back on itself due S to form a hairpin loop. Then extended to SE. Main motion of rays from W to E, but rays swaying to and fro slightly.
- 1513-1517 Many patches of (2) and (3) bands and RB's from W to SE below 40°S. One patch 45°SE became (4).
- 1524 No definite features visible except for (3) ray 15°SE. Many patches could be moonlit cloud. LNS.
- 1534-1537 1/8 scattered. (3) RB 10°W gradually faded out and RB developed from W to SW at 25° and became (4) with rays rippling from E to W and from W to E. (3) ray bundle 25°SSE. (2) zenithal arcs just visible in bright moonlight. Line visible over most of N sky.
- 1542-1547 (2) MZA gradually changed into (3) zenithal band with rays mainly in E. Rays became (4) rippling from W to E. Band curved sharply S from ESE end at 15°. Gradually faded again to (2) MZA.
- 1550 Band much broader and more diffuse in Z. Still sharp in E and (3). In W, section has broken away and become (4) drapery, in motion. (2) flaming from 30°N to Z, most marked in NE quadrant.
- 1552-1558 The small (4) drapery in W gradually spread from W and increased in elevation until it extended from E to W through 80°N, remaining (4).
- 3rd  
MAX. 1559 Brilliant (4) corona and (4) drapery in E half. (3) RB's 20°S.
- 1605 Main feature is (4) horseshoe drapery 15°SE with yellowish colouration.

APRIL 20 cont'd.

1607 No distinct features, but diffuse (2) patches everywhere. Green line very distinct everywhere.

1612 (3) short RB 10°W. Short (3) HB 10°SSE. Short (2) band curving through Z in SW-NE direction.

1620-1630 2/8 scattered. Occasional (2) diffuse bands and rays in SE sector.

1637 Long (2) rays from SE to Z. (2) pulsations in Z.

1641 (3) ray bundle from 15°SE fading out to Z, gradually diffused.

1645 2/8. Diffuse (2) rays 10°SSE and 40°E.

1658 2/8. (2) ray bundle 15°SE spread out into (2) drapery from 15°SE to 30°E.

1700-1705 2/8. (2) drapery continued and then diffused leaving only a small (2) section 10°SSE.

1712 3/8. (2) ray sheet in SE merging into diffuse (2) band from E to Z.

1716 3/8, mainly in NW. (3) narrow fan of rays from ESE to Z. (2) flaming, mainly in NE.

1730 5/8. (2) flaming in NW near Z. NE obscured.

1740 8/8, thin in many parts. (3) drapery visible through thin cloud 10°SE.

1755 7/8, thin in many parts. (3) ray bundle 5°SE.

1810 Almost 8/8, thin in many parts. No forms visible but green line distinct.

1833 5/8 and haze. Long (2) ray bundle from 5°ESE to 50°E. (3) drapery 15°SSW-W.

1844 7/8 and haze. No forms visible. LNS.

1855 6/8 and haze. (2) fan of rays from 30°W to Z. Green line distinct in most parts of sky.

1915 8/8. Green line distinct in W near Z where glow can be seen through cloud.

1927 7/8. Line not visible on continuous background spectrum.

APRIL 21

(0622 Sunset  
 (0821 End astronomical twilight  
 (1825 Beginning astronomical twilight  
 (2024 Sunrise  
 (2043 Moonset Fraction illuminated: 0.99

Till 0800 8/8 and raining. No sign of green line.

0845 Same.

Till 1500 Has remained 8/8 with no sign of display.

1530 8/8, mainly thin. Line not visible on continuous background spectrum.

1600 8/8, very thin in some parts. Green line may be visible on background spectrum 45°S, but this is by no means certain.

1625 8/8, mainly very thin. Line not visible.

1705 Same.

1745 Same.

1815 8/8. Moon not now visible through cloud as before. No sign of line.

1855 8/8. Green line not visible on continuous background spectrum.

APRIL 22

(0620 Sunset  
 (0819 End astronomical twilight  
 (1827 Beginning astronomical twilight  
 (2026 Sunrise  
 (2222 Moonset Fraction illuminated: 1.00

0735 3/8 broken. No sign. LNS.

0820 2/8 thin and scattered. Moon bright. (2) remnant arc (W half) 15°S. Some diffuse (1) and (2) rayed activity below this in SSW.

0840 2/8, mainly in NE. No sign.

0900 1/8. No sign.

0935 0/8. No features visible.

0940 (2) RA through 15°S formed rapidly.

0945 RA completely faded.

1010 1/8. (1) irregular band from E to SW.



APRIL 22 cont'd.

- 1015 1/8. (2) and (3) draperies in S and Z, the rays from the latter extending down to  $50^{\circ}\text{N}$ . Partial corona formed by rays from these draperies.
- 1027 1/8. Striated glow in Z. (1) bands  $15^{\circ}\text{S}$  and  $25^{\circ}\text{S}$ .
- 1050 1/8. (2) RB  $15^{\circ}\text{S}$ . (1) striations in Z.
- 1055 0/8. Single (2) ray  $20^{\circ}$ -  $50^{\circ}\text{ENE}$ . Single (2) ray  $20^{\circ}$ -  $50^{\circ}\text{NNW}$ .
- 1100 0/8. (3) draperies formed low in W and spread rapidly in two main draperies, one to  $20^{\circ}\text{N}$  and the other through  $40^{\circ}\text{S}$  fading out at about  $30^{\circ}\text{SE}$ .
- 1103 Drapery became (4) in W with extremely bright crimson extending up the full  $10^{\circ}$  length of the rays low in W. Internal motion of rays along the two main draperies from W to E.
- 1105 Still (4) low in W and WSW. Draperies in N sky broken up into several scattered (2) sections. Single (2) band through Z in E-W direction and about  $30^{\circ}$  long.
- 1108 Display became tattered everywhere and down to (3) in W.
- 1st  
MAX. 1112 (4) again in W-WSW. Main drapery sweeps from W horizon across S sky ending at  $40^{\circ}$  due S. Only very weak isolated rays in N sky.
- 1115 0/8. Still (4) in W. Drapery has spread into multiple (2) and (3) fan S of Z. (4) RA diffusely rayed through  $13^{\circ}\text{S}$  right across sky. Still only very weak isolated rays in N sky.
- 1120 Main drapery faded to (2). Very broken (2) and (3) multiple long-rayed fans N and NW of Z.
- BCO 1127 0/8. Display has now faded to (2). Most of sky, particularly E-NE and N-W, covered with scattered long diffuse rays. Semblance of weak diffuse arcs at  $20^{\circ}\text{S}$  and  $60^{\circ}\text{S}$ . But it is very difficult to see these features with the moon so brilliant.
- 1130-1150 0/8. Throughout this period there have been signs of weak activity over all NW sky and in W and Z. Seem to be weak bands radiating from W into N sky. Must be (2) because of brilliance of moon.

