CRPL-F65

IONOSPHERIC DATA

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U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
WASHINGTON, D. C.

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CONTENTS

SYMBOLS AND TERMINOLOGY; CONVENTIONS FOR DETERMINING MEDIAN VALUES

Beginning with data reported for January 1949, the symbols, terminology, and conventions for the determination of median values used in this report (CRPL-F series) conform as far as practicable to those adopted at the Fifth Meeting of the International Radio Consultative Committee (C.C.I.R.) in Stockholm, 1948, and given in detail on pages 2 to 10 of the report CRPL-F53, "Ionospheric Data," issued January 1949.

For symbols and terminology used with data prior to January 1949, see report IRPL-C61, "Report of International Radio Propagation Conference, Washington, 17 April to 5 May, 1944," previous issues of the F series, in particular, IRPL-F5, CRPL-F24, F33, F50, and report CRPL-7-1, "Preliminary Instructions for Obtaining and Reducing Manual Ionospheric Records."

Following the recommendations of the Washington (1944) and Stockholm (1948) conferences, beginning with data for January 1945, median values are published wherever possible. Where averages are reported, they are, at any hour, the average for all the days during the month for which numerical data exist.

In addition to the conventions for the determination of medians given in Appendix 5 of Document No. 293 E of the Stockholm conference, which are listed on pages 9 and 10 of CRPL-F53, the following conventions are used in determining the medians for hours when no measured values are given because of equipment limitations and ionospheric irregularities. Symbols used are those given on pages 2-9 of CRPL-F53 (Appendixes 1-4 of Document No. 293 E referred to above).

a. For all ionospheric characteristics:

Values missing because of A, B, C, F, L, M, N, Q, R, S, or T (see terminology referred to above) are omitted from the median count.

b. For critical frequencies and virtual heights:

Values of foF2 (and foE near sunrise and sunset) missing because of E are counted as equal to or less than the lower limit of the recorder. Values of h'F2 (and h'E near sunrise and sunset) missing for this reason are counted as equal to or greater than the median. Other characteristics missing because of E are omitted from the median count. See CRPL-F38, page 9.

Values missing because of D are counted as equal to or greater than the upper limit of the recorder.

Values missing because of G are counted:
1. For foF2, as equal to or less than foF1.
2. For h'F2, as equal to or greater than the median.

Values missing because of W are counted:
1. For foF2, as equal to or less than the median when it is apparent that h'F2 is unusually high; otherwise, values missing because of W are omitted from the median count.
2. For h'F2, as equal to or greater than the median.

Values missing for any other reason are omitted from the median count.

c. For MUF factor (M-factors):

Values missing because of G or W are counted as equal to or less than the median.

Values missing for any other reason are omitted from the median count.

d. For sporadic E (Es):

Values of fEs missing because of G (no Es reflections observed, the equipment functioning normally otherwise) are counted as equal to or less than the median foE, or equal to or less than the lower frequency count of the recorder.

Values of fEs missing for any other reason, and values of h'Es missing for any reason at all are omitted from the median count.

Beginning with data for November 1945, doubtful monthly median values for ionospheric observations at Washington, D. C., are indicated by parentheses, in accordance with the practice already in use for doubtful hourly values. The following are the conventions used to determine whether or not a median value is doubtful:

1. If only four values or less are available, the data are considered insufficient and no median value is computed.

2. For the F2 layer, if only five to nine values are available, the median is considered doubtful. The E and F1 layers are so regular in their characteristics that, as long as there are at least five values, the median is not considered doubtful.

3. For all layers, if more than half of the values used to compute the median are doubtful (either doubtful or interpolated), the median is considered doubtful.

The same conventions are used by the CRPL in computing the medians from tabulations of daily and hourly data for stations other than Washington, beginning with the tables in IRPL-F18.

MONTHLY AVERAGE AND MEDIAN VALUES OF WORLD-WIDE IONOSPHERIC DATA

The ionospheric data given here in tables 1 to 36 and figures 1 to 72 were assembled by the Central Radio Propagation Laboratory for analysis and correlation, incidental to CRPL prediction of radio propagation conditions. The data are median values unless otherwise indicated. The following are the sources of the data in this issue:

Commonwealth of Australia, Ionospheric Prediction Service of the Commonwealth Observatory:
- Brisbane, Australia
- Canberra, Australia
- Hobart, Tasmania

Australian Department of Supply and Shipping, Bureau of Mineral Resources, Geology and Geophysics:
- Watheroo, West Australia

Radio Wave Research Laboratory, Central Broadcasting Administration:
- Chungking, China

Institute for Ionospheric Research, Lindau Uber Northeim, Hannover, Germany:
- Lindau/Harz, Germany

All India Radio (Government of India), New Delhi, India:
- Bombay, India
- Delhi, India
- Madras, India
- Tiruchirapalli, India

Electrical Communications Laboratory, Ministry of Communications:
- Fukaura, Japan
- Shibata, Japan
- Tokyo (Kokubunji), Japan
- Wakkanai, Japan
- Yamagawa, Japan

New Zealand Department of Scientific and Industrial Research:
- Christchurch, New Zealand (Canterbury University College Observatory)
- Rarotonga I.

Norwegian Defense Research Establishment, Kjeller per Lillestrom, Norway:
- Oslo, Norway

South African Council for Scientific and Industrial Research:
- Capetown, Union of South Africa
- Johannesburg, Union of South Africa

National Bureau of Standards (Central Radio Propagation Laboratory):
- Baton Rouge, Louisiana (Louisiana State University)
- Boston, Massachusetts (Harvard University)
- Guam I.
- Hyancayo, Peru (Instituto Geofisico de Huancayo)
- Maui, Hawaii
- Palmyra I.
- San Francisco, California (Stanford University)
- San Juan, Puerto Rico (University of Puerto Rico)
- Trinidad, British West Indies
- Washington, D. C.
- White Sands, New Mexico

The tables and graphs of ionospheric data are correct for the values reported to the CRPL, but, because of variations in practice in the interpretation of records and scaling and manner of reporting of values, may at times give an erroneous conception of typical ionospheric characteristics at the station. Some of the errors are due to:

a. Differences in scaling records when spread echoes are present.

b. Omission of values when foF2 is less than or equal to foF1, leading to erroneously high values of monthly averages or median values.

c. Omission of values when critical frequencies are less than the lower frequency limit of the recorder, also leading to erroneously high values of monthly average or median values.

These effects were discussed on pages 6 and 7 of the previous F-series report IRPL-F5.

Ordinarily a blank space in the fEs column of a table is the result of the fact that a majority of the readings for the month are below the lower limit of the recorder or less than the corresponding values of foE. Blank spaces at the beginning and end of columns of h'F1, foF1, h'E, and foE are usually the result of diurnal variation in these characteristics. Complete absence of medians of h'F1 and foF1 is usually the result of seasonal effects.

The dashed-line prediction curves of the graphs of ionospheric data are obtained from the predicted zero-muf contour charts of the CRPL-D series publications. The following points are worthy of note:

a. Predictions for individual stations used to construct the charts may be more accurate than the values read from the charts since some smoothing of the contours is necessary to allow for the longitude effect within a zone. Thus, inasmuch as the predicted contours are for the center of each zone, part of the discrepancy between the predicted and observed values as given in the F series may be caused by the fact that the station is not centrally located within the zone.

b. The final presentation of the predictions is dependent upon the latest available ionospheric and radio propagation data, as well as upon predicted sunspot number.

c. There is no indication on the graphs of the relative reliability of the data; it is necessary to consult the tables for such information.

The following predicted smoothed 12-month running-average Zürich sunspot numbers were used in constructing the contour charts:

Month	Predicted Sunspot No.				
	1949	1948	1947	1946	1945
December	108	114	126	85	38
November	112	115	124	83	36
October	114	116	119	81	23
September	115	117	121	79	22
August	111	123	122	77	20
July	108	125	116	73	
June	108	129	112	67	
May	108	130	109	67	
April	109	133	107	62	
March	111	133	105	51	
February	113	133	90	46	
January	112	130	88	42	

IONOSPHERIC DATA FOR EVERY DAY AND HOUR AT WASHINGTON, D. C.

The data given in tables 37 to 48 follow the scaling practices given in the report IRPL-C61, "Report of International Radio Propagation Conference," pages 36 to 39, and the median values are determined by the conventions given above under "Symbols and Terminology; Conventions for Determining Median Values." Beginning with September 1949, the data are taken at a new location, Ft. Belvoir, Virginia.

IONOSPHERE DISTURBANCES

Table 49 presents ionosphere character figures for Washington, D. C., during December 1949, as determined by the criteria presented in the report IRPL-R5, "Criteria for Ionospheric Storminess," together with Cheltenham, Maryland, geomagnetic K-figures, which are usually covariant with them.

Table 50 lists for the stations whose locations are given the sudden ionosphere disturbances observed on the continuous field intensity recordings made at Ft. Belvoir, Virginia, during December 1949.

Table 51 lists for the stations whose locations are given the sudden ionosphere disturbances observed at the Brentwood and Somerton, England, receiving stations of Cable and Wireless, Ltd., for December 9 and 12, 1949.

Table 52 lists for the stations whose locations are given the sudden ionosphere disturbances observed at the Barbados, British West Indies, receiving station of the RCA Communications, Inc., for various days in October and November 1949.

Table 53 lists for the stations whose locations are given the sudden ionosphere disturbances reported by the Institut für Ionosphärenforschung, as observed at Lindau, Harz, Germany, during October 1949.

Table 54 gives provisional radio propagation quality figures for the North Atlantic and North Pacific areas, for 01 to 12 and 13 to 24 GCT, November 1949, compared with the CRPL daily radio disturbance warnings, which are primarily for the North Atlantic paths, the CRPL weekly radio propagation forecasts of probable disturbed periods, and the half-day Cheltenham, Maryland, geomagnetic K-figures.

The radio propagation quality figures are prepared from radio traffic and ionospheric data reported to the CRPL, in a manner basically the same as that described in IRPL-R31, "North Atlantic Radio Propagation Disturbances, October 1943 through October 1945," issued February 1, 1946. The scale conversions for each report are revised for use with the data beginning January 1948, and statistical weighting replaces what was, in effect, subjective weighting. Separate master distribution curves of the type described in IRPL-R31 were derived for the part of 1946 covered by each report; data received only since 1946 are compared with the master curve for the period of the available data. A report whose distribution is the same as the master is thereby converted linearly to the Q-figure scale. Each report is given a statistical weight which is the reciprocal of the departure from linearity. The half-daily radio propagation quality figure, beginning January 1948, is the weighted mean of the reports received for that period.

These radio propagation quality figures give a consensus of opinion of actual radio propagation conditions as reported by the half day over the two general areas. It should be borne in mind, however, that though the quality may be disturbed according to the CRPL scale, the cause of the disturbance is not necessarily known. There are many variables that must be considered. In addition to ionospheric storminess itself as the cause, conditions may be reported as disturbed because of seasonal characteristics such as are particularly evident in the pronounced day and night contrast over North Pacific paths during the winter months, or because of improper frequency usage for the path and time of day in question. Insofar as possible, frequency usage is included in rating the reports. Where the actual frequency is not shown in the report to the CRPL, it has been assumed that the report is made on the use of optimum working frequencies for the path and time of day in question. Since there is a possibility that all the disturbance shown by the quality figures is not due to ionospheric storminess alone, care should be taken in using the quality figures in research correlations with solar, auroral, geomagnetic, or other data. Nevertheless, these quality figures do reflect a consensus of opinion of actual radio propagation conditions as found on any one half day in either of the two general areas.

SOLAR CORONAL INTENSITIES OBSERVED AT CLIMAX, COLORADO

In tables 55a and 55b are listed the intensities of the green (5303A) line of the emission spectrum of the solar corona as observed during December 1949 and for October 27, 28, and 31, 1949, by the High Altitude Observatory of Harvard University and the University of Colorado at Climax, Colorado, for east and west limbs, respectively, at 5-degree intervals of position angle north and south of the solar equator at the limb. Beginning January 11, 1949, the actual measurements are on solar rotation coordinates rather than astronomical coordinates; thus values of the correction P given in previous coronal tables are omitted. The time of observation is given to the nearest tenth of a day, GCT. The tables of coronal observations in CRPL-F29 to F41 listed the data on astronomical coordinates; the present format on solar rotation coordinates is in conformity with the tables of CRPL-1-4, "Observations of the Solar Corona at Climax, 1944-46."

Tables 56a and 56b give similarly the intensities of the first red (6374A) coronal line; tables 57a and 57b list the intensities of the second red (6704A) coronal line. The following symbols are used in tables 55, 56, and 57: a, observation of low weight; -, corona not visible; and X, position angle not included in plate estimates.

Table 58 gives details of the Climax observations from July 1949 through December 1949. The first column lists the Greenwich date of observations; the next six columns give the threshold or lowest observable intensity of 5303A for each spectrum plate centered at astronomical position angles 45°, 90°, 135°, 225°, 270°, and 315°, respectively; the last two columns indicate the observer and the person responsible for the intensity estimates of the observation. This table is a continuation of table 1 of CRPL-1-4, and appears in the F series regularly at intervals of six months.

AMERICAN AND ZÜRICH PROVISIONAL RELATIVE SUNSPOT NUMBERS

Table 59 presents the daily American relative sunspot number, R_A, computed from observations communicated to CRPL by observers in America and abroad. Beginning with the observations for January 1948, a new method of reduction of observations is employed such that each observer is assigned a scale-determining "observatory coefficient," ultimately referred to Zürich observations in a standard period, December 1944 to September 1945, and a statistical weight, the reciprocal of the variance of the observatory coefficient. The daily numbers listed in the table are the weighted means of <u>all</u> observations received for each day. Details of the procedure are given in the Publication of the Astronomical Society of the Pacific, issued February 1949, in an article entitled "Reduction of the Sunspot-Number Observations." The American relative sunspot number computed in this way is designated R_A. It is noted that a number of observatories abroad, including the Zürich observatory, are included in R_A. The scale of R_A was referred specifically to that of the Zürich relative sunspot numbers in the standard comparison period; since that time, R_A is influenced by the Zürich observations only in that Zürich proves to be a consistent observer and receives a high statistical weight. In addition, this table lists the daily provisional Zürich sunspot numbers, R_Z.

PRELIMINARY MEAN K-INDICES, PRELIMINARY INTERNATIONAL CHARACTER FIGURES, MAGNETICALLY SELECTED DAYS, PLANETARY INDICES

Table 60 gives preliminary mean K-indices, Kw, and international character figures, C, and also final magnetically selected days from magnetic observatories widely distributed over the Earth's surface. The selected days are preferentially derived using the four magnetic criteria: C-figures, sums of the eight daily mean K-indices, the greatest daily K-index, and the sums of the squares of the eight daily K-indices.

Table 61 gives geomagnetic planetary three-hour-range indices, Kp, for 1943 and 1944. It should be noted that Kp is without reduction because of the (rare) solar flare effects. Kp is designed to measure solar particle-radiation by its magnetic effects at eleven observatories between geomagnetic latitudes 47 and 63 degrees. Complete description of Kp has appeared in Bulletin 12b, "Geomagnetic Indices C and K, 1948" published in Washington, D. C., 1949, by the Association of Terrestrial Magnetism and Electricity, International Union of Geodesy and Geophysics. This bulletin has tables of Kp for 1945-48. Current tables of Kp appear in the Journal of Geophysical Research.

These tables have been furnished by the courtesy of the Committee on Characteristics of Magnetic Disturbance, ATME, IUGG. The majority of the world's magnetic observatories have cooperated in supplying the data. The Meteorological Office, De Bilt, Holland, has efficiently assembled and compiled the summary tables. The Chairman of the Committee has compiled Kp to supply the need for a homogeneous index of solar particle-activity to research workers in the ionospheric field. Tables of Kp will ultimately be available from January 1, 1937, the beginning date for serious ionospheric records.

ERRATA

1. CRPL-F64, p. 17, table 26: The latitude of Tiruchirapalli, India, should be 10.8°N instead of 12.8°N.

2. CRPL-F62, p. 37, table 71: The R_A for September 25, 1949, should have been 158. This makes the mean American relative sunspot number for September 1949, 186.9 instead of 183.7.

TABLES OF IONOSPHERIC DATA

Table 1

Washington, D. C. (38.7°N, 77.1°W) December 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	(4.6)						(2.9)
01	280	(4.7)						(2.9)
02	270	(4.7)						(2.9)
03	260	(4.6)						2.9
04	260	(4.2)						(2.9)
05	260	(3.9)						(2.8)
06	270	(3.7)						(2.9)
07	240	(4.6)						(3.1)
08	220	(7.8)			110	2.2		3.3
09	220	(10.2)			110	2.6		3.3
10	220	11.6	---	---	110	2.9		3.2
11	230	12.4	---	---	110	3.1		3.1
12	220	12.0	---	---	100	3.2		3.1
13	220	12.2			100	3.2		3.0
14	230	(12.2)			100	2.9		(3.0)
15	230	(12.0)			100	2.7		(3.0)
16	220	(11.4)			110	2.2		(3.1)
17	210	(10.7)						(3.1)
18	220	(9.2)						(3.1)
19	220	(7.6)						(3.1)
20	230	(6.2)						(3.0)
21	250	(5.4)						(3.0)
22	260	(5.0)						(3.0)
23	270	(4.8)						(2.9)

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 2

Oslo, Norway (60.0°N, 11.0°E) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(352)	2.6						2.6
01	(350)	2.6						(2.6)
02	(345)	2.4						(2.4)
03	(350)	2.6						(2.6)
04	(340)	2.7						(2.6)
06	(300)	2.8						(2.7)
06	(280)	2.6						2.7
07	(260)	3.8			---	---		(2.8)
08	245	6.4			130	—		2.9
09	240	7.6			115	2.1	2.3	3.0
10	240	(>9.0)			116	2.3		3.0
11	240	(>9.0)			116	2.6		(3.0)
12	240	(>9.0)			115	2.6		(3.2)
13	235	(>9.0)			116	2.6		(3.2)
14	235	(>9.0)			125	2.3		(3.2)
15	220	(>9.0)			138	2.0		---
16	228	(>9.0)			150	1.9		---
17	230	(>8.5)						(2.9)
18	230	8.6						3.0
19	240	4.9						3.0
20	250	3.9						3.0
21	(290)	3.2						2.6
22	(320)	3.0						2.6
23	(350)	2.8						(2.4)

Time: 15.0°E.
Sweep: 1.6 Mc to 10.0 Mc in 5 minutes, automatic operation.

Table 3

Boston, Massachusetts (42.4°N, 71.2°W) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	5.8						2.7
01	265	5.8						2.8
02	266	5.6						2.7
03	265	5.2						2.7
04	272	4.7						2.7
05	275	4.3						2.6
06	270	4.9			---	---		2.7
07	250	7.7			---	---		3.0
08	235	10.0			---	---		3.1
09	235	11.3			---	---		3.1
10	240	12.2			---	---		3.0
11	240	12.7			---	---		3.0
12	240	12.7			---	---		3.0
13	240	13.0			---	---		3.0
14	240	12.7						3.0
15	235	12.6						3.0
16	235	12.3						3.0
17	238	11.3						3.0
18	245	10.7						2.9
19	245	9.3						2.8
20	250	7.6						2.7
21	265	7.1						2.6
22	260	6.6						2.7
23	266	6.0						2.6

Time: 75.0°W.
Sweep: 0.8 Mc to 14.0 Mc in 1 minute.

Table 4

San Francisco, California (37.4°N, 122.2°W) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	3.7					3.0	2.6
01	300	3.6					2.9	2.6
02	300	3.5					2.8	2.7
03	300	3.7					2.9	2.6
04	290	3.7					2.7	2.7
05	300	3.6					3.0	2.7
06	300	3.5					2.6	2.6
07	240	6.6			120	1.9	2.7	3.1
08	240	10.1	---	---	120	2.6	3.1	3.2
09	240	12.2	---	---	120	3.0	4.8	3.0
10	240	13.0	230	---	120	3.2	4.2	3.0
11	240	13.6	230	---	110	3.6	4.2	3.0
12	---	13.6	230	---	110	3.8	4.7	2.9
13	---	14.0	240	---	130	(3.7)	4.2	2.9
14	240	13.9	240	---	110	---		2.8
16	240	13.5	230	---	120	3.0		2.9
16	240	13.2	---	---	120	2.5	2.7	3.0
17	236	12.0	---	---	110	1.7	2.8	3.0
18	220	9.8					2.8	3.0
19	220	7.6					2.7	3.1
20	230	5.7					2.6	3.0
21	250	4.5					2.7	3.0
22	260	3.9					2.8	2.9
23	300	3.6					2.8	2.8

Time: 120.0°W.
Sweep: 1.3 Mc to 18.0 Mc in 4 minutes.

Table 5

White Sands, New Mexico (32.3°N, 106.5°W) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	4.2					2.6	2.7
01	280	4.0					2.5	2.6
02	280	4.1					2.4	2.6
03	280	4.1					2.8	2.7
04	260	4.0					2.4	2.6
06	280	3.8					2.4	2.6
06	275	4.2					2.6	2.6
07	240	8.1			120	(2.1)	2.8	3.1
08	230	10.8			110	2.7	3.8	3.1
09	235	12.6			110	3.2	4.2	3.0
10	230	13.1			110	3.4	4.2	3.0
11	230	(13.4)			110	3.6	4.6	(2.9)
12	230	(13.6)			110	3.7	4.8	(2.8)
13	230	13.5			110	3.6	4.6	2.8
14	235	13.3			110	3.4	4.6	2.8
16	240	13.0			105	3.0	4.2	2.8
16	230	12.6			110	2.5	3.9	2.8
17	220	11.8			110	(1.8)	3.3	2.9
18	220	10.1					3.2	2.9
19	220	8.4					2.4	2.9
20	220	6.5					2.6	2.9
21	230	5.2					2.8	2.9
22	250	4.8					2.6	2.8
23	260	4.2					2.7	2.7

Time: 106.0°W.
Sweep: 0.8 Mc to 14.0 Mc in 2 minutes.

Table 6

Baton Rouge, Louisiana (30.5°N, 91.2°W) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	4.6						2.8
01	310	4.6						2.7
02	310	4.4						2.7
03	320	4.3						2.7
04	330	4.2						2.7
05	330	4.3						2.7
06	300	4.7						2.8
07	270	8.6	240	---				3.1
08	260	11.2	240	---	120	2.9		3.0
09	270	12.0	240	---	120	3.2		3.0
10	290	(12.6)	240	---	120	3.6		3.0
11	300	(12.7)	230	---	120	(3.6)		(2.9)
12	300	12.8	240	---	120	(3.6)		(2.8)
13	300	(12.7)	250	---	120	(3.6)		(2.7)
14	300	12.6	260	---	120	(3.5)		2.7
16	300	12.2	250	---	120	3.2		2.8
16	280	12.0	250	---	130	2.7		2.8
17	270	11.6	---	---	---	---		2.9
18	250	9.6						(2.9)
19	270	7.6						2.9
20	280	7.0						2.9
21	290	6.0						2.8
22	290	5.1						2.8
23	300	4.8						2.7

Time: 90.0°W.
Sweep: 2.12 Mc to 14.1 Mc in 6 minutes, automatic operation.

Table 7

Maui, Hawaii (20.8°N, 156.6°W) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	240	7.3						3.0
01	240	6.4						3.0
02	240	5.1						2.9
03	246	3.8						2.6
04	300	3.2						2.2
05	340	3.1						2.3
06	330	3.6						2.3
07	280	7.8			130	2.1		2.9
08	260	11.2	---	---	120	2.8		3.0
09	270	13.4	250	---	110	3.3	3.9	3.0
10	280	14.2	240	---	110	3.5		2.9
11	310	14.6	230	6.3	110	3.7	4.2	2.7
12	330	15.4	230	(5.6)	110	3.8	4.4	2.7
13	340	16.2	240	(6.8)	110	3.6	4.6	2.7
14	340	16.6	250	6.7	110	3.6	4.6	2.7
15	310	16.4	250	---	110	3.4	4.7	2.7
16	280	15.8	250	---	110	3.0	4.3	2.7
17	250	15.0			115	2.4	4.5	2.8
18	230	14.3			---	---	4.1	2.9
19	220	12.6					4.2	2.9
20	230	11.5					2.7	2.8
21	250	11.0					2.4	2.8
22	240	10.2						2.8
23	240	8.9						3.0

Time: 150.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 8

San Juan, Puerto Rico (18.4°N, 66.1°W) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	(7.3)						2.9
01	250	6.6						3.0
02	240	5.4						3.1
03	---	3.8						2.9
04	---	3.7						2.6
05	---	3.9						2.7
06	(290)	4.6						2.8
07	250	9.0		3.5				3.0
08	250	11.5		---		3.0		3.0
09	260	13.0		---		3.4		3.0
10	260	13.2		---		3.7		3.0
11	260	13.0		---		---		2.9
12	270	12.8		---		3.8		2.8
13	280	(12.3)		---		---		2.8
14	290	12.2		---		3.6		2.7
15	270	12.3		---		3.5		2.7
16	270	12.0		---		3.2		2.7
17	250	11.4		3.6		---		2.8
18	250	10.8						2.8
19	260	9.5						2.8
20	265	8.8						2.8
21	270	8.6						2.8
22	265	7.6						2.8
23	260	7.5						2.8

Time: 60.0°W.
Sweep: 2.8 Mc to 13.0 Mc in 9 minutes, automatic operation; supplemented by manual operation.

Table 9

Guam I. (13.6°N, 144.9°E) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	240	10.6					3.5	3.0
01	230	9.7					4.0	3.1
02	230	8.5					3.6	3.2
03	230	6.9					3.6	3.1
04	240	5.7					3.4	3.0
05	240	4.9					3.8	3.0
06	250	4.8					3.8	2.8
07	260	8.7			130	2.3	4.7	3.1
08	250	11.2			110	3.0	6.1	3.0
09	250	13.2	230	---	110	3.3	6.9	2.9
10	250	(13.6)	220	---	110	3.7	5.8	2.7
11	250	(13.2)	220	4.6	110	3.8	6.6	(2.4)
12	255	(12.1)	200	4.6	110	3.8	6.8	(2.3)
13	250	11.8	220	4.8	110	3.8	6.4	(2.3)
14	260	12.0	230	4.3	110	3.7	5.8	2.3
15	250	(12.4)	240	---	110	3.4	5.2	(2.4)
16	250	13.0	---	---	110	3.0	5.8	(2.5)
17	270	(13.2)			120	2.4	6.6	(2.5)
18	285	13.3					5.1	2.5
19	310	12.9					2.9	(2.4)
20	295	12.4					3.0	(2.4)
21	265	12.2					4.3	(2.5)
22	250	11.6					4.6	(2.7)
23	240	11.4					3.8	2.9

Time: 150.0°E.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 10

Trinidad, Brit. West Indies (10.6°N, 61.2°W) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	230	8.7						3.2
01	220	6.8						3.3
02	220	4.9						3.3
03	250	3.7						3.0
04	280	3.7						2.8
06	270	3.9						3.0
06	250	6.1			---	---	2.1	3.1
07	230	10.0			120	2.6	3.2	3.3
08	240	12.4	220	---	110	3.2	4.0	3.2
09	250	13.8	220	6.0	120	3.7	4.2	3.2
10	250	13.7	220	5.2	120	3.9	4.4	3.1
11	250	13.6	220	5.3	120	4.0	4.4	3.0
12	250	13.2	220	5.2	120	4.0	4.4	2.9
13	250	13.2	220	6.3	120	4.0	4.6	2.8
14	250	13.0	220	5.3	120	3.8	4.8	2.8
15	260	12.8	220	6.1	120	3.6	4.7	2.8
16	250	12.6	230	5.0	120	3.2	4.0	2.8
17	245	12.6			120	2.6	3.6	2.9
18	250	12.2					4.0	3.0
19	240	11.4					2.8	3.0
20	240	10.8					2.5	2.9
21	240	10.3					2.2	2.9
22	240	10.2						3.0
23	220	9.0						3.1

Time: 60.0°W.
Sweep: 1.5 Mc to 18.0 Mc, manual operation.

Table 11

Palmyra I. (5.9°N, 162.1°W) November 1949*

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	(12.8)					3.2	(3.0)
01	280	(9.8)					3.1	(2.8)
02	280	(8.9)					2.7	(2.8)
03	270	(8.3)					2.6	(2.9)
04	260	(6.6)					3.0	(2.9)
05	250	(6.1)					2.8	(2.9)
06	270	6.8			130	1.5	2.6	2.8
07	280	(10.0)			140	2.7		(2.8)
08	260	13.0			130	3.3		2.6
09	250	>13.0			130	---		(2.4)
10	260	13.0	240	---	130	---		2.5
11	280	12.2	240	---	130	---		2.4
12	280	11.9	230	6.3	130	---		2.4
13	270	12.6	230	5.2	130	---		2.3
14	270	13.1	230	---	130	---		2.4
15	260	13.9	250	---	130	3.7		2.6
16	270	14.8	---	---	130	3.4		2.7
17	280	14.9			130	2.8		2.8
18	300	14.9			130	1.8	2.8	2.7
19	350	14.7						2.6
20	350	(14.3)					2.1	(2.5)
21	320	(14.0)					2.4	(2.5)
22	290	14.4					2.9	(2.9)
23	270	(14.6)					3.1	(3.2)

Time: 157.5°W.
Sweep: 1.0 Mc to 13.0 Mc in 1 minute 36 seconds, automatic operation; 13.0 Mc to 18.0 Mc, manual operation.
*Station ceased operation on November 26.

