

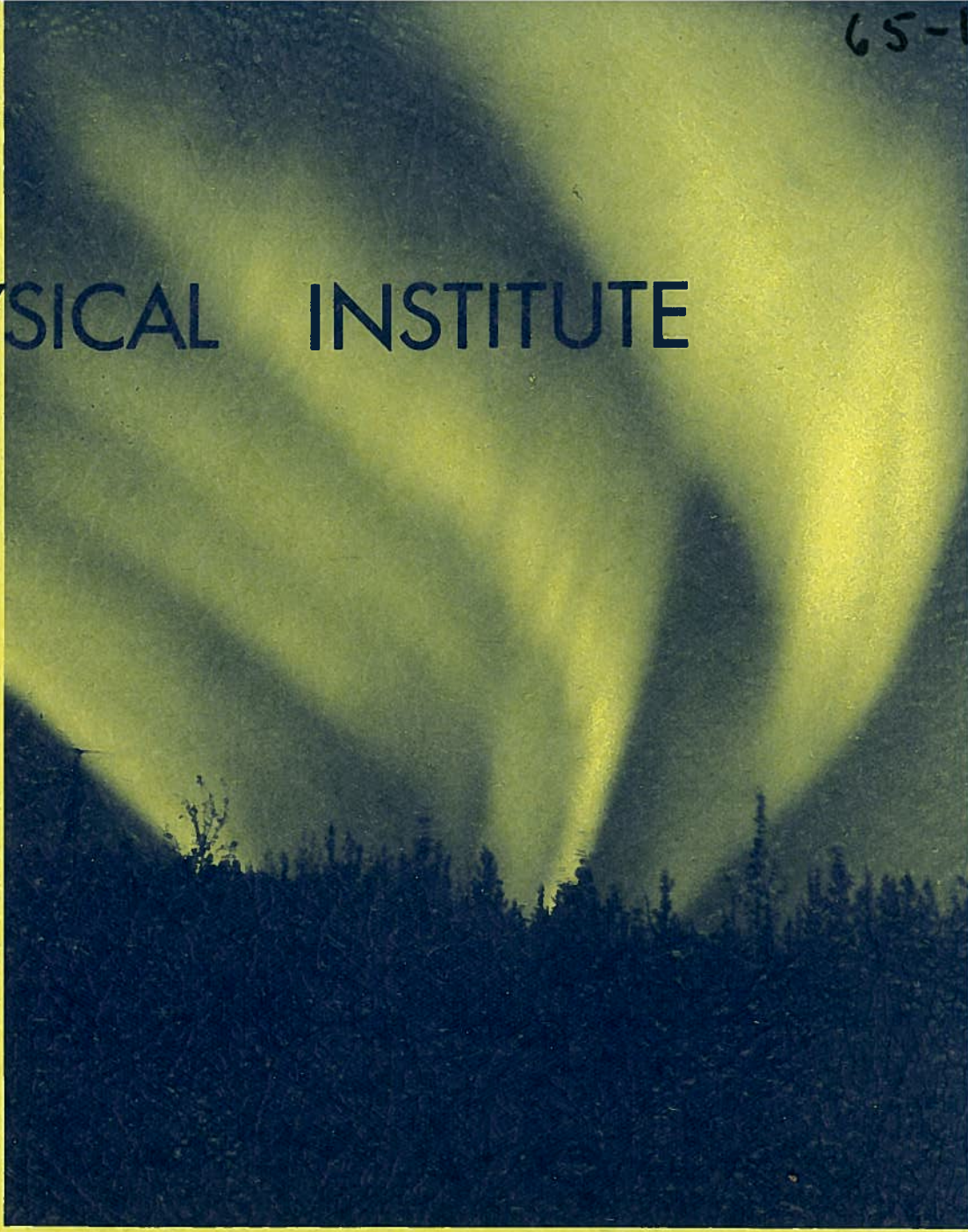
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**SUMMARY OF NOCTILUCENT CLOUD  
REPORTS FROM 1885-1964**

by

**Benson Fogle and Carol Echols**

**CLOUD Report Number 3  
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## CLOUD REPORT #3

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### Introduction

Noctilucent clouds (abbreviated NLC) began to attract the attention of scientists in 1885; the first recorded observation of them, recognizing that they were an unusual and remarkable phenomenon, was made by T. W. Backhouse (1885) at Kissingen, Germany, on June 8 of that year. Many other observations were made at about that time; in later years the number reported rose and fell, partly depending on the attention given to them by interested observers. Over a thousand occurrences are on record so far. The purpose of this report is to collect together all the reports from widely scattered sources in the literature into one complete listing of sightings.

### NLC Observations

The complete list of the 1034 northern hemisphere and 8 southern hemisphere NLC sightings reported from 1885-1964 is given in Table 1a and 1b. Only those observations which were reported for a definite date are included in the table. A number of reports which gave only the month or year of the sighting were deleted as being too vague.

### Frequency of Occurrence of NLC

The data given in Table 1a, rearranged according to the number of sightings made per year and the number of times NLC have occurred on a given date, are presented in Tables 2 and 3, and in graphical form in Figures 1 and 2. Figure 3 shows a histogram and smoothed curve of the data of Table 3 grouped in 10-day intervals.

The salient features of these data are:

- (1) The peak of NLC activity in the northern hemisphere falls on July 10, 20 days after the summer solstice.
- (2) 78 per cent of the displays occurred after the solstice.
- (3) The earliest and latest sightings were made on March 5 and Oct. 29, respectively.
- (4) There is no well defined periodicity in the number of sightings per year.

TABLE 1a

## List of Reported Northern Hemisphere NLC Sightings, 1885-1964

| Date        | Countries (No. of Stations which Observed NLC) | References |
|-------------|--|------------|
| 1885 May 13 | Russia   | 2          |
| June 8      | Germany  | 50         |
| June 10     | England  | 24         |
| June 13     | Russia   | 24, 47     |
| June 23     | Russia, Germany(4), Poland(2)                  | 50         |
| June 24     | Germany(5), Russia                             | 15, 50     |
| June 25     | Germany, Russia                                | 15, 50     |
| June 27     | Russia, Switzerland                            | 50         |
| June 28     | Russia   | ?          |
| June 30     | Russia, Germany, Switzerland                   | 4          |
| July 1      | Germany, Scotland                              | 39, 50     |
| July 2      | Russia, Germany                                | 50         |
| July 3      | Scotland                                       | 4          |
| July 5      | Russia(2)                                      | 15         |
| July 6      | Germany(2), England, Russia                    | 15, 50     |
| July 7      | Russia, Germany(6)                             | 50         |
| July 8      | Germany, Russia                                | 15, 50     |
| July 9      | Germany, Russia                                | 15, 50     |
| July 10     | Russia   | 15         |
| July 11     | Russia   | 15         |
| July 12     | Russia   | 15         |
| July 14     | Russia   | 15         |
| July 16     | Russia   | 15         |
| July 17     | Germany(2)                                     | 50         |
| July 19     | Germany(2), Russia                             | 15, 50     |
| July 21     | Poland   | 50         |
| July 22     | Germany, Russia                                | 15, 50     |
| July 23     | Poland, Russia                                 | 15, 50     |
| July 25     | Russia   | ?          |
| July 27     | Russia, Germany                                | 50         |
| July 28     | Russia   | 15         |
| July 29     | Sweden   | 50         |
| Aug. 1      | Russia   | ?          |
| Aug. 6      | Russia   | 15         |
| Aug. 7      | Russia   | 15         |
| Aug. 8      | Russia   | 15         |
| 1886 May 28 | England  | 50         |
| June 2      | England  | 50         |
| June 3      | England  | 50         |
| June 5      | Germany  | 50         |
| June 8      | Germany(3)                                     | 50         |
| June 10     | Germany  | 50         |
| June 13     | Germany, England                               | 50         |
| June 16     | England  | 50         |
| June 17     | Ireland, Scotland                              | 39, 42, 50 |
| June 22     | England, Ireland                               | 50         |
| June 23     | England(2), Germany(2)                         | 50         |
| June 24     | Germany  | 50         |