APRIL 22 cont'd.

- 1155 0/8. Has remained substantially the same. In addition (2) ray bundle 20°- 50°SE and signs of weak activity in E.
- DCO 1225 0/8. Still weak activity in W-N sky with band-like structures. Signs of activity in E. Weak diffuse HA 35°S.
- 1240 1/8. (1) MB's in E-W direction extending from 30°S to 70°N.
- 1257 1/8. (2) HA through 60°S with (1) MB's above this to about 70°N.
- 1320 1/8. (2) band from 40°SSW to Z and curving from Z to 70°NE. (2) band from ESE through 50°N to W, rayed in E with slow motion of rays from W to E. Diffuse in W.
- 1325 (2) band with its lower edge E-W through 30°S and slightly rayed. Several weak bands from E extending into N sky.
- 1326 0/8. Several very weak diffuse bands from E towards Z and into NE sky. (2) band with small (3) rayed section at E end curving up from SSE horizon through S. and down to W horizon. Similar structure in W-NW.
- 1340 1/8. Several bands beginning from around 5°ESE. One passes through 60°S and curves down sharply from SSW to W; (3) in the latter portion and (2) elsewhere. About three diffuse (2) bands from the same place in ESE into N sky through 30°- 70°N. Not discernible in NW sky where moon is very bright.
- 1350 1/8. (1) band E-W through 40°S; (2) at E end.
- 1423 2/8 scattered. (2) diffuse multiple bands from E towards Z. Not visible beyond 60°E, probably because of bright moonlight. LNS.
- 1425 3/8. Faint (1) band from 10°E to Z.
- 1445 2/8. (2) ray bundle 25°ESE to Z.
- 1455 0/8. (2) band from SSE to 80°, curving slightly E.
- 1505 0/8. (2) ray from SSE to 70°.
- 1525 1/8 in W. No sign. LNS.
- 1550 1/8 low in NW. No sign of features. Line feebly visible on background spectrum low in ESE and WSW.
- 1620 2/8 scattered. (2) HA 25°S.

APRIL 22 cont'd.

- 1630 3/8 scattered. (3) band from 25°S to 50°SE. (2) PDS's in N sky, mainly in NE. Diffuse partial corona formed of DS's 80°ENE.
- 1643 7/8. (4) RB 5°SE-S. Motion of rays along lower edge oscillatory rather than from W to E. (2) PDS visible through small cloud gap in NE.
- 1650 7/8. Fairly short (4) RB 5°SSE-S.
- 1700 7/8 - clear patch 45°S. No forms visible. LNS.
- 1712 5/8 - clear in SE sector and clean patches in W. (2) flaming in E.
- 1730 4/8 scattered. (2) PDS 60°SE. Fairly steady (2) band or DS (impossible to tell which in moonlight) 60°S.
- 1742 1/8. (2) PDS's around Z.
- 1748-1753 1/8. (2) PDS's in most of sky (not visible in W where moon is bright). (3) RB 5°S-SE with motion of rays from W to E.
- 1804 2/8, mainly low in S and W. Rapid (2) flaming in E. somewhat slower in N sky.
- 1830 5/8 - clearest in NE. (2) pulsations and flaming continuing (2) diffuse rays in SE to Z.
- 1835-1845 2/8. (2) flaming over all N sky and (2) DS's above 30°S, fairly steady. At the beginning of this period, (3) RB appeared over plateau, 12°W-SW and gradually increased in elevation to 20°. This became (4) and the rays moved along the band sometimes slowly and sometimes extraordinarily rapidly in W to E direction and sometimes in a slightly oscillatory manner. The whole band drifted as a body across the SE preserving its length. It became more like a horseshoe drapery when its E end was due S and the rays continued to move around the more remote arm in the same direction so that they appeared to move E to W. The band faded to (3) and became more patchy in SE. Maximum of this was at 1840.
- 1850-1858 1/8. (4) in W. Original band has faded leaving only a diffuse patch behind it. (2) flaming continues in N sky. At 1853 (3) RB developed 15°SSE-SE.
- 1905 2/8, mainly in W. Flaming continues in N, being most noticeable in NE round 60°. No features visible in S. LNS.



APRIL 22 cont'd.

- 1912 4/8, mainly in SW half. Pulsations not visible in N. LNS.
- 1920 7/8. Line visible through cloud gaps in N and Z and in SW.
- 1927 6/8. Green line visible 70°S.
- 1940 7/8. Line not visible on continuous background spectrum.
- 

APRIL 23

- (0613 Moonrise Fraction illuminated: 0.98  
 (0617 Sunset  
 (0817 End astronomical twilight  
 (1829 Beginning astronomical twilight  
 (2028 Sunrise
- 0730 6/8. Moon bright in E. No sign. No line.
- 0800 Almost 8/8. No line.
- 0840 6/8 broken. No line.
- 1015 4/8. No sign.
- 1025 5/8. No sign.
- 1048 7/8 and snowing. No sign.
- 1058 8/8 and snowing. No sign.
- 1109 7/8. No sign.
- 1123 6/8. No sign.
- 1130 4/8 broken - clear in S. No sign. No line.
- 1152 3/8. No sign.
- 1215 8/8 and snowing. No sign.
- 1235 6/8. No sign of green line.
- 1247 8/8 and snowing. No sign.
- 1310 Same.
- 1345 6/8. No sign.
- 1425 8/8 and snowing. Line not visible.
- 1450 8/8 and snowing. No sign.
- 1530 8/8. Line not visible.
- 1620 Same.

APRIL 23 cont'd.1720 Same.1830 Same.APRIL 24.0615 Sunset.0639 Moonrise. Fraction illuminated: 0.940815 End astronomical twilight1831 Beginning astronomical twilight2030 Sunrise0615 Sunset - green flash seen.0715 4/8 light and scattered. Dark enough now to see (2) display but no sign.0735 4/8 scattered. No sign.0750 4/8. No sign of green line.0830 1/8. (3) diffusely rayed band from W to S parallel with horizon and  $12^\circ$  above it. (2) band above this at  $20^\circ$ . Broad (2) rayed sheet sweeping towards Z from low in W and several isolated (2) rays in E and N forming partial corona. Momentarily (3) in ENE.0835 1/8. Band reached (4) low in SW, and has now spread into SSE sky, low. (2) fan N of Z reaching from several long rays WNW through N to ENE. Rays from horizon almost to Z in WNW. No sign of sunlit break.0843 1/8. (4) RB from W to ESE through  $30^\circ$ S with considerable internal vibratory motion. Weak diffuse zenithal arc.0855 0/8. Band now (3) and higher ( $60^\circ$ S). Spreading in many diffuse and tattered folds to cover all the low SSE sky. Weak zenithal arc.0905 3/8 scattered. Main band faded to (1) in central section. (3) tattered sections low in S-SSE and in W. Weak zenithal arc.0920 4/8 scattered. (3) HA  $10^\circ$ S (this is either a remnant HA or the W end is obscured by cloud from S to W). (2) broad diffuse band from W to  $45^\circ$ SW.0930 1/8. (3) RB  $20^\circ$ W-S. Several diffuse and broken bands low in SSE.0955 0/8. (2) RB from WSW horizon through  $25^\circ$ S to SE, double over E half.1034 0/8. (2) MB through Z. (2) bands from E to SW through  $15^\circ$ S and  $30^\circ$ S, rayed at SW ends.