Table 12

Huancayo, Peru (12.0°S, 75.3°W) November 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	340	(10.0)					2.7	(2.8)
01	280	(9.3)					3.0	(2.9)
02	240	8.6					3.2	3.0
03	240	7.2					2.8	3.1
04	230	6.6					2.9	3.2
06	260	6.5					3.2	2.9
06	260	8.8				2.4	3.3	3.0
07	250	11.9				3.0	8.4	2.9
08	240	13.5	---	---		3.5	11.1	2.7
09	270	14.0	230	5.5		3.8	11.9	2.4
10	270	14.2	220	6.4		4.0	11.9	2.3
11	270	13.7	220	5.4		4.0	12.0	2.2
12	260	13.9	220	5.4		4.1	11.9	2.2
13	270	13.2	210	5.4		4.0	11.9	2.2
14	280	13.0	220	5.4		3.9	11.9	2.2
15	240	13.4	220	---		3.6	11.3	2.2
16	260	13.2	---	---		3.2	10.8	2.1
17	270	(12.6)				2.5	7.3	2.1
18	310	11.6				1.4	3.2	2.1
19	400	10.8						2.0
20	430	10.4						(2.0)
21	420	10.6						2.1
22	400	(9.8)						(2.6)
23	360	(10.1)					2.7	(2.6)

Time: 75.0°W.
Sweep: 16.0 Mc to 0.6 Mc in 15 minutes, automatic operation.

Table 13

Lindau/Harz, Germany (51.6°N, 10.1°E) October 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	310	4.2					2.4	
01	320	4.1					2.4	
02	310	3.8					2.4	
03	320	3.7					2.2	
04	300	3.4					2.6	
05	290	3.2					2.4	
06	270	3.6			---	E	2.0	
07	240	5.9	---	---	130	1.8	2.0	
08	230	8.3	---	---	110	2.3		
09	230	9.6	---	---	100	2.6	3.5	
10	220	10.4	---	---	100	3.0	4.3	
11	220	11.0	220	4.5	100	3.1	4.2	
12	230	11.2	210	---	100	3.2	4.2	
13	220	11.4	220	5.4	100	3.1		
14	230	11.3	---	---	100	3.1	3.8	
15	230	11.4	---	---	100	2.8		
16	230	11.2			100	2.4	3.5	
17	220	10.1			110	2.0	3.5	
18	230	9.3			---	E	3.2	
19	230	7.8					2.6	
20	230	6.0					2.9	
21	260	5.2					2.3	
22	290	4.8					2.0	
23	300	4.4					2.0	

Time: 16.0°E.
Sweep: 1.4 Mc to 16.0 Mc in 8 minutes.

Table 14

Palmyra I. (5.9°N, 162.1°W) October 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	250	>13.0					1.8	3.0
01	250	>13.0					2.1	2.9
02	250	(9.0)					2.0	(2.8)
03	250	8.3					2.0	2.8
04	270	(7.8)					2.5	(2.8)
05	260	6.2					2.6	3.0
06	290	8.7			120	1.5	1.7	2.8
07	270	(9.5)			120	2.7		(2.7)
08	250	(12.6)			130	3.4		2.6
09	250	12.7	230	---	130	---		(2.6)
10	(270)	12.7	(240)	---	130	---		2.6
11	(285)	12.8	245	---	130	---		2.5
12	(300)	13.0	(250)	---	130	---		2.5
13	(286)	13.5	250	---	130	---		2.5
14	(280)	13.8	(240)	---	130	---		2.5
15	270	14.1	(250)	---	130	---		2.6
16	(280)	14.6	250	---	130	3.4		2.5
17	275	14.9	260	---	120	2.7		2.6
18	300	14.8			120	---	2.5	2.5
19	360	13.8			---	---	2.4	2.4
20	360	(13.8)						(2.4)
21	320	(13.6)					2.1	(2.6)
22	270	(14.0)					1.7	(3.1)
23	260	>13.0					2.3	---

Time: 157.6°W.
Sweep: 1.0 Mc to 13.0 Mc in 1 minute 36 seconds, automatic operation; 13.0 Mc to 18.0 Mc, manual operation.

Table 15

Johannesbug, Union of S. Africa (26.2°S, 28.0°E) October 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(260)	6.7						2.8
01	(250)	6.3						2.7
02	(265)	5.7						2.8
03	(260)	6.3						2.8
04	(260)	4.8						2.8
05	(270)	4.8						2.8
06	240	7.4			115	(2.1)		3.1
07	240	9.8	230	---	110	(2.9)		3.1
08	240	11.1	230	4.0	110	(3.3)		3.0
09	250	11.7	220	---	110	(3.7)		2.9
10	260	12.1	210	---	110	(3.9)		2.8
11	270	12.6	210	---	110	---		2.8
12	265	12.8	210	---	110	---		2.7
13	305	12.8	210	---	110	(4.0)		2.7
14	320	12.9	220	---	110	(3.9)	4.1	2.7
15	300	12.6	230	---	110	(3.7)	4.1	2.7
16	(280)	12.4	240	---	110	(3.3)	3.7	2.7
17	250	12.3	240	---	120	(2.7)	3.2	2.8
18	250	12.2			---	---	2.2	2.8
19	240	11.4					1.8	2.9
20	(235)	10.2					1.8	2.8
21	(240)	9.1						2.9
22	(260)	8.1						2.8
23	(260)	7.2						2.8

Time: 30.0°E.
Sweep: 1.0 Mc to 15.0 Mc in 7 seconds.

Table 16

Watheroo, W. Australia (30.3°S, 116.9°E) October 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	6.9					3.1	2.7
01	270	6.6					2.9	2.7
02	270	6.1					3.0	2.6
03	290	6.6					2.9	2.5
04	300	5.2					2.9	2.6
05	300	5.4					2.8	2.5
06	270	6.4	---	---		2.1	2.3	3.0
07	250	7.6	260	4.2		2.8	2.8	3.1
08	270	8.4	240	4.9		3.3	3.5	2.8
09	290	9.2	230	5.3		3.5	3.9	2.8
10	310	10.1	230	5.2		3.6	4.2	2.7
11	330	10.8	230	5.5		3.6	4.3	2.7
12	320	10.8	230	5.5		3.6	4.2	2.7
13	340	11.3	230	6.5		3.5	4.1	2.6
14	330	10.7	240	5.3		3.4	4.0	2.6
16	320	10.8	240	5.1		3.4	3.6	2.6
16	260	10.3	250	4.9		3.2	3.4	2.6
17	260	10.2	250	---		2.6	3.0	2.7
18	260	10.0				1.8	2.8	2.8
19	250	9.2					2.4	2.8
20	260	8.3					2.5	2.7
21	270	7.6					2.5	2.7
22	290	7.1					2.8	2.6
23	290	7.0					2.8	2.6

Time: 120.0°E.
Sweep: 16.0 Mc to 0.5 Mc in 16 minutes, automatic operation.

Table 17

Capetown, Union of S. Africa (34.2°S, 18.3°E) October 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	6.0					1.8	2.8
01	(280)	5.5					2.1	2.7
02	280	5.3					1.8	2.7
03	280	5.0					2.0	2.7
04	290	4.7						2.7
05	270	4.6						2.6
06	280	6.6			---	1.7	2.4	2.8
07	240	8.3			110	2.4	3.1	3.0
08	240	10.1	240	---	110	3.1	3.4	3.0
09	250	11.1	230	---	110	3.5		2.9
10	260	12.0	230	---	110	(3.7)	3.9	2.8
11	280	12.5	220	---	110	---		2.7
12	280	12.8	220	6.2	110	---		2.7
13	300	13.1	220	5.2	110	---		2.7
14	320	13.2	220	6.2	110	---		2.6
16	310	13.0	240	4.9	110	(3.7)		2.7
16	290	12.9	240	---	110	3.5		2.7
17	250	12.4	240	---	110	3.1	3.6	2.7
18	250	12.2			120	2.5	3.0	2.8
19	240	11.8			---	1.8	2.2	2.9
20	230	10.6					2.2	2.9
21	230	8.8					2.2	2.9
22	250	7.6					2.1	2.9
23	260	6.6					1.8	2.8

Time: 30.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 7 seconds.

Table 18

Wakkanai, Japan (45.4°N, 141.7°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	6.8					1.8	2.6
01	300	6.6					1.6	2.6
02	290	6.4					1.8	2.6
03	290	5.9					1.8	2.6
04	290	5.9					1.8	2.6
05	290	6.4	---	---	100	1.2	1.7	2.7
06	270	7.8	230	---	100	2.2	2.5	2.9
07	240	9.4	230	---	100	2.8	3.2	(3.0)
08	250	9.4	230	---	100	3.2	3.4	(3.1)
09	260	9.6	220	---	100	3.5	4.0	3.1
10	260	9.7	210	---	100	---	3.9	3.0
11	280	9.5	220	---	100	---	4.3	(2.9)
12	280	9.7	220	5.0	100	3.7		(2.9)
13	290	(9.2)	230	5.6	100	---		(3.0)
14	290	(8.9)	220	---	100	3.6		(2.9)
15	280	9.1	220	4.7	100	3.4	3.5	3.0
16	260	9.0	240	4.4	100	2.9	3.3	3.0
17	260	(8.8)	---	---	100	2.3	3.0	(3.0)
18	260	(8.8)	---	---	100	1.7	2.7	(3.0)
19	260	7.8					3.2	(3.0)
20	270	7.8					2.8	2.8
21	250	7.4					2.5	2.7
22	280	6.8					2.2	2.6
23	300	6.8					1.7	2.6

Time: 135.0°E.
Sweep: 1.0 Mc to 17.0 Mc in 16 minutes, manual operation.

Table 19

Fukaura, Japan (40.6°N, 139.9°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	6.6					2.3	2.7
01	300	6.5					2.0	2.7
02	290	6.4					1.8	2.7
03	280	6.0						2.7
04	280	5.8						2.8
05	300	6.0			---	---	1.8	2.7
06	250	8.4	230	---	120	2.2	2.1	3.1
07	240	9.7	---	---	110	2.7	3.2	3.1
08	250	10.2	---	---	110	3.2	4.2	3.2
09	260	9.8	210	---	110	---	(5.0)	3.1
10	270	9.9	220	---	120	---	(4.9)	3.0
11	270	10.0	220	---	---	---	(5.3)	2.9
12	280	10.1	220	---	---	---	(5.3)	2.9
13	290	10.2	240	---	---	---	(5.2)	2.9
14	290	10.0	240	---	110	---		2.9
15	290	9.8	230	---	110	---	(5.0)	2.9
16	260	9.4	240	---	110	3.0	(3.3)	3.0
17	250	9.6	---	---	110	2.5	3.4	3.0
18	240	9.6	---	---	---	---	3.1	3.0
19	240	8.4					3.0	3.0
20	260	7.8					4.1	3.0
21	270	7.4					3.0	2.8
22	280	7.0					3.0	2.8
23	290	6.8					2.2	2.8

Time: 135.0°E.
Sweep: 1.0 Mc to 17.0 Mc in 15 minutes, manual operation.

Table 20

Shibata, Japan (37.9°N, 139.3°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	270	6.7					2.4	2.9
01	270	6.4					2.2	2.9
02	260	6.4					2.0	2.9
03	240	6.0					2.4	3.0
04	250	5.7					2.6	2.8
05	270	5.9			---	E	2.6	2.9
06	220	8.5	---	---	100	2.1	2.9	3.2
07	210	10.6	---	---	100	2.8	3.2	3.3
08	210	10.8	200	---	100	3.3	3.7	3.3
09	210	10.7	200	---	100	3.5	4.9	3.2
10	240	10.8	200	---	100	3.7	4.8	3.1
11	260	11.2	200	---	100	---	5.2	3.0
12	280	11.4	200	---	100	---	4.9	3.0
13	280	11.7	200	---	100	---	4.9	3.0
14	270	11.6	200	---	100	---	4.7	3.0
15	260	11.4	210	---	100	3.5	4.2	3.0
16	240	10.6	220	---	100	3.1	4.1	3.1
17	230	10.7	---	---	100	2.4	3.8	3.1
18	220	10.4	220	---	---	---	3.3	3.2
19	220	9.0					3.4	3.2
20	220	7.4					3.5	3.1
21	240	7.1					3.9	3.0
22	250	7.0					3.0	2.9
23	260	7.0					3.0	2.9

Time: 135.0°E.
Sweep: 1.0 Mc to 17.0 Mc in 15 minutes, manual operation.

Table 21

Tokyo, Japan (35.7°N, 139.5°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	250	6.7					2.7	3.0
01	250	6.6					2.7	2.9
02	250	6.5					2.6	3.0
03	240	6.1					2.2	3.0
04	230	5.7					1.8	2.9
05	250	5.9	---	---	---	E	1.4	2.9
06	220	8.7	---	---	100	2.2	2.9	3.4
07	210	10.9	210	---	100	2.9	3.8	3.4
08	200	10.8	---	---	100	3.3	3.9	3.4
09	210	10.4	200	---	100	3.4	4.6	3.3
10	230	10.7	200	---	100	3.6	4.9	3.0
11	260	11.7	200	---	100	---	5.2	3.1
12	270	12.1	210	---	100	---	5.2	3.0
13	250	12.2	210	---	100	---	4.4	3.1
14	260	12.2	210	---	100	---	4.5	3.0
15	250	12.0	210	---	100	3.6	4.0	3.1
16	220	11.4	210	---	100	3.0	4.0	3.2
17	230	11.1	210	---	100	2.5	3.8	3.2
18	210	10.2			---	---	3.6	3.4
19	210	9.2			---	---	4.2	3.3
20	220	8.0					3.0	3.1
21	230	7.6					3.4	3.0
22	240	7.3					3.2	3.0
23	250	7.0					3.0	2.9

Time: 135.0°E.
Sweep: 1.0 Mc to 17.0 Mc in 15 minutes, manual operation.

Table 22

Yamagawa, Japan (31.2°N, 130.6°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	7.9					3.0	2.8
01	280	7.7					2.8	2.9
02	280	7.3					2.2	2.9
03	250	7.0					2.2	3.0
04	260	6.2						3.0
05	270	5.6						2.9
06	270	6.8	---	---	---	(1.6)	2.4	3.0
07	230	9.9	---	---	110	(2.5)	3.1	3.3
08	230	10.8	220	---	100	3.2	4.0	3.3
09	230	10.8	220	---	100	3.6	4.4	3.2
10	250	11.2	210	---	110	3.6	4.6	3.0
11	260	11.6	210	---	100	---	4.8	2.9
12	280	12.2	210	---	100	---	4.8	2.8
13	290	13.2	220	---	100	---	4.8	2.8
14	280	13.4	220	---	---	---	5.0	2.9
15	280	13.3	230	---	100	3.6	4.7	(2.9)
16	280	13.6	230	---	100	(3.4)	4.4	2.9
17	260	12.9	230	---	110	2.8	4.2	3.0
18	250	12.4	240	---	---	---	3.8	3.1
19	230	11.3					3.9	3.2
20	240	9.9					3.4	2.9
21	250	8.7					3.8	2.8
22	270	8.5					3.2	2.8
23	270	8.2					2.8	2.9

Time: 135.0°E.
Sweep: 1.2 Mc to 18.5 Mc in 15 minutes, manual operation.

Table 23

Chungking, China (29.4°N, 106.8°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	270	9.4					2.4	2.7
01	260	9.1					2.4	2.8
02	240	8.4						2.9
03	230	6.2						2.8
04	240	5.2						2.7
05	270	5.2					2.6	2.6
06	240	7.8	---	---	100	2.0	3.5	3.0
07	220	10.5	210	---	100	2.8	4.0	3.2
08	220	10.8	200	---	110	3.2	4.6	3.2
09	240	11.2	200	---	100	3.6	4.6	2.8
10	260	12.0	200	---	100	3.8	4.8	2.7
11	290	13.3	200	---	---	---	4.9	2.7
12	280	14.0	190	6.8	90	4.1	4.4	2.8
13	280	15.0	170	---	90	4.2	4.5	2.7
14	285	16.0	180	---	90	4.0	4.4	2.8
15	290	16.4	190	---	100	3.7	4.0	2.6
16	270	16.9	200	---	100	3.4	4.0	2.8
17	260	16.2	200	---	90	2.6	3.8	2.9
18	220	15.5					3.9	2.9
19	205	15.0					3.2	2.8
20	200	13.5					2.6	2.8
21	220	11.8					2.8	2.7
22	240	11.2					2.5	2.7
23	255	10.2					2.6	2.6

Time: 105.0°E.
Sweep: 1.5 Mc to 20.0 Mc in 15 minutes, manual operation.

Table 24

Johannesburg, Union of S. Africa (26.2°S, 28.0°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(250)	5.3						2.9
01	(250)	5.0						2.8
02	(260)	4.8						2.8
03	(250)	4.6						2.8
04	(260)	4.3						2.8
05	(255)	4.1						2.8
06	250	6.0			---	(1.8)		3.0
07	230	8.9	---	---	110	(2.6)		3.3
08	240	10.3	230	---	110	(3.2)		3.2
09	250	11.3	220	---	110	3.6		3.1
10	260	11.6	220	---	110	(3.8)		2.9
11	260	11.9	210	---	110	(3.9)		2.9
12	280	12.0	210	---	110	(4.0)		2.8
13	300	12.1	210	---	110	(4.0)		2.8
14	295	12.1	210	---	110	(3.9)	4.0	2.7
15	300	12.0	220	---	110	3.7	3.9	2.7
16	265	11.8	230	---	110	3.2	3.5	2.8
17	240	11.8			110	(2.6)	2.8	2.8
18	240	11.5			---	(1.8)		2.9
19	230	10.9					2.0	2.9
30	230	9.6					1.5	3.0
21	230	8.3						3.0
22	240	7.5						3.0
23	240	6.2						3.0

Time: 30.0°E.
Sweep: 1.0 Mc to 15.0 Mc in 7 seconds.

Table 25

Watheroo, W. Australia (30.3°S, 115.9°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	275	6.1					2.6	2.7
01	280	5.9					2.6	2.7
02	270	5.7					2.7	2.8
03	260	5.3					2.5	2.7
04	280	4.8					2.6	2.6
05	290	4.8					2.5	2.6
06	265	5.6				1.8	2.5	2.9
07	240	8.4				2.5		3.2
08	250	10.2	230	4.8		3.0		3.2
09	260	10.9	230	5.0		3.3		3.1
10	260	11.2	230	5.0		3.3		3.0
11	280	11.6	220	5.2		3.3	3.8	2.9
12	280	11.4	220	5.1		3.3	3.9	2.9
13	280	11.6	230	5.2		3.3	3.8	2.8
14	280	11.3	230	5.0		3.3	3.8	2.8
15	270	11.0	230	5.0		3.3	3.3	2.7
16	270	11.0	250	5.0		3.2		2.7
17	250	10.8				2.5	2.8	2.7
18	250	10.3				1.8	1.9	2.8
19	240	9.4					2.5	2.8
20	240	8.4					2.5	2.9
21	250	7.3					2.4	2.8
22	260	6.5					2.5	2.8
23	255	6.2					2.5	2.7

Time: 120.0°E.
Sweep: 16.0 Mc to 0.5 Mc in 15 minutes, automatic operation.

Table 26

Capetown, Union of S. Africa (34.2°S, 18.3°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	240	5.0					1.4	2.9
01	270	4.4					1.8	2.7
02	290	4.3					1.8	2.7
03	270	4.4					1.7	2.8
04	260	4.1						2.8
05	260	4.0						2.8
06	265	4.1					1.6	2.8
07	240	7.0			120	2.1	2.6	3.2
08	230	9.2	---	---	110	2.8		3.2
09	240	10.5	230	---	110	3.2		3.1
10	250	11.2	230	---	110	3.6		3.0
11	260	12.0	220	---	110	---		2.8
12	280	12.6	220	---	110	---		2.8
13	280	12.9	230	4.7	110	---		2.7
14	290	12.8	230	---	110	---		2.7
15	285	12.8	230	5.0	110	(3.7)	3.8	2.7
16	280	12.6	230	---	110	3.5	3.8	2.7
17	260	12.2	240	---	110	3.0	3.6	2.8
18	250	12.0			120	2.4	2.7	2.9
19	230	11.4			---	1.5	1.8	2.9
20	220	10.0					1.6	2.9
21	230	8.8					1.7	3.0
22	230	7.7						3.1
23	240	6.0						3.0

Time: 30.0°E.
Sweep: 1.0 Mc to 15.0 Mc in 7 seconds.

Table 27

Christchurch, New Zealand (43.5°S, 172.7°E) September 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	270	6.5					2.7	2.7
01	270	6.1					2.3	2.7
02	270	5.8					2.6	2.7
03	260	5.6					2.4	2.7
04	270	5.0					2.6	2.7
05	270	4.7					2.2	2.7
06	270	5.2				1.3	2.8	3.0
07	245	7.0				2.4	3.1	3.1
08	240	8.5	---	---		2.9	4.0	3.1
09	240	9.9	240	4.8		3.2	4.4	3.1
10	250	10.5	230	4.9		3.5	3.8	3.0
11	270	10.7	230	5.1		3.5	3.6	2.9
12	260	10.9	220	5.1		3.6	3.8	2.9
13	260	10.5	230	4.9		3.6	3.4	2.8
14	245	10.4	230	4.8		3.4	3.5	2.9
15	250	10.0	230	4.2		3.2	3.4	2.9
16	245	9.7	240	3.8		2.8	3.5	2.9
17	250	9.6	---	---		2.2	2.9	2.9
18	250	9.1				1.4	2.8	2.8
19	250	8.1					2.3	2.7
20	260	7.8					2.4	2.7
21	270	7.4					2.4	2.6
22	270	7.0					2.6	2.7
23	280	6.8					2.4	2.6

Time: 172.5°E.
Sweep: 1.0 Mc to 13.0 Mc.

Table 28

Delhi, India (28.6°N, 77.1°E) August** 1949

Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	420	7.7						2.6
01	420	7.2						
02	---	---						
03	---	---						
04	(420)	5.8						2.6
05	400	5.8						
06	360	7.1						
07	360	8.4						
08	360	9.1						2.8
09	400	9.8						
10	440	10.2						
11	480	11.0						
12	(400)	(12.2)						2.6
13	---	(12.2)						
14	---	(12.2)						
15	---	(12.2)						
16	---	(12.1)						
17	---	(11.8)						
18	---	(11.5)						
19	(390)	(11.2)						
20	(380)	(10.0)						2.6
21	(400)	(9.1)						
22	420	8.4						2.6
23	420	8.1						

Time: Local.
Sweep: 1.8 Mc to 16.0 Mc in 5 minutes, manual operation.
*Height at 0.83 foF2.
**Average values; other columns, median values.

Table 29

Bombay, India (19.0°N, 73.0°E) August** 1949

Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05								
06								
07	330	7.9						
08	---	---						
09	480	9.5						
10	480	11.0						
11	540	11.8						
12	510	(12.3)						2.5
13	---	---						
14	---	(13.0)						
15	---	(13.3)						
16	---	(13.6)						
17	---	(13.9)						
18	---	(13.6)						
19	570	12.9						
20	510	11.6						2.4
21	510	10.0						
22	480	8.5						2.5
23	(450)	(8.0)						

Time: Local.
Sweep: 1.8 Mc to 16.0 Mc in 5 minutes, manual operation.
*Height at 0.83 foF2.
**Average values; other columns, median values.

Table 30

Madras, India (13.0°N, 80.2°E) August** 1949

Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05								
06								
07	360	8.5						
08	420	9.2						2.6
09	480	9.6						
10	480	9.8						
11	480	10.0						
12	480	10.2						2.3
13	540	10.3						
14	540	10.6						
15	540	10.8						
16	540	10.8						2.3
17	540	10.8						
18	540	10.7						
19	540	10.5						
20	510	(10.2)						2.4
21	480	(10.0)						
22	---	(9.5)						
23								

Time: Local.
Sweep: 1.8 Mc to 16.0 Mc in 5 minutes, manual operation.
*Height at 0.83 foF2.
**Average values; other columns, median values.

Table 31

Tiruchirapalli, India (10.8°N, 78.8°E) August 1949

Time		foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05								
06	300	---						
07	360	8.5						
08	420	10.2						
09	450	10.2						
10	480	10.0						
11	520	10.0						
12	510	10.0						
13	540	10.2						
14	560	10.2						
15	600	10.5						
16	600	11.2						
17	600	11.1						
18	590	11.2						
19	600	11.0						
20	620	11.0						
21	600	11.2						
22	---	---						
23								

Time: Local.
Sweep: 1.8 Mc to 16.0 Mc in 5 minutes, manual operation.
*Height at 0.83 foF2.

Table 32

Barotonga I. (21.3°S, 159.8°W) August 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	6.0					2.3	2.9
01	255	6.3						2.9
02	250	5.3						2.9
03	250	4.8						2.9
04	280	4.0						2.7
05	290	3.9					2.1	2.7
06	300	4.1					2.8	2.7
07	255	8.0	---	---	---	2.1	3.0	3.0
08	250	10.5	240	---	110	3.0	3.7	3.1
09	260	11.1	240	5.0	110	3.2	4.0	3.1
10	270	12.5	230	5.5	110	3.5	4.2	3.2
11	270	11.6	220	5.4	110	3.7	4.3	3.1
12	290	11.3	210	5.6	110	3.8	4.5	2.9
13	300	11.4	205	5.4	110	3.8	4.8	3.0
14	290	10.5	220	6.8	108	3.6	4.7	2.9
15	300	10.5	230	5.5	110	3.4	4.4	2.8
16	260	10.7	230	4.8	110	3.2	4.1	2.9
17	250	10.4	250	---	110	2.6	4.4	2.9
18	260	10.6	---	---	---	---	3.6	2.9
19	250	10.0					3.5	3.0
20	250	9.6					3.2	2.9
21	260	9.2					3.0	2.9
22	250	8.3					2.6	2.9
23	250	8.1						2.9

Time: 157.5°W.
Sweep: 2.0 Mc to 16.0, manual operation.

Table 33

Brisbane, Australia (27.5°S, 153.0°E) August 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	6.0					2.0	2.9
01	255	5.9					2.0	3.0
02	250	5.7					2.2	2.9
03	240	5.2					2.2	3.0
04	260	4.8					2.2	2.8
05	260	4.8						2.9
06	260	5.2			---	---		3.0
07	240	8.0			130	2.4		3.3
08	240	9.3	240	5.2	120	3.0		3.3
09	250	9.9	235	6.5	120	3.4		3.2
10	270	10.1	230	5.1	110	3.7		3.2
11	260	10.0	220	5.0	110	3.9		3.2
12	270	9.8	200	5.2	110	3.8		3.1
13	280	10.0	210	5.3	110	3.7		3.1
14	270	9.7	220	5.0	115	3.6		3.1
15	250	9.2	230	4.4	120	3.4		3.1
16	240	9.0	---	3.9	120	3.0	2.2	3.0
17	240	9.0			130	2.3	2.0	3.1
18	230	8.2			---	---	2.2	3.1
19	230	7.4						3.0
20	250	7.0						2.9
21	250	6.6					2.0	2.9
22	260	6.6						2.9
23	250	6.2					2.0	2.9

Time: 150.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 66 seconds.

Table 34

Canberra, Australia (36.3°S, 149.0°E) August 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	250	4.8					2.6	2.9
01	260	4.7					3.3	2.8
02	260	4.6					3.3	2.9
03	250	4.5					3.0	2.9
04	250	4.0					2.8	3.0
06	250	3.7					2.9	2.9
06	250	3.5			---	(1.4)	2.4	3.0
07	230	5.6			140	2.0	2.8	3.2
08	230	7.8	---	---	100	2.6	3.5	3.3
09	240	8.5	220	4.3	100	3.1	3.5	3.3
10	250	9.2	210	4.5	100	3.4	3.5	3.2
11	250	9.4	205	4.6	100	3.6	3.5	3.1
12	250	9.5	205	4.6	100	3.5	4.0	3.1
13	260	9.5	205	4.6	100	3.4	3.5	3.0
14	250	9.0	200	4.5	100	3.4	3.6	3.1
16	245	8.7	208	4.2	100	3.2	3.6	3.0
16	240	8.4	202	3.5	100	2.8	3.5	3.1
17	230	8.5			115	2.2	3.4	3.2
18	220	7.8			---	(1.6)	2.9	3.0
19	230	7.4					2.9	3.0
20	240	6.0					2.8	3.0
21	250	5.8					2.7	3.0
22	250	5.1					2.6	2.9
23	250	5.0					2.5	2.8

Time: 150.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 55 seconds.