| Date         | Countries (No. of Stations which Observed NLC) | References     |
|--------------|--|----------------|
| 1886 June 26 | Germany  | 50             |
| June 28      | Germany  | 50             |
| June 30      | Germany  | 50             |
| July 1       | England  | 50             |
| July 3       | Germany  | 50             |
| July 7       | Germany, Russia                                | 15, 50         |
| July 8       | Ireland  | 50             |
| July 9       | Ireland, Germany                               | 50             |
| July 11      | Poland, Eckerberg                              | 50             |
| July 12      | Germany, Eckerberg                             | 50             |
| July 18      | England, Eckerberg                             | 50             |
| July 20      | England, Germany                               | 50             |
| July 24      | England  | 50             |
| July 25      | Swinen, Lichtenw                               | 50             |
| July 27      | Scotland, England                              | 50             |
| July 29      | Eckerberg                                      | 50             |
| July 30      | Eckerberg                                      | 50             |
| Aug. 1       | England  | 50             |
| Aug. 10      | England  | 50             |
| <hr/>        |  |                |
| 1887 June 4  | Germany  | 50             |
| June 6       | Germany  | 50             |
| June 9       | Germany  | 50             |
| June 13      | Scotland                                       | 50             |
| June 14      | England(2)                                     | 50             |
| June 15      | Germany  | 50             |
| June 16      | Germany(2)                                     | 50             |
| June 17      | Germany  | 50             |
| June 18      | Germany, England                               | 50             |
| June 19      | Germany(3), England, Ireland                   | 50             |
| June 20      | Germany  | 50             |
| June 21      | Ireland  | 50             |
| June 22      | Germany(2)                                     | 24             |
| June 23      | Germany  | 50,            |
| June 24      | Germany, Ireland, Scotland                     | 39, 42, 50     |
| June 25      | Germany(2)                                     | 50             |
| June 26      | Germany(2), Ireland, Scotland                  | 39, 42, 50     |
| June 27      | Germany  | 50             |
| June 28      | Germany, Ireland, Scotland                     | 39, 42, 50     |
| June 29      | Germany(3), Ireland, Scotland                  | 39, 42, 50     |
| July 1       | Germany  | 50             |
| July 2       | Germany(2)                                     | 24, 26, 50     |
| July 3       | Germany(2), Poland                             | 50             |
| July 4       | Germany  | 50             |
| July 6       | Germany(2), France, Scotland                   | 24, 39, 42, 50 |
| July 7       | Germany  | 50             |
| July 9       | Germany  | 50             |
| July 14      | Germany  | 50             |
| July 15      | Germany, Russia                                | 2, 50          |
| July 17      | Germany, Scotland                              | 39, 42, 50     |
| July 18      | Germany  | 50             |
| July 20      | Scotland                                       | 39, 42, 50     |
| July 22      | Germany  | 50             |
| July 24      | Germany  | 50             |
| July 25      | Germany  | 50             |

| Date         | Countries (No. of Stations which Observed NLC) | References     |
|--------------|--|----------------|
| 1887 July 27 | Russia   | 15             |
| July 29      | England  | 50             |
| July 30      | Germany  | 50             |
| 1888 June 4  | Scotland                                       | 39, 42, 50     |
| June 6       | Scotland                                       | 39, 42         |
| June 12      | England  | 50             |
| June 14      | England  | 50             |
| June 15      | Scotland                                       | 39, 42         |
| June 16      | Scotland                                       | 42             |
| June 17      | Scotland                                       | 39             |
| June 20      | Scotland                                       | 39, 42         |
| June 21      | Scotland                                       | 39, 42         |
| June 22      | Scotland                                       | 39, 42         |
| June 23      | Germany(2), Poland, Russia, Scotland           | 39, 42, 50     |
| June 24      | Germany(3), Scotland                           | 39, 42, 50     |
| June 25      | England, Germany(3), Scotland                  | 42, 50         |
| June 26      | Germany, Scotland                              | 39, 42, 50     |
| June 30      | Scotland                                       | 39, 42         |
| July 1       | England  | 50             |
| July 4       | Germany  | 50             |
| July 5       | Germany  | 50             |
| July 7       | Germany, Scotland                              | 39, 42, 50     |
| July 15      | Germany  | 50             |
| July 23      | Germany  | 50             |
| 1889 May 26  | Scotland                                       | 39, 42         |
| June 7       | Ireland, Scotland                              | 39, 42, 50     |
| June 9       | Scotland                                       | 39, 42         |
| June 10      | Scotland                                       | 39, 42         |
| June 12      | Germany  | 50             |
| June 21      | Germany(2), Russia, Scotland                   | 15, 23, 39, 42 |
| June 22      | Germany  | 50             |
| July 1       | Germany(2)                                     | 23, 50         |
| July 3       | Russia, Scotland                               | 15, 39, 42     |
| July 4       | Scotland                                       | 39             |
| July 5       | Germany(2)                                     | 23             |
| July 9       | Germany  | 50             |
| July 17      | Scotland                                       | 39             |
| July 24      | Germany  | 50             |
| July 30      | Denmark  | 50             |
| July 31      | Germany  | 50             |
| Aug. 1       | 48.5N, 34.4W                                   | 50             |
| Aug. 18      | Norway   | 50             |
| Aug. 19      | Russia   | 15             |
| 1890 May 26  | Germany(2), Scotland                           | 23, 39, 42, 50 |
| June 8       | Russia   | 2              |
| June 11      | Russia   | 2              |
| June 17      | England(2), Ireland, Scotland                  | 42, 50         |
| June 25      | Ireland  | 50             |
| June 29      | Scotland                                       | 39, 42, 50     |
| July 4       | Scotland(2), Ireland                           | 26, 42, 50     |
| July 6       | Urania   | 50             |
| July 9       | Germany(2)                                     | 23, 50         |

| Date         | Countries (No. of Stations which Observed NLC) | References |
|--------------|--|------------|
| 1890 July 10 | ?  | 50         |
| July 12      | Denmark  | 50         |
| July 15      | England, Scotland                              | 39, 42, 50 |
| July 16      | Scotland                                       | 39, 42     |
| July 24      | Germany(2)                                     | 23, 50     |
| 1891 June 3  | Ireland  | 50         |
| June 7       | Ireland  | 50         |
| June 9       | Ireland, Scotland                              | 42, 50     |
| June 13      | Scotland                                       | 42         |
| June 14      | Scotland                                       | 42         |
| June 30      | England, Ireland                               | 50         |
| July 9       | Scotland                                       | 39         |
| July 10      | Denmark  | 50         |
| July 11      | Denmark  | 50         |
| July 13      | Scotland                                       | 39         |
| July 14      | Scotland                                       | 39         |
| 1892 May 17  | Wales  | 50         |
| July 13      | Scotland                                       | 39, 42     |
| July 23      | Scotland                                       | 39, 42     |
| July 24      | Denmark, Scotland                              | 39, 42, 50 |
| 1893 June 15 | Germany  | 50         |
| June 16      | Germany  | 50         |
| July 8       | Denmark, Germany(2)                            | 50         |
| 1894 June 9  | Denmark  | 50         |
| July 12      | Germany  | 50         |
| 1895 June 16 | Scotland                                       | 39, 42     |
| 1897 June 25 | Russia   | 2          |
| June 26      | Russia   | 2          |
| July 7       | Russia   | 15         |
| July 8       | Russia   | 15         |
| 1898 July 3  | Russia   | 2          |
| 1899 June 27 | Russia   | 2          |
| June 28      | Germany  | 50         |
| June 30      | Russia   | 2          |
| July 2       | Russia   | 2          |
| July 3       | Russia   | 2          |
| July 4       | Russia   | 2          |
| July 8       | Russia   | 2          |
| July 9       | Russia   | 5          |
| July 12      | Russia   | 5          |
| July 14      | Russia   | 2, 15      |
| July 15      | Russia(2)                                      | 2, 15      |
| July 16      | Russia   | 15         |
| July 19      | Russia   | 15         |
| July 26      | Russia   | 15         |
| July 27      | Russia   | 2, 15      |
| Aug. 8       | Russia(2)                                      | 5          |

| Date         | Countries (No. of Stations which Observed NLC)            | References    |
|--------------|---|---------------|
| 1900 July 12 | Russia  | 2             |
| July 25      | Russia  | 15            |
| July 26      | Russia  | 15            |
| Aug. 2       | Russia(3)   | 15            |
| 1902 July 18 | Scotland  | 39            |
| 1903 July 8  | England   | 50            |
| 1904 July 5  | Russia  | 2             |
| July 18      | Russia  | 15            |
| 1905 June 10 | Russia  | 2             |
| June 23      | Russia  | 2, 15         |
| July 6       | Russia(2)   | 15            |
| 1906 July 17 | Russia  | 2             |
| July 19      | England   | 50            |
| July 30      | Russia  | 15            |
| 1908 May 27  | England   | 50            |
| June 23      | Russia(2)   | 2             |
| June 28      | Russia  | 2             |
| June 29      | Russia(5), England  | 2, 50         |
| June 30      | England, Germany(3), Czechoslovakia, Poland,<br>Russia(2) | 2, 24, 47, 50 |
| July 1       | England, Germany(3), Russia(2)                            | 2, 50         |
| July 5       | Russia(2)   | 2             |
| July 7       | Russia  | 2             |
| July 10      | Russia  | 2, 15         |
| July 11      | Russia(4)   | 2, 15         |
| July 12      | Russia  | 15            |
| July 13      | Russia  | 2             |
| July 14      | Russia  | 15            |
| July 15      | Russia  | 2             |
| July 16      | Russia  | 2             |
| July 18      | Russia  | 15            |
| July 24      | Russia(2)   | 15            |
| July 26      | Russia  | 15            |
| July 28      | Russia  | 15            |
| July 29      | Russia  | 15            |
| 1909 May 26  | Russia  | 2             |
| June 8       | Russia  | 15            |
| June 21      | Russia  | 15            |
| July 4       | Russia  | 15            |
| July 17      | Russia  | 15            |
| July 21      | Russia  | 2             |
| July 27      | Norway  | 50            |
| 1910 June 24 | Germany   | 50            |
| June 26      | Russia  | 2             |
| July 9       | Russia  | 15            |
| July 17      | Germany, Wongrowitz                                       | 50            |