APRIL 24 cont'd.

- 1040-1050 (3) RB from  $15^{\circ}\text{W}$  fading out towards  $15^{\circ}\text{SE}$ .  
(2) MZB, very streaky in W and (3) at lower end in W. Not visible in E where moon is brilliant.
- 1107 0/8. (2) band from SW through  $70^{\circ}\text{N}$  to ESE, S-shaped. (2) rays in S.
- 1110 0/8. (2) and (3) variable RA with some very long rays through  $12^{\circ}\text{S}$ . (2) HB from W through  $40^{\circ}\text{N}$  over to ENE horizon. Multiple broken (2) and (3) bands fanning a short distance out into NW sky from W horizon.
- MAX. 1125 0/8. (4) RB  $70^{\circ}\text{S}$ . (2) RB  $30^{\circ}\text{S}$ . Partial (2) corona. (2) glow with weak bands down to  $30^{\circ}\text{N}$ .
- 1135-1142 0/8. Draperies over entire sky running mainly in E-W directions. (2) and somewhat diffuse from  $30^{\circ}\text{N}$  to Z and (3) over most of S sky, being (4) in SE sector where draperies are considerably convoluted.
- 1150-1155 0/8. (3) band from WNW horizon through Z to SE, there curving into SSE where innumerable (4) folds extend from horizon to  $30^{\circ}$ . Slightly rayed  $50^{\circ}\text{WNW}$ .
- 1200 0/8. (1) MZB. (2) draperies SSE. (2) RB's  $30^{\circ}\text{S}$  and  $50^{\circ}\text{S}$ .
- 1208 2/8 scattered. (2) bands from WNW through N sky to E and through S sky to SE. No sign above  $45^{\circ}$  in N or S.
- 1226 4/8. (2) band from E through  $50^{\circ}\text{N}$ . (2) glow in W.
- 1248 6/8. (3) RB from W to Z and (2) irregular V-shaped band in E. These two probably join but the junction is obscured by cloud.
- 1302 6/8, thin in parts. (4) drapery  $20^{\circ}$ - $40^{\circ}$  NW.
- 1305 6/8. (2) glow through cloud  $30^{\circ}$ - $40^{\circ}\text{NE}$ . (2) MB visible  $60^{\circ}\text{E}$  through small cloud gap.
- 1323 8/8. No sign. LNS.
- 1348 8/8. No sign.
- 1357 8/8. No sign. LNS.
- 1413 7/8. No sign.
- 1425 Almost 8/8. Line not visible on continuous background spectrum.
- 1436 7/8. No sign.
- 1510 8/8. No sign. LNS.



APRIL 24 cont'd.1605 8/8. Line not visible.1700 Same.1740 Same.1805 8/8. LNS.1855 8/8. Line not visible.1925 Same.APRIL 25.

(0613 Sunset

(0724 Moonrise. Fraction illuminated: 0.86

(0813 End astronomical twilight

(1833 Beginning astronomical twilight

(2032 Sunrise

0715 8/8. Line not visible.0820 8/8. Slight glow through cloud in S but line not visible.0925 Almost 8/8 - stars dimly visible in W. Line visible  $60^{\circ}$  W where cloud is very thin. Appears to be at least (2) display present.0935 Nutt reported: (3) bands in E and W.0940-0945 8/8 at first, rapidly clearing to 4/8 scattered, revealing (3) drapery folding back and forth through Z and then into NE sky. (3) band  $20^{\circ}$  SW.1040 Dawson reported: 8/8 for some time, but has just cleared to 4/8 revealing (2) diffuse rays  $20^{\circ}$  WSW and (2) fold  $50^{\circ}$  SE.1118 7/8. (2) ray  $30^{\circ}$  SW.1120 5/8. (3) drapery from W to Z, partly obscured by cloud.1130 Almost 8/8. Small rayed patch at least (2) visible through thin cloud  $10^{\circ}$  W.1140 7/8 - clear in SW. No definite features visible. May be auroral patches low in SE. LNS.1145 5/8. No sign.1213 Same.1234 5/8. (4) draperies around Z.1308 8/8. No sign.1330 Almost 8/8 - several small gaps over most of sky. No forms visible LNS.

APRIL 25 cont'd.

1337 7/8. No sign.  
1400 8/8. No sign.  
1445 8/8. Line distinct.  
1500 8/8. No sign. LNS.  
1525 8/8. Line visible.  
1600 8/8. Line not visible on background spectrum.  
1635 8/8. Line weakly visible on background spectrum low in SW.  
1710 8/8. Line not visible.  
1750 Same.  
1845 Same.  
1900 Same.

APRIL 26.

(0610 Sunset  
 (0811 End astronomical twilight.  
 (0830 Moonrise. Fraction illuminated: 0.77  
 (1834 Beginning astronomical twilight.  
 (2034 Sunrise.  
0710 8/8. Line not visible.  
0750 8/8. Fairly dark.  
0900 8/8. Glow through cloud in SSE. Green line may be visible but not certain.  
0930 8/8. Line distinct low in W and visible in S.  
1120 6/8. (3) band in Z from SW to SE.  
1125 6/8, clear in Z. (2) band curving through Z.  
1135 7/8. No sign.  
1145 7/8. No sign.  
1245 8/8, thin in parts. Line visible in W and may be present in S and Z.  
1259 8/8. No sign.  
1345 8/8. Line not definitely present on continuous spectrum.  
1350 8/8. No sign.  
1420 Same.

APRIL 26 cont'd.

- 1455 8/8. Line not visible on background spectrum.  
1500 8/8. No sign.  
1550 8/8. Line not visible on background spectrum.  
1635 Same.  
1715 Same.  
1845 Same.  
1920 Same.

APRIL 27.