Table 35

Hobart, Tasmania (42.8°S, 147.4°E) August 1949

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	3.5					4.0	2.6
01	260	4.0					3.8	2.6
02	270	3.8					3.6	2.6
03	260	3.6					4.2	2.7
04	250	3.3					4.0	2.7
05	250	3.1					4.0	2.7
06	250	3.1					3.6	2.8
07	240	4.3			---	E	2.1	3.0
08	230	6.8			---	2.4	4.0	3.2
09	230	7.5	220	---	---	2.8	3.3	3.2
10	250	8.3	220	4.2	---	3.2	3.5	3.1
11	250	8.6	210	4.3	---	3.3	3.8	3.0
12	250	(9.5)	210	4.4	---	3.3	4.0	(3.0)
13	250	9.4	210	4.5	---	3.4	4.0	3.0
14	250	9.6	200	4.3	---	3.3	3.5	2.9
15	240	9.2	220	4.1	---	3.0	3.3	2.9
16	230	9.3	210	---	---	2.7	3.2	2.9
17	225	8.0			130	2.0	2.5	3.0
18	220	7.8					2.4	2.9
19	220	6.6					2.1	2.9
20	230	6.2					2.5	2.8
21	235	5.5					2.1	2.7
22	250	5.2					2.6	2.7
23	250	4.4					3.0	2.7

Time: 150.0°E.
Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 36

Oslo, Norway (60.0°N, 11.0°E) 1949

	(M3000)F2					fEs, Mc	
Time	May	June	July	Aug.	Sept.	May	June
00	2.6	2.7	2.7	2.7	2.5		2.3
01	2.5	(2.7)	2.7	(2.7)	2.5		
02	2.6	2.6	2.7	2.7	2.5		
03	2.6	2.6	2.7	(2.7)	2.5		1.8
04	2.7	2.6	2.8	(2.7)	2.5	2.0	2.8
05	2.7	2.7	2.8	2.8	2.6	2.5	2.9
06	2.7	2.8	2.8	3.0	3.0		3.1
07	2.7	2.7	2.8	2.9	3.0	2.9	3.2
08	2.7	2.7	2.8	2.9	3.0		3.8
09	2.6	2.7	2.8	2.9	2.9	3.5	3.8
10	2.6	2.7	2.8	3.0	2.9	3.6	4.0
11	2.7	2.7	2.8	2.8	2.8	3.9	3.9
12	2.7	2.6	2.8	2.8	2.8	3.8	3.8
13	2.7	2.6	2.8	2.8	2.8		3.7
14	2.7	2.8	2.8	2.8	2.8	3.8	
15	2.8	2.7	2.8	2.9	2.8		
16	2.8	2.8	2.8	2.9	2.8		3.5
17	2.8	2.8	2.8	2.9	2.8		
18	2.9	2.8	2.8	3.0	2.9		3.2
19	2.9	2.8	2.8	3.1	2.9	2.8	3.0
20	2.9	2.9	2.9	3.0	(2.8)	2.4	3.0
21	2.8	2.8	2.8	2.9	(2.8)	1.7	2.4
22	2.7	2.8	2.8	2.8	2.7		2.4
23	(2.7)	2.7	(2.8)	2.8	(2.6)		

Time: 15.0 E.
Sweep: 1.6 Mc to 10.0 Mc in 5 minutes, automatic operation.

TABLE 37

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

IONOSPHERIC DATA

Form adopted June 1946

h'F2 (Characteristic), Km (Unit), December (Month), 1949

Observed at Washington, D. C.

Lat. 38.7°N, Long. 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B.E.B., J.D., C.B.P.

Calculated by: B.E.B., C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	(350)S K	370K	320K	290K	260K	300K	300	250	230	210	220	220	[220]C	220	220	230	230	220	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	210	230	210	220	220	220	230	220	220	220	250	270	260	270
3	270	280	250	260	280	290	280	250	210	220	220	240	230	[230]B	230	220	220	(250)A	250	220	250	240	250	250
4	[260]A	(270)A	250	260	(310)S	300	260	210	230	230	230	230	230	220	230	230	230	220	230	210	220	240	240	240
5	300	280	270	270	240	240	230	230	220	230	220	220	220	[220]C	220	220	220	220	240	220	220	280	270	230
6	260	270	260	270	250	250	230	240	230	210	230	220	230	220	230	240	220	210	210	230	[250]C	270	270	270
7	290	280	250	250	230	270	260	240	210	210	210	230	220	220	230	220	220	210	210	220	220	(250)A	250	270
8	A	A	A	A	A	A	290	260	210	220	210	[240]C	270	220	220	230	210	220	250	250	250	A	A	310
9	340	[390]S	340	300	290	300	370	290	240	230	210	230	230	220	220	230	210	210	220	230	240	270	300	(290)A
10	[290]A	(300)A	270	(290)S	290	270	270	230	230	210	220	230	220	240	230	230	220	210	220	260	240	250	A	A
11	A	A	A	A	300	[290]A	290	230	210	210	210	230	210	230	210	220	210	210	230	250	250	260	290	270
12	290	290	290	290	280	250	270	230	210	220	C	C	230	[230]C	230	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	210	[220]B	(220)B	220	230	220	220	220	230	210	210	230	250	280	(280)S
14	300	260	270	290	270	290	280	250	230	220	260	250	230	230	220	230	220	210	210	230	240	230	260	270
15	270	270	250	240	230	230	250	230	210	220	220	220	210	220	230	220	210	210	230	230	250	280	270	280
16	270	270	270	270	C	C	C	C	220	220	250	230	220	210	220	230	210	210	[220]A	230	260	230	260	300
17	280	290	250	230	260	240	(270)S	230	210	210	210	220	230	210	210	230	210	210	210	210	220	250	240	250
18	280	290	270	260	280	280	260	220	220	210	230	230	240	220	220	230	220	200	210	220	220	250	270	[270]A
19	270	(300)A	280	A	A	(280)S	(250)S	(230)S	220	220	220	230	220	220	230	220	210	220	220	220	220	240	240	250
20	300	300	280	280	250	240	280	250	220	220	230	230	210	210	230	230	230	230	A	A	A	A	250	260
21	280	290	280	270	250	240	250	260	230	220	240	220	210	220	210	230	210	200	210	220	240	290	280	270
22	290	300	270	260	[240]C	C	300	260	[240]M	220	220	220	220	230	220	230	230	210	210	210	A	A	270	290
23	290	270	270	[260]C	250	240	(270)S	230	210	210	220	230	230	240	230	230	230	210	220	230	C	C	C	A
24	270	260	240	210	C	C	C	270	220	210	210	220	230	230	230	230	220	210	200	210	230	250	C	C
25	250	[260]C	260	230	250	260	260	260	230	230	230	230	240	230	230	230	220	220	220	210	230	240	250	260
26	270	280	[270]C	260	270	280	240	240	220	230	220	230	240	240	240	220	220	220	220	[220]A	[230]A	(230)S	250	250
27	260	260	270	280	C	C	270	[260]C	250	220	220	210	230	220	220	220	220	220	220	210	200	A	A	260
28	260	260	250	240	250	[250]A	260	220	210	210	210	210	220	220	230	240	250	220	200	200	240	240	250	[260]A
29	260	250	250	250	230	220	250	210	200	220	210	220	210	220	[220]C	230	230	210	230	(230)A	[230]A	230	240	250
30	270	270	270	260	250	230	230	220	[220]C	230	220	220	[220]C	230	230	240	250	220	200	210	200	230	[260]A	280
31	280	270	270	240	260	290	270	280	210	210	220	220	230	230	230	230	220	210	210	200	220	230	260	290
Median	280	280	270	260	260	260	270	240	220	220	220	230	220	220	230	230	220	210	220	220	230	250	260	270
Count	27	27	27	26	24	24	27	28	29	30	30	30	31	31	31	31	30	30	28	28	26	24	24	26

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 38

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

IONOSPHERIC DATA

foF2 (Characteristic), Mc (Unit), December (Month), 1949

Observed at Washington, D.C.

Lat. 38.7°N, Long. 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B.E.B., J.D., C.B.P.

Calculated by: B.E.B., C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	[2.8]FK	(2.3)FK	2.4FK	3.2FK	(3.3)SF	2.6FK	2.7F	(5.1)JF	(8.9)JS	10.1	12.0	12.2	12.4	(12.9)	(12.2)	(11.2)	11.3	9.9	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	11.3	12.6	12.6	12.7	(12.1)J	11.4	(11.0)S	(10.0)S	(8.4)S	[7.2]S	(5.6)JS	(5.2)JS	(4.4)J	(4.8)JS
3	4.6	4.5	4.3	(3.9)SP	3.7	(3.4)S	3.5	(5.4)SP	(8.2)SP	(9.7)SP	11.5	(12.0)S	13.1	12.9	13.0	12.6	(11.6)JS	(10.8)J	(10.3)J	(8.7)JS	7.6	[7.5]S	(6.8)JS	(6.2)SP
4	(5.9)JS	(4.9)JS	(5.2)JS	[4.6]S	4.1	(4.2)SP	(4.3)SP	[6.9]S	9.5	10.2	11.5	13.4	13.0	12.6	12.4	(12.1)JS	(12.3)J	11.5	(10.3)S	(9.0)SP	[8.0]S	[7.0]S	[6.4]S	(5.8)SJ
5	(5.4)JS	(5.7)JS	(5.5)JS	(5.0)SP	(4.6)SP	(4.6)JS	4.0	(5.1)JS	(8.2)JS	(11.3)J	(12.8)SP	13.2	13.7	[13.2]C	12.8	12.8	(11.8)J	11.4	10.0	(8.4)J	S	S	S	(5.5)JS
6	(5.0)JS	(5.4)JS	[5.2]JS	(4.8)J	(4.4)J	(4.7)PS	(4.3)S	(5.4)J	8.5	(9.2)J	12.8	13.5	13.1	12.7	12.2	12.9	(12.3)J	(11.1)SP	(9.3)S	S	C	(5.9)JS	(5.4)S	5.2
7	(4.9)JS	(5.1)JS	(5.6)S	(5.2)JS	(4.0)SF	(3.3)SF	(3.2)F	4.8	(7.7)JS	8.9	11.2	12.2	11.9	11.3	(11.2)S	(11.6)SP	11.2	9.5	8.4	7.1	(6.1)SP	(4.9)JA	(4.7)JS	(4.4)JS
8	(4.2)S	(4.0)JA	(4.0)JA	A	A	3.3A	3.2	(4.8)JS	(7.8)S	9.7	(10.1)JS	[11.0]C	11.9	12.0	11.4	11.5	10.9	(9.8)J	(8.9)J	7.6	(7.2)J	(5.1)SP	4.5	(4.0)J
9	(3.9)JS	(3.8)JS	4.4	(4.6)SP	3.4F	3.2F	2.9F	4.4F	8.4	(10.1)SJ	11.0	13.4	13.8	(12.9)SP	(12.9)SP	(12.8)SF	(11.9)JS	(10.9)JS	(9.2)SP	(7.6)JS	(6.5)SJ	(5.9)SP	(5.9)JS	6.0
10	(5.2)JS	(5.3)S	4.9	4.4	(4.3)SP	(4.0)JS	(3.9)JS	5.0	(8.8)SP	9.0	(12.0)P	12.8	(11.6)SP	(11.8)SP	(11.6)SP	(11.7)JS	(11.3)S	10.0	(8.2)J	(6.6)SP	(6.0)SP	(4.7)JS	(4.6)S	[4.3]A
11	(4.0)AJ	(3.8)S	(3.8)JA	(3.6)JA	(3.6)SP	(3.8)SA	3.6F	(4.9)SF	8.6	(10.2)J	10.8	12.5	(12.3)J	12.0	(12.1)JP	(11.8)SP	(11.4)SP	10.8	(8.8)SP	7.5	(6.5)S	5.2F	(5.1)SP	4.6F
12	4.2	J(3.8)FS	S(3.8)JF	3.7F	4.2SF	4.0F	(4.0)SF	4.9F	7.8	(10.3)SP	C	C	12.4	[12.1]C	(11.8)JS	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	10.0	11.6	(13.2)PS	(12.8)PS	13.0	12.6	12.4	(11.6)J	10.3	(9.4)SP	(7.8)JS	(6.2)JP	(5.4)S	[5.1]S	(5.0)JS
14	(5.1)S	(5.3)SF	5.0	4.9	4.7	4.6	4.6	5.2F	7.8	(10.3)JS	(12.2)J	13.8	13.6	(14.1)SP	(13.8)SP	(13.7)JS	(13.0)SP	12.5	(10.6)JS	(9.3)JS	(8.6)SP	(7.4)SP	(7.4)JS	(6.9)SP
15	(7.6)JS	(7.4)SP	(7.0)SF	(6.9)SF	(5.8)SF	(5.2)SF	(5.3)SF	(5.2)SF	(8.1)SF	(11.3)SP	12.0	(14.0)JS	13.4	12.2	12.6	(12.1)JS	11.3	(9.8)JS	(8.6)JF	(8.1)PF	6.1	(5.9)JF	(5.4)SF	(5.7)SF
16	(6.4)PS	5.6	5.2	5.0	(4.6)J	(4.0)J	(4.0)J	4.8P	7.9F	10.5	13.1	12.9	(12.5)SP	(13.0)SP	(13.1)SP	(13.0)J	(11.8)SP	(11.3)S	(9.4)JS	(8.2)J	(6.7)S	5.4F	5.0F	(5.0)S
17	5.5	(5.4)S	(5.3)S	4.8	4.5	4.0	3.7	(4.6)S	7.5	9.7	11.1	(13.8)JS	(12.7)S	(11.4)SP	(11.5)S	(12.6)S	(11.8)JS	(9.7)SP	8.6	(7.1)S	(6.3)S	(5.1)SP	(4.8)S	(4.0)JS
18	(3.5)S	(3.8)JF	4.5F	(4.0)JF	3.8F	3.8F	(4.1)S	4.4	7.7	8.3	10.7	(12.6)SP	12.3	11.5	12.0	(12.2)SP	11.3	(10.4)S	(9.2)SP	(7.9)S	(6.7)S	5.3F	(5.1)SF	4.1
19	(4.2)S	(3.6)JF	(3.5)JF	3.8	(3.7)SF	(3.7)SF	(3.8)SF	(4.3)SF	7.7	10.2	11.7	12.6	12.0	(12.0)P	12.6	(12.4)P	(11.2)P	(10.4)JP	(9.4)JP	(7.8)S	(6.2)SJ	5.7	(5.0)JS	(4.3)JF
20	(4.3)SF	(4.0)JF	(4.4)SF	4.3F	4.3F	(4.0)JS	3.6F	(4.4)S	(8.2)JS	9.4	11.4	11.8	11.8	11.9	(12.3)SP	(12.7)SP	12.1	(10.6)S	9.1	(7.5)S	(5.8)SF	(5.0)SF	(4.7)JS	(4.2)JF
21	(4.3)JF	(4.1)SF	4.7F	4.8	4.7	(4.1)JS	(3.8)SP	(4.3)S	8.3	10.2	(11.6)SP	11.3	11.3	11.4	(11.0)SP	[11.0]S	(11.1)SP	(9.7)SP	(7.9)JS	6.4	(5.1)JS	(5.2)JS	(4.9)JS	4.7
22	(4.6)J	(4.6)J	(4.7)JS	(4.2)J	[4.2]C	C	3.4F	(4.7)SF	[7.0]M	9.4	10.8	11.5	11.5	11.3	11.1	10.8	10.7	(10.3)S	7.6	5.7	(4.3)A	(3.9)J	(4.1)JS	(4.0)J
23	4.2	(4.0)J	(4.3)J	[4.0]C	3.7F	3.3F	2.8F	3.6F	(7.7)SP	9.2	11.1	11.8	11.1	11.0	(11.4)P	11.3	(11.3)SF	11.2	8.7	7.4	5.7	5.5	5.7	6.0
24	6.4F	6.6F	6.9F	5.5F	(3.8)JF	(3.3)PF	(2.9)P	4.3	8.0	10.4	11.7	(11.4)J	11.7	11.7	(11.7)P	(11.9)P	(11.6)SP	(10.3)J	8.5	6.5	5.7	(4.5)P	(4.5)J	4.8F
25	(4.7)J	4.7	4.7F	4.5	(3.4)JF	3.2	(3.0)P	(4.6)PJ	7.6	(10.8)P	12.0	(12.2)JP	11.8	12.5	12.4	(11.8)SP	11.3	11.0	9.2	(7.0)S	(5.8)S	(5.4)S	(5.0)JS	4.8
26	(4.2)P	4.7	(4.7)J	(5.1)J	4.7	4.7	4.6	(4.5)JF	7.5	11.4	12.0	12.5	(12.0)J	12.6	(12.9)P	12.0	11.0	10.6	9.5	(7.4)SF	6.3	5.5	5.4	(4.8)SF
27	(4.3)F	(4.0)JF	(4.0)JF	4.1	(4.1)JP	(3.7)JP	(3.0)P	(3.2)JP	(6.9)P	9.7	(11.3)SP	11.5	12.0	(12.2)P	(11.7)SP	(11.4)SP	(11.4)SP	(10.8)SP	(10.2)SP	(8.0)SP	(5.9)JS	(4.9)JP	[4.9]A	(4.8)JP
28	(5.1)SP	5.1	5.0	4.3	(4.4)J	(3.8)SF	(3.5)S	(4.3)SF	(7.8)J	10.8	11.7	11.8	11.9	12.2	(12.4)P	(12.0)JP	(12.2)SP	(12.5)SP	(10.0)JS	(8.4)JS	(7.2)JS	(6.0)JS	(4.9)PS	(4.9)PS
29	(5.3)JS	(5.3)J	(5.4)JS	(5.1)JS	(4.8)JS	(4.2)JS	(3.4)JF	(3.7)SF	(6.7)S	10.3	11.2	11.0	11.0	12.0	[11.7]C	11.3	(11.2)P	11.0	(9.1)P	7.7	5.9	5.3F	4.3F	(3.9)SF
30	4.0F	(4.4)PF	(5.1)JP	(4.7)SF	(5.1)SF	(5.0)SF	(4.6)SF	(4.2)SF	[7.7]C	11.0	11.4	11.8	[11.7]C	11.6	11.8	12.2	(12.4)SP	12.7	(10.3)JS	(10.0)S	8.1	(7.0)JS	(6.5)SP	(6.4)SP
31	(6.3)JS	(6.2)S	(5.3)SP	(4.9)JS	4.5F	3.8F	3.8F	3.8F	(7.8)SP	9.7	11.6	12.0	12.0	13.0	(13.3)S	(13.2)S	(13.3)SP	11.6	(11.0)SP	(9.1)SP	(7.4)SP	(6.5)SP	(5.5)S	(5.5)S
Median	(4.6)	(4.7)	(4.7)	(4.6)	(4.2)	(3.9)	(3.7)	(4.6)	(7.8)	(10.2)	11.6	12.4	12.0	12.2	(12.2)	(12.0)	(11.4)	(10.7)	(9.2)	(7.6)	(6.2)	(5.4)	(5.0)	(4.8)
Count	29	29	29	28	28	28	29	29	29	30	30	30	31	31	31	30	30	30	29	28	27	28	28	29

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U. S. GOVERNMENT PRINTING OFFICE 1946 O - 702519

TABLE 39

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

Form adopted June 1946

IONOSPHERIC DATA

foF2 (Characteristic), Mc (Unit), December (Month), 1949

Observed at Washington, D.C.

Lat. 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B.E.B., J.D., C.B.P.

Calculated by: B.E.B., C.B.P.

Day	0030	0130	0230	0330	0430	0530	0630	0730	0830	0930	1030	1130	1230	1330	1430	1530	1630	1730	1830	1930	2030	2130	2230	2330
1	(2.4)FK	2.3FK	3.1FK	[3.2]FK	2.7FK	2.7FK	3.4F	(6.8)JF	9.6	11.8	(12.2)S	[12.3]C	12.4	12.4	11.5	11.1	10.5	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	10.5	12.2	12.0	12.4	(12.0)S	11.4	11.0	10.6	(9.0)S	(8.1)JS	(6.2)SP	(5.3)JS	(5.2)J	(5.0)JS	P(4.9)JS
3	(4.6)J	4.5	4.2	3.8	(3.4)SP	(3.4)S	3.7	(7.1)JS	8.3	10.1	12.0	12.6	(12.8)SP	12.9	12.9	(12.1)JS	11.1	(10.4)JS	(9.7)J	(7.7)J	(7.9)SP	(6.9)JS	(5.9)JS	(5.9)J
4	(5.6)JS	[5.0]S	S	4.5	4.3	(4.4)SP	[5.7]S	(7.0)JS	(10.2)J	(10.6)J	(12.3)J	13.0	12.8	12.3	(12.3)JS	(12.2)JS	(11.8)S	10.9	(9.8)S	(8.4)S	S	S	S	(5.5)JS
5	[5.6]S	(5.7)JS	(5.4)JS	(4.8)SP	(4.6)JS	(4.3)S	(4.2)J	(7.2)JS	9.8	12.3	13.7	(13.3)JS	[13.1]C	12.9	12.9	12.0	11.9	10.4	(9.1)J	S	S	S	P(6.2)JS	[5.2]S
6	P(5.0)JS	P(5.4)JS	(5.8)JS	(4.8)J	(4.4)P	(4.3)SP	(4.1)SP	(7.0)J	(9.0)J	10.8	(13.0)S	(13.2)JS	12.7	12.7	12.5	(12.6)SP	(11.7)J	(9.7)JS	S	S	(5.9)JS	(5.6)S	(5.3)S	(5.1)S
7	(4.9)JS	(5.3)JS	(5.4)JS	(4.7)JF	F(3.3)JS	(3.2)JF	(3.7)JF	6.8	8.4	9.6	(12.0)SP	12.4	[11.6]C	(11.2)SP	[11.4]C	(11.3)S	(10.5)S	(9.1)JS	(7.9)S	(6.8)SP	(5.7)A	(4.8)JS	(4.6)JS	(4.3)A
8	(4.2)JA	(4.0)AJ	(3.7)SP	A	A	(3.3)S	(3.3)S	(6.9)S	[8.8]S	(10.3)S	11.0	[11.4]C	11.8	[11.7]C	[11.4]C	[11.2]C	(10.5)JS	9.0	(8.3)SP	7.1	(5.9)SP	(4.6)J	(4.2)S	(3.8)JS
9	(3.9)JS	(4.2)JS	(4.5)SP	3.8F	(3.2)F	3.0F	3.4F	(6.7)S	9.1	11.0	12.5	13.8	(13.1)JS	(12.6)SP	(12.7)SP	(12.5)JS	(11.7)J	(9.9)JS	(8.2)SP	(6.7)S	(6.2)P	(5.7)JF	(6.0)JS	(5.2)S
10	(5.4)S	(5.1)SP	(4.6)JS	4.3	(4.2)S	(4.0)JS	(4.1)JS	(6.6)S	(9.7)SP	(10.3)SP	(12.4)PS	(12.2)P	(11.5)P	11.5	P(11.6)JS	(11.4)SP	10.8	(9.1)S	(7.1)JS	(6.4)S	(5.3)S	4.5	4.6	A
11	(3.9)AJ	(3.8)JS	(3.7)JS	3.5	[3.7]A	(3.4)A	(3.8)JS	(7.0)JS	(8.6)J	(10.1)SP	(12.8)SP	(12.9)SP	(12.0)SP	(11.8)S	(12.0)SP	(11.8)J	(11.6)SP	(9.5)SP	(8.1)SP	(6.7)S	(5.8)S	(4.9)S	(4.8)F	4.4
12	(4.0)J	(3.8)FJ	F(3.8)SP	(4.3)JF	4.1F	4.0F	(4.1)JF	(7.1)JF	(10.0)JS	(10.2)S	11.2	C	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	10.6	12.0	(13.4)JS	(13.0)S	(12.8)SP	(12.8)SP	(12.6)P	(11.1)J	10.0	(8.9)S	(7.2)S	(5.8)SP	(5.0)JS	(5.2)SP	(5.0)S
14	(5.3)S	(5.3)S	4.9	4.7	4.6	(4.6)JS	(4.6)F	(6.7)F	(10.0)J	10.9	12.6	(13.8)J	(13.7)JS	(13.9)SP	14.0	(13.2)SP	(13.1)S	(12.1)SP	(9.5)JS	8.6	P(7.9)JS	(7.1)SP	(6.9)S	(7.5)S
15	(7.2)S	(7.1)SF	7.0F	5.9F	5.3F	5.2F	5.0F	(7.0)SF	(9.9)S	11.7	12.2	(13.4)JS	(13.2)JS	12.6	(13.0)JS	[11.7]C	10.9	(9.6)SP	(8.7)PF	(7.6)PF	(6.7)JS	(6.1)JS	(5.3)SF	(6.0)SF
16	5.8	(6.3)JF	5.0	4.2	4.3	4.1J	(3.8)JF	6.9F	9.1	11.4	13.2	(13.7)J	11.9	(13.0)S	(13.2)SP	12.5	(11.7)J	10.5	8.8	(7.2)S	6.3	5.4	5.0	(5.4)S
17	5.3	5.5	(5.2)S	4.5	4.3	3.7	(3.8)J	(6.5)S	(8.7)SP	(10.5)S	(12.8)S	(13.7)S	(12.5)S	(11.4)S	(12.3)JS	(12.3)S	(10.9)SP	(9.3)SP	(8.5)SP	(6.9)S	(5.3)S	(5.1)S	4.5	(3.7)JS
18	(3.6)JS	4.4F	(4.4)FS	3.8F	3.7F	(3.9)JF	(3.9)J	6.4	8.6	(9.7)SP	11.9	12.1	11.5	(12.0)S	11.9	(11.9)S	(11.0)S	(10.0)S	8.4	7.2	5.6F	5.3F	4.6	(4.0)JF
19	(3.7)JF	3.5F	(3.7)JF	3.8	3.6	3.9	(3.8)JS	(6.0)SP	8.6	11.0	12.6	(12.3)SP	11.4	(12.4)SP	12.6	(11.8)J	(10.4)P	(10.0)J	8.8	(7.1)SP	5.8	(5.7)SP	(4.7)JS	F(4.3)JS
20	(4.3)SF	(4.2)SF	(4.4)F	4.4	4.0	3.3F	3.7	(6.2)PS	(8.8)SP	10.5	12.2	11.6	(11.8)S	(12.0)SP	(12.4)SP	(12.1)JS	(11.3)S	(9.4)JS	8.5	(6.7)S	5.6F	(5.0)SF	C	(4.0)SF
21	(4.1)JF	(4.3)PF	(4.8)J	4.8	4.5	(3.8)JS	(3.6)SP	(6.4)SP	9.7	(11.7)SP	11.3	[11.3]C	11.4	C	(10.8)S	[10.7]C	(10.7)SP	(8.8)SP	7.0	(5.7)JS	5.0	(5.0)JF	(4.7)JS	(4.6)J
22	(4.4)J	(4.7)J	4.7	4.3F	3.7F	3.5F	(3.8)S	(6.0)JS	[8.2]M	10.5	11.0	11.6	11.3	(11.1)J	10.6	[10.8]C	(10.4)JS	8.7	(6.7)S	4.7	(3.9)J	(3.0)J	(4.0)J	(4.2)SP
23	(4.3)S	4.1	(4.4)JS	[3.8]C	3.3F	2.9F	[3.2]C	(5.7)S	(9.5)SP	(9.8)M	11.6	11.3	11.4	11.5	(11.5)SP	10.8	(11.7)J	10.0	7.7	6.4	5.5	5.5	5.9	6.1
24	6.4	6.9F	6.6F	(4.3)JF	3.4F	(3.0)PF	3.1	(6.3)PF	(9.2)P	(11.3)P	12.0	11.4	11.8	(11.9)SP	(11.3)J	(11.8)JP	11.4	(9.5)J	7.3	(5.8)J	4.8	(4.2)J	4.8	5.0F
25	4.7	4.7	4.6F	(3.7)J	(3.4)J	(3.1)PF	(2.9)P	5.8F	9.0	(11.1)P	12.0	11.8	11.8	12.4	12.0	(11.7)SP	11.2	(10.1)SP	8.6	(6.1)S	(5.7)S	(5.1)SF	(5.1)SF	(4.5)J
26	(4.0)J	4.8	(5.0)P	5.0	(4.4)J	4.8	(4.2)P	(5.6)J	10.0	(11.8)J	12.2	12.1	12.7	(12.8)P	12.6	11.4	11.0	(10.3)JS	8.7	(6.5)JS	5.9	5.3	5.0	(4.6)F
27	(4.2)JF	4.1F	4.2	(3.6)J	(4.1)J	(3.3)J	(2.8)SP	5.4	8.4	10.6	11.6	(11.6)JP	(12.2)P	(12.1)JP	(11.9)SP	(11.4)SP	(11.1)SP	(10.7)SP	9.1	(6.9)JP	(5.5)SP	[5.1]A	(4.7)J	(5.0)JP
28	(5.1)SP	5.1	(4.8)SP	4.4	(4.0)F	(3.6)J	(3.5)JF	6.2	9.5	11.1	12.4	11.8	12.0	12.4	12.4	12.0	13.0	11.6	(9.6)SP	(7.2)JF	(6.4)SP	(5.0)SP	(5.0)SP	(5.3)JS
29	(5.9)SP	(5.6)JS	(5.2)JS	(4.9)JS	(4.1)JS	(3.6)SF	(3.2)JF	(5.4)SP	(9.5)P	10.4	11.4	10.8	11.8	12.0	[11.6]C	11.2	11.1	(10.2)JP	(8.8)P	6.8	5.8	4.7	4.3	(4.0)JF
30	(4.1)SP	(5.2)PF	(4.8)PF	(5.1)SF	(5.3)SF	(4.7)SF	(4.1)SP	5.8	9.4	11.3	11.5	C	C	11.7	11.8	12.2	(13.3)S	11.8	(10.1)SP	(9.2)S	(7.7)S	(6.7)SF	(6.1)S	(6.3)S
31	6.4	(5.8)JS	(5.5)SP	(4.8)JS	4.0F	3.2F	2.9F	(5.8)SF	(8.8)SP	11.0	12.0	11.9	12.2	(13.2)JS	(13.3)S	(13.0)JS	(12.7)S	(11.4)S	(10.1)JS	(8.2)S	(6.9)JS	(5.7)JS	(5.2)JS	(5.6)JS
Median	(4.6)	(4.8)	(4.8)	4.4	4.0	(3.6)	(3.8)	(6.5)	(9.1)	10.7	12.2	12.2	12.0	(12.3)	(12.2)	(11.8)	(11.1)	(10.0)	(8.6)	(6.9)	(5.8)	(5.1)	(5.0)	(5.0)
Count	29	29	28	28	28	29	29	29	29	31	31	29	29	29	30	30	30	29	28	27	27	27	27	28

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U S GOVERNMENT PRINTING OFFICE 1948 O - 702519

TABLE 40

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

IONOSPHERIC DATA

Form adopted June 1946

h'F1 (Characteristic), Km (Unit), December (Month), 1949

Observed at Washington, D.C.