| Date         | Countries (No. of Stations which Observed NLC) | References |
|--------------|--|------------|
| 1911 June 24 | Bothkamp                                       | 50         |
| June 27      | Russia   | 2          |
| June 28      | Russia   | 2          |
| July 4       | Germany  | 50         |
| July 10      | Russia   | 15         |
| July 11      | Germany  | 50         |
| 1914 June 17 | Russia   | 2          |
| June 27      | Germany  | 50         |
| July 1       | Germany  | 50         |
| July 5       | Germany  | 50         |
| July 19      | Russia   | 2          |
| July 30      | Russia   | 15         |
| Aug. 1       | Russia   | 15         |
| 1916 Aug. 25 | Sweden   | 50         |
| 1918 June 20 | Russia   | 2, 15      |
| July 12      | Russia(2)                                      | 2, 15      |
| 1920 July 3  | Russia(2)                                      | 2, 15      |
| July 7       | Russia   | 15         |
| July 19      | Russia(2)                                      | 2, 15      |
| July 20      | Russia   | 15         |
| July 29      | Germany  | 50         |
| 1921 July 1  | Russia(2)                                      | 2, 15      |
| July 2       | Russia(2)                                      | 2, 15      |
| July 5       | Russia   | 2, 15      |
| July 14      | Russia   | 2, 15      |
| 1922 June 25 | Russia   | 2, 15      |
| July 8       | Russia   | 2, 15      |
| July 29      | Russia   | 2, 15      |
| July 30      | Russia(4)                                      | 2, 15      |
| 1923 July 1  | Russia   | 2, 15      |
| July 2       | Russia   | 2, 15      |
| July 11      | Russia   | 2, 15      |
| 1924 June 22 | Russia   | 2          |
| July 22      | Russia   | 15         |
| Sept.30      | Russia   | 15         |
| 1925 June 10 | Russia   | 2, 15      |
| June 19      | Russia   | 2          |
| June 21      | Russia   | 2, 15      |
| June 25      | Russia   | 15         |
| June 28      | Russia(2)                                      | 2, 15      |
| July 2       | Russia   | 2, 15      |
| July 5       | Russia   | 2, 15      |
| July 7       | Russia(2)                                      | 2, 15      |
| July 11      | Russia   | 2, 15      |
| July 14      | Russia(2)                                      | 2, 15      |
| July 15      | Russia(2)                                      | 2, 15, 47  |
| July 20      | Russia(3)                                      | 2, 15      |
| July 25      | Russia(2)                                      | 2, 15      |

| Date         | Countries (No. of Stations which Observed NLC) | References |
|--------------|--|------------|
| 1925 July 26 | Russia   | 2, 15, 47  |
| July 28      | Russia   | 2, 15      |
| Aug. 2       | Russia   | 2, 15      |
| Aug. 8       | Russia   | 2, 15, 47  |
| Aug. 12      | Russia   | 2, 15      |
| 1926 Apr. 24 | Russia   | 2, 15      |
| Apr. 29      | Russia   | 15         |
| June 23      | Russia(5)                                      | 2, 15      |
| June 24      | Russia(2)                                      | 2, 15      |
| June 25      | Russia(2)                                      | 2, 15      |
| June 26      | Russia(2)                                      | 2, 15      |
| June 27      | Russia(3)                                      | 2, 15      |
| June 28      | Russia   | 2, 15      |
| June 29      | Russia   | 2, 15      |
| June 30      | Russia   | 15         |
| July 1       | Russia(4)                                      | 2, 15      |
| July 8       | Russia   | 2, 15      |
| July 10      | Russia   | 2, 15      |
| July 14      | Russia(6)                                      | 2, 15      |
| July 15      | Russia   | 2, 15      |
| July 18      | Russia(2)                                      | 2, 15      |
| July 23      | Russia(5)                                      | 2, 15      |
| July 26      | Russia   | 2, 15      |
| July 27      | Russia   | 2, 15      |
| Aug. 3       | Russia(2)                                      | 2, 15      |
| Aug. 13      | Russia   | 15         |
| Sept. 13     | Russia   | 2          |
| 1927 June 13 | Russia   | 2, 15      |
| June 22      | Russia   | 2, 15      |
| July 10      | Russia   | 2, 15      |
| July 19      | Russia   | 2, 15      |
| July 27      | Russia   | 2, 15      |
| July 28      | Russia   | 15         |
| 1928 June 15 | Russia   | 2, 15      |
| June 21      | Russia   | 2, 15      |
| June 29      | Russia   | 2, 15      |
| July 20      | Russia   | 2, 15      |
| July 29      | Russia   | 2, 15      |
| 1929 June 18 | Russia   | 2, 15      |
| June 19      | Russia(4)                                      | 2, 15      |
| June 20      | Russia(2)                                      | 2, 15      |
| June 21      | Russia(2)                                      | 2, 15      |
| June 22      | Russia   | 2, 15      |
| June 28      | Russia   | 15         |
| June 29      | Russia   | 2, 15      |
| July 7       | Russia   | 2          |
| July 10      | Russia   | 15         |
| July 15      | Russia   | 2, 15      |
| July 19      | Russia(4)                                      | 2, 15      |
| July 20      | Russia(4)                                      | 2, 15      |
| July 22      | Russia(3)                                      | 2, 15      |
| July 27      | Russia   | 2, 15      |

| Date         | Countries (No. of Stations which Observed NLC) | References    |
|--------------|--|---------------|
| 1929 July 29 | Russia   | 2, 15         |
| Aug. 4       | Russia   | 2, 15         |
| Aug. 10      | Russia   | 2, 15         |
| Aug. 16      | Russia   | 2, 15         |
| Sept. 2      | Russia   | 2, 15         |
| 1930 June 22 | Russia(2)                                      | 2, 15         |
| July 10      | Russia   | 15            |
| July 19      | Russia   | 15            |
| July 20      | Russia(2)                                      | 2, 15         |
| 1932 June 16 | Russia   | 2, 15         |
| June 23      | Russia   | 2, 15         |
| June 24      | Russia   | 2, 15         |
| June 29      | Russia   | 2, 15         |
| July 1       | Russia   | 2, 15, 45     |
| July 2       | Russia   | 2, 15         |
| July 4       | Russia(2)                                      | 2, 15         |
| July 6       | Russia   | 2, 15         |
| July 7       | Germany  | 50            |
| July 10      | Norway   | 45, 50        |
| July 13      | Norway(2)                                      | 26, 45, 50    |
| July 23      | Norway, Russia                                 | 2, 45, 50     |
| July 24      | Norway(2), Russia                              | 2, 15, 45, 50 |
| Aug. 8       | Norway   | 45, 50        |
| 1933 June 15 | Russia   | 15            |
| June 28      | Russia(2)                                      | 2, 15         |
| June 29      | Russia   | 2, 15         |
| July 1       | Russia   | 2, 15         |
| July 4       | Norway   | 47            |
| July 7       | Denmark  | 47            |
| July 9       | Norway   | 47            |
| July 12      | Germany  | 50            |
| July 19      | Norway   | 47            |
| July 20      | Canada   | 9, 50         |
| July 28      | Russia   | 2, 15         |
| July 31      | Russia   | 2, 15         |
| Aug. 1       | Russia   | 15            |
| Aug. 2       | Russia(4)                                      | 2, 15         |
| Aug. 6       | Germany  | 50            |
| Aug. 9       | Norway   | 47            |
| Aug. 23      | Poland   | 47            |
| 1934 May 4   | Russia   | 2, 15         |
| June 30      | Norway(2), Russia                              | 2, 15, 45     |
| July 5       | Norway, Russia                                 | 2, 15, 47     |
| July 6       | Norway   | 45            |
| July 12      | Russia   | 2, 15         |
| July 16      | Norway, Russia(2)                              | 2, 15, 47     |
| July 17      | Norway, Sweden                                 | 47            |
| July 18      | Norway   | 47            |
| July 30      | Norway, Russia                                 | 2, 15, 47     |
| July 31      | Norway, Russia                                 | 15, 47        |
| Aug. 7       | Norway   | 47            |
| Aug. 19      | Russia   | 2, 15         |
| Aug. 25      | Russia   | 2, 15         |