- (0608 Sunset.  
 (0809 End astronomical twilight.  
 (0955 Moonrise. Fraction illuminated: 0.67.  
 (1836 Beginning astronomical twilight.  
 (2036 Sunrise.
- 0720 8/8. Line not visible.  
0807 8/8 and light rain. Fairly dark. LNS.  
0930 8/8. Fairly dark.  
1040 8/8. No sign.  
1125 8/8. Very dark. No sign.  
1130 8/8. Very dark. Has been too dark to seek line.  
1215 8/8. Slightly light, but line not visible.  
1248 8/8 and rain. No sign.  
1255 8/8. Slightly light but no sign of green line.  
1410 8/8. Line not visible on weak continuous background spectrum.  
1430 8/8. No sign.  
1500 Same.  
1505 8/8. Line not visible on weak continuous spectrum.  
1620 8/8 mist, thin enough to see moon dimly occasionally. Line not visible on continuous background spectrum.  
1705 1/8 in NE (Dawson reported that front passed at about 1645 clearing mist). (2) MZA. Short (2) rays 15°SW.



APRIL 27 cont'd.

- 1715 1/8 in NE. (2) MZA, somewhat more diffuse and patchy and extend from Z to  $40^{\circ}$ S (running in E-W direction). (1) flaming over all N sky.
- 1727 2/8 in SW sector, rapidly spreading. (2) PDS's in broad band from E to W through Z. (1) PDS's in N sky.
- 1738 8/8. LNS.
- 1800 Almost 8/8 - some very small breaks. Line not definitely visible on background spectrum.
- 1832 Almost 8/8. Line not visible.
- 1900 7/8, clear in NE and thin elsewhere. No sign of features. Line not visible.
- 1925 8/8. Line not visible.
- 1935 Same.

APRIL 28.

- (0606 Sunset
- (0808 End astronomical twilight
- (1127 Moonrise. Fraction illuminated: 0.56
- (1838 Beginning astronomical twilight.
- (2038 Sunrise.
- 0650 3/8 scattered. Line not visible on background spectrum.
- 0740 8/8. Fairly dark.
- 0845 0/8. (1) G to  $25^{\circ}$ S. Slightly lighter in SE than elsewhere.
- 0914 1/8. (2) remnant HA from ESE horizon to  $25^{\circ}$ SE where intensity diminishes to (1) and faded out.
- 0928 4/8 scattered. (2) patches visible through gaps in SE round  $30^{\circ}$ .
- 0940 8/8. Patches of glow through cloud.
- 1014 1/8. (2) RB from S to SW at  $25^{\circ}$ .
- 1029 1/8. No sign.
- 1043 Same.
- 1108 Same.
- 1135 1/8. (1) broad diffuse short rays  $15^{\circ}$ S.
- 1140 1/8. No sign.
- 1323 7/8. No sign.

APRIL 28 cont'd.

- 1350 3/8. No sign.  
1403 7/8. No sign.  
1420 7/8, clear patches in Z. Green line very feeble low in W.  
1500 0/8. May be faint glow in S.  
1600 0/8. (1) broad diffuse HA 25°S. Lower edge so ill-defined that it could be taken as G.  
1645 0/8. (1) G to 20°S (very feeble).  
1710 0/8. No sign.  
1730 6/8. No sign. LNS.  
1745-1810 Fairly continuous obs. over this period. Cloud usually 0/8, but beginning to cloud over thinly at end of period. No forms visible at any time.  


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1815 6/8. No sign. LNS.  
1830 Almost 8/8. Line not visible.  
1848 7/8 - clearest in S. No forms visible LNS.  
1910 8/8. No sign of green line.
- 

APRIL 29.

- (0604 Sunset  
 (0806 End astronomical twilight  
 (1258 Moonrise. Fraction illuminated: 0.45  
 (1840 Beginning astronomical twilight.  
 (2040 Sunrise.  
0725 8/8. Too dark to seek line.  
0810 8/8. Dark and misty.  
1000-1500 Frequent obs. during this period. Always 8/8 with no sign.  
1535 8/8 and raining. LNS previously, but now green line distinct.  
1615 8/8 and raining. Line visible weakly.  
1645 8/8. Sky slightly light. LNS.  
1745 Same.  
1900 8/8 thin cloud. Stars dimly visible over most of sky. No forms visible and line not visible.  
1930 8/8 thin cloud with stars dimly visible. No sign. LNS.
-

APRIL 30.

(0602	Sunset.
(0804	End astronomical twilight.
(1425	Moonrise. Fraction illuminated: 0.34.
(1841	Beginning astronomical twilight.
(2041	Sunrise.
0717	4/8. No sign.
0740	2/8. No sign.
0800	1/8. Very dark. No sign.
0806	1/8. Fairly dark. No sign of green line.
0810-0845	1/8 - 3/8. Extremely weak G below 15°S with line just visible.
0930	1/8 in S. Patches (1) G visible through gaps in cloud to 15°S.
0940	0/8. (1) broad diffuse HA 20°S.
1015-1150	Very frequent obs. during this period. Cloud varied between 1/8 and 3/8. Very steady (2) HA 12°S has persisted throughout the period.
1155	8/8. Sleet squalls.
1220	Same.
1245	2/8. (2) HA 10°S. Short (2) rays 12°SW.
1255	Almost 8/8. No sign.
1316	3/8 and haze. May be slight glow over plateau in S.
1338	1/8. (1) G to 25°S.
1350	5/8. No sign.
1415	3/8 mist. No sign.
1430-1515	Fairly continuous obs. during this period whilst taking star photos. 0/8 mainly. May be extremely weak G to 10°S.
1530	2/8. No sign.
1740	3/8 and light rain for last 1½ hours. Line not visible.
1810	3/8. Too dark to seek line.
1915	3/8. Slightly light. LNS.



### NOTES ON AURORAL OBSERVATIONS

Though a detailed analysis of the frequency of auroral activity in various sectors of the sky has been postponed until a later paper, certain general features of the spatial distribution merit discussion here.

From the relatively small amount of observational data available, White and Geddes (1939) estimated the position of the southern Auroral Zone. They considered it almost circular with a radius of  $18^\circ$  about the point  $75^\circ\text{S}$ ,  $129^\circ\text{E}$  and passing in a general east-westerly direction roughly  $6^\circ$  south of Macquarie Island. Part of the records used in this work came from observations made in 1913 at Macquarie Island by members of the Australasian Antarctic Expedition (Mawson 1925). These records showed that practically all displays occurred in the southern half of the sky. Only three displays extended into the northern sky and these were confined to the W-NW sector.