Lat. 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B.E.B., J.D., C.B.P.

Calculated by: B.E.B, C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									Q	Q	Q	Q	C	Q	Q	Q	Q							
2									C	C	Q	Q	Q	Q	Q	Q	Q							
3									Q	Q	Q	Q	Q	Q	Q	Q	Q							
4									Q	Q	Q	Q	Q	Q	Q	Q	Q							
5									Q	Q	Q	Q	Q	C	Q	Q	Q							
6									Q	Q	Q	Q	Q	Q	Q	Q	Q							
7									Q	Q	Q	Q	Q	Q	Q	Q	Q							
8									Q	Q	Q	C	a210	Q	Q	Q	Q							
9									Q	Q	Q	Q	Q	Q	Q	Q	Q							
10									Q	Q	Q	Q	Q	Q	Q	Q	Q							
11									Q	Q	Q	Q	Q	Q	Q	Q	Q							
12									Q	Q	C	C	Q	C	Q	C	C							
13									C	Q	Q	Q	Q	Q	Q	Q	Q							
14									Q	Q	a210	a230	Q	Q	Q	Q	Q							
15									Q	Q	Q	Q	Q	Q	Q	Q	Q							
16									Q	Q	a230	Q	Q	Q	Q	Q	Q							
17									Q	Q	Q	Q	Q	Q	Q	Q	Q							
18									Q	Q	Q	Q	Q	Q	Q	Q	Q							
19									Q	Q	Q	Q	a200	Q	Q	Q	Q							
20									Q	Q	Q	a200	Q	Q	Q	Q	Q							
21									Q	Q	Q	Q	Q	Q	Q	Q	Q							
22									M	Q	Q	Q	Q	Q	Q	Q	Q							
23									Q	Q	Q	Q	Q	Q	Q	Q	Q							
24									Q	Q	Q	Q	Q	Q	Q	Q	Q							
25									Q	Q	Q	Q	Q	Q	Q	Q	Q							
26									Q	Q	Q	Q	Q	Q	Q	Q	Q							
27									Q	Q	Q	Q	Q	Q	Q	Q	Q							
28									Q	Q	Q	Q	Q	Q	Q	Q	Q							
29									Q	Q	Q	Q	Q	Q	C	Q	Q							
30									C	Q	Q	a200	C	Q	Q	Q	Q							
31									Q	Q	Q	Q	Q	Q	Q	Q	Q							
Median											—	—	—											
Count											2	3	2											

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U. S. GOVERNMENT PRINTING OFFICE 1946 O - 703519

TABLE 41

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

Form adopted June 1946

IONOSPHERIC DATA

foFl (Characteristic), Mc (Unit), December (Month), 1949

Observed at Washington, D.C.

Lat. 38.7°N, Long. 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B.E.B., J.D., C.B.P.

Calculated by: B.E.B., C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									Q	Q	Q	Q	C	Q	Q	Q	Q								
2									C	C	Q	Q	Q	Q	Q	Q	Q								
3									Q	Q	Q	Q	Q	Q	Q	Q	Q								
4									Q	Q	Q	Q	Q	Q	Q	Q	Q								
5									Q	Q	Q	Q	Q	C	Q	Q	Q								
6									Q	Q	Q	Q	Q	Q	Q	Q	Q								
7									Q	Q	Q	Q	Q	Q	Q	Q	Q								
8									Q	Q	Q	C	L	Q	Q	Q	Q								
9									Q	Q	Q	Q	Q	Q	Q	Q	Q								
10									Q	Q	Q	Q	Q	Q	Q	Q	Q								
11									Q	Q	Q	Q	Q	Q	Q	Q	Q								
12									Q	Q	C	C	Q	C	Q	C	C								
13									C	Q	Q	Q	Q	Q	Q	Q	Q								
14									Q	Q	L	L	Q	Q	Q	Q	Q								
15									Q	Q	Q	Q	Q	Q	Q	Q	Q								
16									Q	Q	L	Q	Q	Q	Q	Q	Q								
17									Q	Q	Q	Q	Q	Q	Q	Q	Q								
18									Q	Q	Q	Q	Q	Q	Q	Q	Q								
19									Q	Q	Q	Q	L	Q	Q	Q	Q								
20									Q	Q	Q	L	Q	Q	Q	Q	Q								
21									Q	Q	Q	Q	Q	Q	Q	Q	Q								
22									M	Q	Q	Q	Q	Q	Q	Q	Q								
23									Q	Q	Q	Q	Q	Q	Q	Q	Q								
24									Q	Q	Q	Q	Q	Q	Q	Q	Q								
25									Q	Q	Q	Q	Q	Q	Q	Q	Q								
26									Q	Q	Q	Q	Q	Q	Q	Q	Q								
27									Q	Q	Q	Q	Q	Q	Q	Q	Q								
28									Q	Q	Q	Q	Q	Q	Q	Q	Q								
29									Q	Q	Q	Q	Q	Q	C	Q	Q								
30									C	Q	Q	L	C	Q	Q	Q	Q								
31									Q	Q	Q	Q	Q	Q	Q	Q	Q								
Median											—	—	—												
Count																									

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 42

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

IONOSPHERIC DATA

h'E (Characteristic), Km (Unit), December (Month), 1949

Observed at Washington, D. C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B.E.B., J.D., C.B.P.

Calculated by: B.E.B., C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									(100)A	(100)A	100	100	C	B	120	120	120							
2									C	C	100	(100)A	100	[100]B	(100)A	(100)A	(100)A							
3									(100)A	(100)A	(100)A	(100)A	(100)A	(100)A	[100]B	110	110							
4										110	(100)A	(100)A	[100]B	110	110	110	110							
5									(100)A	110	110	100	(100)A	[110]C	120	(100)A	(110)A							
6										110	110	110	110	110	100	110	B							
7									110	100	100	100	100	110	110	110	B							
8									110	110	(100)A	[100]C	(100)A	100	100	B	100							
9										100	120	130	B	(120)B	100	100	B							
10									B	B	B	B	B	100	B	B	160							
11									100	(100)A	B	B	B	(100)A	(100)A	(100)A	B							
12									130	B	C	C	B	C	(110)A	C	C							
13									C	120	B	B	110	110	B	B	B							
14									B	B	110	(110)B	110	(110)A	(100)A	(100)S	130							
15									(100)A	(100)A	110	110	(110)A	110	110	B	B							
16									B	B	(120)A	(120)A	110	100	100	100	(100)A							
17									130	120	110	100	100	100	100	100	120							
18									B	B	B	B	B	100	(100)A	110	100							
19									(120)S	(130)B	(130)B	120	110	110	110	(120)B	B							
20									120	120	(110)S	110	110	110	(100)A	100	(130)A							
21									B	110	(100)A	110	100	100	100	100	B							
22									M	B	B	B	(100)A	100	[100]B	B	B							
23									B	(100)A	B	B	B	B	B	B	B							
24									B	B	B	B	B	B	B	B	B							
25									B	B	B	B	B	B	B	B	B							
26									B	B	B	B	B	B	B	B	B							
27									B	110	(120)B	110	(100)A	(100)A	(100)A	(100)A	110							
28									(100)A	(100)A	120	[110]B	(100)A	(120)A	(90)A	110	(120)B							
29									120	120	120	110	B	B	C	B	(100)A							
30									C	120	120	120	[120]C	110	110	110	B							
31									100	100	100	110	110	100	110	(100)A	(100)S							
Median									110	110	110	110	100	100	100	100	110							
Count									14	21	21	21	20	24	24	20	16							

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 43

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

IONOSPHERIC DATA

foE (Characteristic), Mc (Unit), December (Month), 1949

Observed at Washington, D. C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B. E. B., J. D., C. B. P.

Calculated by: B.E.B., C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									A	2.9	3.1	3.5	C	B	(2.9)^B	2.8	2.2							
2									C	C	3.1	[3.3]^B	3.5	B	B	2.6	A							
3									2.3	A	A	A	A	B	B	(2.7)^P	2.5							
4										2.6	A	B	B	3.3	3.2	2.7	2.1							
5									(2.5)^A	2.5	2.9	3.3	B	C	(3.3)^B	2.9	A							
6										2.6	3.1	B	B	3.2	2.9	2.7	B							
7									2.2	2.5	2.9	3.1	3.3	3.2	2.8	2.5	B							
8									2.2	2.8	A	C	A	3.3	B	B	2.8							
9										2.7	2.9	3.1	B	3.3	(3.2)^P	B	B							
10									B	B	B	B	B	B	B	B	2.2							
11									2.6	A	B	B	B	A	A	A	B							
12									(2.3)^B	B	C	C	B	C	B	C	C							
13									C	(2.5)^S	B	B	3.2	3.3	B	B	B							
14									B	B	2.9	2.9	(3.1)^S	(3.2)^A	A	(2.6)^S	2.2							
15									2.2	[2.6]^A	3.0	3.2	[3.2]^A	3.2	2.8	B	B							
16									B	B	(2.4)^A	3.3	(3.2)^P	3.2	2.9	(2.4)^S	A							
17									2.2	2.6	2.9	3.1	3.3	(3.1)^S	2.6	2.2	2.2							
18									B	B	B	B	B	2.9	2.8	2.6	B							
19									2.2	(2.6)^B	(3.0)^B	3.1	3.2	3.2	2.9	(2.6)^B	B							
20									1.8	(2.5)^B	2.8	3.0	3.1	2.9	2.8	2.6	(2.2)^B							
21									2.1	2.5	[2.8]^A	3.1	3.1	2.9	2.8	2.6	B							
22									M	B	B	B	3.2	3.0	[2.6]^B	B	B							
23									B	A	B	B	3.1	B	B	B	B							
24									B	B	B	B	B	B	B	B	B							
25									B	B	B	B	B	B	B	B	B							
26									B	B	B	B	B	B	B	B	B							
27									B	(2.6)^B	(2.9)^B	(3.3)^P	A	A	3.1	2.7	2.2							
28									2.2	[2.6]^B	2.9	B	B	3.1	3.0	2.2	(2.2)^B							
29									2.3	2.6	(2.2)^A	(3.1)^P	B	B	C	B	A							
30									C	B	3.0	3.1	[3.1]^C	3.2	3.1	2.7	B							
31									2.1	2.6	3.1	3.2	3.3	3.2	3.0	2.7	2.2							
Median									2.2	2.6	2.9	3.1	3.2	3.2	2.9	2.7	2.2							
Count									14	17	18	16	14	18	18	17	11							

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 44

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

IONOSPHERIC DATA

Es (Characteristic), Mc,Km (Unit), December (Month), 1949

National Bureau of Standards (Institution)

Observed at Washington, D. C.

Scaled by: B.E.B., J.D., C.B.P.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

Calculated by: B.E.B., C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	2.8/100	4.2/100	G	G	C	G	G	G	G	G	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	G	2.7/100	G	G	2.6/100	2.3/100	3.2/100	2.7/100	3.2/100	G	3.0/100	3.1/100	G	G
3	3.3/100	3.2/100	G	G	G	G	G	G	2.4/100	4.4/100	4.4/100	3.8/100	2.9/100	2.5/100	G	G	G	4.2/100	4.2/100	3.3/100	3.6/100	2.0/100	G	G
4	3.9/100	2.9/100	G	G	G	G	G	G	G	G	3.9/100	2.9/100	G	G	G	G	G	4.2/100	4.3/110	G	G	G	G	G
5	2.0Y/100	3.7/100	3.1/100	G	G	G	G	G	3.3/100	G	G	G	3.1/100	C	G	2.6/100	3.1/110	3.1/100	G	G	G	G	G	G
6	3.1/100	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	C	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	5.0/100	G	4.5/110	G	G	G	4.8/100	G	G	G	5.0/100	G	G
8	5.7/100	4.2/100	4.3/100	5.6/100	9.2/100	11.0/100	G	6.8/100	G	G	4.2/100	C	5.1/100	G	G	G	G	G	G	G	G	4.3Y/100	G	G
9	G	G	G	G	G	G	G	G	G	G	2.3/100	G	G	G	G	G	G	G	G	G	G	G	3.9/100	9.4/100
10	9.8/100	5.2/100	G	G	G	G	2.8/100	2.6/100	G	G	G	G	G	G	G	G	G	1.9/100	3.2/100	5.4/100	G	G	5.7/100	7.6/100
11	7.2/100	7.6/100	6.4/100	3.9/100	G	4.9/100	3.1/100	3.8/100	2.6/100	G	G	G	G	3.1/100	2.9/100	3.0/100	G	3.6/100	2.2/100	G	G	G	G	G
12	G	G	G	G	G	G	G	G	G	G	C	C	G	C	2.9/100	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	3.3/110	4.0/100	G	G	G	G	G	G	G	G	G
15	G	G	G	G	G	G	G	2.3/100	2.6/100	2.5/100	G	G	3.4/110	G	G	G	G	G	G	G	G	G	G	G
16	G	4.6/110	G	G	G	G	G	G	G	2.9/120	3.4/120	3.5/120	G	G	G	G	5.4/100	3.6/100	7.4/100	(6.6)S/100	4.0/100	2.8/100	G	1.9/100
17	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
18	G	G	G	G	G	G	G	G	G	G	G	G	G	G	2.6/100	G	G	G	G	4.7/110	G	G	3.6/110	4.3/100
19	3.4/100	3.5/100	5.6/100	5.6/100	6.5/100	3.7/100	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
20	G	G	G	G	G	G	G	G	G	G	G	G	G	G	6.6/100	G	4.6/130	5.2/110	4.9/100	5.6/100	4.8/110	(4.6)S/110	G	G
21	G	G	G	G	G	G	G	G	G	G	6.3/100	G	G	G	G	G	G	G	G	G	G	G	G	G
22	G	G	G	G	C	C	G	G	G	G	G	G	2.6/100	G	G	G	G	G	G	G	6.4/100	6.5/100	G	G
23	G	G	G	C	G	G	G	G	G	5.6/100	G	G	G	G	G	G	G	G	G	G	G	G	G	4.7/100
24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	1.9/100	G	G	G	G
25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	4.0/100	6.7/100	7.8/100	1.7/100	G	G
27	G	G	G	G	G	G	G	G	G	G	G	G	2.8/100	3.3/100	2.5/100	2.3/100	G	4.6Y/100	4.2/100	3.0Y/100	4.6/100	8.4/100	7.5/100	G
28	G	G	G	G	3.2/100	4.3/100	2.7/100	G	1.9/100	4.2/100	G	G	2.6/100	2.9Y/100	1.9/90	G	G	G	1.8/100	1.7/100	3.2/100	4.0/100	2.1/100	1.9/100
29	G	G	G	4.0/100	G	G	G	2.1/100	G	G	G	G	G	G	C	G	2.4/100	2.6/100	2.8/100	5.6/100	4.3/100	2.3/100	G	G
30	G	G	G	3.1/110	G	G	G	G	C	G	G	G	C	G	G	G	G	G	G	G	2.1Y/100	2.1Y/100	5.9/100	5.6/100
31	4.3/100	4.7/100	3.8/100	3.5/100	2.5Y/100	G	G	G	G	G	G	G	G	G	G	2.3/100	G	G	G	1.9Y/100	2.2/100	4.2/110	G	G
Median	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Count	29	29	29	28	28	28	29	29	28	30	30	29	29	29	30	30	30	30	29	29	28	29	29	29

** MEDIAN fEs LESS THAN MEDIAN foE OR LESS THAN LOWER FREQUENCY LIMIT OF RECORDER.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

TABLE 45

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

Form adopted June 1946

IONOSPHERIC DATA

(M1500)F2 (Characteristic), ____ (Unit), December (Month), 1949

Observed at Washington, D. C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B.E.B., J.D., C.B.P.

Calculated by: B.E.B., C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	FK	(1.7)FK	1.8FK	1.9FK	S(1.8)FK	1.8FK	1.8F	(2.1)FJ	(2.2)JS	2.2	2.1	2.0	C	(1.9)S	(2.0)JS	(2.0)S	2.1	(2.0)JS	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	2.1	2.0	2.0	2.0	(1.9)J	2.0	(2.0)S	(1.9)S	(1.9)S	S	(2.0)JS	(2.0)JS	(2.0)J	(2.0)JS
3	2.0	2.0	2.0	(2.0)SP	1.8	(1.8)S	1.9	(2.2)SP	(2.4)SP	(2.2)SP	2.0	(2.0)S	2.0	1.9	1.9	1.9	(2.0)JS	(1.9)J	(2.0)J	(2.0)JS	2.0	S	(2.0)JS	(1.9)SP
4	(2.0)JS	(2.0)JS	(2.1)JS	S	1.6	(1.7)SP	(1.9)SP	S	2.4	2.2	2.1	2.0	1.9	1.9	1.9	(1.9)JS	(1.9)J	2.0	(2.0)S	(2.0)SP	S	S	S	(2.1)JS
5	(1.8)JS	(1.9)JS	(1.9)JS	(1.8)SP	(1.9)SP	(1.9)JS	2.0	(2.2)JS	(2.2)JS	(2.2)J	(2.1)SP	2.1	2.0	C	2.0	2.0	(2.0)J	2.0	2.0	(2.1)J	S	S	S	(2.2)JS
6	(2.1)SJ	(1.9)JS	S	(1.9)S	(2.0)J	(1.9)PS	(2.0)S	(2.1)J	2.2	(2.0)J	2.0	2.1	2.0	2.0	1.9	2.0	(2.0)J	(2.0)SP	(2.0)S	S	C	(1.9)JS	(1.9)S	1.8
7	(1.8)JS	(1.8)JS	(1.9)S	(2.1)JS	(2.0)SF	(1.9)SF	1.9F	2.3	(2.1)JS	2.2	2.1	2.1	2.1	2.0	(2.1)S	(2.0)SP	2.0	2.1	2.1	2.0	(2.1)SP	(2.0)JA	(2.0)JS	(2.0)JS
8	(2.0)S	(2.0)JA	(1.9)JA	A	A	1.8A	1.9	(2.2)JS	(2.4)S	2.3	(2.4)JS	C	2.0	2.0	2.0	2.0	2.1	(2.0)J	(2.0)J	2.1	(1.9)J	(2.0)SP	1.9	(1.8)J
9	(1.7)JS	(1.7)SJ	1.6	(1.7)SP	1.9F	1.8F	1.7F	1.8F	2.6	(2.4)SJ	2.0	2.1	2.0	(2.0)SP	(2.0)S	(2.0)SP	(2.0)JS	(2.0)JS	(2.0)SP	(2.0)JS	(2.0)SJ	(2.0)SP	(1.9)JS	2.0
10	(1.8)JS	(1.9)S	2.0	1.9	(1.9)SP	(1.8)JS	(2.0)JS	2.2	(2.3)SP	2.3	(2.1)P	2.1	(2.1)SP	(2.0)SP	(1.9)SP	(2.0)JS	(2.0)S	2.1	(2.1)J	(2.0)SP	(2.0)SP	(2.0)JS	(1.9)S	A
11	A	(1.9)S	(1.9)JA	(1.8)JA	(1.8)SP	(1.8)SA	1.9F	(2.1)SF	2.3	(2.5)J	2.1	2.2	(2.0)J	2.1	(2.0)JP	(2.0)SP	(2.0)SP	2.1	(2.0)SP	2.0	(2.0)S	2.0F	(1.9)SP	2.0F
12	1.9	J(2.0)FS	J(1.9)FS	1.9F	(1.9)SF	1.9F	(2.0)SF	2.2F	2.2	(2.2)SP	C	C	2.1	C	(2.0)JS	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	2.2	2.1	(2.1)SS	(2.0)FS	2.0	2.0	2.0	(2.1)J	2.0	(2.1)SP	(2.2)JS	(2.1)JP	(2.0)S	S	(2.2)JS
14	(1.8)S	(2.0)SF	2.0	1.8	1.8	1.7	1.9	2.1F	2.2	(2.2)JS	(2.1)J	2.0	2.0	(2.0)SP	(2.0)SP	(2.1)JS	(2.0)SP	2.0	(2.0)JS	(1.9)JS	(2.0)SP	(1.9)SP	(1.9)JS	(1.7)SP
15	(1.9)JS	(2.0)SP	(2.0)SF	(2.0)SF	(2.0)SF	(2.0)SF	(1.9)SF	(2.0)SF	(2.3)SF	(2.2)SP	2.1	(2.1)JS	2.1	2.1	2.1	(2.0)JS	2.0	(2.0)JS	(1.9)JF	(2.1)PF	2.0	(2.1)JF	(1.9)JF	(1.8)SF
16	(2.0)PS	1.9	1.9	1.9	(2.0)J	(1.8)J	(2.0)J	(2.1)F	2.3F	2.2	2.3	2.1	(2.1)SP	(2.0)SP	(2.0)SP	(2.2)J	(2.1)SP	(2.1)S	(2.1)JS	(2.1)J	(2.0)S	2.0F	2.0F	(1.8)S
17	2.0	(1.9)S	(2.0)S	2.1	2.0	2.0	1.9	(1.9)S	2.3	2.3	2.0	(2.1)JS	(2.2)S	(2.1)SP	(2.0)S	(2.0)S	(2.2)JS	(2.0)SP	2.0	(2.1)S	(2.2)S	(2.0)SP	(2.2)S	(2.0)JS
18	(1.8)S	(1.9)JF	1.9F	(2.0)JF	1.9F	1.9F	(2.1)S	2.1	2.4	2.3	2.3	(2.0)SP	2.1	2.0	2.0	(2.0)SP	2.1	(2.0)S	(2.0)SP	(2.2)S	(2.2)S	1.9F	(2.1)SF	2.0
19	(2.0)S	(2.0)JF	(2.1)JF	1.8	(1.8)SF	(2.0)SF	(2.0)SF	(2.0)SF	2.2	2.2	2.1	2.2	2.1	(2.0)P	2.1	(2.2)P	(2.1)P	(2.2)JP	(2.1)JP	(2.2)S	(2.0)JS	2.0	(2.1)JS	(2.1)JF
20	(1.7)SF	(2.0)JF	(1.8)SS	1.9F	1.9F	(2.0)JS	1.9F	(2.0)S	(2.3)JS	2.2	2.2	2.2	2.1	2.0	(2.1)SP	(2.1)SP	2.1	(2.1)S	2.0	(2.0)S	(2.1)SF	(2.1)SF	(2.1)JS	(2.0)JF
21	(1.9)JF	(1.8)SF	1.9F	1.9	2.0	(2.0)JS	(2.1)SP	(2.0)S	2.4	2.3	(2.4)SP	2.2	2.1	2.1	(2.2)SP	S	(2.2)SP	(2.1)SP	(2.1)JS	2.0	(2.0)SS	(1.9)JS	(2.0)JS	1.9
22	(1.9)J	(2.0)J	(2.1)JS	(2.0)J	C	C	2.0F	(2.1)SF	M	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	(2.1)S	2.1	2.1	(1.9)A	(1.8)J	(1.9)JS	(1.9)J
23	1.9	(2.0)J	(1.9)J	C	2.0F	2.0F	1.9F	2.0F	(2.2)SP	2.1	2.3	2.1	2.0	2.0	(2.0)P	2.0	(2.0)SF	1.9	2.0	2.0	2.0	1.7	1.7	1.8
24	1.8F	2.0F	2.1F	2.1F	(2.2)JF	(1.8)PF	(1.8)P	1.9F	2.3	2.3	2.1	(2.1)J	2.0	2.0	(2.0)P	(2.0)P	(2.1)SP	(2.3)J	2.1	2.0	1.9	(2.0)P	(2.1)J	1.9F
25	(2.0)J	1.9	2.0F	2.1F	(1.9)JF	1.9	(1.9)P	(1.9)PJ	2.2	(2.2)P	(2.1)F	(2.1)JP	2.0	2.0	2.1	(2.2)SP	2.0	2.0	2.2	(2.3)S	(2.0)S	(2.0)S	(2.0)JS	2.0
26	(1.9)P	1.8	(1.9)J	(1.9)J	1.8	1.9	2.1	(2.0)JF	2.1	2.2	2.3	2.2	(2.1)J	2.0	(2.1)P	2.1	2.2	2.2	2.2	(2.1)SF	2.0	2.0	2.0	(2.0)SF
27	(1.9)F	(1.9)JF	(2.0)JF	2.0	(2.0)JP	(2.3)JP	(2.1)P	(2.0)JF	(2.2)P	2.2	(2.2)SP	2.2	2.1	(2.1)P	(2.1)SP	(2.2)SP	(2.1)SP	(2.2)SP	(2.2)SP	(2.2)SP	(2.1)JS	(1.9)JP	A	(2.0)JP
28	(1.9)SP	1.9	2.0	2.0	(2.0)J	(1.9)SF	(2.0)S	(2.1)SF	(2.3)J	2.3	2.3	2.1	2.1	2.0	(2.0)P	(2.0)JP	(2.1)SP	(2.2)SP	(2.2)JS	(2.2)JS	(2.1)JS	(2.1)JS	(1.9)PS	(1.8)FS
29	(1.9)JS	(2.1)J	(1.9)JS	(2.0)JS	(2.0)JS	(2.0)JS	(2.0)JF	(2.0)SF	(2.2)S	2.3	2.2	2.2	2.1	2.0	C	2.1	(2.1)P	2.1	(2.2)P	2.2	2.1	2.1F	1.9F	(1.9)SF
30	1.8F	(1.8)PF	(1.8)JP	(1.9)SF	(1.9)SF	(2.0)SF	(2.0)SF	(1.9)SF	C	2.2	2.3	2.2	C	2.0	2.0	2.0	(1.9)SP	2.1	(2.0)JS	(2.1)S	2.0	(2.0)JS	(1.8)SP	(1.9)SP
31	(1.9)JS	(2.0)S	(1.9)SP	(1.8)JS	1.8F	1.8F	1.8F	1.9F	(2.3)SP	2.3	2.1	2.0	2.0	1.9	(2.0)S	(1.9)S	(2.1)SP	2.1	(2.1)SP	(2.1)SP	(2.1)SP	(2.1)SP	(1.8)S	(1.7)S
Median	(1.9)	(1.9)	(1.9)	1.9	(1.9)	(1.9)	(1.9)	(2.0)	2.3	2.2	2.1	2.1	2.1	2.0	(2.0)	(2.0)	(2.1)	(2.0)	(2.0)	(2.1)	(2.0)	(2.0)	(1.9)	(2.0)
Count	27	29	28	26	27	28	29	28	28	30	30	29	29	29	30	29	30	30	29	27	26	26	25	28

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 46

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

IONOSPHERIC DATA

(M3000)F2 (Characteristic), ____ (Unit), December (Month), 1949

Observed at Washington, D. C.

Lat. 38.7°N, Long. 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B.E.B., J.D., C.B.P.