| Date         | Countries (No. of Stations which Observed NLC) | References |
|--------------|--|------------|
| 1935 July 3  | Russia   | 2, 15      |
| July 8       | Russia   | 2, 15      |
| July 11      | Russia(2)                                      | 2, 15      |
| July 12      | Russia(2)                                      | 2, 15      |
| July 15      | Russia(2)                                      | 2, 15      |
| July 16      | Ru-sia(2)                                      | 2, 15      |
| July 17      | Russia(4)                                      | 2, 15      |
| July 18      | Russia   | 2, 15      |
| July 23      | Russia   | 15         |
| July 24      | Russia   | 2          |
| 1936 June 15 | Russia   | 15         |
| June 16      | Russia   | 2, 15      |
| June 17      | Russia(2)                                      | 2, 15      |
| June 21      | Russia(2)                                      | 2, 15      |
| June 22      | Russia(3)                                      | 2, 15      |
| June 24      | Russia   | 2, 15      |
| June 27      | Russia(3)                                      | 2, 15      |
| June 29      | Russia(3)                                      | 2, 15      |
| July 1       | Russia(2)                                      | 2, 15      |
| July 2       | Russia   | 2, 15      |
| July 4       | Russia   | 2, 15      |
| July 5       | Russia(2)                                      | 2, 15      |
| July 6       | Russia   | 2, 15      |
| July 7       | Russia   | 2, 15      |
| July 8       | Russia(2)                                      | 2, 15      |
| July 9       | Russia(2)                                      | 2, 15      |
| July 10      | Russia(4)                                      | 2, 15      |
| July 11      | Russia(2)                                      | 2, 15      |
| July 15      | Russia   | 15         |
| July 22      | Russia   | 2, 15      |
| July 25      | Russia   | 2, 15      |
| July 28      | Russia(2)                                      | 2, 15      |
| July 29      | Russia   | 2, 15      |
| July 30      | Russia   | 2, 15      |
| Aug. 8       | Russia   | 2, 15      |
| Oct. 6       | Russia   | 15         |
| 1937 May 26  | Russia   | 2, 15      |
| June 5       | Russia   | 2, 15      |
| June 6       | Russia   | 2, 15      |
| June 8       | Russia   | 2, 15      |
| June 11      | Russia(2)                                      | 2, 15      |
| June 20      | Russia(6)                                      | 2, 15      |
| June 23      | Russia(8)                                      | 2, 15      |
| June 24      | Russia(3)                                      | 2, 15      |
| June 25      | Russia   | 2, 15      |
| June 27      | Russia(2)                                      | 2, 15      |
| June 29      | Russia   | 2, 15      |
| June 30      | Russia(5)                                      | 2, 15      |
| July 4       | Russia   | 2, 15      |
| July 5       | Russia   | 2, 15      |
| July 6       | Russia   | 2, 15      |
| July 7       | Russia   | 2, 15      |

| Date         | Countries (No. of Stations which Observed NLC) | References |
|--------------|--|------------|
| 1937 July 8  | Russia   | 2, 15      |
| July 12      | Russia(2)                                      | 2, 15      |
| July 17      | Russia   | 2, 15      |
| July 24      | Russia   | 2, 15      |
| July 27      | Russia   | 2, 15      |
| July 31      | Russia   | 2, 15      |
| Aug. 4       | Russia   | 2, 15      |
| Aug. 6       | Russia   | 2, 15      |
| Aug. 9       | Russia   | 2, 15      |
| Aug. 11      | Russia   | 2, 15      |
| Aug. 17      | Russia   | 2, 15      |
| 1938 May 3   | Russia   | 15         |
| May 13       | Russia   | 2          |
| May 23       | Russia   | 2, 15      |
| June 6       | Russia   | 2, 15      |
| June 12      | Russia   | 2, 15      |
| June 14      | Russia   | 2, 15      |
| June 27      | Russia   | 2, 15      |
| June 28      | Russia   | 2, 15      |
| July 2       | Russia   | 2, 15      |
| July 10      | Russia   | 2, 15      |
| July 17      | Russia(2)                                      | 2, 15      |
| July 21      | Russia   | 2, 15      |
| Aug. 5       | Russia   | 2, 15      |
| Aug. 7       | Russia(2)                                      | 2, 15      |
| 1939 June 15 | Russia(4)                                      | 2, 15      |
| June 20      | Russia   | 2, 15      |
| June 21      | Russia(4)                                      | 2, 15      |
| June 24      | Russia   | 2          |
| June 25      | Russia(2)                                      | 2, 15      |
| July 22      | Russia   | 2          |
| July 25      | Russia   | 15         |
| July 30      | Russia   | 2, 15      |
| 1940 June 12 | Russia   | 2, 15      |
| June 14      | Russia   | 2, 15      |
| June 22      | Russia   | 2, 15      |
| July 4       | Russia   | 2, 15      |
| July 6       | Russia   | 2, 15      |
| July 7       | Russia   | 2, 15      |
| July 8       | Russia(2)                                      | 2, 15      |
| July 15      | Russia   | 2, 15      |
| July 17      | Russia   | 2, 15      |
| July 21      | Russia   | 2, 15      |
| July 28      | Russia   | 2, 15      |
| Aug. 5       | Russia   | 2, 15      |
| 1941 July 15 | Russia   | 2, 15      |
| July 17      | Russia   | 2          |
| July 21      | Russia(2)                                      | 2, 15      |
| July 23      | Russia   | 2          |
| 1942 June 15 | Russia   | 2, 15      |

| Date         | Countries (No. of Stations which Observed NLC) | References          |
|--------------|--|---------------------|
| 1943 June 22 | Russia(2)                                      | 15                  |
| 1944 July 11 | Russia   | 2, 15               |
| 1947 Aug. 1  | Russia   | 15                  |
| 1949 July 10 | Scotland                                       | 37, 38, 39, 42      |
| 1950 May 20  | Russia(2)                                      | 2                   |
| June 12      | Russia   | 15                  |
| June 17      | Russia   | 15                  |
| June 18      | Russia   | 15                  |
| June 19      | Russia   | 15                  |
| June 20      | Russia(6)                                      | 15, 25              |
| June 25      | Russia   | 15                  |
| June 30      | Scotland                                       | 39, 42              |
| July 2       | Russia   | 15                  |
| July 24      | Russia, Scotland                               | 15, 37, 38, 39, 42, |
| July 30      | Russia   | 15                  |
| Aug. 3       | Russia   | 15                  |
| 1951 Apr. 13 | Russia   | 15                  |
| June 2       | Russia   | 15                  |
| June 3       | Russia   | 15                  |
| June 10      | Russia   | 25                  |
| June 11      | Russia   | 25                  |
| June 18      | Russia   | 15                  |
| June 19      | Scotland                                       | 38, 39, 42          |
| June 21      | Russia   | 15                  |
| June 22      | Russia(2)                                      | 13, 15              |
| June 24      | Russia   | 13                  |
| June 26      | Russia   | 15                  |
| June 27      | Russia(2)                                      | 13, 15              |
| June 28      | Russia   | 13, 15              |
| July 6       | Russia(5)                                      | 13, 15, 25          |
| July 10      | Russia(7)                                      | 15                  |
| July 11      | Russia(4)                                      | 15                  |
| July 12      | Russia(2)                                      | 15                  |
| July 13      | Russia   | 15                  |
| July 16      | Russia   | 15                  |
| July 17      | Russia   | 15                  |
| July 27      | Russia(4)                                      | 2, 15               |
| July 30      | Russia   | 15                  |
| 1952 June 1  | Russia   | 15                  |
| June 12      | Russia   | 15                  |
| June 13      | Russia   | 15                  |
| June 21      | Russia   | 15                  |
| June 28      | Russia   | 15                  |
| July 3       | Russia   | 15                  |
| July 9       | Russia   | 15                  |
| July 12      | Russia(2)                                      | 15                  |
| July 24      | Russia   | 15                  |
| 1953 Mar. 30 | Russia   | 15                  |
| June 14      | Russia   | 15                  |
| June 15      | Russia   | 15                  |
| June 20      | Russia(4)                                      | 2, 15               |