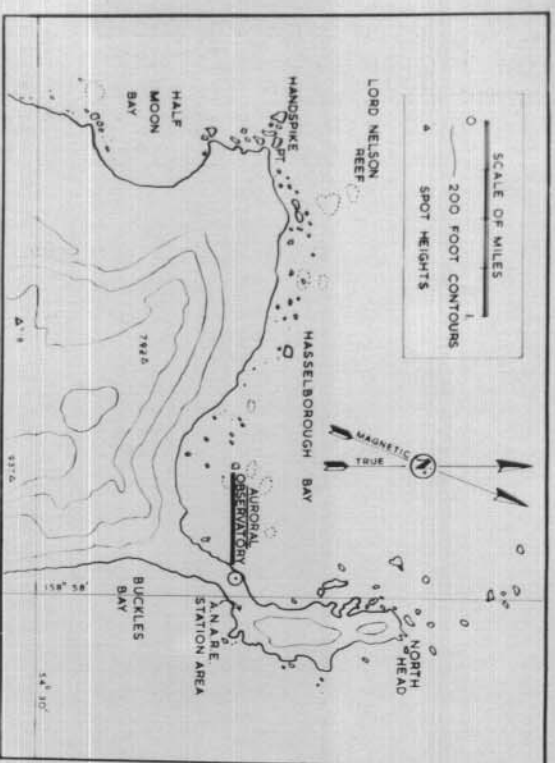
The 1950/51 observations confirm that the greatest activity occurs in the southern half of the sky, with no marked difference between SE and SW but they show a greater proportion of displays in the northern half of the sky. During 1950/51 almost half of all displays extended well north of the zenith and frequently occurred low down on the northern horizon. The region of greatest intensity, however, was centred most often south of the zenith. The 1950/51 observations were made over a period of great sunspot and magnetic activity compared with 1913, a year of minimum activity. From observations made in the south of New Zealand between 1931 and 1939, White and Geddes suspected that the southern Auroral Zone passed somewhat closer to Macquarie Island than the 1913 data indicated. The New Zealand observations were however strongly influenced by the data of 1939, a year of maximum sunspot activity.

The difference between the 1913 and 1950/51 data may then be taken as further evidence for an expansion and contraction of the Auroral Zone in sympathy with the sunspot cycle as discussed by Vestine and Snyder (1945) and Thomsen (1947).

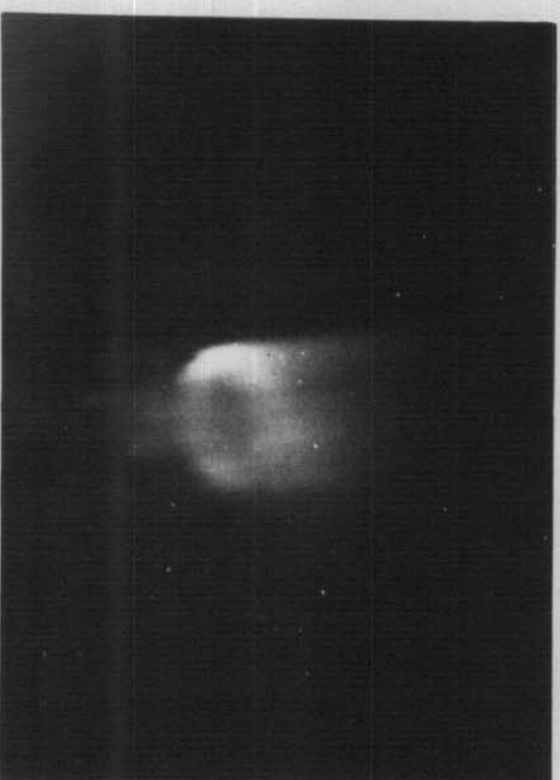
The majority of intense displays involved the occurrence of all forms either simultaneously in different parts of the sky, or appearing for short periods with rapid variations from one form to another. Weaker displays were normally confined to such forms as quiet arcs, extensive uniform glows, diffuse surfaces and weak multiple zenithal bands. The brighter displays were in general subject to rapid movement and change of form and involved forms such as rays, rayed bands and arcs, draperies and coronas.

Homogeneous and rayed arcs were all approximately E-W and symmetrical about the magnetic meridian. Irregular bands and draperies usually occurred with an approximate east-west trend, but in active displays this trend was observed to vary greatly and on several occasions bands and draperies were oriented roughly north-south (c.f. 1245 G.M.T. 7/3/51). Some examples of "horseshoe" and "closed ring" draperies were also observed (c.f. 1357 G.M.T. 7/3/51, 1016 G.M.T. 10/3/51 and Plate 1).

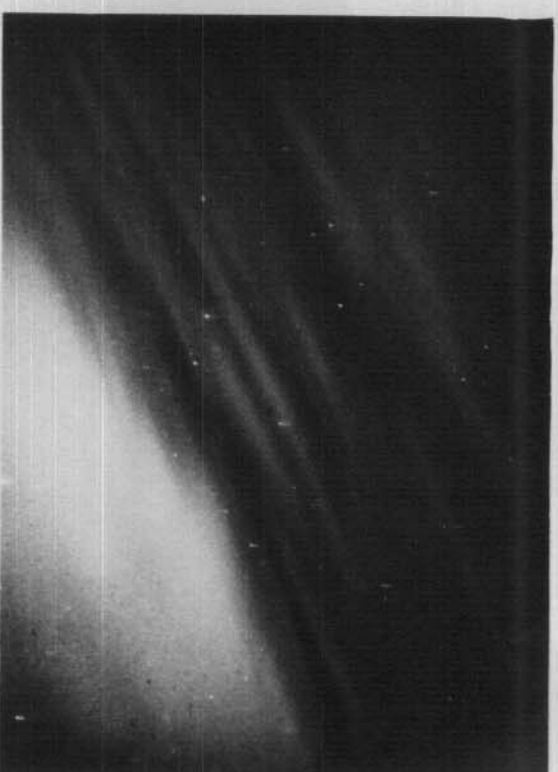




NORTH END OF MACQUARIE ISLAND SHOWING  
POSITION OF AURORAL OBSERVATORY.



CLOSED RING DRAPERY LOW IN S.E. (INTENSITY 2.  
EXPOSURE 4 SECS.) 13 JANUARY 1951. 1319 G.M.T.



STRIATED SHEET IN E. (EXPOSURE 3 SECS.)  
13 MARCH 1951. 1606 G.M.T.



MULTIPLE BANDS IN ZENITH (INTENSITY 2.  
EXPOSURE 5 SECS.) 9 MARCH 1951. 1514 G.M.T.



Observations of the direction of internal motion of rays in rayed arcs, rayed bands and draperies are summarised in Table 1. The speed of this internal motion in general increased with the intensity, and in some brilliant displays was almost impossible to follow. In what are described as "seething" coronas the swirling motion of the rays around the radiation point was also extremely rapid.

A rather rare phenomenon was the occurrence of "whirls" or "vortices" which formed in the lower borders of bands or draperies. These appeared as small spiral convolutions which drifted, sometimes quite rapidly, along the length of an otherwise fairly regular band or drapery. This phenomenon has been mentioned by Mawson (1925) who describes the eddies as in motion from W to E. Motion both W to E and E to W was noted in the present observations (c.f. 1024 G.M.T. 10/3/52, 1041 G.M.T. 10/3/51).