Calculated by: B.E.B., C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F K	(2.6) FK	2.8 FK	2.8 FK	K(2.7) SF	2.7 FK	2.7 F	(3.1) JF	(3.4) JS	3.2	3.1	3.0	C	(2.9) S	(3.0) JS	(3.0) S	3.1	(3.0) JS	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	3.1	3.1	3.0	3.0	(3.0) J	3.0	(2.9) S	(2.9) S	(2.9) S	S	(3.1) JS	(3.1) JS	(3.1) J	(3.0) JS
3	3.0	3.1	3.0	(3.1) SP	2.7	(2.7) S	2.8	(3.2) SP	(3.5) SP	(3.2) SP	3.0	(3.0) S	3.0	2.8	2.9	2.9	(3.0) JS	(2.9) J	(3.0) J	(3.1) JS	3.0	S	(3.0) JS	(2.9) SP
4	(3.0) JS	(3.0) JS	(3.1) JS	S	2.5	(2.7) SP	(2.8) SP	S	3.4	3.3	3.2	3.0	2.9	2.9	2.9	(2.9) JS	(2.9) J	3.0	(3.0) S	(3.0) SP	S	S	S	(3.1) SF
5	(2.7) JS	(2.9) JS	(2.9) JS	(2.8) SP	(2.8) SP	(2.9) JS	3.0	(3.2) JS	(3.3) JS	(3.2) J	(3.1) SP	3.1	3.0	C	2.9	2.9	(3.1) J	3.0	3.1	(3.2) J	S	S	S	(3.3) JS
6	(3.1) JS	(3.0) JS	S	(2.8) J	(3.1) J	(2.9) PS	(3.0) S	(3.1) J	3.3	(3.0) J	3.1	3.0	3.0	3.0	2.9	3.0	(3.1) J	(3.0) SP	(3.1) S	S	C	(2.9) JS	(2.8) S	2.8
7	(2.8) JS	(2.8) JS	(2.9) S	(3.1) JS	(3.0) SF	(2.8) SF	2.9 F	3.3	(3.1) JS	3.4	3.1	3.0	3.1	3.1	(3.1) S	(3.0) SP	3.0	3.2	3.0	3.0	(3.1) SP	(3.1) JA	(3.1) JS	(3.0) JS
8	(3.0) S	(2.9) JA	(2.9) JA	A	A	2.7 A	2.9	(3.2) JS	(3.5) S	3.3	(3.1) JS	C	3.0	3.1	2.9	3.0	3.0	(3.1) J	(3.1) J	3.1	(2.8) J	(3.0) SP	2.9	(2.8) J
9	(2.6) JS	(2.5) JS	2.5	(2.6) SP	2.9 F	2.7 F	2.5 F	2.8 F	3.3	(3.2) JS	3.1	3.1	2.9	(3.1) SP	(3.1) S	(3.0) SP	(3.0) JS	(3.0) JS	(3.0) SP	(3.0) JS	(3.0) JS	(3.0) SP	(2.9) JS	3.0
10	(2.8) JS	(2.8) S	3.0	2.9	(2.9) SP	(2.8) JS	(3.0) JS	3.2	(3.4) SP	3.4	(3.2) P	3.1	(3.1) SP	(3.0) SP	(2.8) SP	(3.0) JS	(3.1) S	3.1	(3.1) J	(2.9) SP	(3.0) SP	(3.0) JS	(2.9) S	A
11	A	(2.9) S	(2.9) JA	(2.8) JA	(2.7) SP	(2.8) JA	2.9 F	(3.2) SF	3.4	(3.5) J	3.1	3.2	(3.0) J	3.1	(3.0) JP	(3.1) SP	(2.9) SP	3.1	(3.1) SP	3.0	(3.0) S	3.0 F	(2.8) SP	3.0 F
12	2.9	S(3.0) JF	S(2.9) JF	2.9 F	(2.9) SF	2.9 F	(3.0) SF	3.2 F	3.2	(3.3) SP	C	C	3.1	C	(3.0) JS	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	3.3	3.0	(3.1) PS	(3.0) PS	3.0	3.0	3.0	(3.1) J	3.0	(3.1) SP	(3.3) JS	(3.1) JP	(2.9) S	S	(3.3) JS
14	(2.8) S	(3.0) SF	3.0	2.8	2.7	2.7	2.9	3.1 F	3.3	(3.3) JS	(3.1) J	3.0	3.0	(2.9) SP	(3.0) SP	(3.0) JS	(3.0) SP	3.1	(3.1) JS	(3.0) JS	(3.0) SP	(2.9) SP	(2.9) JS	(2.6) SP
15	(2.9) JS	(3.0) SP	(3.0) SF	(3.1) SF	(3.0) SF	(3.0) SF	(2.8) SF	(3.0) SF	(3.4) SF	(3.3) SP	3.1	(3.1) JS	3.1	3.1	3.2	(3.0) JS	3.0	(3.1) JS	(3.1) JF	(3.1) PF	3.0	(3.2) JF	(3.0) SF	(2.7) JF
16	(3.0) SP	2.9	2.9	2.9	(3.0) J	(2.7) J	(3.0) J	3.1 F	3.3 F	3.3	3.3	3.1	(3.1) PS	(3.0) SP	(3.0) SP	(3.1) J	(3.1) SP	(3.1) S	(3.1) JS	(3.1)	(3.1) S	3.0 F	3.0 F	(2.8) S
17	2.9	(2.8) S	(3.0) S	3.1	3.0	2.9	2.9	(2.9) S	3.4	3.4	3.1	(3.1) JS	(3.2) S	(3.1) SP	(3.0) S	(3.1) S	(3.2) JS	(3.0) SP	3.0	(3.1) S	(3.3) S	(2.9) SP	(3.3) S	(3.0) JS
18	(2.8) S	(3.0) JF	3.0 F	(3.0) JF	2.9 F	2.8 F	(3.1) S	3.1	3.6	3.4	3.3	(3.0) SP	3.2	3.0	3.0	(3.0) SP	3.2	(3.0) S	(3.1) SP	(3.2) S	(3.2) S	3.0 F	(3.1) SF	2.9
19	(2.9) S	(3.0) JF	(3.1) JF	2.8	(2.8) SF	(3.0) SF	(3.0) SF	(3.1) SF	3.3	3.2	3.2	3.2	3.2	(3.0) P	3.1	(3.2) P	(3.1) P	(3.2) JP	(3.2) JP	(3.2) S	(2.9) SJ	3.0	(3.1) JS	(3.0) JF
20	(2.6) SF	(3.0) JF	(2.7) SF	2.8 F	2.8 F	(3.0) JS	2.9 F	(3.2) S	(3.4) JS	3.2	3.3	3.3	3.1	3.0	(3.1) SF	(3.2) SP	3.2	(3.1) S	3.1	(3.0) S	(3.1) SF	(3.1) SF	(3.1) JS	(3.1) JF
21	(2.9) JF	(2.8) SF	2.9 F	2.9	3.0	(3.0) PS	(3.1) SP	(3.0) S	3.4	3.3	(3.4) SP	3.3	3.1	3.1	(3.2) SP	S	(3.2) SP	(3.1) SP	(3.1) JS	3.1	(3.0) JS	(2.9) JS	(3.0) JS	2.9
22	(2.9) J	(3.0) J	(3.1) JS	(3.0) J	C	C	2.9 F	(3.1) SF	M	3.4	3.2	3.3	3.1	3.1	3.2	3.1	3.2	(3.2) S	3.1	3.2	(2.9) A	(2.8) J	(2.8) JS	(2.6) J
23	2.8	(3.0) J	(2.9) J	C	3.0 F	3.0 F	2.8 F	3.0 F	(3.2) SP	3.2	3.3	3.1	3.0	3.0	(3.1) P	2.9	(3.1) SF	3.1	3.0	3.1	3.1	2.6	2.5	2.8
24	2.8 F	2.9 F	3.1 F	3.2 F	(3.4) JF	(2.7) PF	(2.8) P	2.9 F	3.3	3.4	3.2	(3.1) J	3.0	3.0	(3.0) P	(3.0) P	(3.1) SF	(3.3) J	3.2	3.0	3.0	(3.0) P	(3.2) J	3.0 F
25	(3.0) J	2.9	3.0 F	3.2 F	(2.9) JF	2.8	(2.9) P	(2.9) JF	3.3	(3.2) P	(3.2) P	(3.1) JP	3.0	3.0	3.0	(3.2) SP	3.1	3.0	3.2	(3.3) S	(3.0) S	(3.1) S	(2.9) JS	3.0
26	(2.9) P	2.6	(2.9) J	(2.9) J	2.8	2.8	3.1	(3.1) JF	3.1	3.3	3.3	3.2	(3.3) J	3.1	(3.1) P	3.1	3.2	3.2	3.2	(3.2) SF	3.0	3.0	3.0	(2.9) SF
27	(2.9) F	(3.0) JF	(3.0) JF	2.9	(3.0) JP	(3.3) JP	(3.1) P	(3.1) JF	(3.3) P	3.3	(3.2) SP	3.2	3.2	(3.1) P	(3.2) SP	(3.2) SP	(3.2) SP	(3.2) SP	(3.2) SP	(3.2) SP	(3.2) JS	(3.0) JP	A	(3.0) JP
28	(2.9) SP	2.9	3.0	3.0	(2.9) J	(2.9) SF	(3.0) S	(3.0) SF	(3.3) J	3.3	3.4	3.1	3.1	3.0	(2.9) P	(2.9) JP	(3.1) SP	(3.2) SP	(3.2) JS	(3.3) JS	(3.2) JS	(3.2) JS	(2.9) SP	(2.7) PS
29	(2.8) JS	(3.1) J	(2.9) JS	(3.0) JS	(3.1) JS	(3.0) JS	(3.0) JF	(3.0) SF	(3.3) S	3.4	3.2	3.3	3.1	3.0	C	3.1	(3.1) P	3.1	(3.2) P	3.2	3.1	3.2 F	3.0 F	(2.9) SF
30	2.8 F	(2.7) PF	(2.7) JP	(2.8) SF	(2.9) SF	(3.1) SF	(3.0) SF	(2.9) SF	C	3.3	3.3	3.2	C	3.0	3.0	2.9	(2.9) SP	3.1	(3.0) JS	(3.1) S	3.0	(3.1) JS	(2.8) SP	(2.8) SP
31	(2.9) JS	(3.0) S	(2.9) SP	(2.8) JS	2.6 F	2.7 F	2.8 F	2.9 F	(3.3) SP	3.3	3.1	3.0	3.0	2.9	(3.0) S	(2.9) S	(3.0) SP	3.1	(3.1) SP	(3.2) SF	(3.1) SF	(3.1) SP	(2.7) S	(2.7) S
Median	(2.9)	(2.9)	(2.9)	2.9	(2.9)	(2.8)	(2.9)	(3.1)	3.3	3.3	3.2	3.1	3.1	3.0	(3.0)	(3.0)	(3.1)	(3.1)	(3.1)	(3.1)	(3.0)	(3.0)	(3.0)	(2.9)
Count	27	29	28	26	27	28	29	28	27	30	30	29	29	29	30	29	30	30	29	27	26	26	25	28

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

TABLE 47

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

Form adopted June 1946

IONOSPHERIC DATA

(M3000)F1 (Characteristic), ____ (Unit), December (Month), 1949

Observed at Washington, D. C.

Lat. 38.7°N, Long. 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B. E. B., J. D., C. B. P.

Calculated by: B. E. B., C. B. P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									Q	Q	Q	Q	C	Q	Q	Q	Q							
2									C	C	Q	Q	Q	Q	Q	Q	Q							
3									Q	Q	Q	Q	Q	Q	Q	Q	Q							
4									Q	Q	Q	Q	Q	Q	Q	Q	Q							
5									Q	Q	Q	Q	Q	C	Q	Q	Q							
6									Q	Q	Q	Q	Q	Q	Q	Q	Q							
7									Q	Q	Q	Q	Q	Q	Q	Q	Q							
8									Q	Q	Q	C	L	Q	Q	Q	Q							
9									Q	Q	Q	Q	Q	Q	Q	Q	Q							
10									Q	Q	Q	Q	Q	Q	Q	Q	Q							
11									Q	Q	Q	Q	Q	Q	Q	Q	Q							
12									Q	Q	C	C	Q	C	Q	C	C							
13									C	Q	Q	Q	Q	Q	Q	Q	Q							
14									Q	Q	L	L	Q	Q	Q	Q	Q							
15									Q	Q	Q	Q	Q	Q	Q	Q	Q							
16									Q	Q	L	Q	Q	Q	Q	Q	Q							
17									Q	Q	Q	Q	Q	Q	Q	Q	Q							
18									Q	Q	Q	Q	Q	Q	Q	Q	Q							
19									Q	Q	Q	Q	L	Q	Q	Q	Q							
20									Q	Q	Q	L	Q	Q	Q	Q	Q							
21									Q	Q	Q	Q	Q	Q	Q	Q	Q							
22									M	Q	Q	Q	Q	Q	Q	Q	Q							
23									Q	Q	Q	Q	Q	Q	Q	Q	Q							
24									Q	Q	Q	Q	Q	Q	Q	Q	Q							
25									Q	Q	Q	Q	Q	Q	Q	Q	Q							
26									Q	Q	Q	Q	Q	Q	Q	Q	Q							
27									Q	Q	Q	Q	Q	Q	Q	Q	Q							
28									Q	Q	Q	Q	Q	Q	Q	Q	Q							
29									Q	Q	Q	Q	Q	Q	C	Q	Q							
30									C	Q	Q	L	C	Q	Q	Q	Q							
31									Q	Q	Q	Q	Q	Q	Q	Q	Q							
Median											—	—	—											
Count																								

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 48

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

IONOSPHERIC DATA

(M1500)E , ______ (Unit) , December (Month), 1949 (Characteristic)

Observed at Washington, D. C.

Lat 38.7°N , Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: B.E.B., J.D., C.B.P.

Calculated by: B.E.B., C.B.P.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									A	4.1	4.2	4.3	C	B	(4.3)B	3.9	4.7							
2									C	C	4.2	B	4.3	B	B	4.5	A							
3									4.2	A	A	A	A	B	B	(4.4)P	4.5							
4										4.5	A	B	B	4.3	4.2	4.4	4.3							
5									(4.1)A	4.3	4.4	4.2	B	C	(4.4)B	4.1	A							
6										4.4	4.4	B	B	4.3	4.4	4.2	B							
7									4.1	4.4	4.1	4.4	4.4	4.4	4.6	4.2	B							
8									3.9	4.3	A	C	A	4.4	B	B	4.5							
9										4.3	4.1	4.2	B	4.1	(4.3)P	B	B							
10									B	B	B	B	B	B	B	B	3.8							
11									4.6	A	B	B	B	A	A	A	B							
12									(4.1)B	B	C	C	B	C	B	C	C							
13									C	(4.4)S	B	B	4.5	4.1	B	B	B							
14									B	B	4.1	4.5	(4.3)S	(4.4)A	A	(4.5)S	4.0							
15									4.0	A	4.4	4.3	A	4.4	4.5	B	B							
16									B	B	(4.4)A	3.9	(4.1)P	4.3	4.7	(4.7)S	A							
17									3.7	4.2	4.5	4.4	4.5	(4.3)S	4.4	4.5	4.1							
18									B	B	B	B	B	4.6	4.6	4.5	B							
19									4.0	(4.1)B	(4.0)B	4.2	4.2	4.3	4.5	(4.2)B	B							
20									4.3	(4.2)B	4.3	4.3	4.0	4.4	4.3	4.1	(4.4)B							
21									3.8	4.3	A	4.1	4.2	4.3	4.4	4.1	B							
22									M	B	B	B	4.1	4.4	B	B	B							
23									B	A	B	B	4.2	B	B	B	B							
24									B	B	B	B	B	B	B	B	B							
25									B	B	B	B	B	B	B	B	B							
26									B	B	B	B	B	B	B	B	B							
27									B	(4.2)B	(4.1)B	(3.9)P	A	A	4.3	4.1	4.1							
28									3.6	B	4.1	B	B	4.2	4.3	4.1	(4.5)B							
29									3.7	4.0	(4.3)P	(4.2)P	B	B	C	B	A							
30									C	B	4.5	4.2	C	4.1	4.4	4.3	B							
31									4.1	4.2	4.1	4.2	4.2	4.3	4.4	4.3	4.0							
Median									4.0	4.3	4.2	4.2	4.2	4.3	4.4	4.2	4.3							
Count									14	15	17	15	12	18	17	18	11							

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Table 49

Ionospheric Storminess at Washington, D. C.

December 1949

Day	Ionospheric character* 00-12 GCT	Ionospheric character* 12-24 GCT	Principal storms Beginning GCT	Principal storms End GCT	Geomagnetic character** 00-12 GCT	Geomagnetic character** 12-24 GCT
1	5	2	0100	1100	2	0
2	***	2			2	0
3	2	2			1	2
4	1	1			2	2
5	2	1			2	2
6	1	1			2	2
7	1	2			1	1
8	2	3			1	2
9	3	1			3	3
10	2	2			1	1
11	3	2			1	0
12	2	2			0	0
13	***	1			1	1
14	2	2			2	3
15	3	1			2	1
16	2	1			2	1
17	2	1			2	1
18	3	2			1	1
19	3	2			1	1
20	2	2			2	1
21	2	2			2	2
22	2	3			2	1
23	2	3			1	2
24	1	2			4	1
25	1	2			2	1
26	2	2			2	1
27	1	2			1	1
28	1	1			2	2
29	1	2			1	2
30	1	2			1	2
31	1	1			2	3

*Ionosphere character figure (I-figure) for ionospheric storminess at Washington, D. C., during 12-hour period, on an arbitrary scale of 0 to 9, 9 representing the greatest disturbance.

**Average for 12 hours of Cheltenham, Maryland, geomagnetic K-figures on an arbitrary scale of 0 to 9, 9 representing the greatest disturbance.

***No readable record. Refer to table 38 for detailed explanation.

Table 50

Sudden Ionosphere Disturbances Observed at Washington, D. C.

December 1949

1949 Day	GCT Beginning	GCT End	Location of transmitters	Relative intensity at minimum*	Other phenomena
December					
11	1435	1500	Ohio, D. C., England	0.2	
12	1254	1320	England	0.2	
13	1455	1520	Ohio, D. C., England	0.1	Solar flare** 1448

*Ratio of received field intensity during SID to average field intensity before and after, for station KQ2XAU (formerly W8XAL), 6080 kilocycles, 600 kilometers distant, for all SID except the following: Station GIH, 13525 kilocycles, received in New York, 5340 kilometers distant, was used for the SID on December 12.

**Time of observation at Wendelstein Observatory, Germany.

Table 51

Sudden Ionosphere Disturbances Reported by Engineer-in-Chief,

Cable and Wireless, Ltd., as Observed in England

1949 Day	GCT Beginning	GCT End	Receiving station	Location of transmitters
December				
9	1240	1525	Somerton	Argentina, Brazil
12	1256	1325	Brentwood	Barbados, Belgian Congo, Canary Is., Chile, Greece, India, Iran, Kenya, Malta, Palestine, Southern Rhodesia, Spain, Switzerland, Syria, Turkey, Uruguay, U.S.S.R., Yugoslavia, Zanzibar
12	1255	1325	Somerton	Argentina, Brazil, Gold Coast, Union of S. Africa

Note: Observers are invited to send to the CRPL information on times of beginning and end of sudden ionosphere disturbances for publication as above. Address letters to the Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

Table 52

Sudden Ionosphere Disturbances Reported by RCA Laboratories, as Observed at Barbados, B. W. I.

1949 Day	GCT Beginning	End	Location of transmitters	Other phenomena
October				
1	1713	1720	England, Jamaica	Terr.mag. pulse* 1709-1725
3	0320	0400	Australia	Solar flare** 0314
4	1320	1400	England	
6	1330	1355	England, Jamaica	
8	1315	1340	England, Jamaica	
11	1520	1600	England, Jamaica	
13	1145	1225	England, Jamaica	
15	1645	1700	England, Jamaica	
November				
6-7	2338	0105	Australia	
14-15	2325	0110	Australia	
17	1135	1200	England	
19	1945	2140	Canada	
29	0650	0705	England	

*As observed on Cheltenham magnetogram of the United States Coast and Geodetic Survey.

**Time of observation at Kodaikanal Observatory, India.

Table 53

Sudden Ionosphere Disturbances Reported By Institut für Ionosphärenforschung, as Observed at Lindau, Harz, Germany, October 1949

1949 Day	GCT Beginning	GCT End	Location of transmitters	Relative intensity at minimum*	Other phenomena
October					
1	1000	1035	Berlin, Lindau**	0.03	Terr.mag.pulse*** 1005-1020
1	1410	1425	Berlin	0.3	
2	1400	1430	Berlin, Lindau**	0.03	Terr.mag.pulse*** 1400-1415
3	1200	1215	Berlin, Lindau**	0.2	
4	1315	1340	Berlin, Lindau**	0.3	Terr.mag.pulse*** 1355-1430
#	1020	1040	Lindau**		Terr.mag.pulse*** 1025-1035
5	1120	1135	Berlin, Lindau**	0.2	Terr.mag.pulse*** 1120-1130
6	1140	1155	Berlin	0.2	Terr.mag.pulse*** 1115-1200
6	1320	1430	Berlin, Lindau**	0.3	Terr.mag.pulse*** 1335-1445
8	1315	1340	Berlin, Lindau**	0.06	Terr.mag.pulse*** 1315-1325
9	0620	0640	Lindau**		
9	1300	1400	Lindau**		
10	0950	1010	Lindau**		Terr.mag.pulse*** 1045-1105
11	1150	1300	Berlin, Lindau**	0.1	
11	1520	1535	Berlin, Lindau**	0.05	Terr.mag.pulse*** 1520-1630
12	1150	1210	Lindau**		
13	1140	1245	Berlin, Lindau**	0.03	Terr.mag.pulse*** 1155-1305
18	1230	1300	Berlin	0.02	
22	1355	1430	Berlin	0.4	
23	1110	1145	Berlin	0.05	Terr.mag.pulse*** 1130-1145
28	0810	0900	Berlin	0.4	Terr.mag.pulse*** 0815
28	1050	1110	Lindau**		
29	1045	1115	Berlin	0.4	Terr.mag.pulse*** 1055-1100

*Ratio of received field intensity during SID to average field intensity before and after, for station Voice of America, 6078.9 kilocycles, 200 km distant.

**Lindau station 1780 kilocycles pulse, transmitter and receiver at Lindau.

***Time of observation at Lindau.

#Day not indicated.

Table 54

Provisional Radio Propagation Quality Figures
(Including Comparisons with CRPL Warnings and Forecasts)
November 1949

Day	North Atlantic quality figure Half day GCT (1)	(2)	CRPL* Warning Half day GCT (1)	(2)	CRPL** Forecast (J-reports)	North Pacific quality figure Half day GCT (1)	(2)	Geomagnetic K_{Ch} Half day GCT (1)	(2)
1	7	5				6	6	2	(4)
2	5	5	U			6	6	(4)	3
3	6	6			X	6	7	3	2
4	7	6			X	6	7	2	1
5	6	6				6	6	3	3
6	7	7				7	7	2	1
7	8	7				6	7	1	1
8	7	7				5	6	0	0
9	8	7			X	5	6	2	2
10	8	7			X	6	7	2	3
11	6	6	W	(U)		6	6	(4)	2
12	6	6				6	6	3	3
13	7	6				6	7	3	1
14	8	6				5	6	2	2
15	7	6				6	7	2	2
16	7	7				7	8	3	1
17	7	6				7	7	0	1
18	7	6				6	7	1	3
19	5	(3)		(W)		6	5	3	(4)
20	(3)	(3)	W	W		5	5	(4)	2
21	(4)	5	U			5	5	2	2
22	6	5	U			6	6	1	1
23	7	5				5	6	2	2
24	7	5				6	6	2	0
25	6	6				5	6	1	1
26	7	6				6	6	0	2
27	7	6				6	7	3	2
28	7	6			X	6	7	2	1
29	6	6			X	6	6	(4)	3
30	6	5	W	W		6	6	(4)	(4)

Score:	Warning N.A.	Warning N.P.	Forecast N.A.	Forecast N.P.
H	5	1	0	0
(M)	0	0	0	0
M	0	0	4	0
G	50	50	44	48
O	5	9	12	12

*Broadcast on WWV, Washington, D.C. Times of warnings recorded to nearest half day as broadcast. ( ) broadcast for one-quarter day. Blanks signify N.

**In addition to dates marked X, the following were designated as probable disturbed days on forecast more than eight days in advance of said dates: November 11-12.

Scales:
Quality Figures
(1)- Useless
(2)- Very poor
(3)- Poor
(4)- Poor to fair
5 - Fair
6 - Fair to good
7 - Good
8 - Very good
9 - Excellent

Geomagnetic K_{Ch} - 0 to 9, 9 representing the greatest disturbance; $K_{Ch} \geq 4$ indicates significant disturbance, enclosed in ( ) for emphasis.

Symbols:
- W Disturbed conditions expected
- U Unstable conditions expected
- N No disturbance expected
- X Probable disturbed date

Scoring:
- H Storm ($Q \leq 4$) hit
- (M) Storm severer than predicted
- M Storm missed
- G Good day forecast
- O Overwarning

Scoring by half day according to following table:

	Quality Figure ≤3	4	5	≥6
W	H	H	O	O
U	(M)	H	H	O
N	M	M	G	G
X	H	H	O	O

Table 55a

Coronal observations at Climax, Colorado (5303A), east limb

Date	Degrees north of the solar equator																		0°	Degrees south of the solar equator																	
GCT	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1949																																					
Dec. 1.7a	-	-	-	-	-	-	-	-	-	2	5	9	10	10	11	12	11	11	10	11	13	13	10	12	10	7	4	2	2	2	2	2	2	2	-	-	-
2.7a	-	-	-	-	-	-	-	-	1	2	3	4	9	8	13	13	12	14	15	14	17	15	10	10	9	7	4	3	2	1	1	2	2	-	-	-	-
3.8a	-	-	-	-	-	-	-	-	-	-	-	-	10	10	13	13	14	14	14	14	13	12	9	8	-	-	-	-	-	-	-	-	-	-	-	-	-
4.7a	-	-	-	-	-	-	-	-	-	-	-	3	8	13	24	25	20	27	26	20	17	15	13	10	9	7	2	-	-	-	-	-	-	-	-	-	-
5.7a	-	-	-	-	-	-	-	-	-	-	1	2	.4	14	22	27	26	20	19	18	16	13	10	10	9	8	3	-	-	-	-	-	-	-	-	-	-
12.9	-	-	-	-	-	-	-	-	2	2	2	3	4	6	14	15	15	15	11	11	10	10	10	9	9	9	6	3	2	-	-	-	-	-	-	-	-
13.9a	X	-	-	-	-	-	-	-	2	2	4	6	9	9	13	17	17	18	14	13	14	12	11	11	10	9	5	4	3	2	2	-	-	-	X	X	X
14.7a	-	-	-	-	-	-	-	-	2	2	3	5	7	8	11	11	12	12	11	13	15	13	12	13	9	3	2	-	-	-	-	-	-	-	-	-	-
17.8a	-	-	1	2	2	2	2	4	6	10	12	11	14	23	22	25	24	14	15	19	18	19	17	14	12	9	9	8	4	4	5	8	7	7	3	1	-
23.9a	-	-	-	-	-	-	-	-	-	-	-	-	10	11	11	10	9	8	7	6	6	6	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
25.7	-	-	2	2	2	2	2	-	-	2	9	10	13	17	24	15	14	16	16	14	13	11	10	9	9	8	6	5	4	-	-	-	-	-	-	-	-
27.9	X	X	X	X	X	X	X	X	-	2	3	4	8	10	11	11	11	13	14	13	15	18	19	14	12	9	5	2	2	2	2	-	X	X	X	X	X
28.7a	-	1	1	1	2	2	2	2	2	3	3	3	10	11	13	14	15	15	17	19	27	33	28	21	16	13	10	8	4	4	3	2	1	-	-	-	-
29.8	X	X	X	X	X	X	X	-	-	-	-	8	9	13	14	14	14	16	16	17	15	13	12	10	5	-	-	-	-	-	-	-	-	-	-	-	X
30.8	-	-	-	-	-	-	-	-	-	-	5	6	9	13	26	24	17	22	21	17	14	13	10	10	6	3	-	-	-	-	-	-	-	-	-	-	-
31.7	-	-	-	-	-	-	-	-	-	-	2	5	10	19	23	20	14	14	14	13	13	12	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*Oct. 27.7	X	X	X	X	X	X	-	-	-	-	4	9	14	23	25	24	21	30	20	13	13	14	13	10	8	4	3	-	-	-	-	-	-	X	X	X	X
28.9	-	-	-	-	-	-	2	2	3	4	8	11	18	23	27	24	21	17	22	17	13	13	13	9	11	11	5	4	2	-	-	-	-	-	-	-	-
31.8	-	-	-	-	-	1	3	6	7	8	9	14	15	34	38	36	32	21	19	14	13	13	13	13	11	10	5	4	6	7	4	2	-	-	-	-	-

Table 56a

Coronal observations at Climax, Colorado (6374A), east limb

Date	Degrees north of the solar equator																		0°	Degrees south of the solar equator																	
GCT	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1949																																					
Dec. 1.7a	2	2	2	2	2	2	2	2	2	3	3	1	-	-	3	1	-	1	-	7	5	2	2	1	-	-	-	-	1	1	1	1	1	2	2	2	2
2.7a	2	2	2	1	1	-	1	1	2	2	3	3	2	1	2	-	3	1	11	12	4	2	2	2	1	1	-	1	2	2	1	1	1	1	-	-	-
3.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.7a	-	-	1	1	1	2	2	2	3	3	4	1	-	-	5	3	10	1	12	3	6	4	-	-	1	1	2	2	2	2	2	2	2	2	-	-	-
5.7a	-	-	-	-	-	1	1	1	1	1	1	-	-	-	1	1	3	3	2	4	5	1	-	-	-	1	2	2	2	2	2	2	2	2	-	-	-
12.9	-	-	-	-	-	-	-	-	-	-	-	-	-	1	10	9	9	10	8	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.9a	X	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	10	4	3	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
14.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	4	3	2	1	1	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-
17.8a	2	2	2	2	2	2	2	2	1	1	1	1	1	11	25	19	16	14	9	3	1	1	-	1	1	1	-	-	-	-	-	-	-	-	1	1	1
23.9a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25.7	-	-	-	-	-	-	-	-	-	-	-	1	16	13	18	8	1	5	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27.9	X	X	X	X	X	X	X	X	1	1	2	2	8	11	9	4	2	2	3	4	5	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
28.7a	1	2	2	2	2	3	-	1	2	2	2	1	2	10	9	-	4	12	11	12	11	12	-	1	-	1	1	1	1	1	2	2	2	2	2	2	2
29.8	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	1	10	5	5	10	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
30.8	-	-	-	2	2	2	2	2	2	2	2	2	-	1	1	2	4	1	13	12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-
31.7	1	1	1	1	1	1	1	1	1	1	1	-	-	-	1	4	4	3	5	4	3	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-
*Oct. 27.7	X	X	X	X	X	X	-	-	-	-	-	-	-	5	4	2	1	10	15	1	2	11	10	6	1	-	-	-	-	-	-	-	-	X	X	X	X
28.9	1	1	-	-	-	-	-	-	-	-	-	-	1	10	3	6	-	3	9	8	5	1	4	7	2	1	-	-	-	-	-	-	-	-	-	-	-
31.8	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	4	3	-	-	1	5	2	-	1	1	1	1	1	2	3	1	2	2	-	-	-	-

*Observations for Oct. 27, 28, and 31 received late.