| Date         | Countries (No. of Stations which Observed NLC) | References     |
|--------------|--|----------------|
| 1953 July 4  | Russia(2)                                      | 15             |
| July 5       | Russia, Scotland                               | 15, 38, 39, 42 |
| July 9       | Russia   | 15             |
| July 10      | Russia(4)                                      | 2, 15          |
| July 11      | Russia   | 15             |
| July 14      | Russia(2)                                      | 15             |
| July 16      | Russia   | 15             |
| July 17      | Russia(2)                                      | 15             |
| July 23      | Russia(2)                                      | 15             |
| July 26      | Russia   | 15             |
| July 27      | Russia   | 15             |
| 1954 June 19 | Russia   | 15             |
| June 25      | Russia   | 14, 15         |
| June 26      | Russia   | 15             |
| June 27      | Russia   | 15             |
| June 30      | Russia   | 14             |
| July 2       | Russia(2) Scotland                             | 15, 39, 42     |
| July 7       | Russia   | 15             |
| July 8       | Russia   | 15             |
| July 9       | Russia   | 15             |
| July 18      | Sweden(2)                                      | 54             |
| July 20      | Russia, Sweden(2)                              | 14, 54         |
| July 29      | Sweden(2)                                      | 54             |
| Aug. 16      | Sweden(2)                                      | 54             |
| 1955 June 8  | Russia, Scotland                               | 15, 39, 42     |
| June 11      | Russia   | 15             |
| June 18      | Russia   | 15             |
| June 28      | Russia   | 15             |
| July 6       | Russia, Scotland                               | 15, 38, 39, 42 |
| July 7       | Russia, Scotland                               | 15, 39, 42     |
| July 10      | Russia   | 15             |
| July 11      | Russia   | 15             |
| July 13      | Russia(3)                                      | 15             |
| July 15      | Russia   | 15             |
| July 16      | Russia(2)                                      | 15             |
| July 17      | Russia   | 15             |
| July 18      | Sweden(2)                                      | 54             |
| July 21      | Russia(3)                                      | 15             |
| July 22      | Russia(2)                                      | 15             |
| July 23      | Russia, Sweden(2)                              | 15, 54         |
| July 25      | Russia(2)                                      | 15             |
| July 27      | Russia(3) Sweden(2)                            | 15, 54         |
| July 30      | Russia(3)                                      | 15             |
| Aug. 1       | Russia(3)                                      | 15             |
| Aug. 4       | Russia   | 15             |
| Aug. 5       | Russia   | 15             |
| Aug. 6       | Russia   | 15             |
| Aug. 7       | Russia(2)                                      | 15             |
| Aug. 8       | Russia   | 15             |
| Aug. 9       | Russia(3) Sweden(2)                            | 15, 54         |
| Aug. 11      | Russia   | 15             |
| Aug. 12      | Russia(4) Sweden(2)                            | 15, 54         |
| Aug. 15      | Russia   | 15             |

| Date         | Countries (No. of Stations which Observed NLC) | Reference      |
|--------------|--|----------------|
| 1955 Aug. 22 | Russia   | 15             |
| Aug. 23      | Russia   | 15             |
| Aug. 26      | Russia   | 15             |
| Aug. 30      | Russia   | 15             |
| Aug. 31      | Russia   | 15             |
| Sept. 15     | Russia   | 15             |
| 1956 June 13 | Russia   | 15             |
| June 18      | Russia   | 15             |
| June 26      | Canada   | 26             |
| June 27      | Canada   | 26             |
| June 28      | Canada   | 26             |
| June 29      | Canada   | 26'            |
| July 1       | Russia(5)                                      | 2, 15          |
| July 2       | Russia(4) Sweden                               | 15, 52, 54     |
| July 3       | Russia(5)                                      | 2, 15          |
| July 6       | Russia(2)                                      | 2              |
| July 9       | Russia(4)                                      | 2, 15          |
| July 15      | Russia(2)                                      | 15             |
| July 18      | Norway   | 52             |
| July 19      | Sweden   | 54             |
| July 22      | Sweden   | 52, 54         |
| July 26      | Canada, Russia, Scotland                       | 6, 15, 39, 42  |
| Aug. 5       | Norway, Sweden                                 | 52, 54         |
| Aug. 6       | Norway, Sweden                                 | 52, 54         |
| Aug. 10      | Norway, Sweden                                 | 52, 54         |
| Aug. 13      | Norway, Sweden                                 | 52, 54         |
| 1957 May 16  | Russia   | 20             |
| June 17      | Russia   | 20             |
| June 21      | Russia(4)                                      | 5, 40          |
| June 26      | Russia   | 20, 40         |
| June 28      | Russia   | 40             |
| June 30      | Russia(2)                                      | 40             |
| July 1       | Russia(4), Scotland                            | 20, 39, 40, 42 |
| July 2       | Russia(2)                                      | 40             |
| July 3       | Russia   | 40             |
| July 5       | Russia   | 20             |
| July 6       | Russia   | 40             |
| July 8       | Russia   | 40             |
| July 9       | Russia   | 40             |
| July 12      | Russia   | 40             |
| July 13      | Russia   | 40             |
| July 14      | Russia   | 40             |
| July 15      | Russia   | 40             |
| July 16      | Russia   | 40             |
| July 17      | Russia   | 40             |
| July 18      | Russia   | 40             |
| July 19      | Russia   | 40             |
| July 21      | Russia   | 40             |
| July 22      | Russia   | 40             |
| July 23      | Russia   | 2, 40          |
| July 25      | Russia   | 40             |
| July 27      | Alaska(2) Russia(2)                            | 8, 28, 40      |
| July 30      | Russia(4)                                      | 2, 20, 40      |



| Date         | Countries (No. of Stations which Observed NLC) | References    |
|--------------|--|---------------|
| 1957 Aug. 1  | Russia(3) Scotland                             | 2, 20, 39, 42 |
| Aug. 2       | Russia   | 40            |
| Aug. 4       | Russia(2)                                      | 20, 40        |
| Aug. 5       | Russia(2)                                      | 40            |
| Aug. 6       | Russia   | 40            |
| Aug. 7       | Alaska   | 11            |
| Aug. 10      | Russia   | 40            |
| Aug. 11      | Russia   | 2             |
| Aug. 12      | Russia   | 2             |
| Aug. 13      | Russia   | 2             |
| Aug. 19      | Russia   | 2             |
| Aug. 21      | Russia   | 40            |
| Aug. 25      | Russia   | 2             |
| Aug. 26      | Russia   | 2, 40         |
| Aug. 30      | Russia   | 40            |
| Sept. 2      | russia   | 40            |
| Sept. 3      | Russia   | 40            |
| Sept. 5      | Russia   | 40            |
| Sept. 7      | Russia(2)                                      | 40            |
| Sept.14      | Russia   | 40            |
| Sept.19      | Russia   | 40            |
| Sept.21      | Russia   | 40            |
| Sept.23      | Russia(2)                                      | 40            |
| Sept.26      | Russia   | 40            |
| Sept.27      | Russia   | 40            |
| Sept.29      | Russia   | 40            |
| Oct. 9       | Russia   | 40            |
| Oct. 10      | Russia   | 40, 44        |
| 1958 Mar. 12 | Russia   | 40            |
| Mar. 15      | Russia   | 40            |
| Mar. 16      | Russia   | 44            |
| Mar. 17      | Russia   | 40            |
| Mar. 28      | Russia   | 40            |
| Mar. 29      | Russia   | 40            |
| Mar. 30      | Russia(2)                                      | 40            |
| Mar. 31      | Russia   | 40            |
| Apr. 3       | Russia   | 40            |
| Apr. 7       | Russia   | 40            |
| Apr. 10      | Russia   | 40            |
| Apr. 11      | Russia   | 40            |
| Apr. 12      | Russia   | 40            |
| Apr. 20      | Russia   | 40            |
| Apr. 21      | Russia   | 40            |
| Apr. 24      | Russia   | 40            |
| Apr. 25      | Russia   | 40            |
| May 7        | Russia   | 40            |
| May 11       | Russia   | 40            |
| May 12       | Russia   | 40            |
| May 14       | Russia   | 40            |
| May 15       | Russia(3)                                      | 40            |
| May 16       | Russia   | 40            |
| May 18       | Russia   | 40            |