Weak multiple arcs passing from east to west close to the zenith were often present for a large proportion of the duration of a display, remaining almost unchanged despite changes in form and intensity in other regions of the sky. On many occasions the distinct multiple arc structure was replaced by a very broad sheet giving a finely striated appearance by large numbers of narrow dark strips oriented in a general east-west direction. (c.f. 1606 G.M.T. 13/3/51 and Plate 1).

The observed times of occurrence of pulsating and flaming auroras are set out in Table 2. It will be noted that they are much more frequent during the equinoctial months than at other times.

Pulsating and flaming auroras were usually associated with very intense displays. Almost invariably confined to the northern sky or the region close to the zenith, they usually took the form of diffuse surfaces or scattered remnants of previously brighter draperies or coronas. The intensity was seldom very great. On no occasion did pulsating or flaming forms appear until a display had been in progress for some considerable time and on several occasions such forms were observed to persist until dawn (c.f. 2/10/50, 6/4/51).

Flaming auroras exhibited a general tendency for an upward sweep towards the magnetic zenith. Regular wave-like variations were infrequent but were of two distinct types, one in the nature of waves which brightened scattered areas of glow momentarily as they passed, the other in the form of a succession of regular arcs sweeping rapidly in a direction normal to their orientation. These latter were almost invariably directed towards the magnetic zenith but on one occasion very distinct waves following each other at intervals of about one second swept from approximately  $20^\circ$  south of the zenith to low in the northern sky (c.f. 1325 G.M.T. 2/3/51 - obs. from Lusitania Bay).

On only one occasion (0920 G.M.T. 14/10/50) was an aurora seen showing a dark segment which may have been associated with the boundary between the sunlit and dark atmosphere. On this occasion several rays were of a weak blue-purple colour.

TABLE I

SUMMARY OF OBSERVATIONS OF INTERNAL MOTION OF RAYS  
IN RA, RB AND D.

	<u>DATE</u>	<u>G.M.T.</u>	<u>AURORAL FORM</u>	<u>DIRECTION OF MOTION OF RAYS</u>
1950	MAY 26	0858	D	Rapid irregular lateral vibration.
	AUG 8	1125	D	W-E with some momentary reversals.
	AUG 20	0830	D	E-W
	SEP 19	1110	D <sup>s</sup>	E-W and W-E. Intense and rapid with random reversals of direction.
	OCT 2	1505	RB	W-E
	NOV 29	1250	RA	W-E
	DEC 23	1357	RB	W-E
1951	JAN 13	1315	RA	W-E
	FEB 11	1632	RB	W-E
	FEB 23	1630	RA	W-E
		1705	RB	W-E
		1710	RB	E-W and W-E. Subject to random reversals.
	FEB 25	1050	RB	W-E
		1120	RB	W-E
	MAR 7	1245	RB	E-W predominantly with some momentary reversals.
	MAR 8	1137	D	E-W
		1155	D	E-W
	MAR 10	1013	D <sup>s</sup>	W-E
		1041	D <sup>s</sup>	E-W and W-E. Simultaneous opposite motion in separate draperies with some reversals.
		1148	RB	E-W and W-E. Random reversals.
	MAR 13	0940	RB	W-E
		1144	RB	E-W and W-E. Slow even motion in opposite directions in parallel bands.
	APRIL 3	1636	RB <sup>s</sup>	E-W
		1639	D	W-E
	APRIL 6	1152	D	W-E
		1607	RB	W-E
		1844	RB	W-E
	APRIL 8	1612	RB	W-E

<u>DATE</u>	<u>G.M.T</u>	<u>AUROLAL</u> <u>FORM</u>	<u>DIRECTION OF MOTION OF RAYS</u>
1951 APRIL 20	1455	RB	W-E
	1505	D	W-E and E-W. Rhythmic "swaying" reversals.
	1535	RB	E-W and W-E. Random reversals.
	1545	RB	W-E
APRIL 22	1103	D <sup>s</sup>	W-E
	1320	RB	W-E. Slow even drift of rays.
	1643	RB	Rapid lateral oscillatory motion of rays.
	1750	RB	W-E.
	1840	RB	W-E predominantly some lateral vibration RB curved back on itself in SE and rays moving W-E in top section moved round to appear E-W in lower section.
APRIL 24	0843	RB	Rapid irregular lateral vibration plus some more regular oscillatory motion at times.



TABLE 2

SUMMARY OF OBSERVATIONS OF PULSATING AND FLAMING AURORAS

E means observation at previous times prevented by cloud.

A means still present and subsequent observation prevented by cloud.

P = Pulsating Aurora, F = Flaming Aurora, P.Z.A. - Pulsating zenithal Arc.

<u>DATE</u>		<u>DURATION</u> <u>G.M.T.</u>		<u>FORM</u>	
1950	MAY 17	1330	-	A1432	F
	" 23	1304	-	A1315	P
	AUG 14	1350	-	A1452	P
	" 15	1125	-	A1130	F
	SEP 8	1535	-	A1535	P
	" 10	1505	-	1525	P
	" 19	1120	-	1155	F
	" 20	1615	-	A1720	PZA + P
	OCT 2	1230	-	A1735	P
	" 3	1058	-	1150	P
	" 5	E1605	-	A1641	P
	" 6	1610	-	A1647	P
	" 7	1142	-	1550	P
	" 8	1140	-	1635	P
	" 14	1308	-	1625	P + F
	" 18	E1615	-	1640	F
	" 29	E1410	-	A1440	F
	NOV 1	1114	-	1605	P + F
	" 3	E1332	-	1430	P
	" 14	1400	-	1440	P
	" 17	1235	-	1415	PZA + P
	" 29	1310	-	1350	P + F
1951	JAN 22	1128	-	1529	PZA + P + F
	" 27	1151	-	A1322	P
	FEB 6	1123	-	1144	P
	" 8	E1520	-	A1550	F
	" 11	1515	-	A1637	P
	" 25	1612	-	1650	P
	" 27	E1642	-	A1700	P
	MAR 2	1320	-	1530	P + F
	" 3	1625	-	1640	P
	" 6	1210	-	A1305	P + F
	" 8	1150	-	1645	P + F
	" 9	E1509	-	1630	P
	" 10	1200	-	A1615	P + F
	" 13	1245	-	1424	P
	" 14	1206	-	A1245	F
	" 18	1330	-	A1550	P
	" 22	1735	-	1750	F
	" 26	1345	-	1415	P
	" 29	1522	-	1557	P

DATE	DURATION G.M.T.	FORM
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1951 APRIL 3	1230 --	A1716	P + F
" 6	1225 --	A1855	F
" 7	1309 -	A1549	P
" 8	E1345 -	A1643	P + F
" 11	1350 -	1520	P
" 15	E1720 -	A1755	P
" 20	1550 -	A1730	F
" 22	1156.		F
" 22	1630 -	A1905	P + F
" 27	E1715 -	A1727	F

TABLE 3

SUMMARY OF OBSERVATIONS ON HOMOGENEOUS ARCS (H), RAYED ARCS (R)  
AND MULTIPLE ARCS (M)

Elevations in degrees measured from the southern  
horizon.