Table 55b

Coronal observations at Climax, Colorado (5303A), west limb

Date	Degrees south of the solar equator																		0°	Degrees north of the solar equator																	
GCT	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1949																																					
Dec. 1.7	-	-	-	-	-	2	4	4	3	2	2	5	7	10	13	14	14	14	13	13	14	15	14	13	10	8	3	7	5	2	-	-	-	-	-	-	-
2.7a	-	-	-	1	2	2	2	1	-	-	2	3	6	9	15	14	14	14	12	13	13	13	12	13	12	7	8	9	4	2	-	-	-	-	-	-	-
3.8a	-	-	-	-	-	-	-	-	-	-	-	-	9	10	13	14	14	13	12	12	13	14	20	18	12	10	7	5	-	-	-	-	-	-	-	-	-
4.7	-	-	-	-	1	2	3	3	2	2	-	2	9	10	10	13	17	15	15	14	15	24	24	30	21	12	8	7	4	2	-	-	-	-	-	-	-
5.7	-	-	-	-	-	-	-	2	3	3	3	2	3	8	8	18	20	19	18	19	20	20	24	22	18	14	9	5	2	2	-	-	-	-	-	-	-
12.9	-	1	1	2	2	3	3	3	3	4	4	4	4	4	10	10	12	14	15	15	14	17	19	18	18	13	8	6	5	-	-	-	-	-	-	-	-
13.9	X	X	X	X	X	X	-	-	2	2	2	2	2	2	5	9	10	10	11	10	10	9	10	10	11	11	6	3	-	X	X	X	X	X	X	X	X
14.7	-	-	-	-	-	-	-	-	2	3	4	5	6	9	10	12	15	18	15	11	13	18	18	17	16	14	8	2	-	-	-	-	-	-	-	-	-
17.8a	-	-	-	-	-	1	1	1	3	6	5	5	4	4	10	17	25	24	27	26	26	29	33	25	18	15	3	-	-	-	-	-	-	-	-	-	-
23.9a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	9	10	11	11	12	12	10	9	9	8	5	-	-	-	-	-	-	-	-	-	-	-
25.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	4	5	12	14	9	9	9	5	3	-	-	-	-	-	-	-	-	-	-	-
27.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28.7a	-	-	-	-	2	2	3	3	4	4	4	4	5	7	12	12	13	14	13	13	15	16	14	12	10	8	5	4	4	3	2	1	1	-	-	-	-
29.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30.8a	-	-	-	-	-	2	2	2	-	-	-	-	1	9	11	12	13	14	13	14	13	8	9	10	2	7	3	-	-	-	-	-	-	-	-	-	-
31.7a	-	-	-	3	3	4	5	2	2	2	2	3	9	10	10	12	13	15	16	16	17	18	16	15	13	10	9	8	6	3	1	-	-	-	-	-	-
*Oct.27.7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28.9	-	-	-	-	-	-	-	-	-	-	-	2	13	15	19	18	21	23	20	17	16	19	14	9	7	4	3	2	-	-	-	-	-	-	-	-	-
31.8	-	-	-	-	-	-	-	-	-	-	2	2	2	9	11	14	17	27	25	21	22	22	20	20	9	4	2	1	-	-	-	-	-	-	-	-	-

Table 56b

Coronal observations at Climax, Colorado (6374A), west limb

Date	Degrees south of the solar equator																		0°	Degrees north of the solar equator																	
GCT	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1949																																					
Dec. 1.7	2	2	2	1	1	2	1	-	-	-	-	-	1	-	4	-	10	4	-	10	8	8	1	-	-	-	1	1	1	2	1	2	2	2	2	2	2
2.7a	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	-	2	2	1	4	4	5	8	5	3	2	-	-	-	-	1	1	1	1	1	1	2
3.8a	-	-	-	-	-	-	-	-	-	-	4	4	4	4	3	2	2	3	4	7	12	12	10	12	5	3	2	-	-	-	-	-	-	-	-	-	-
4.7	-	-	-	-	-	-	-	-	-	-	1	2	3	3	2	1	1	11	12	12	14	12	14	13	14	14	5	1	1	1	1	1	1	2	2	2	-
5.7	-	-	-	-	-	-	-	-	-	-	-	-	5	3	-	-	10	10	11	10	15	12	11	11	10	7	3	1	-	-	-	-	-	-	-	-	-
12.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	1	-	3	10	11	11	2	-	-	-	-	-	-	-	-	-	-
13.9	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	1	7	1	-	-	1	1	2	-	-	-	X	X	X	X	X	X	X	X
14.7	-	-	-	-	1	2	2	2	1	1	1	1	-	-	-	-	8	-	9	10	8	1	4	4	3	2	1	1	1	1	1	1	1	1	1	-	-
17.8a	1	2	2	2	2	2	1	2	2	2	1	1	1	-	5	-	10	13	-	1	8	8	7	-	1	1	5	5	4	3	2	2	1	2	1	1	2
23.9a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	4	10	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28.7a	2	2	-	-	-	-	-	-	-	-	-	-	-	1	4	2	5	9	2	8	11	9	2	5	1	-	-	-	-	-	-	-	-	-	-	-	1
29.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	2	2	5	12	7	2	1	-	-	-	-	-	-	-	-	-	-	-	-
31.7a	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	2	1	9	11	14	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
*Oct.27.7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28.9	-	-	-	-	-	-	-	-	1	1	1	1	1	1	13	9	10	14	1	1	2	9	9	1	1	1	1	1	-	1	3	3	3	1	3	2	1
31.8	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	10	14	12	1	1	1	13	10	-	2	2	3	4	5	5	6	6	7	1	-

Table 57a

Coronal observations at Climax, Colorado (6704A), east limb

Date GCT	Degrees north of the solar equator																		0°	Degrees south of the solar equator																	
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1949																																					
Dec. 1.7a	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.7a	-	-	-	-	-	-	-	-	-	-	-	1	1	1	2	2	2	2	3	2	2	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
3.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	4	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.7a	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	2	3	4	5	4	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.7a	-	-	-	-	-	-	-	-	-	1	1	1	2	3	3	3	3	3	3	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.9	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	2	2	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.9a	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
14.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-
17.8a	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	1	2	2	2	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-
23.9a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25.7	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-
27.9	X	X	X	X	X	X	X	X	-	-	-	-	-	1	1	1	1	2	2	2	2	2	2	2	1	-	-	-	-	-	-	-	X	X	X	X	X
28.7a	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	·1	1	1	2	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
29.8	X	X	X	X	X	X	X	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	X
30.8	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.7	-	-	-	-	-	-	-	-	-	1	1	1	2	2	2	2	2	2	2	2	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oct.27.7	X	X	X	X	X	X	-	-	-	-	-	-	1	2	2	3	4	4	2	1	1	1	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X
28.9	-	-	-	-	-	-	-	-	-	-	-	1	1	2	3	3	3	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.8	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	2	3	2	2	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Observations for Oct. 27, 28, and 31 received late.

Table 57b

Coronal observations at Climax, Colorado (6704A), west limb

Date GCT	Degrees south of the solar equator																		0°	Degrees north of the solar equator																	
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1949																																					
Dec. 1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.7a	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	2	1	1	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	-	1	2	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-
5.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-
12.9	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	2	2	2	2	2	2	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-
13.9	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X
14.7	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-
17.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	2	3	3	3	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
23.9a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-
*Oct. 27.7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28.9	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	2	2	2	3	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	2	2	2	2	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 58

Particulars of Observations, Climax, Colorado
July--December 1949

Date GCT	Green line threshold intensity at 45°	90°	135°	225°	270°	315°	Obs.	Meas.	Date GCT	Green line threshold intensity at 45°	90°	135°	225°	270°	315°	Obs.	Meas.
1949									1949								
Jul. 1.7	15	12	8	8	8	7	J	E	Aug.13.7	7	8	7	13	12	12	F/D	E
2.7	8	11	9	10	-	-	J	E	14.7	5	5	5	5	5	5	F	E
3.6	8	8	8	10	8	7	F	E	15.6	6	6	6	6	6	6	J	E
4.7	9	9	8	7	8	8	J	E	16.6	5	5	5	5	5	5	F	E
5.6	10	9	8	10	9	9	F	E	17.6	7	6	6	5	5	5	F	E
6.6	9	13	10	7	7	8	J	E	18.6	11	10	9	8	9	8	J	E
8.8	8	7	7	-	14	-	F/D	E	19.6	7	7	7	6	6	5	F	E
9.6	8	8	8	7	9	7	F	E	20.6	10	10	9	12	12	12	J	E
11.8	12	7	11	11	14	14	F	E	21.6	7	8	8	6	6	7	F	E
12.6	6	6	8	10	11	8	F	E	22.6	7	7	7	7	6	6	J	E
13.6	9	10	11	7	11	8	F/D	E	23.7	7	8	8	8	7	7	F	E
14.7	9	11	8	8	14	9	J	E	24.7	5	4	4	5	4	5	F/D	E
15.6	14	14	14	14	13	14	F	E	25.9	12	10	8	11	13	15	J	E
16.6	14	12	12	9	13	9	J	E	26.6	8	8	7	13	7	7	D/F	E
17.6	13	12	12	14	14	14	F	E	27.6	8	8	8	9	9	10	F	E
18.7	11	12	13	13	12	12	F	E	29.6	10	12	10	>15	10	11	F	E
19.6	9	9	10	11	11	10	F/J	E	30.7	15	11	8	-	10	12	D/F	E
20.8	13	12	12	12	10	>15	F	E	Sep. 1.6	-	7	-	-	-	-	J	E
21.6	10	10	10	11	8	10	F	E	4.7	13	10	10	11	12	10	J	E
22.8	13	15	13	-	15	15	F	E	5.7	7	7	7	7	8	6	J/D	E
23.6	10	12	10	11	9	11	F	E	6.7	8	9	10	10	10	9	F	E
24.6	4	4	4	4	4	4	F	E	7.6	8	10	9	9	10	10	F/J	E
26.6	6	5	6	4	4	4	F/J	E	8.6	15	14	13	14	13	14	F	E
27.6	8	8	8	8	7	6	F	E	9.6	14	11	13	10	11	10	F	E
28.6	7	6	6	6	7	8	J/D	E	10.8	8	11	8	9	15	11	D	E
29.6	7	6	7	6	6	7	F	E	11.7	-	7	-	-	-	-	J	E
30.6	6	8	7	7	9	7	F/D	E	12.9	6	6	6	7	6	7	F	E
31.7	8	9	9	9	10	10	F	E	14.7	5	3	5	4	4	3	F	E
Aug. 1.9	9	11	10	-	-	-	F	E	15.7	6	6	5	13	6	8	F	E
2.8	10	9	8	9	8	8	F/D	E	16.7	7	7	7	6	5	7	F	F
3.8	10	7	7	-	9	10	F	E	17.7	15	11	12	10	10	9	D	F
4.7	2	3	3	3	4	2	D/F	E	18.7	>15	15	13	12	12	15	D	E
5.6	6	6	8	5	6	6	F	E	19.6	8	8	9	-	8	10	F	E
6.8	-	-	-	-	8	13	F	E	20.7	-	-	-	11	12	11	F	E
7.7	10	7	6	7	7	6	F	E	21.6	>15	>15	15	15	14	12	F	E
8.6	9	6	6	9	6	7	F	E	22.8	5	7	7	8	6	6	F	E
9.8	12	8	8	5	7	6	F	E	23.8	7	5	6	9	10	7	F	E
10.7	6	5	5	4	5	5	F	E	24.8	15	9	11	-	15	11	F	E
11.6	7	7	6	7	8	7	F	E	25.7	9	9	12	10	11	10	F	E
12.9	6	6	7	9	7	7	F/D	E	26.7	-	>15	12	-	-	-	D	F

Table 58 (continued)

Particulars of Observations, Climax, Colorado
July—December 1949

Date GCT	Green line threshold intensity at 45°	90°	135°	225°	270°	315°	Obs.	Meas.
Sep. 27.7	7	8	8	6	6	5	F	E
28.7	7	10	8	6	6	8	F/D	E
29.8	–	6	6	–	–	–	F	E
30.7	>15	7	8	–	>15	–	F	E
Oct. 1.6	5	7	7	–	6	5	F	E
2.8	5	5	6	7	4	3	F/D	E
3.8	4	5	4	6	6	6	F	E
4.6	7	10	7	9	5	7	D	E
5.6	5	4	5	5	4	6	F	E
6.7	10	10	10	12	10	10	F	E
7.6	15	14	14	15	14	15	D	E
8.7	15	12	13	–	–	14	F	E
11.7	6	9	6	5	6	5	D	E
12.7	5	4	5	5	6	6	F	E
13.6	4	4	4	4	4	4	F/D	E
15.6	4	4	4	4	4	4	F	E
18.6	4	4	4	5	5	5	F	E
20.6	5	6	5	6	6	6	D/F	E
22.6	3	3	4	4	4	5	F	E
24.6	6	6	6	6	7	5	D	E
25.9	5	5	5	6	6	6	D	E
26.7	3	4	3	4	3	3	F	E
27.7	–	11	6	–	–	–	F	E
28.9	6	6	7	7	7	5	F	E
31.8	5	6	5	10	6	5	F	E
Nov. 1.7	4	4	4	4	4	4	F	E
2.7	7	7	7	10	7	7	D	E
3.7	5	5	5	6	6	5	D/F	E
4.6	8	6	6	5	7	6	D	E
5.8	6	6	8	6	6	6	F	E
6.7	9	13	6	6	5	6	D	E
7.6	6	6	7	7	6	5	F	E
8.7	8	8	7	7	8	8	D	E
Nov. 9.6	5	5	5	–	–	12	F	E
12.8	7	6	5	6	7	6	F/D	E
13.6	8	9	13	6	7	12	F	E
14.7	3	5	7	5	5	4	D	E
15.9	8	6	6	7	7	7	F	E
16.9	11	11	11	–	12	12	D	E
17.8	7	6	10	7	6	7	D	E
19.7	6	5	5	5	5	4	F	E
20.7	4	3	4	6	5	4	F	E
21.7	1	2	1	3	2	3	D	E
22.8	6	7	7	13	6	8	D	E
25.7	3	4	3	4	4	4	F	E
26.8	5	6	5	8	10	6	F	E
27.7	11	7	9	6	8	5	F	E
29.8	7	7	10	11	11	11	D	E
30.7	4	4	4	6	6	5	D	E
Dec. 1.7	3	3	3	3	3	2	D	E
2.7	3	3	3	3	2	3	F	E
3.8	11	9	10	9	14	11	F	E
4.7	11	12	8	5	4	5	F	E
5.7	6	6	5	8	7	5	D	E
12.9	7	9	7	–	7	–	F	E
13.9	11	8	6	>15	6	14	F/D	E
14.7	7	8	10	8	6	6	D	E
17.8	5	6	6	5	5	4	F	E
23.9	>15	>15	11	14	15	>15	D	E
25.7	10	9	11	12	12	14	D	E
27.9	–	7	11	–	–	–	D	E
28.7	3	3	3	5	2	3	F/A	E
29.8	–	14	11	–	–	–	F	E
30.8	12	9	7	6	4	8	D	E
31.7	7	4	4	5	6	5	D	E

A – Allen
D – Dolder
E – Evans
F – Fleming
J – Johnson

Table 59

American and Zürich Provisional Relative Sunspot Numbers

December 1949

Date	R_A*	R_Z**	Date	R_A*	R_Z**
1	187	190	17	125	96
2	166	158	18	157	100
3	143	155	19	134	115
4	137	125	20	118	88
5	129	108	21	119	92
6	140	97	22	167	110
7	163	124	23	162	103
8	174	120	24	161	119
9	174	122	25	170	140
10	164	124	26	171	129
11	175	137	27	150	107
12	195	143	28	163	114
13	189	150	29	138	101
14	148	105	30	116	90
15	129	107	31	122	110
16	129	106	Mean:	152.1	118.9

*Combination of 46 observers; see page 9.

**Dependent on observations at Zürich Observatory and its stations at Locarno and Arosa.

Errata: The R_A for September 25, 1949 should have been 158. This makes the mean American relative sunspot number for September 1949, 186.9 instead of 183.7.

Table 60

Preliminary values of mean K-indices, Kw,

from 32 observatories for October and 21 for November:

Preliminary values of International Character-Figures, C, for October and November:

Final magnetically selected days, namely the five quiet, five disturbed and ten quiet days

for October and November 1949

Gr. Day 1949	Values Kw Oct								Sum	Values Kw Nov								Sum	C Oct	C Nov
1	3.3	2.1	2.3	2.7	1.7	1.3	0.6	2.1	16.1	2.5	0.8	1.9	3.3	4.9	5.6	5.4	3.2	27.6	0.6	1.7
2	2.2	3.1	2.3	1.2	2.1	0.5	1.1	1.3	13.8	3.1	2.1	3.3	3.7	4.1	4.1	4.1	5.3	29.8	0.5	1.6
3	0.9	0.5	0.8	1.6	1.3	0.6	0.8	2.3	8.8	4.8	3.9	2.9	1.1	1.1	1.7	2.4	4.3	21.8	0.2	1.1
4	3.2	2.4	2.7	3.1	4.2	2.9	2.8	2.4	23.7	1.3	1.3	2.1	2.0	1.8	2.7	1.9	1.0	14.1	1.2	0.6
5	3.9	3.1	3.2	2.6	2.1	2.3	1.9	2.8	21.9	2.9	2.8	3.1	2.5	3.1	2.9	2.0	3.9	23.2	0.9	1.1
6	1.0	1.3	2.9	3.3	3.3	3.8	3.7	3.7	23.0	3.7	2.1	1.2	1.7	1.7	1.8	1.5	1.4	15.1	1.2	0.7
7	3.3	4.0	3.4	3.7	4.3	4.9	5.7	5.0	34.3	1.2	1.2	1.5	1.4	0.8	0.8	1.7	1.1	9.7	1.8	0.1
8	5.6	3.3	2.6	3.2	4.1	4.5	3.1	2.8	29.2	0.2	0.2	0.3	0.5	0.4	0.2	0.1	0.9	2.8	1.5	0.0
9	4.8	3.9	2.7	2.0	2.7	3.0	2.1	1.8	23.0	0.5	1.3	2.4	2.1	1.4	1.6	2.4	1.8	13.5	1.0	0.6
10	1.1	0.8	1.2	3.3	2.0	2.4	2.0	1.5	14.3	1.5	1.3	2.1	2.2	2.4	3.1	2.3	3.9	18.8	0.6	1.1
11	3.3	2.1	2.2	2.2	3.6	4.0	2.4	3.3	23.1	3.8	4.2	3.1	2.6	2.3	4.5	2.9	2.4	25.8	1.0	1.4
12	2.4	1.6	1.9	2.2	2.4	0.8	1.4	1.9	14.6	1.8	1.7	1.7	2.4	2.5	3.0	4.5	3.4	21.0	0.5	1.1
13	1.8	1.5	1.8	1.1	1.7	3.2	4.5	3.3	18.9	3.2	2.5	1.5	1.9	2.0	3.3	1.6	0.4	16.4	0.9	0.8
14	3.5	3.5	3.9	5.1	4.8	6.1	6.4	6.0	39.3	1.0	2.8	2.4	2.3	2.3	3.3	2.0	3.0	19.1	1.9	0.9
15	5.1	4.5	6.1	6.6	6.2	6.3	6.9	6.2	47.9	2.4	1.3	1.2	1.2	1.5	3.2	2.9	3.1	16.8	2.0	0.9
16	5.5	5.2	4.1	5.0	3.8	4.4	3.2	2.9	34.1	4.0	2.9	2.2	1.2	0.6	0.6	0.6	0.7	12.8	1.7	0.9
17	3.2	2.0	2.8	2.6	1.8	3.2	3.2	2.7	21.5	0.4	0.2	0.5	0.8	0.7	0.3	1.2	2.1	6.2	0.8	0.1
18	1.6	1.1	1.9	2.5	2.7	1.9	1.3	0.7	13.7	2.3	0.8	1.4	2.3	3.1	1.7	1.9	2.1	15.6	0.4	0.7
19	0.3	1.1	3.4	3.3	3.1	3.1	2.3	2.8	19.4	2.6	1.4	3.0	2.8	3.1	4.3	6.0	5.9	29.1	0.9	1.7
20	2.5	1.5	1.0	1.9	2.8	1.9	2.8	3.2	17.6	5.4	4.3	4.2	2.6	4.5	3.5	3.3	2.9	30.7	0.7	1.5
21	1.8	2.9	2.2	2.8	2.5	2.7	1.6	0.6	17.1	3.1	1.4	1.4	2.0	2.7	3.7	4.9	2.1	21.3	0.5	1.1
22	1.8	0.8	1.5	2.1	1.9	1.7	3.5	5.1	18.4	1.2	0.5	0.5	1.2	1.3	2.4	2.5	1.9	11.5	1.1	0.6
23	2.6	1.3	1.8	2.8	2.8	2.9	4.5	3.5	22.2	2.0	1.9	0.8	1.3	0.8	1.3	3.5	2.3	13.9	1.0	0.9
24	4.5	4.0	2.8	2.5	1.5	2.0	1.7	1.9	20.9	2.3	2.3	1.0	1.2	0.9	0.8	0.2	0.1	8.8	0.9	0.4
25	2.3	1.3	1.3	2.2	1.7	0.7	0.6	0.5	10.6	0.1	0.2	0.8	1.3	1.7	0.7	2.0	1.1	7.9	0.2	0.2
26	1.7	0.8	0.9	1.2	0.7	1.3	3.1	1.9	11.6	0.6	0.3	0.6	0.7	1.1	0.4	1.5	2.5	7.7	0.4	0.2
27	1.2	3.7	2.7	2.5	4.4	4.2	5.2	4.9	28.8	2.3	1.8	2.2	2.1	2.1	4.0	2.9	2.1	19.5	1.6	0.9
28	4.8	4.3	3.6	2.9	3.0	3.3	3.0	2.5	27.4	1.6	1.1	1.4	1.2	1.0	0.3	0.2	2.3	9.1	1.3	0.2
29	2.2	2.0	2.4	2.6	3.2	2.3	2.4	3.2	20.3	4.9	3.5	2.5	3.0	3.0	4.0	5.0	3.9	29.8	0.8	1.5
30	0.6	1.3	1.9	2.2	2.0	1.8	1.5	2.2	13.5	3.6	3.0	3.4	4.7	4.7	5.3	4.9	3.8	33.4	0.3	1.6
31	3.3	2.5	1.8	1.3	0.8	1.5	2.0	1.4	14.6										0.5	
Mean	2.75	2.37	2.45	2.72	2.75	2.76	2.82	2.79	2.68	2.34	1.84	1.87	1.98	2.12	2.50	2.61	2.50	2.22	0.93	0.87

Sel. Days

	Oct	Nov
Five Quiet	3	7
	18	8
	25	17
	26	25
	30	26
Five Disturbed	7	1
	8	2
	14	19
	15	20
	16	30
Ten Quiet	2	4
	3	7
	10	8
	12	9
	18	17
	21	22
	25	24
	26	25
	30	26
	31	28

Table 61.--Geomagnetic planetary three-hour-range indices Kp

	January 1943			February 1943			March 1943		
E	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum
1	0o0o0o0+	0o1+3-3o	7+	3-1o1o1-	1o1+1o3-	11+	0o2-1-1o	2+3o2-1o	11+
2	2-0+2-1+	1o3-2-1o	11+	1+1+2o1+	2o2-1o2-	12+	1+3-5+4+	3-1+1+1o	20o
3	1+2o1-1o	3-3-2-3-	15-	2+3-3-3-	3-2-3-2+	20-	1o1o2o3+	3-1o2+3+	17-
4	3-3-3-5o	5+5o4+3+	31o	3o4o3-4o	3-2-2o2+	22+	3-3o4o4o	3+2+4-5-	28-
5	5-3+3+3-	1o3o3-4-	24+	3o2o3o3-	3o3-3+1+	21o	3+4-4o3-	2o4-3-3-	25-
6	3+2+3-3-	2+2+2+2+	20+	4-2-2+2+	3-3o2+3o	21o	3-1+2o1o	2-1+3o2-	15-
7	1+1o1-0+	0+1-0+1o	6-	2o2o1+1o	1-1o2-2-	11+	2o2-1o1o	1+1+2+2o	13-
8	0+1+0o0o	1o2-2+3o	10-	2o2-1o1o	1o1o3-1+	12-	3+3+2o2o	2-2o2-2+	18+
9	3o3-3+3+	1-1+1-1o	16o	2o2-2o1+	1o1-2+1+	12+	3+2-2o2o	2-1+2-2+	16o
10	1-1+1+1+	1+1o1+3o	11+	0o1-1o1o	1o1+1+1+	8-	2-1-1-1o	1o1+1o2-	9o
11	1+1+1o0+	0+2-1-2-	8+	3-3o4-2+	2-0o1o1o	15+	3o2o1-1+	2o3-5o4-	20+
12	1+3-3-1o	1-0+1-2-	11o	1+2o1-1o	1+1-2-2o	11-	4o5-2-3o	3+4+4-3o	28-
13	2-1+1o1-	1-1-1-1+	8o	2+3o4-3-	3o2+2+2+	22-	2+1o0+0o	2-0+0+1o	7o
14	0+1o1-0o	0o0o0+0+	3-	2+2o2o2+	1o0o0+1+	11+	2+3+2+2+	2-2+0+1+	16o
15	0o0+0+0o	0o1-1o1o	3+	2-1o2o2o	1-0+1+0+	9+	1o1-0o1-	0+2-1-1-	6-
16	0+0o0+1-	2-3-2o2o	10-	0+0+1o0+	0+2-2o2-	8-	2+3o4o6-	3+3o5-4+	30+
17	3+2o3o5+	4+4+4o3o	29+	3o5-5+7-	4o3+4+4o	35+	4o1o2-4-	3+1-0+2o	17-
18	3-2+3+2+	2+2-3-1-	18o	3+4-4-3o	3o1+1-2+	21o	1+1o3-2o	1-2+2o1+	13+
19	2o2o2o1o	2o2+2-2o	15o	3+2-2+2+	2+3-1+1-	17-	1o1-2o2+	1o3+3+4o	18-
20	2-2+4-3+	3-5o7-6+	32-	0o2o0+2+	2o2o0+0+	9+	2+3o5o4+	3+4-6-1+	29-
21	5-4o4o5-	4+3+2o4+	31+	0o0o1o1+	1-1-1+1+	6+	2-2+2o3+	2-2+2o1+	17-
22	6-2+3o4-	4-5-4o4-	31-	0+0o0+2o	1+1o1+2-	8o	2-2+2-3o	2+3+4+5-	23+
23	3+3-2+2+	2o1+2-2+	18o	2-2-2o2o	1+2-3o3-	16o	5+5o5-4-	3+3-4o3-	31+
24	3+3-2-3o	2+2-2+2o	19o	3-3o2o2o	2-1o2-2+	16+	2-2-3o2-	3o4-1-0+	16-
25	2o2-2o1o	1+1o1-0+	10o	1-2o0+1+	1+3o4o4o	17-	1o3o1+1-	0+0+0+1-	8-
26	3o4-3+4+	2-3+1o2+	23-	5o5o3-3o	2-4-4-3o	28-	2o2-2-1-	0+1+1-2o	10+
27	2o1o0+2o	3o3o1+0+	13o	4-4-1+3-	2-1o2-2o	18-	2-0+0+1o	0+2-3-1+	9+
28	0+2o2+3o	2+3o3-1+	17o	1+2o1+1o	1-1-1o0+	8+	0o0o1o1o	1-0+2-1+	6o
29	2o1o1-1o	2-1-2-2o	11-				2+3o2-2+	3o4o7o6+	30-
30	4-3o2-1-	1-1-1o2+	14-				5o5-3+4-	3+3o4+4o	31+
31	1o2-1o1o	1+2o2-2-	11+				4o3+2o1o	2o4+3o4+	24o

	April 1943			May 1943			June 1943		
E	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum
1	3+4-3-2+	2o3o3o2+	22+	4+6+6+6o	4o5-5+6-	43-	2-2-2+2+	2-1o2+3o	16o
2	4-3-4-1+	3o2+1+3-	21-	5o3+4o4+	3o4+2o2o	28o	1o1+1+3o	3-1o1o1o	12+
3	6-6-5-4o	3+4+3o4o	35-	3o1-1-1o	1+4-2o4o	16+	1-1o2+1-	1o1o1-1+	9-
4	4o4o3o3o	4o3o5-3-	28+	2+3+3-1+	1+2o2-2+	17o	2-2-1+1o	1+1-0o0o	8-
5	5o3+3-3o	3o6-3-4+	30-	2-2-2+3o	3o3-2-2-	18-	2-1o1-1o	2-2-2o2+	12o
6	4o2+4o5-	5+4o2+4-	30+	3-1-0o2-	2-2-0+1-	9+	4-4o3o1+	2-1o1-1-	16o
7	5o4+3-2+	3+2-3+2+	25o	2+3-1+1o	1o1-1-1+	11o	0+1+1+3o	4o3o2o4-	19-
8	3o2o3o2o	2-1-1-1-	14-	1o1-0o0+	1-1o1-0+	5-	3-4o4-5-	4+5-4o4o	32o
9	1-1-0+0+	1o1-2-2-	7o	0+1-1o1-	1-1o1-1-	6-	3o5-4-5-	3+3+3o3-	28+
10	2-4o4o4+	4+2+5-4+	30-	1-0+1o1+	2-3-2-1o	10+	1+4-4o4-	2+4o1+4o	24+
11	5o6+6o4o	3-3-3+4-	34-	1-1+2-1-	1o3+2o3-	13+	1-0+2-3+	4+4o2o2+	19-
12	2+1-1-1o	2-1o1o1-	9o	2+5-3+2-	1+1-2-2-	17+	1o3-4-3o	3o2-3o2o	20o
13	0o1o1o1-	0+1+0+1+	6o	2o2o4o4-	4-4o2-3+	24+	6-4-2o2-	3o3+4o3+	27-
14	0+1-0+1-	1-1o1-1-	5o	4-3+2-3+	1+2o1+3o	20-	4o3+3+3+	2+2+1o1-	20+
15	0+1o1o2o	2+3-3-3o	15o	6-5+4o4-	2+2o2+3o	28+	1-2-1+1o	1-0+1-1+	8-
16	3o3o4-4-	3-2+3-2-	23-	1-0+1-4-	4-3o4o2o	18o	1o1-1-1o	1-1-0+1o	6o
17	2+2-3o2+	2-2o1o1+	15+	3+2+3o3o	2+4-6-5-	28o	1+1o0+0o	1-1-0+0o	4+
18	2-3o2o1+	1-1+1-1o	12-	6-6-5o5-	4o3o3o4o	35o	0o1-1-1o	1-1-1o1o	6-
19	2+2-1-1+	2-1-1o0+	10-	4-5o4o2o	3o2o3o3-	25+	1o1+1o3o	3-3+3-4+	19+
20	0o2-1+3-	3+3+1o3-	16o	2o1o1o1+	2o1-1o1+	10+	5+5-2+3+	3-3-3-4-	27+
21	4+4+4-5-	3+3+4-1+	29-	1+1o2-2-	1o1o1-0o	8+	4-3o3-4-	4o4+3+4-	28+
22	1+2o4-3-	1o1+0+1+	14-	0+1-1+1o	0+0+0+1o	5+	3o4+5-3+	3-3o4-3-	27+
23	0o1-1-1-	1-1-0+1-	4+	1o2o2+3o	2+2o2+3o	18o	3o3+3o3-	4+4o4-4o	28o
24	0+0+0o1-	1o0+0+1-	4-	6o4+3-2+	3o4-4+4+	31-	4o4+4+3+	3+4+3+3-	30-
25	3-3o2+2-	2-3o3-5-	22-	4+3o4+3-	4+3-3+3-	27+	3o3o3o3o	2+3o2+3o	23-
26	6o6-5+4-	3-3-3-3+	32o	2+2-1+1+	2-2+3-3-	16o	2-2o1o1o	1+1o1o2o	11o
27	4-1+2-1-	2-2+1+0+	13o	4-3+3o1+	1+2o3-4+	22-	3-1o1+2-	1+2-1o4-	14+
28	1o2-1o0+	1-1o3-3+	12-	5o5-4o4-	3o4o4-4o	32o	2+3+5-3o	4-3o4o3o	27o
29	3+2o4-2+	3-2-2o2+	21-	3-4-3-3-	2o2-3-2-	20-	3-3+2o1+	1-1-0+0+	11+
30	3-4+3+5o	3o2+3-3-	26o	2+2o3+1o	2-1+2-2o	15+	1o1+1o1+	1+1-0+1-	8-
31				1o1-1+1o	1+1+1+2o	10o			