| Date        | Countries (No. of Stations which Observed NLC) | References |
|-------------|--|------------|
| 1958 May 19 | Russia   | 40         |
| May 21      | Russia   | 40         |
| May 25      | Russia   | 20         |
| May 31      | Canada, Russia                                 | 21, 40     |
| June 1      | Canada   | 21         |
| June 5      | Russia   | 40         |
| June 11     | Russia   | 40         |
| June 12     | Russia(5)                                      | 20, 40     |
| June 14     | Russia   | 40         |
| June 16     | Russia(5)                                      | 20, 40     |
| June 17     | Russia(3)                                      | 40         |
| June 19     | Russia   | 40         |
| June 20     | Russia(2)                                      | 40         |
| June 21     | Russia   | 40         |
| June 22     | Russia(2)                                      | 40         |
| June 24     | Russia   | 40         |
| June 26     | Russia   | 40         |
| June 27     | Russia   | 20         |
| July 1      | Russia(4)                                      | 40         |
| July 2      | Russia(3)                                      | 20, 40     |
| July 5      | Russia(4)                                      | 40         |
| July 6      | Russia(2)                                      | 20, 40     |
| July 8      | Russia   | 40         |
| July 10     | Russia   | 40         |
| July 11     | Russia   | 40         |
| July 12     | Russia(2)                                      | 40         |
| July 13     | Russia(4)                                      | 40         |
| July 14     | Russia   | 20         |
| July 15     | Russia   | 40         |
| July 16     | Russia   | 40         |
| July 17     | Russia(3)                                      | 20         |
| July 18     | Russia   | 40         |
| July 19     | Russia   | 40         |
| July 20     | Russia(4)                                      | 40         |
| July 21     | Russia(4)                                      | 40         |
| July 24     | Russia(2)                                      | 40         |
| July 25     | Russia(4)                                      | 20         |
| July 27     | Russia(3)                                      | 40         |
| Aug. 1      | Russia(2)                                      | 40         |
| Aug. 2      | Russia(3)                                      | 20, 40     |
| Aug. 3      | Russia(3)                                      | 20, 40     |
| Aug. 4      | Russia(5)                                      | 20         |
| Aug. 5      | Russia(2)                                      | 40         |
| Aug. 6      | Russia   | 40         |
| Aug. 9      | Russia(6)                                      | 40         |
| Aug. 10     | Norway, Russia(2), Sweden                      | 20, 40, 53 |
| Aug. 11     | Russia   | 40         |
| Aug. 12     | Canada   | 40         |
| Aug. 13     | Russia(2)                                      | 40         |
| Aug. 14     | Russia(4)                                      | 40         |
| Aug. 19     | Russia   | 40         |
| Aug. 20     | Russia(2)                                      | 20, 40     |
| Aug. 24     | Russia   | 40         |
| Aug. 25     | Russia(2)                                      | 20, 40     |
| Aug. 27     | Russia(2)                                      | 40         |

| Date         | Countries (No. of Stations which Observed NLC) | References           |
|--------------|--|----------------------|
| 1958 Aug. 31 | Russia   | 40                   |
| Sept. 2      | Russia   | 40                   |
| Sept. 8      | Russia   | 40                   |
| Sept.13      | Russia   | 40                   |
| Sept.17      | Russia(2)                                      | 40                   |
| Sept.18      | Russia   | 40                   |
| Sept.20      | Russia   | 40                   |
| Sept.22      | Russia   | 40                   |
| Sept.25      | Russia   | 40                   |
| Sept.27      | Russia   | 40                   |
| 1959 Mar. 5  | Russia(2)                                      | 4                    |
| Mar. 6       | Russia(3)                                      | 4                    |
| Mar. 12      | Russia(2)                                      | 4                    |
| Mar. 22      | Russia   | 4                    |
| Mar. 25      | Russia   | 4                    |
| Mar. 26      | Russia   | 4                    |
| Mar. 29      | Russia   | 4                    |
| Apr. 4       | Russia   | 4                    |
| Apr. 7       | Russia   | 4                    |
| Apr. 30      | Russia   | 4                    |
| May 6        | Russia   | 4                    |
| May 8        | Russia   | 4                    |
| May 10       | Russia   | 4                    |
| May 12       | Russia   | 4                    |
| May 13       | Russia   | 2                    |
| May 15       | Russia   | 4                    |
| May 22       | Russia   | 4                    |
| May 23       | Russia   | 4                    |
| May 26       | Russia   | 4                    |
| May 28       | Scotland                                       | 39, 42               |
| May 30       | Russia(2)                                      | 2                    |
| June 3       | Russia(2)                                      | 4                    |
| June 5       | Russia(4) Scotland                             | 39, 42               |
| June 6       | Russia(2)                                      | 2                    |
| June 8       | Russia(3)                                      | 4                    |
| June 13      | Russia   | 4                    |
| June 14      | Russia   | 4                    |
| June 16      | Russia   | 4                    |
| June 18      | Germany, Scotland                              | 5, 38, 39, 42        |
| June 21      | Russia(2)                                      | 2, 4                 |
| June 22      | Russia   | 4                    |
| June 23      | Scotland                                       | 39, 42               |
| June 24      | Scotland                                       | 39, 42               |
| June 26      | Scotland, Russia                               | 4, 39, 42            |
| June 27      | Germany, Russia(4)                             | 2, 4, 5              |
| June 28      | Russia(3)                                      | 2, 4                 |
| June 30      | Russia(4)                                      | 2, 4                 |
| July 1       | Russia(4) Scotland                             | 2, 4, 38, 39, 42     |
| July 2       | Russia(5)                                      | 2, 4                 |
| July 3       | Canada, Russia(3), Scotland                    | 1, 7, 13, 19, 46, 53 |
| July 4       | Russia   | 27                   |
| July 5       | Russia(7) Scotland                             | 1, 7, 13, 45, 46, 53 |
| July 6       | Russia(3)                                      | 4                    |

| Date        | Countries (No. of Stations which Observed NLC) | References                  |
|-------------|--|-----------------------------|
| 1959 July 7 | Russia(3)                                      | 2                           |
| July 8      | Russia(2) Scotland                             | 2, 4, 39, 42                |
| July 9      | Russia(7) Scotland                             | 2, 4, 39, 42                |
| July 10     | Russia(5) Scotland                             | 2, 4, 39, 42                |
| July 11     | Russia(2)                                      | 2                           |
| July 12     | Russia   | 4                           |
| July 13     | Russia(7) Scotland                             | 2, 4, 39, 42                |
| July 14     | Germany, Russia(3) Scotland                    | 2, 4, 5, 39, 42             |
| July 15     | Russia(4) Scotland                             | 2, 4, 27, 36, 39,<br>42, 44 |
| July 18     | Russia(4)                                      | 2, 4                        |
| July 23     | Russia(5)                                      | 2                           |
| July 25     | Russia(7)                                      | 2, 4                        |
| July 26     | Russia(5)                                      | 2, 4                        |
| July 27     | Russia(7)                                      | 2                           |
| July 28     | Russia   | 4                           |
| July 29     | Russia   | 4                           |
| July 30     | Russia(8) Sweden                               | 2, 4                        |
| July 31     | Russia   | 4                           |
| Aug. 1      | Russia   | 4                           |
| Aug. 2      | Russia(7)                                      | 2, 4                        |
| Aug. 4      | Russia(2)                                      | 4                           |
| Aug. 5      | Russia   | 4                           |
| Aug. 6      | Russia(3)                                      | 2, 4                        |
| Aug. 8      | Russia(3)                                      | 4                           |
| Aug. 9      | Russia(7)                                      | 2, 4                        |
| Aug. 10     | Russia(4)                                      | 2, 4                        |
| Aug. 11     | Russia(2)                                      | 4                           |
| Aug. 12     | Russia(2)                                      | 2                           |
| Aug. 13     | Russia(7)                                      | 2, 4                        |
| Aug. 14     | Russia   | 4                           |
| Aug. 16     | Russia   | 4                           |
| Aug. 17     | Russia(7)                                      | 2                           |
| Aug. 25     | Russia   | 4                           |
| Aug. 26     | Russia(7)                                      | 2, 4                        |
| Aug. 28     | Russia(7)                                      | 2, 4                        |
| Aug. 29     | Russia   | 4                           |
| Aug. 30     | Russia(7)                                      | 2                           |
| Sept. 1     | Russia(7)                                      | 2                           |
| Sept. 3     | Russia   | 4                           |
| Sept. 4     | Russia   | 4                           |
| Sept. 6     | Russia(5)                                      | 2                           |
| Sept. 8     | Russia(2)                                      | 4                           |
| Sept. 10    | Russia(3)                                      | 2                           |
| Sept. 16    | Russia   | 4                           |
| Sept. 18    | Russia   | 4                           |
| Sept. 25    | Russia   | 4                           |
| Sept. 28    | Russia(2)                                      | 4                           |
| Oct. 7      | Russia   | 4                           |
| Oct. 10     | Russia   | 4                           |
| Oct. 21     | Russia   | 4                           |
| Oct. 29     | Russia   | 4                           |
| 1960 May 26 | Scotland                                       | 39, 42                      |
| June 15     | Germany  | 5                           |
| June 18     | Scotland                                       | 39, 42                      |