<u>DATE</u>	<u>TYPE</u>	<u>INTENSITY</u>	<u>ELEVATION</u>	<u>G.M.T. HOUR OF OCCURRENCE</u>
<u>1950</u>				
MAY 1	M	2	120	16 - 17
3	H	1	100	08 - 09
	H	1	90	09 - 10
	M	1	90	08 - 09
6	H	3	45	09 - 10 - 11
9	H	2	10	08 - 09
	H	1	25	12 - 13 - 14
11	H	1	135	09 - 10
	M	1	105	08 - 09 - 10
15	H	3	45	08 - 09
16	H	1	10	10 - 11
17	H	1	40	12 - 13
	H	1	60	13 - 14
	M	2	105	13 - 14
26	H	2	30	08 - 09
	H	1	45	08 - 09
	H	1	50	08 - 09
	H	2	60	08 - 09
	H	1	90	08 - 09
JUNE 6	R	2	135	08 - 09
9	H	2	70	09 - 10
	H	1	140	09 - 10
	H	1	100	09 - 10
	H	1	135	10 - 11
	R	2	80	08 - 09
	M	1	90	09 - 10
	H	1	145	13 - 14
	H	1	130	13 - 14
10	H	1	10	08 - 09
	H	1	130	10 - 11
	H	1	80	12 - 13
	M	2	110	12 - 13
17	H	1	50	09 - 10
	H	1	30	11 - 12
JULY 6	H	1	45	08 - 09
	H	1	110	09 - 10
10	M	1	90	10 - 11
21	H	1	45	12 - 13
25	H	2	45	08 - 09
	H	1	50	09 - 10
	H	1	80	09 - 10
	R	1	15	09 - 10
AUG 7	H	1	45	08 - 09
	H	2	30	12 - 13 - 14
8	H	2	40	09 - 10
	R	2	30	09 - 10
	M	1	130	09 - 10
	M	1	160	09 - 10
	M	2	90	10 - 11
	M	1	90	10 - 11



DATE   TYPE   INTENSITY   ELEVATION   G.M.T. HOUR OF OCCURRENCE

1950

AUG 9	H	1	170	09 - 10
	H	1	160	09 - 10
	R	2	80	10 - 11
	M	1	90	08 - 09
	M	2	110	09 - 10
	M	1	90	12 - 13
11	M	2	100	13 - 14
13	H	1	10	13 - 14
14	H	1	15	09 - 10
	H	2	30	09 - 10 - 11
	H	2	100	12 - 13
15	H	2	10	07 - 08
	H	2	20	08 - 09
20	M	1	90	08 - 09
29	H	2	12	08 - 09
	H	1	40	08 - 09
	H	1	50	08 - 09
	H	1	60	08 - 09
	H	1	90	09 - 10
	R	2	5	08 - 09
SEP 8	H	1	90	11 - 12
	H	1	30	14 - 15
	M	1	90	10 - 11
9	H	1	20	11 - 12
	M	1	95	11 - 12
18	M	1	95	11 - 12
19	H	1	10	08 - 09
	H	2	5	08 - 09
	H	2	110	09 - 10
	H	2	135	10 - 11
	H	2	160	10 - 11
	H	2	170	11 - 12
	R	2	20	08 - 09
	R	2	12	08 - 09
	R	2	10	08 - 09
20	M	1	90	16 - 17
OCT 7	H	1	100	09 - 10
	H	2	50	10 - 11
	M	2	90	09 - 10
	M	1	115	11 - 12
8	H	1	45	09 - 10
	H	1	45	10 - 11
	H	2	15	10 - 11
	H	1	60	10 - 11
	H	1	90	10 - 11
	H	1	70	10 - 11
	H	1	35	10 - 11
	H	2	40	10 - 11
	R	2	5	09 - 10
	R	1	25	09 - 10
	R	2	10	09 - 10 - 11
	R	2	20	09 - 10
	R	2	20	11 - 12
	R	2	35	11 - 12
12	H	2	90	11 - 12
	M	1	100	11 - 12
14	H	2	160	15 - 16
19	H	2	15	09 - 10
	H	1	5	11 - 12
	H	1	30	12 - 13
	R	2	20	09 - 10

<u>DATE</u>	<u>TYPE</u>	<u>INTENSITY</u>	<u>ELEVATION</u>	<u>G.M.T. HOUR OF OCCURRENCE</u>
<u>1950</u>				
OCT 21	H	2	10	13 - 14
	R	2	5	12 - 13
	R	2	5	12 - 13
	H	1	15	09 - 10
	H	1	50	11 - 12
	H	1	80	11 - 12
	H	2	90	12 - 13
	H	2	135	12 - 13
	R	2	10	10 - 11
	R	2	15	10 - 11
NOV	1 H	2	90	09 - 10
	H	2	170	13 - 14
	R	2	165	13 - 14
	5 H	2	45	10 - 11
	H	2	70	11 - 12
	H	2	90	11 - 12
	R	2	65	11 - 12
	M	1	115	10 - 11
	6 H	2	15	10 - 11
	7 H	2	15	10 - 11 - 12
	14 H	1	25	12 - 13
	H	1	30	14 - 15
	H	1	80	14 - 15
	17 H	1	45	14 - 15 - 16
	H	1	60	14 - 15
	M	1	95	12 - 13 - 14 - 15
	25 H	2	170	12 - 13
	26 H	2	160	13 - 14
	H	1	165	11 - 12
	H	1	90	13 - 14
	29 H	1	150	12 - 13
	R	2	50	12 - 13
	M	1	115	12 - 13 - 14
DEC	4 H	1	20	11 - 12
	H	1	30	13 - 14
	6 H	1	20	14 - 15
	M	1	105	14 - 15
	10 H	2	45	11 - 12
	14 H	1	20	11 - 12
	23 H	2	90	14 - 15
	31 H	2	25	12 - 13
<u>1951</u>				
JAN	8 H	1	120	12 - 13 - 14
	M	1	90	12 - 13 - 14
	M	1	130	13 - 14
	10 H	2	25	13 - 14
	13 H	2	20	13 - 14
	14 H	1	90	14 - 15
	H	1	45	14 - 15
	22 H	1	100	11 - 12
	H	1	110	11 - 12
	H	1	150	12 - 13
	H	1	30	15 - 16
	H	1	140	13 - 14
	H	1	150	13 - 14
	H	1	20	14 - 15
	H	1	30	14 - 15
	R	4	12	11 - 12
	R	2	15	11 - 12
	R	3	3	13 - 14
	R	3	5	13 - 14