	July 1943			August 1943			September 1943		
E	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum
1	1-1o2o0+	1-0+0+1-	6o	3+2+3+3o	4o4+4+3-	27+	6-4+4-4+	4+5o5-3-	35-
2	0+1o2-1o	1o0+1o3-	9o	3o3+5-3o	4-4o5-4-	30o	5-5-3+4o	5+3+5-4+	34+
3	3-4+4+3-	2+2o2-2-	22-	6-4-4o4-	4o2+4+4-	31+	5-5+5+5+	5+5-3+6-	40-
4	2o2o2+3+	4-5-5+4+	28-	3o4-4-3+	4+4+4+3+	30o	3+5o5o5-	4o3+4-2o	31o
5	5+5+5o4o	5-5o5+5o	40-	4+3+4o3+	4-3o3o2+	27o	4o5-3o4o	3-4o4-3o	29o
6	5+5o5-6-	5-4o4o4o	37+	2+2o4-3-	2o3o4+2o	22o	3+3o3o3-	1+3-2+1-	19o
7	3+3+3o4-	2+3o3-3+	25-	2o2o3o6-	4o3+1-1o	22-	3+2+1+1+	2-1+2-2o	15o
8	3+3o5-5-	4o3o3+2-	28-	3-4+3+5+	7-7+6+7+	43+	3-2o3-3-	2+4+6o5o	28-
9	3o3+6-5-	4-4+5+3+	33+	8-6+4+3-	3o3o2+4o	33+	6o5-4-4+	4o3+4o5+	35+
10	3o5-4-5-	4o4-2+2-	28-	4-3+2o2-	1o1-1o2+	16-	5+5-4-5o	4-4o3o4o	33+
11	2+4-5-4-	4o3-2+4-	27o	2+2-2-1+	1o1o2-2o	13-	5-5-3+2+	4-4-3o4+	30-
12	3+4-4-3+	2o3-3o3+	25o	2+1+2+1-	1o1+2o4o	15o	4o2+2o4+	2o3o4+3o	25o
13	4o3o3o2+	3o4-4-2+	25o	3+5o5o6-	6-4+5+6o	40+	5-5o3o4o	3+4+4+2+	31o
14	2+0+0+1-	0+1-2-0+	7-	4+3o3o4-	4o4o5o5-	32-	4o4o3-4+	3+2+4o4o	29-
15	1-1+2o2o	2+2+2+2o	15o	3o3o3+2+	3+4o4+4o	27+	4o3-3o2o	2+3-3o4-	23+
16	3o3o2o2-	2+2o3-2+	19o	4-3+5o5+	3+4-3o3+	31-	2+2o1+2-	2+4o3-2+	19-
17	4o2-1o1o	2o1+3-3+	17o	5+5-5o3-	3-3-4-4-	30+	3-4o3-1o	2-2-2o3-	18+
18	2+3o2+4o	4+4-4+3+	27+	3+4-5o6+	5o4o3+2-	32+	2-2+1o1o	1-0+2o5-	14-
19	3+3+4-2-	2o3o3-3+	23o	1o2+5-5o	4o5o5o5o	32o	4-4-3+3-	2o1+2-1+	20-
20	3o2-2o2o	2o2+2-2o	17-	6-5-5-5+	4-3o4-4+	35o	1o2o1o1o	3-2o2-3-	14o
21	3+3-3o3o	3+3o2+3o	24-	4o5-4o3+	3-2-1+2+	24o	4-3+4o5-	4-3o4o3o	29+
22	3-3-3+3+	3-2+3-3o	23-	2o1o1o1-	1+1-1+1+	9+	4o5-4o2o	4o4o2+2+	27+
23	2-2-3-2-	2-2o2-1+	14+	2-2o1o1o	3o1+3-4o	17-	3+4-3+3o	2-2o2o2o	21o
24	2-2+2-1-	1o1-0+0o	8+	4-5+5o2o	2+4-2+3-	27o	3+2o1+1o	1o1-2o2-	13o
25	1-1+1-0+	1-1-1-1+	6+	4o4+3+2+	3-3+3o3+	26+	2-4-4o3+	3-2o1o1+	20-
26	1+1o2-2+	2-1o3+2o	14+	3+4-5o3o	2+3-3o2-	25-	2o4-4+4o	6o5+5-5-	35-
27	3+2+2o2o	3-2+1o1+	17o	1+2+1o1-	1o1-2-1+	10o	5-4+4+5-	4o4-5+5-	36-
28	0+1+1+1+	2-1o1o1+	9+	2-3o2+4o	7o5+4-6o	33o	6o6-5-4+	5+4+3+5o	39-
29	2-2o1o1-	0o0+0+1+	7+	5-4+4o4o	5+5+5+3-	35o	4o6-6-5+	7-5-6o5-	43-
30	2+3+3o5-	4-4o4o3-	28-	5+6+6-6-	7-6o7-7o	49+	5+6+5-7o	5o4o5+6o	44-
31	3o2-2+4o	2+1+2+4o	21o	7o8+7+7+	8-7o6+5-	56-			

	October 1943			November 1943			December 1943		
E	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum
1	5o6-4o4o	5+5-5-5+	39-	4-3+4o4+	5o4+4+2+	31+	0o0o1o2-	2-3o3-3+	13+
2	6-4o4-5-	5-5o6-5-	38o	2+2-2+2+	0+2o1+1-	13o	2-3-2-2o	2o5-5+4o	24o
3	4+4o5+5+	5-5+4-5+	38o	1o2-1+0+	1-0+1o2o	8+	3+4o4-2o	4+5-4+4o	30+
4	4+4+4-4+	4-4-2o2+	28+	1o1+1-1-	1+1o1-2o	9-	4-3+3-3-	4o3o4-4-	27-
5	3+3-2o1+	2-1o2+2-	16o	2o3+3o3o	4-3-2+2-	22-	3o5o3o2+	3o3+2+2-	24-
6	2o3-2-1o	1-1-0+1-	10-	2o3+3o2+	4-6o5-5-	30-	0+0o0o0+	0o1-0o0+	2-
7	3+2+1o2o	4o3+3o4+	23+	3+2+4o3o	1o1o4o3+	22o	1+1-1-2-	1+1-0+0+	7o
8	4o2+3-6-	5-4+4o5o	33-	2+3+4-3+	2o2+2o3-	22-	1o2-1o1+	1+2+1+0+	10+
9	4-5o6+5-	4-5+5+4o	38o	3+3-4o1-	1o2-2o2o	17+	2o3-3o2+	2-3-2-2-	18-
10	3o3o4-2+	3+6-3-2-	25+	2+1+1+1+	1+2-4o3o	16+	3-2-2-2o	3-2+1-1o	15-
11	2o2-3+3+	3o2-3o3o	21o	1+2-1o0+	0+0+1o0+	6+	1-1-1-1+	1o1o1o0+	7-
12	3+4-3+2o	0+2-3o3o	20+	0o0+0+2o	2+2-1+1-	9-	1-0o0+1-	0+1o1+2-	6o
13	3-3-1o1o	2+1o1-1+	13-	0o0o0o1-	1-1+2o2o	7-	3o1+0+1-	0+0o2o1-	8+
14	2o1-1-1o	1-1-2o1-	8+	1+2o1+0+	1-2-2-1-	10-	0o0+1-2-	3o4-1+1+	12o
15	0+0+0o1+	1o0+1-0+	4+	0+1o0+0+	1-1+2o1+	7+	2-0+0+1-	0+1o3-4-	11-
16	1o2-1-1-	1+1o1-2o	9o	3-4o2-2-	3o3-3o3+	22o	4-2o5o6-	6-4+4+4+	35o
17	1-2+3+4-	3+2o2+3o	21-	1o0+1-0+	0+0+0+1-	4o	5o5o4-5o	4+5-3o4o	35-
18	1o0+1o1o	1o3-3-3o	13-	1o1+2-2o	3-3o3-1+	16-	4+4-3+3+	5-3o4o2+	29-
19	3o3-2+2+	2+2-2o1o	17+	1+5-7-6o	6o4+4o6o	39o	4o3+4+4+	4o6o6o4o	36o
20	1-1+1o1+	2-4-5+3o	18o	5o6-5+5o	4o5+4+3o	38-	5-3-4-4+	4+5-4-5-	33-
21	4+3-2o1-	0+0+1-1-	12-	5+5-5-5-	5-5o4+4-	37o	5-3-2-3-	3+2-5o5o	27-
22	1+2-3+5o	4-4+3+5-	27+	3o4o4-3+	4o5o4-4-	30+	4-3+3-4o	3+4o3+4-	28o
23	4+3-2-1o	3o1+1o3-	18-	4-4+4o4o	4+5o6o6o	37+	2+3-3o3+	4-2o3o2+	22+
24	4-3+3o7-	5+5-5-5-	36o	5o4o4o4-	5o5-5o4o	35+	2+3-2o2o	2o2-2+2-	17-
25	6-4+5o4+	5-4+5-4o	37o	4o4+4+5-	5o5o6o5o	38+	1+4+2+3+	1o1o3-2+	18+
26	5o6-6-5+	6-5-4+4o	40+	3o5-4+3+	5+6-5-5+	36+	3+1+2-3-	3o4+3+3+	23o
27	4-4+5o4-	2o3+5+5+	33-	5+6+6-4+	4+3o4o4+	37+	1+3-2-2o	2+1o1+1o	13+
28	6-6o4+4-	4-5+5-4+	38-	4o4-5-5o	2-2o4o3o	28o	2o1+2o0+	0o0o0o0+	6o
29	5-5-4+5-	5+4+5+4o	37+	4o5o4+3+	4+4-4o2o	31-	1o2o2-3o	1-3-3o2-	16-
30	4+4o5-4o	5o4o4-5-	34+	2o2-2o1+	3o3+1-1-	15-	1o1-1-1-	3-2-1-1o	9o
31	4-5+4-5o	5o4-5o4o	35+				1-1-2+3o	3o3+3o5-	21-

Table 61.--Geomagnetic planetary three-hour-range indices Kp (continued)

	January 1944			February 1944			March 1944		
E	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum
1	3o2-2o2+	5o4+4-3-	25-	2+1o0o1o	1+1-2-1-	9-	2-2+2+1-	0+1-1o2o	11o
2	2o2o2o1-	2-2+2+1+	14+	0+3-3-1+	1-1-1+2o	12-	3-3+1-1+	3-2o3o1+	17o
3	1o0+1-1o	2o0o0+0+	6-	1o1o0+1-	1-0+1o1-	6-	2+2o1+1o	0o0+0+1-	8o
4	2o2o1o1-	0+1+2-3-	12-	1-2o1+2-	3-3-3-1o	15-	2+3-5-6-	5-3o3-3-	28+
5	5-3o3-3-	1o3+2+2o	22-	0+1o2-1-	1o1+2o2o	10o	2-1o1-2o	2o3+3o3-	16+
6	1-1-0+0+	2-1+2+3-	10o	2o1-1-1o	1o1-1-0+	7o	3+5-3o4-	3+3o4+3+	29-
7	2o2o1o1o	1-1+1o1o	10o	2o2o3+5o	6o5+5o5+	34o	5-5-4-3+	5o5+2o3+	32o
8	1o2-1+2-	1o2o2-1-	11o	5o4o4-3o	4-4-4o5+	32+	2+4-2+3-	4+4-5o3o	27o
9	3-1+0+1o	1-2+1-2+	11+	1+3-5-4-	4+4o3+2+	26+	4+5-2+5o	4o4o4-4o	32o
10	1+1o2-2o	2o2+3-6-	19-	3-4o4-4+	3o3+4o2+	27+	4o5-5o5-	5+5-5-4+	37+
11	3+4+3-5-	3-6-6-3-	32-	4o3+3+4o	4-3+3o3o	28-	3-4-3o4-	2-2-4o2o	22+
12	3o4+4+4-	5-4+3o3o	30+	3+4-3o3-	4-3o3o1+	24-	3o4o3+3+	4-5o4o4+	31-
13	5o4o4+4o	5-3o4+4-	33o	1+1o3-2-	2-3o3-5o	19o	4o3+3-2+	4+4o2-1o	23+
14	4o4-3o4-	4o6-5-3o	32-	5+6+7-5o	4+3+3o3o	37o	3-4-4-3+	2o1+3o1-	20+
15	4+4o3+2o	3+4-5-5-	30o	4+4-3-3o	4o4o4o4o	30-	1-3-1+1-	1+0+2o3-	12-
16	4+3-4o4+	5-4+3-3o	30o	3o2+3o2+	2o2o1-2+	18-	3-4-1+2+	2o2o0+0+	15-
17	3+3+4-4-	4+4-4-3+	29o	2o1-1-1+	2o1+1o2o	11o	0+0+0+0+	0+0+0+0+	3-
18	2o3o3o5-	3+4o4o3o	27o	1-1o0+2o	1+0+0o0o	6-	0o0o2o1o	1+2o4o5+	16-
19	3+3+3o2-	1o4-3-3-	21+	0+1o1+2-	1o1-0o0o	6o	6+5+2+4-	3+1+4-5-	31-
20	3-2-2+2+	2+3o3-3+	20+	1-1-1o4-	5-4-3o4-	21o	3+1o3-2+	1+0+2-1o	14-
21	3-2+1-1-	2o2-2o1o	13o	4-3-2o3-	1+2o2-2o	18o	2-3o1-0+	1-1o2-3o	12o
22	3o1+2-1-	1+1+2o1-	12o	3-3-1o0+	0+1-1-0+	9-	3+4-2+3o	3+2+2-1+	21o
23	2-2+1o2-	0o0o1o3+	11o	1-2o1+1-	1+1-1-2-	9o	1o3-2o1+	1o2-3o3o	16-
24	3-1o1+0+	1o3o1o0o	10+	1o1+0+1-	0+0+1o2o	7o	1-0+1-1o	1o1+0o0o	5o
25	0o1-0+1o	2-2+1-3-	9+	2o1o1-0+	0+0+0o1-	5+	0+1o1o2o	2o2+3+3+	15+
26	0+0o1-2-	3-3+3o4-	15+	1-1-1o1+	0+0+1o1o	6+	4-4+5+5-	6o2+2o5+	34-
27	3o3-3-3o	3-2+3o3-	22o	2o0+1-1-	1-0+0+0+	5+	7+7o6-6-	3+3o4-2+	38o
28	3o2+3-2+	1o2-2+1o	16+	2-1+1o1+	1+0+2-1o	10-	2-1+1+2+	2+3-2+4o	18o
29	2-1o1o1+	2+2-2-2-	12+	1-2+2o2-	2o2o2+2+	15+	5-5o5o4-	2+3-3-2o	28o
30	1-2o0+1o	1o1o1o1+	8+				4-3-3+2-	2+3+2o5-	24-
31	1+1o1-1-	1-3-2+2+	12-				3o3o3o2+	2+0o1o2-	16+

	April 1944			May 1944			June 1944		
E	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum	1 2 3 4	5 6 7 8	Sum
1	3-1-1o2-	2-1+4o4+	17+	3+3-3-3+	6o6-4+5-	33-	2+1-1+1o	1+2o2o0+	11o
2	4+5o8o8+	6o4o5o4o	45-	4-5o4+5o	4+3o2o2o	29+	1-1+1+2+	1+1-2-1+	11-
3	5o5o4-2o	2o2o3o3o	26-	3-3-2o1+	3+2o1o1+	16+	0+1-1+1-	1-0+1o1o	6o
4	3o3+4+5+	4-3+3o3o	29o	1o1-1-4-	3o3+5o5o	22+	1-1-1-1-	1-1-3+3o	10+
5	3o5-3o4o	3-4o4+4o	30-	4+2+2+3+	4o3o3+2-	24+	2o1o1+2-	2+3-2o1o	14o
6	3+3o5o5o	3o4+4-3-	30o	4o2+3-4o	3+4-4+2+	27-	2-1o1-1-	1o1+2-0+	8+
7	4+3-3+3-	2o3+5-5o	28o	2o3-4o3-	3o3+3o3-	23+	0o0+1-1o	1o2-1o0+	6o
8	4-2o1-3-	5+2-3+2+	22-	3+3+3o3-	1o1-1o2-	17-	0+1o0+0+	1-1o1-1-	5o
9	1o2-1+1o	1-2o3+4o	15o	0+1-1+1-	0+1-2+1+	8-	1+2-1+1o	2-2-1o2-	11+
10	3+5o6-4o	3+3o1+3-	28+	2+1-0+0+	1-1-1-2-	7+	2o1o1-1o	1+1o1o1o	9o
11	3+2-2+2o	1+3+3o4-	21-	1+2-1+1-	1o1o1o2-	10-	1o1-1+1o	1+2+2o2o	12-
12	4+3-2+1+	1+0+1o0+	14-	2-1-1-2-	1o1+2-2o	11-	1o1o1-1-	1-1-0+0o	5o
13	0+1o0+0o	0o0o0o0+	2o	0+1-0+1-	0+0+0+1+	4+	0o1o1o1o	2-1+2-2o	10-
14	0o0o0+1+	0+0+0o0o	2+	0+1+2-1o	1-0+0+1o	7-	2o1o1-2-	3-1-1+4o	14o
15	2-0+0+1o	3-3-3o4+	16o	3-2+2o1-	0+0+0+0+	9o	4o3+4-2o	3-3+3o3+	25+
16	5+4o5-4+	4+6-3+2+	34o	0o1-1-0+	1o0+0+0+	4-	3o2-3o3-	3-2o2o3-	20-
17	4-3o1o2-	2o2-1+2+	17-	2-1o1-1-	1o0o0+2-	7o	2o1+2o1o	1o2o1-3-	13-
18	4-1o1+1-	0+1-1-2-	10o	1o1-1-1+	1-0o1-1+	6+	2o2o2o1o	1+1o1-1o	11o
19	2o0o0+1-	1o1o1+1-	7o	1+0+1o1-	1+0+1o1o	7o	1o2-1-2-	1+1-0+2+	10-
20	2-2o1o1o	1o1o1o0+	9o	0+0+0o0+	0+0+0o0o	2-	2+3-3-2+	2-1+2+3+	19-
21	0+1o1o1o	3-1+1-0+	8+	1-1-1-1o	0+1-0+1+	6-	3-4+4+4-	2o2o2o2o	23o
22	0+0+0+1-	0+1-0o0+	3o	0+0+1o1-	1o1o2-2-	8-	3+4+3+4o	2+5-2o3+	27+
23	0o0o0+0+	1-0+0+0o	2o	1o2o1o1+	2-2-2-2-	12o	2o2-5-2o	2o4-2o3-	21-
24	3+4-4-2+	3o2-2-2+	22-	3o2+4-3o	2-1+2+3-	20o	2+2o2o1+	1+1o1-1-	11+
25	3+2o2-1-	1-1o2+3-	14+	1o2+2-1o	2-1o2+2-	13-	1-1o1-0+	1-2-2o1-	8-
26	2+3-2+1+	1o2+3-2+	17o	3o2o2-2-	1+2-1+1o	14-	2-2+2o3-	4-4o4o4o	24+
27	2+3-2-3o	2+2+4-3-	21-	2+3o2+3o	2+1o1o1-	16-	3+3o2o3o	2-2+2-2+	19+
28	3+3-2+2o	2+2+3o1+	19+	1-1-2-2-	2-1+1+2+	11+	1o1+1+2o	2-1+1-2+	12-
29	1o3-3o2+	3o2+2o1+	18-	3+3-3-4-	3o4-3+6o	28+	3-4+2+1+	1+2-1o1o	16-
30	2+4o5+5-	2o3-1+3+	26-	4-2+3o3o	3o2-1-1+	19-	2o1o2+2o	2+1+0+2-	13o
31				1o2+3-1o	1+4-2o3-	17-			

	July 1944		August 1944		September 1944	
E	1 2 3 4 5 6 7 8	Sum	1 2 3 4 5 6 7 8	Sum	1 2 3 4 5 6 7 8	Sum
1	2+1+1-1- 2-2-2-1+	11+	2o2o2o2+ 3o1o1-1-	14-	4+2-2-3- 3o1+1o3-	18+
2	2o2o2o2- 2-1o1+2-	13+	1+2-2-2- 3-3o3+5o	20+	5-5-4+4- 3o3+4-3+	31-
3	1-1o2o2o 2-1+1+2o	12o	6+6+5+5- 3+1+3-3o	33o	3-1o3+3o 1+1+1o1o	15-
4	2+1+0o1- 0+1-3-1-	9-	3o1o1+1+ 2-1o1+1o	12-	2-1o0+1+ 1+1+3+3+	14-
5	2o2-2-1o 1o1+1o1-	10+	1o1o0+2- 1+2-2-3o	12-	3+2o2-2o 1+1+0+1o	13o
6	1o1+1+1o 1o1-1o2+	10-	2+2+3-2o 1+2-1+1+	15o	1+0+0+2+ 1+2+1+2o	11+
7	3o3-1+1+ 2-1+1o1+	14-	2o1+1-1o 2o2-1-1+	11-	1o3-3-2+ 1-1o1-0+	11+
8	0+1+1o1+ 1o0+2-1+	8+	1-1o1-2- 1+3-3o2-	13-	1-1o1+2o 2+2+3o3+	16o
9	3-2-4-3+ 2o2-2-1+	18o	2o2o1+1o 1o2-1+1o	11+	3-2+0+1o 1-0+2o2-	11o
10	2o2-1o1- 2-2o3o2-	14-	1+2-3+3- 2+2+1+2o	17o	2-2o2+1+ 1o2o2o2+	15-
11	2o2o2-1- 1-1-1-1-	9o	4-3-2o1o 1+1o2+4-	18-	2o2+2+2- 2-1o2-3o	16-
12	1-1+1-1- 1-1o1o2o	8o	4-4-2o2o 2o2o1o2o	18+	2+2+3o3+ 2+1+1+2o	18o
13	2o1+2-1o 1+1o1o1+	11-	3-1o2+2- 1o1o2-1-	12o	2o0o0o1o 1+2+2o3o	12-
14	1-0+2o3o 1o2o1+2o	12+	1o0+0+1o 2-1o3-2+	10+	3o3+2+1+ 3o2+2o1-	18o
15	2+2+3o2+ 3-1+2-2-	17+	2-2o2o1+ 1+1-1o1o	11o	1+2+1+2o 1-0o0o1-	8+
16	1o2-2o1o 2+2-3o2o	15-	1-1-1o2- 2-2o1o2o	11-	0+2o2-1- 1+2o1-1-	9+
17	1+3+3-2o 2-1+2-1o	15o	3-2+1-1- 1-1-1o1o	10-	1-1-1-1+ 2-2o0+1o	8+
18	1+1+1o1- 1-1-2+3-	11-	3o2o6-4o 3-2+3+2-	25-	4-3+3-2- 2-1o2o1-	17-
19	3-2-2-2+ 3o1+1o2o	16-	3o2+3-1+ 1o1o1-1+	13+	1o0+1-1- 2-0+0+0o	5o
20	2o2+3+3+ 3o1-1o2-	17+	2+1+1o1o 2-1-1o1+	10+	0o0o1o1o 2-2-2+4o	12-
21	1o2-2+3- 2+2-2o2+	16o	2-1o1-1o 0+1-1+1-	7+	5+4o3+3+ 2+2-2o2o	24o
22	1+1+2+2- 1+2-2+2-	14-	1+2-1o2- 1o1-0+2+	10o	3-2-1o1+ 1+1+3-4o	16o
23	1o1-2o2o 1o1+0+1-	9o	4-2o3-2o 3-2-2o1+	18o	3+3o2-2o 1o2-3o4+	20o
24	0+0+1o0+ 0+0+1-1o	4+	2o3+3+3- 4o3-1o1o	20o	5+3+5-5- 4o2-2-4-	29o
25	1o1+1-0+ 1-0+0+0+	5o	0+1+0+0+ 1-1+0+0+	5o	3o3o2-2- 2o1+3+3-	19-
26	0+1o1-1+ 1-0+1-1-	6-	1-0+0+0+ 1o2-2o3-	9o	4+2+2o2o 2+2+2o3-	20o
27	0o0o1-0+ 1o1+1o1+	6-	2o2-2o0+ 1-1o3+2o	13o	1o3o4-2+ 2o3+3+3o	22-
28	1o0+0+0+ 1o1+1+2+	8o	2o3-5o4- 4-3o3o3o	26o	1+3-2o1+ 1-1+2-1+	12+
29	2-1o0+1o 1-1o2-2-	9o	1o0+1-2- 2-2-1o1+	9+	1o3-2o2+ 2-1o2+2o	15o
30	1+1+1+2- 1+1+1o2-	11o	3-3-2o2+ 2o1+3-2-	17+	1-1o1+2- 5-6o6o5-	26o
31	2+2+1+2o 1+0+1+2o	13o	3o4-4-4- 1+4-3-3-	24+		