| Date | Countries (No. of Stations which Observed NLC) | References                 |               |
|------|--|----------------------------|---------------|
| 1960 | June 19  | Scotland                   | 39, 42        |
|      | June 20  | Scotland                   | 38, 39, 42    |
|      | June 25  | Denmark, Germany, Scotland | 5, 38, 39, 42 |
|      | June 27  | Scotland                   | 39, 42        |
|      | June 29  | Scotland                   | 38, 39, 42    |
|      | June 30  | Scotland                   | 39, 42        |
|      | July 9   | Scotland                   | 39, 42        |
|      | July 10  | Scotland                   | 42            |
|      | July 11  | Scotland                   | 39            |
|      | July 12  | Scotland                   | 39, 42        |
|      | July 18  | Germany, Scotland          | 5, 38, 39, 42 |
|      | July 20  | Scotland                   | 39, 42        |
|      | July 21  | Scotland                   | 39, 42        |
|      | July 25  | Scotland                   | 39            |
|      | July 28  | Scotland                   | 39, 42        |
|      | Aug. 2   | Scotland                   | 39, 42        |
| 1961 | June 12  | Scotland                   | 39, 42        |
|      | June 15  | Germany                    | 5             |
|      | June 29  | Germany, Scotland          | 5, 39, 42     |
|      | June 30  | Germany, Scotland          | 5, 39, 42     |
|      | July 1   | Germany, Scotland          | 5, 39, 42     |
|      | July 2   | Scotland                   | 39, 42        |
|      | July 4   | Scotland                   | 39, 42        |
|      | July 5   | Scotland                   | 39, 42        |
|      | July 17  | Scotland                   | 39, 42        |
|      | July 20  | Scotland                   | 39, 42        |
|      | July 23  | Canada                     | 3, 6, 8       |
|      | July 31  | Scotland                   | 39, 42        |
|      | Aug. 7   | Germany                    | 5             |
|      | Aug. 13  | Germany                    | 43            |
|      | Sept. 12                                       | Arlis                      | 17            |
| 1962 | Apr. 28  | Germany                    | 43            |
|      | May 6  | Alaska                     | 8, 11         |
|      | May 22   | Sweden                     | 54            |
|      | June 7   | Germany(2)                 | 5, 43         |
|      | June 8   | Scotland                   | 39, 42        |
|      | June 14  | Sweden                     | 54            |
|      | June 17  | Germany                    | 5             |
|      | June 29  | Germany, Sweden            | 5, 54         |
|      | July 12  | Scotland                   | 39, 42        |
|      | July 14  | Scotland                   | 39, 42        |
|      | July 15  | Scotland                   | 39, 42        |
|      | July 29  | Sweden                     | 54            |
|      | July 31  | Sweden                     | 54            |
|      | Aug. 5   | Germany(2), Sweden         | 5, 43, 54     |
|      | Aug. 6   | Sweden                     | 18            |
|      | Aug. 7   | Norway                     | 53            |
|      | Aug. 10  | Sweden                     | 18, 54        |
|      | Aug. 11  | Alaska(2)                  | 8, 11         |
|      | Aug. 13  | Alaska                     | 8, 11         |
|      | Aug. 14  | Alaska(2)                  | 8, 11         |
|      | Aug. 16  | Alaska(2)                  | 8, 11         |
|      | Aug. 24  | Sweden                     | 54            |

| Date         | Countries (No. of Stations which Observed NLC) | References        |
|--------------|--|-------------------|
| 1963 Apr. 30 | Alaska   | 9                 |
| June 9       | Germany  | 43                |
| June 15      | USA  | 32                |
| June 23      | Germany  | 5                 |
| June 26      | Canada   | 7                 |
| June 28      | Alaska, Scotland                               | 11, 39, 42        |
| July 1       | Canada(2)                                      | 7, 49             |
| July 2       | Germany  | 5                 |
| July 3       | Canada   | 7                 |
| July 4       | Canada   | 7                 |
| July 5       | Canada   | 7                 |
| July 8       | Alaska(2)                                      | 49                |
| July 9       | Alaska   | 10                |
| July 11      | Alaska, Germany, Scotland, Sweden              | 5, 9, 39, 42, 54  |
| July 12      | Alaska(2)                                      | 10, 11            |
| July 13      | Alaska   | 11                |
| July 14      | Sweden   | 54                |
| July 15      | Scotland, Sweden                               | 39, 42, 54        |
| July 16      | Scotland, Sweden                               | 39, 42, 54        |
| July 17      | Scotland, Sweden                               | 39, 42, 54        |
| July 18      | Sweden   | 54                |
| July 19      | Sweden   | 54                |
| July 20      | Germany, Scotland, Sweden                      | 5, 39, 42, 54     |
| July 21      | Sweden   | 54                |
| July 22      | Alaska(2), Germany, Sweden                     | 43, 49, 54        |
| July 23      | Scotland, Sweden                               | 39, 42, 54        |
| July 24      | Sweden   | 54                |
| July 25      | Alaska, Scotland, Sweden                       | 39, 42, 48, 54    |
| July 26      | Sweden   | 54                |
| July 27      | Alaska, Germany Sweden                         | 10, 43, 54        |
| July 28      | Germany(2) Sweden                              | 5, 43, 54         |
| July 29      | Germany, Iceland, Sweden                       | 30, 43, 54        |
| July 30      | Germany  | 43                |
| July 31      | Canada(7)                                      | 49                |
| Aug. 1       | Canada   | 9                 |
| Aug. 2       | Alaska   | 10                |
| Aug. 5       | Alaska, Canada(3)                              | 9, 10, 49         |
| Aug. 6       | Alaska(5), Canada, Iceland                     | 1, 10, 30, 48, 49 |
| Aug. 8       | Alaska   | 1                 |
| Aug. 9       | Iceland, Sweden                                | 30, 54            |
| Aug. 10      | Iceland  | 30                |
| Aug. 11      | Alaska(12) Canada, Sweden                      | 10, 48, 49, 54    |
| Aug. 12      | Alaska(21) Canada(4)                           | 10, 47, 48, 49    |
| Aug. 16      | 63-66N, 10-80W                                 | 9                 |
| Aug. 18      | Alaska(2)                                      | 10, 48            |
| Sept. 28     | Alaska   | 10                |
| 1964 Apr. 26 | Canada   | 49                |
| Apr. 28      | Alaska, Canada(2)                              | 10, 49            |
| Apr. 30      | Canada(2)                                      | 49                |
| May 3        | Canada   | 49                |
| May 9        | Canada(2)                                      | 49                |
| May 11       | Alaska   | 48                |
| May 17       | Canada   | 49                |

| Date        | Countries (No. of Stations which Observed NLC) | References            |
|-------------|--|-----------------------|
| 1964 June 2 | Canada   | 49                    |
| June 5      | Canada   | 49                    |
| June 9      | Canada   | 49                    |
| June 10     | Canada, Scotland                               | 42, 49                |
| June 11     | Alaska(2)                                      | 48, 49                |
| June 12     | Canada   | 49                    |
| June 14     | Scotland                                       | 42                    |
| June 15     | Canada, North Atlantic                         | 31, 49                |
| June 20     | Canada, Scotland                               | 42, 49                |
| June 21     | Canada(2)                                      | 49                    |
| June 23     | Canada   | 49                    |
| June 24     | Canada(2) Scotland                             | 42, 49                |
| June 27     | Scotland                                       | 42                    |
| June 28     | Canada(8) Germany, Scotland                    | 5, 42, 49             |
| June 29     | Canada(16) Scotland                            | 42, 49                |
| June 30     | Alaska(2) Canada(9) North Atlantic, Scotland   | 10, 31, 42, 48, 49    |
| July 1      | Canada(5)                                      | 49                    |
| July 4      | Canada(3)                                      | 49                    |
| July 5      | Canada(10)                                     | 49                    |
| July 6      | Canada(3) Alaska, North Atlantic               | 31, 49                |
| July 7      | Canada   | 49                    |
| July 8      | Alaska, Canada(6)                              | 49                    |
| July 10     | Canada   | 49                    |
| July 11     | Canada(11)                                     | 49                    |
| July 12     | Canada(8)                                      | 49                    |
| July 13     | Canada(8)                                      | 49                    |
| July 14     | Sweden   | 54                    |
| July 15     | Alaska(2) Canada, Sweden                       | 48, 49, 54            |
| July 16     | Alaska(8) Canada(8)                            | 1, 35, 47, 48, 49     |
| July 17     | Alaska   | 47                    |
| July 19     | Sweden   | 54                    |
| July 20     | Alaska(4)                                      | 10, 48, 49            |
| July 21     | Alaska(5) Canada(2)                            | 1, 10, 35, 48, 49     |
| July 22     | Alaska(2) Canada(6)                            | 10, 35, 49            |
| July 23     | Canada(8)                                      | 49                    |
| July 24     | Alaska(2) Canada(9)                            | 10, 49                |
| July 25     | Canada, Sweden                                 | 49, 54                |
| July 26     | Alaska, Canada(5) Norway, Sweden               | 10, 12, 49, 54        |
| July 27     | Alaska, Canada(3)                              | 47, 49                |
| July 28     | Alaska(5) Canada(3)                            | 10, 48, 49            |
| July 29     | Alaska, Canada(2)                              | 10, 49                |
| July 30     | Canada(4)                                      | 49                    |
| Aug. 1      | Canada, Alaska, Netherlands                    | 48, 49, 54            |
| Aug. 2      | Alaska(3) Canada(10) Norway                    | 10, 48, 49            |
| Aug. 3      | Alaska(3) Canada(5) Sweden                     | 35, 48, 49, 54        |
| Aug. 4      | Sweden   | 54                    |
| Aug. 6      | Alaska, Iceland(3) Sweden                      | 10, 30, 54            |
| Aug. 7      | Alaska(4) Iceland, Sweden                      | 35, 47, 48, 49, 54    |
| Aug. 8      | Alaska(6) Canada(2) Sweden                     | 10, 35, 48, 49, 54    |
| Aug. 9      | Alaska(3) Canada(2) Sweden                     | 10, 48, 49, 54        |
| Aug. 10     | Sweden   | 54                    |
| Aug. 11     | Alaska(3) Canada                               | 47, 48, 49            |
| Aug. 13     | Alaska(8) Canada(2)                            | 1, 10, 35, 48, 49, 51 |
| Aug. 20     | Canada   | 49                    |
| Aug. 29     | Canada(2)                                      | 49                    |
| Aug. 30     | Canada   | 49                    |