DATE   TYPE   INTENSITY   ELEVATION   G.M.T. HOUR OF OCCURRENCE

1951

DATE	TYPE	INTENSITY	ELEVATION	G.M.T. HOUR OF OCCURRENCE
JAN 22	M	1	100	11 - 12
	M	1	90	14 - 15
27	H	2	95	11 - 12
	H	1	60	11 - 12
	H	1	75	11 - 12
	R	3	25	10 - 11
	R	2	25	11 - 12
	R	2	40	11 - 12
	M	1	100	11 - 12
FEB 4	M	2	90	12 - 13
5	H	2	80	10 - 11
	H	1	90	11 - 12
	H	1	115	11 - 12
	H	1	155	11 - 12
	H	1	160	12 - 13 - 14
	R	2	25	11 - 12
	R	2	40	12 - 13
	R	1	60	13 - 14
	M	1	115	15 - 16
	M	1	90	16 - 17
6	H	1	20	10 - 11
11	H	1	25	11 - 12
	H	2	30	15 - 16 - 17
	M	1	25	14 - 15
	M	1	50	14 - 15
	M	1	100	15 - 16
	M	1	115	15 - 16
18	M	1	90	15 - 16
19	R	2	65	10 - 11
	M	1	90	10 - 11
23	H	2	80	16 - 17
	H	1	75	16 - 17
	H	2	40	16 - 17
	H	1	60	16 - 17
	H	2	15	17 - 18
	R	3	40	16 - 17
	M	2	90	16 - 17 - 18
24	H	1	130	14 - 15
	R	2	20	10 - 11
25	H	2	10	11 - 12
	H	1	35	11 - 12
	H	1	40	11 - 12
	H	2	25	11 - 12
	H	3	20	11 - 12
	H	1	50	11 - 12
	H	1	70	11 - 12
	H	1	15	15 - 16 - 17 - 18
	H	1	20	15 - 16 - 17
	R	2	15	11 - 12
	M	2	20	09 - 10
	M	2	40	10 - 11
27	H	1	40	15 - 16 - 17
MAR 2	H	2	10	12 - 13 - 14
	R	2	10	11 - 12
	R	2	5	12 - 13
3	H	2	20	15 - 16
4	H	1	15	15 - 16
	H	1	40	12 - 13
	R	2	25	13 - 14
6	H	1	160	10 - 11
	H	1	140	10 - 11
	H	2	115	10 - 11
	H	1	155	11 - 12



DATE	TYPE	INTENSITY	ELEVATION	G.M.T. HOUR OF OCCURRENCE
1951				
MAR 6	H	2	150	11 - 12
	H	2	90	11 - 12
	H	2	30	13 - 14
	R	2	15	10 - 11
	R	2	30	11 - 12
	R	2	30	11 - 12
	M	2	100	09 - 10
	M	2	20	10 - 11
8	H	2	70	09 - 10
	H	1	90	09 - 10
	H	2	20	11 - 12
	H	2	155	11 - 12
	H	3	20	11 - 12
	M	2	50	09 - 10
	M	1	95	09 - 10
	M	1	115	09 - 10 - 11
9	M	1	105	09 - 10
10	H	1	135	10 - 11
	H	3	15	11 - 12
	H	3	20	11 - 12
	H	3	40	11 - 12
	R	4	15	11 - 12
	M	2	90	10 - 11
13	H	2	165	10 - 11 - 12 - 13
	H	2	145	17 - 18
14	H	1	160	10 - 11
	H	3	60	10 - 11
	H	2	155	11 - 12
	M	1	90	11 - 12
	M	2	120	11 - 12
16	H	2	155	10 - 11
	H	1	30	14 - 15
	R	2	15	09 - 10
	M	1	90	10 - 11
	M	1	100	11 - 12 - 13
	M	2	135	11 - 12
18	H	2	90	09 - 10
	M	2	100	09 - 10
	M	1	100	10 - 11-12-13-14-15
19	R	3	10	10 - 11
21	R	2	30	14 - 15
22	H	1	100	14 - 15
	H	1	150	14 - 15
	H	1	140	15 - 16
	H	2	100	15 - 16
	H	2	125	16 - 17
	M	1	100	15 - 16
	M	2	90	17 - 18 - 19
25	H	3	40	09 - 10
	H	2	10	09 - 10
	H	2	80	14 - 15
	M	1	90	09 - 10
	M	1	90	12 - 13
29	M	2	150	17 - 18
	M	2	120	17 - 18
	M	1	100	18 - 19
30	H	1	30	13 - 14
	R	2	35	12 - 13
	R	2	15	12 - 13
31	H	1	50	08 - 09
APR 3	H	2	40	15 - 16
	M	2	90	14 - 15
	M	2	75	15 - 16

<u>DATE</u>	<u>TYPE</u>	<u>INTENSITY</u>	<u>ELEVATION</u>	<u>G.M.T. HOUR OF OCCURRENCE</u>
1951				
APR 6	H	2	160	12 - 13
	H	1	20	13 - 14
	H	1	30	15 - 16
	H	1	120	15 - 16
	H	1	45	16 - 17
	H	1	10	17 - 18
	H	2	15	17 - 18
		3	30	16 - 17
	R	2	85	13 - 14
	M	1	100	15 - 16 - 17
	M	2	35	08 - 09
7	H	2	60	09 - 10
	H	3	40	09 - 10
	H	2	90	09 - 10
	H	1	20	15 - 16
	H	2	40	09 - 10
		2	90	09 - 10
	R	2	70	15 - 16
	M	2	35	15 - 16
8	H	2	20	09 - 10
	H	1	25	08 - 09
9	H	2	30	11 - 12
11	H	2	15	15 - 16
	H	2	30	15 - 16 - 17
		1	30	11 - 12
	R	2	15	15 - 16 - 17
	M	1	15	10 - 11 - 12
16	H	2	35	09 - 10
20	H	2	5	10 - 11
	H	2	10	11 - 12
	H	1	15	10 - 11
	H	1	60	08 - 09
		2	25	09 - 10
	R	2	90	14 - 15
	M	2	15	08 - 09
22	H	2	35	12 - 13
	H	1	60	12 - 13
	H	2	25	16 - 17
		2	15	09 - 10
	R	2	15	11 - 12
	R	4	90	08 - 09 - 10
24	H	1	10	09 - 10
	H	3	10	11 - 12
		3	70	17 - 18
27		2	30	09 - 10
28	H	2	25	16 - 17
	H	1	20	09 - 10
30	H	2	10	10 - 11 - 12 - 13

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