TABLE 1b

List of reported Southern  
Hemisphere NLC sightings, 1885-1965

| Date            | Country or Location        | References |
|-----------------|----------------------------|------------|
| 1886 ?          | 54.85S, 68W                | 22         |
| 1888 December ? | Punta Arenas (53.15S, 71W) | 22         |
| 1962 December 4 | 55S, 58.8W                 | 19         |
| 1964 August 22  | South Pole (90S, -)        | 49         |
| 1965 January 9  | Punta Arenas (53.15S, 71W) | 10         |
| January 20      | Punta Arenas (53.15S, 71W) | 34         |
| January 23      | Punta Arenas (53.15S, 71W) | 34         |
| February 1      | Punta Arenas (53.15S, 71W) | 34         |



TABLE 2

Number of NLC sightings in Northern Hemisphere per year

| <u>Year</u> | <u>No. NLC</u> | <u>Year</u> | <u>No. NLC</u> |
|-------------|----------------|-------------|----------------|
| 1885        | 36             | 1925        | 18             |
| 1886        | 31             | 1926        | 22             |
| 1887        | 38             | 1927        | 6              |
| 1888        | 21             | 1928        | 5              |
| 1889        | 19             | 1929        | 19             |
| 1890        | 14             | 1930        | 4              |
| 1891        | 11             | 1931        | 0              |
| 1892        | 4              | 1932        | 14             |
| 1893        | 3              | 1933        | 17             |
| 1894        | 2              | 1934        | 13             |
| 1895        | 1              | 1935        |                |
| 1896        | 0              | 1936        | 26             |
| 1897        | 4              | 1937        | 27             |
| 1898        | 1              | 1938        | 14             |
| 1899        | 16             | 1939        | 8              |
| 1900        | 4              | 1940        | 12             |
| 1901        | 0              | 1941        | 4              |
| 1902        | 1              | 1942        | 1              |
| 1903        | 1              | 1943        | 1              |
| 1904        | 2              | 1944        | 1              |
| 1905        | 3              | 1945        | 0              |
| 1906        | 3              | 1946        | 0              |
| 1907        | 0              | 1947        | 1              |
| 1908        | 20             | 1948        | 0              |
| 1909        | 7              | 1949        | 1              |
| 1910        | 4              | 1950        | 12             |
| 1911        | 6              | 1951        | 22             |
| 1912        | 0              | 1952        | 9              |
| 1913        | 0              | 1953        | 15             |
| 1914        | 7              | 1954        | 13             |
| 1915        | 0              | 1955        | 35             |
| 1916        | 1              | 1956        | 20             |
| 1917        | 0              | 1957        | 55             |
| 1918        | 2              | 1958        | 89             |
| 1919        | 0              | 1959        | 94             |
| 1920        | 5              | 1960        | 19             |
| 1921        | 4              | 1961        | 15             |
| 1922        | 4              | 1962        | 22             |
| 1923        | 3              | 1963        | 46             |
| 1924        | 3              | 1964        | 63             |

TABLE 3

Number of NLC sightings per day

| Day | March | April | May | June | July | August | September | October |
|-----|-------|-------|-----|------|------|--------|-----------|---------|
| 1   |       |       |     | 2    | 20   | 12     | 1         |         |
| 2   |       |       |     | 3    | 17   | 9      | 3         |         |
| 3   |       | 1     | 2   | 4    | 13   | 4      | 2         |         |
| 4   |       | 1     | 1   | 2    | 17   | 7      | 1         |         |
| 5   | 1     |       |     | 5    | 18   | 9      | 1         |         |
| 6   | 1     |       | 2   | 5    | 16   | 11     | 1         | 1       |
| 7   |       | 2     | 1   | 3    | 18   | 8      | 1         | 1       |
| 8   |       |       | 1   | 8    | 18   | 9      | 2         |         |
| 9   |       |       | 1   | 6    | 18   | 7      |           | 1       |
| 10  |       | 1     | 1   | 7    | 20   | 9      | 1         | 2       |
| 11  |       | 1     | 2   | 6    | 18   | 8      |           |         |
| 12  | 2     | 1     | 2   | 9    | 21   | 6      | 1         |         |
| 13  |       | 1     | 3   | 8    | 11   | 8      | 2         |         |
| 14  |       |       | 1   | 10   | 15   | 3      | 1         |         |
| 15  | 1     |       | 2   | 13   | 20   | 1      | 1         |         |
| 16  | 1     |       | 2   | 9    | 13   | 5      | 1         |         |
| 17  | 1     |       | 2   | 10   | 20   | 2      | 1         |         |
| 18  |       |       | 1   | 8    | 17   | 2      | 2         |         |
| 19  |       |       | 1   | 8    | 14   | 4      | 1         |         |
| 20  |       | 1     | 1   | 11   | 13   | 2      | 1         |         |
| 21  |       | 1     | 1   | 15   | 11   | 1      | 1         | 1       |
| 22  | 1     |       | 2   | 14   | 11   | 1      | 1         |         |
| 23  |       |       | 2   | 12   | 14   | 2      | 1         |         |
| 24  |       | 2     |     | 15   | 14   | 2      |           |         |
| 25  | 1     | 1     | 1   | 13   | 14   | 5      | 2         |         |
| 26  | 1     | 1     | 6   | 13   | 10   | 3      | 1         |         |
| 27  |       |       | 1   | 16   | 17   | 1      | 2         |         |
| 28  | 1     | 2     | 2   | 19   | 11   | 1      | 2         |         |
| 29  | 2     | 1     |     | 15   | 14   | 2      | 1         | 1       |
| 30  | 2     | 3     | 1   | 16   | 16   | 4      | 1         |         |
| 31  | 1     |       | 1   |      | 8    | 2      |           |         |

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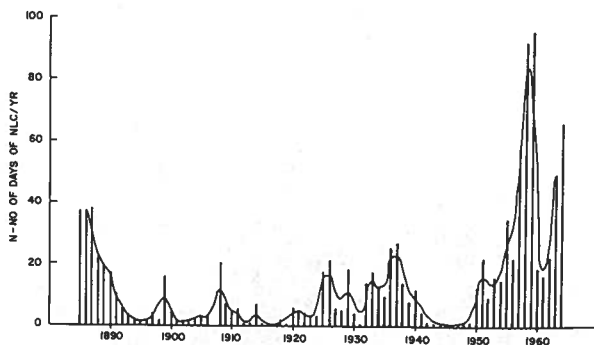


Figure 1: Number of NLC displays per year from 1885-1964.

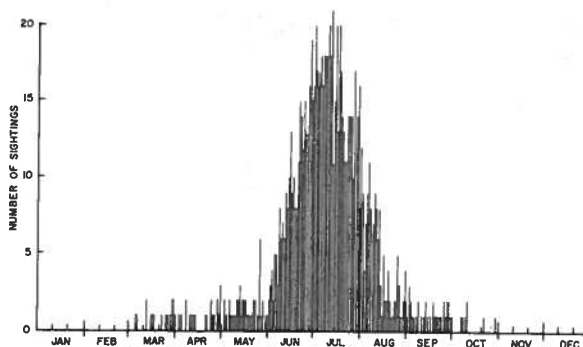


Figure 2: Number of times NLC have been observed on a given date during the period 1885-1964.

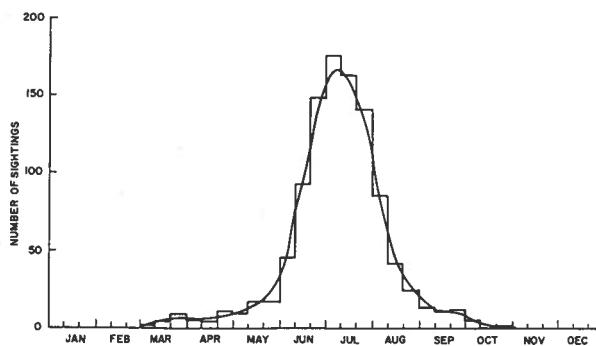


Figure 3: Frequency distribution of the number of NLC sightings/ ten day interval for all data between 1885-1964.