	October 1944		November 1944		December 1944	
E	1 2 3 4 5 6 7 8	Sum	1 2 3 4 5 6 7 8	Sum	1 2 3 4 5 6 7 8	Sum
1	4o3-2+4+ 4-4o3+4+	29-	1o0+0+1- 1-1-1-2o	6+	2-0+1o2o 3-3o2+2-	15-
2	2o0o0+2- 2-1+2+3-	12o	1o2+1-1+ 0+1-1o1o	8+	3+2+3o2+ 2o3+4+2+	23o
3	3o4-4-3- 3-3+4o3+	26+	0o1-1+2+ 3o3-1o1-	12-	3o3+3o2- 2o1+2o2o	18+
4	3o1o0+2o 1-3-3-1+	14-	2o2+3o3o 4-3+2o2o	21+	2o3o1+1- 1o0+2o1+	12-
5	2+2+1+1o 1o1o0+1-	10o	3o5o4+3o 3+4-4-5+	31+	1+2-1+2+ 2-1+1o2+	13o
6	2-2+2o1+ 1-3o4-3+	18o	3o4-4+3- 4-1+1o1o	21-	3-2+1+2- 1-2-1+1-	12+
7	2+2+1o1- 2+1o3-1+	14-	1o1-1-1- 2+2+2-2o	11+	1o0o1-0+ 0+0o0o0+	3-
8	1o1-0o0+ 0+0+1-1+	5-	2o2+3-2- 1-0+0o0+	10o	0o0o1+0o 1o1o1o2-	6o
9	2+1+2o1+ 0o0o0+0+	8-	2+2o3-2- 1o1-3-1+	14+	3-3-1o1- 0+1o2-1+	11+
10	0o0o1o1+ 1o1-2+4-	10o	0+0+2o2+ 3o4o3o0o	15o	2-2-0+1o 1-1-1+0+	8-
11	6-6o2o1+ 3+5+3o3+	30o	0+1+1o1o 1+2+1+0o	9-	1+1o1o1+ 1-1-0o0o	6o
12	2o3-2-2- 2-2+3-3o	18-	2-1o2-1- 0+0+0o0o	6-	1o1+0+1o 0+0+1+1-	6+
13	3-1-1o1- 3o3+2+3+	17o	0o0o0o0+ 0+0o0+0+	1+	1+2o2o3o 3o4+4-3+	23-
14	3-2-2o4- 3o4+4o6+	28-	1-1-0+0+ 1o1o1+1o	6+	4o5o4o3- 4o2o0+0o	22o
15	6o6o3+3+ 2o3-3+5+	32o	2-2-0+0o 0+0o0+1o	5+	1-1-2-1+ 1-1-3o4o	13-
16	3-1+4-2- 2o3-2+2+	19-	1+2o2o2- 1+0+0+0o	9o	4o4-4+6o 8o8+5o3o	42+
17	3-2+3+3o 2o1-1-4-	18+	0o0o0+0+ 0+0o1-2o	4-	2+5o6o6- 6o6+5+6+	43o
18	4-3-2o3o 2-2o1+1-	17o	3+1+1+1- 3-3-1o1o	14o	4o5-4o3- 3-3o3-2o	26-
19	2-1o1o2+ 0+0+1-0o	7+	3+3-2-2- 2o2+1+1-	16-	1+2+2o3- 1o2+3-2o	16+
20	0+0+0+1o 0+1+2+3+	9+	2o4-3o3- 4o5-3+4-	27o	1+2+3-1+ 1-2o2+3o	16-
21	2-1o1+1+ 1-1o2-2-	10+	2o0+1-1o 0o0o0+1-	5o	4o4-2o1+ 2o2o1+2-	18o
22	2-2-2-1o 1+2-1+1o	11+	0+0o0o0+ 0+2o1o1o	5o	2o1o0+1- 2-2o3o3o	14-
23	2-2-2o1o 1o4o4-4+	19+	2o1+1o1o 1-1o1-0+	8o	2o2-2-1+ 1o1o1o1+	11o
24	4+3o4-3+ 3-2+4-3-	26-	0+1o1-0o 0o0o0o0+	2+	0o0o0+1- 1-1+1-0+	4o
25	2+2o1o1o 1-1o3+2+	14-	0o0o0o0+ 0+0o1-0+	2-	1o0+0+1+ 1-1-0+1o	6-
26	4o4-4o2o 0+1o3-2o	20-	3+2-1o1- 1+1+0+0+	10o	1-1-0+3- 2+3-2+2+	14o
27	3-2-1-1o 2o4-2-1o	14+	1-1o1o0+ 0+0+1-0+	5-	4-4-3o4+ 5-6-5-5+	35o
28	2-3-3-2- 2o1+2+2-	16o	0+0o0o0+ 0o1-2o1+	5-	5+2o2o3- 3o3-1+1+	20+
29	1o1o0o1- 1-1+2o2o	9-	0+2o0+1- 1o1-1o0+	6+	1o3o2+2+ 1+2+4-3-	19-
30	2o2+2o1+ 0+0o0+1o	9+	2o2-1o1- 2o2o1+2-	12+	4-4-3o2+ 3+3o3-4o	26-
31	3-3o3+2+ 2+3o3o2+	22o			1+2-1+1o 2+2o2o3+	15o

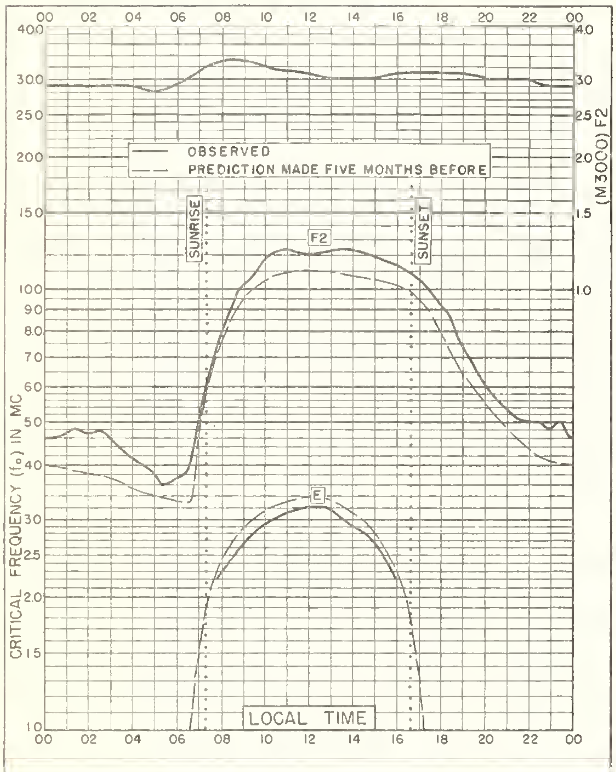


Fig 1 WASHINGTON, D. C.
38.7°N, 77.1°W DECEMBER 1949

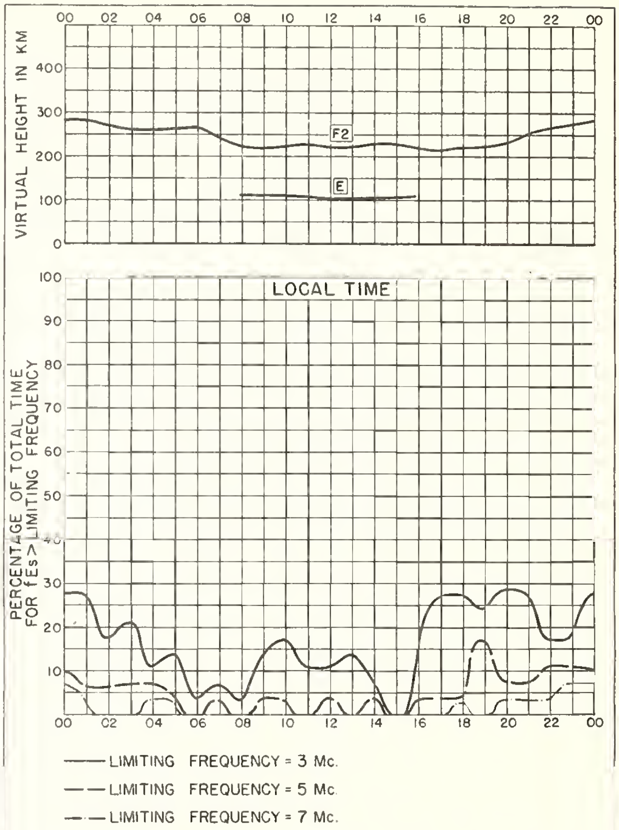


Fig. 2 WASHINGTON, D. C. DECEMBER 1949

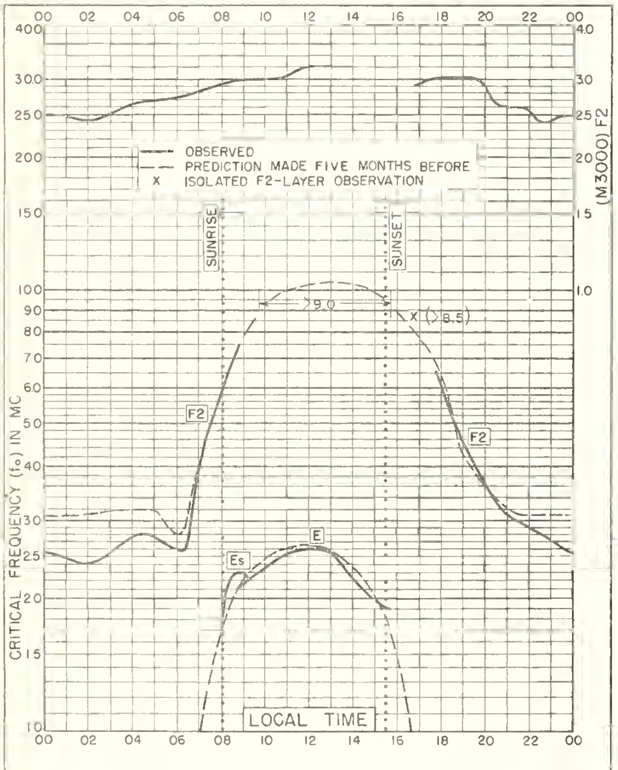


Fig 3. OSLO, NORWAY
60.0°N, 11.0°E NOVEMBER 1949

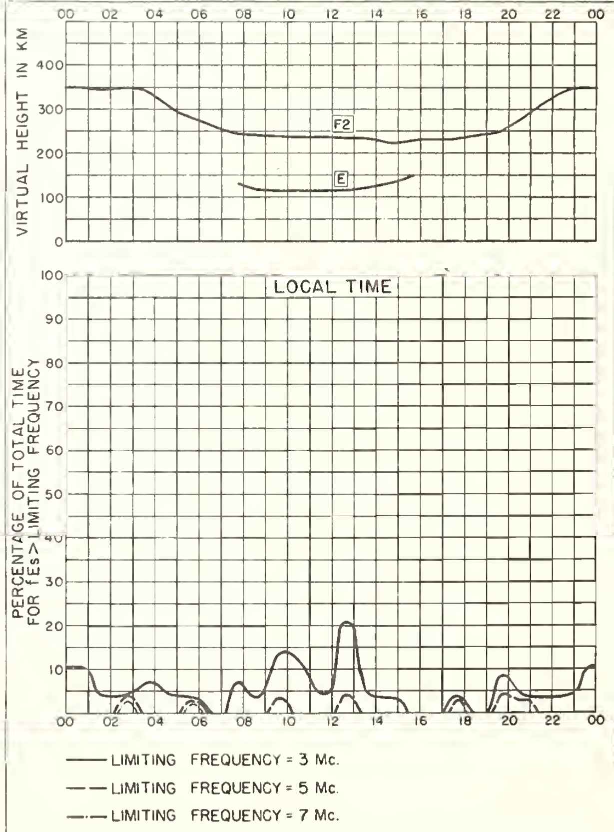


Fig. 4 OSLO, NORWAY NOVEMBER 1949

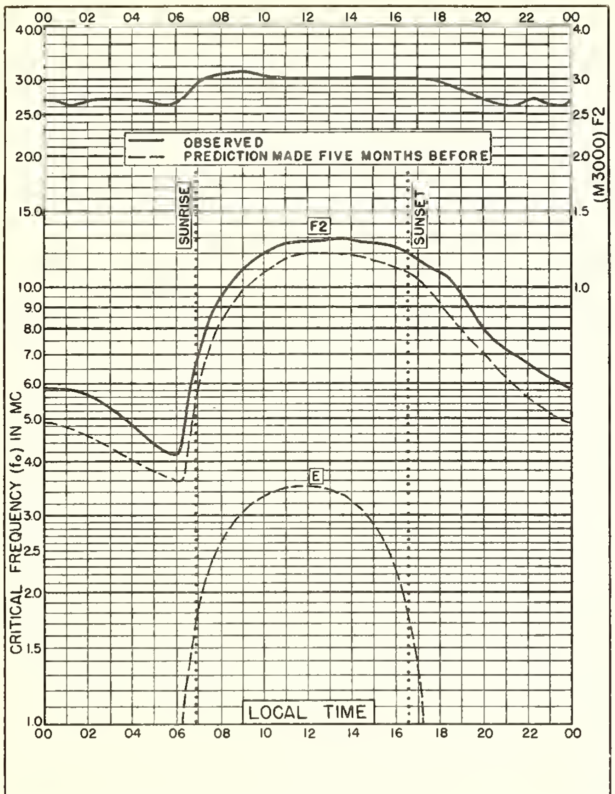


Fig. 5. BOSTON, MASSACHUSETTS
42.4°N, 71.2°W NOVEMBER 1949

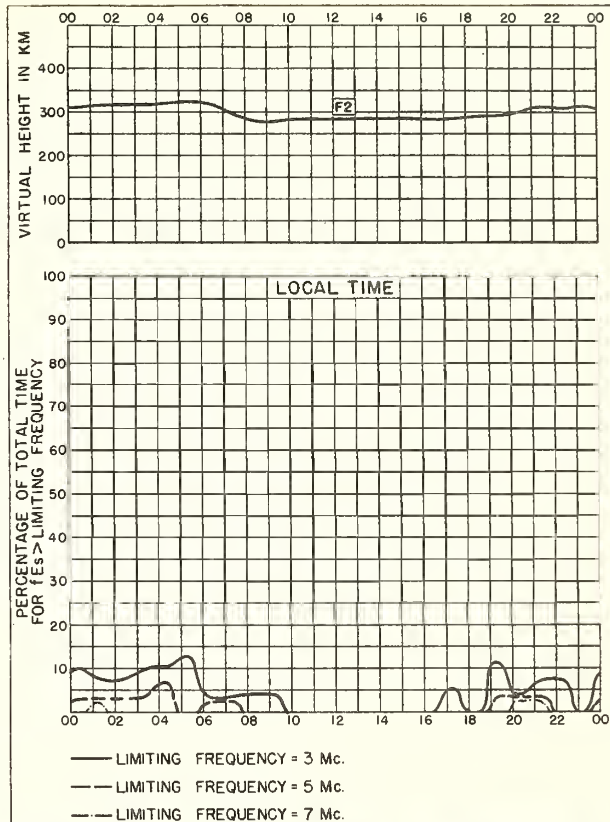


Fig. 6. BOSTON, MASSACHUSETTS NOVEMBER 1949

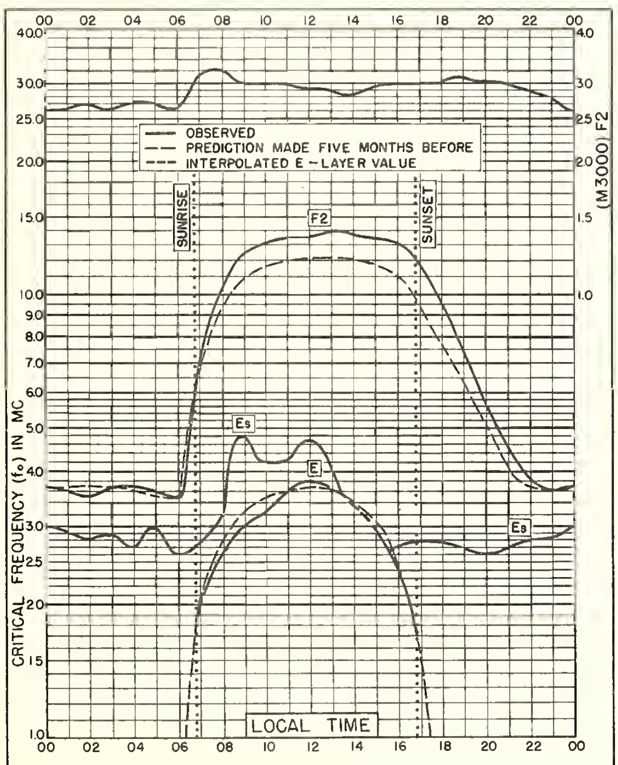


Fig. 7. SAN FRANCISCO, CALIFORNIA
37.4°N, 122.2°W NOVEMBER 1949

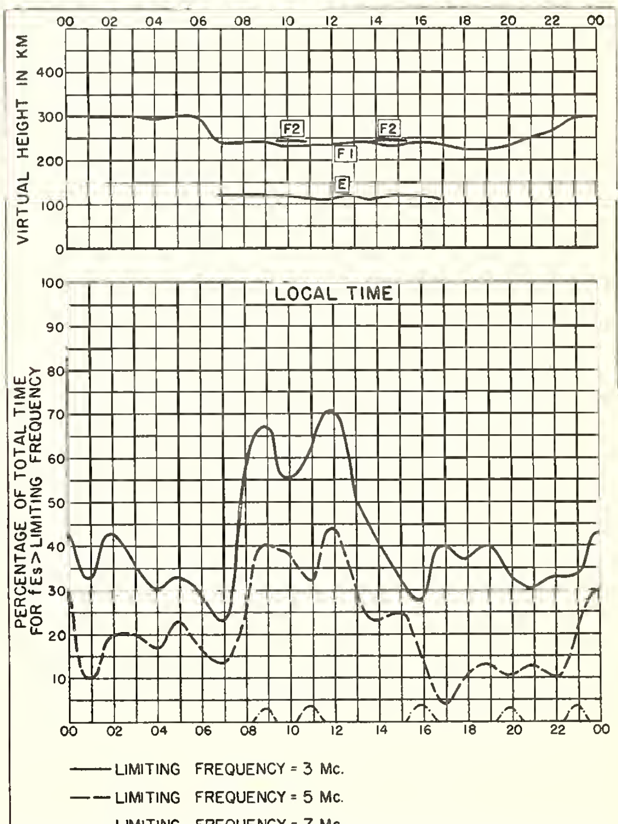


Fig. 8. SAN FRANCISCO, CALIFORNIA NOVEMBER 1949

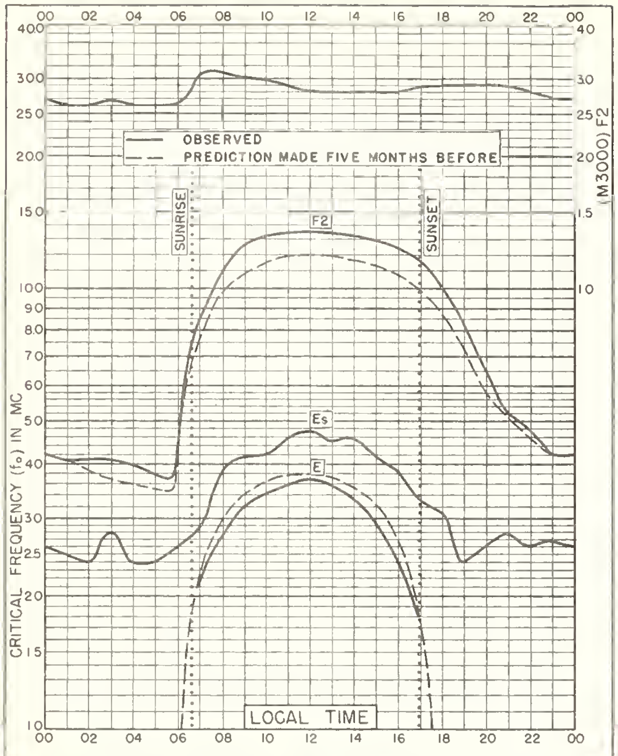


Fig 9. WHITE SANDS, NEW MEXICO
32.3°N, 106.5°W NOVEMBER 1949

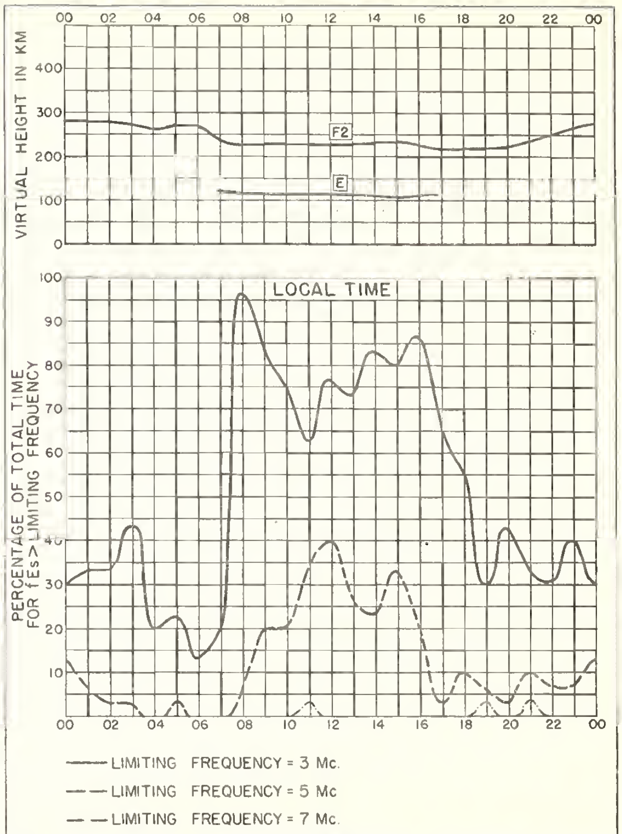


Fig 10. WHITE SANDS, NEW MEXICO NOVEMBER 1949

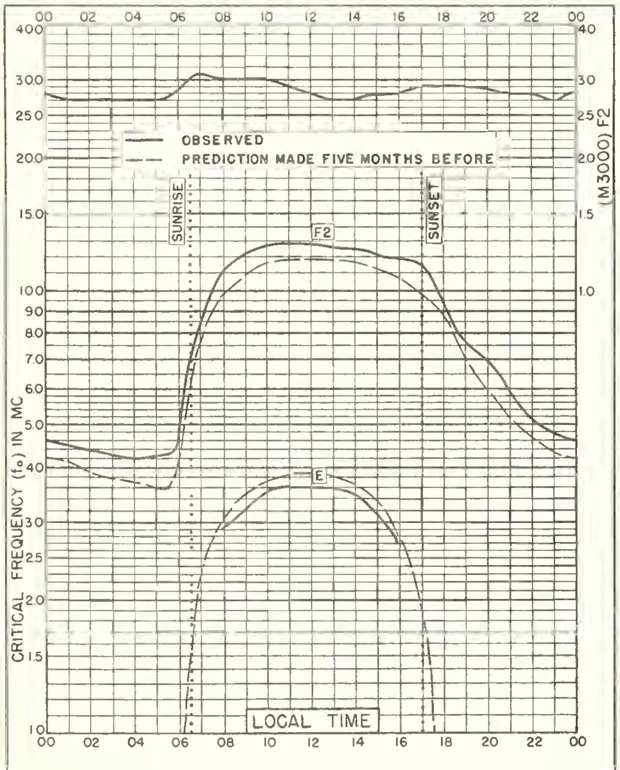


Fig. 11. BATON ROUGE, LOUISIANA
30.5°N, 91.2°W NOVEMBER 1949

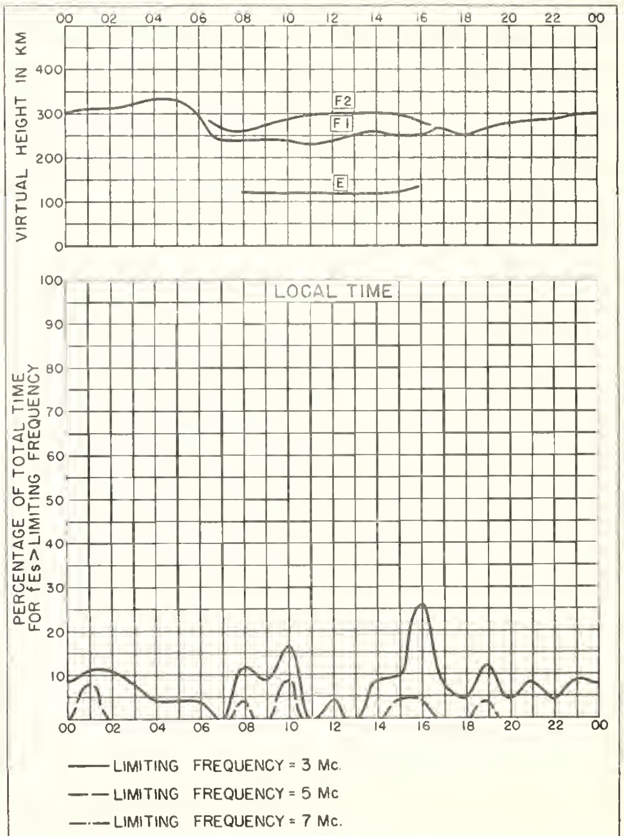


Fig. 12. BATON ROUGE, LOUISIANA NOVEMBER 1949

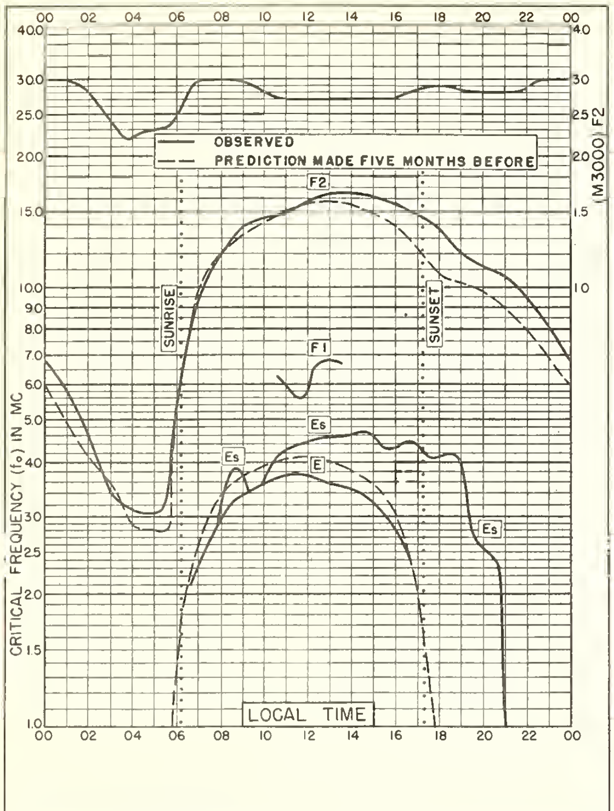


Fig. 13. MAUI, HAWAII
20.8°N, 156.5°W NOVEMBER 1949

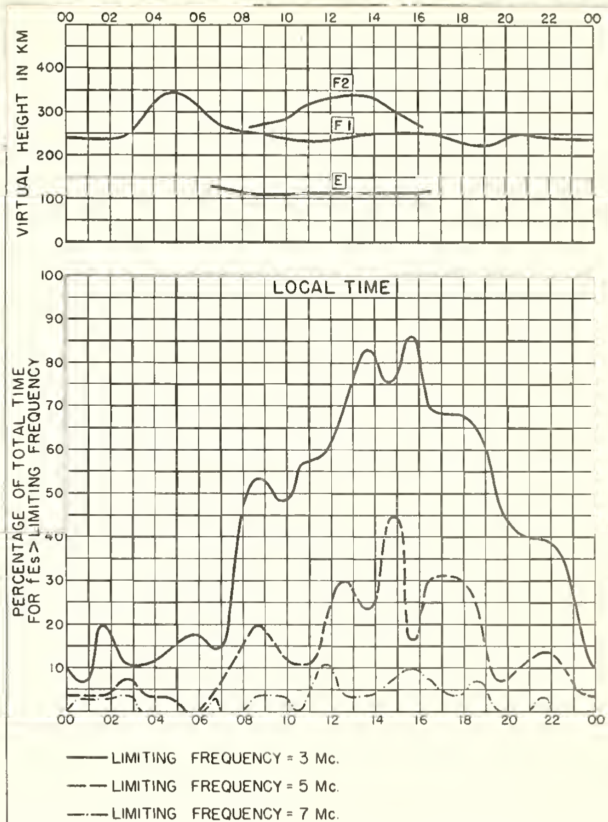


Fig. 14. MAUI, HAWAII NOVEMBER 1949

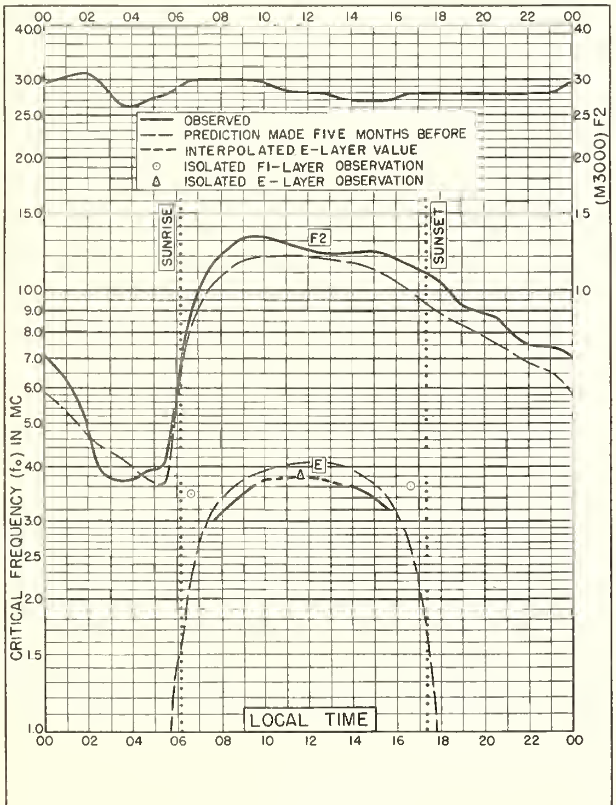


Fig. 15. SAN JUAN, PUERTO RICO
18.4°N, 66.1°W NOVEMBER 1949

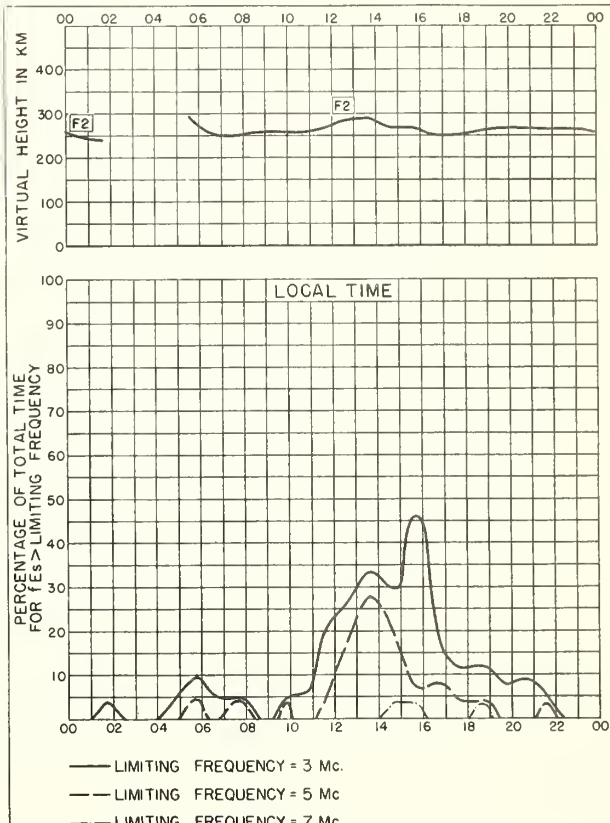


Fig. 16. SAN JUAN, PUERTO RICO NOVEMBER 1949

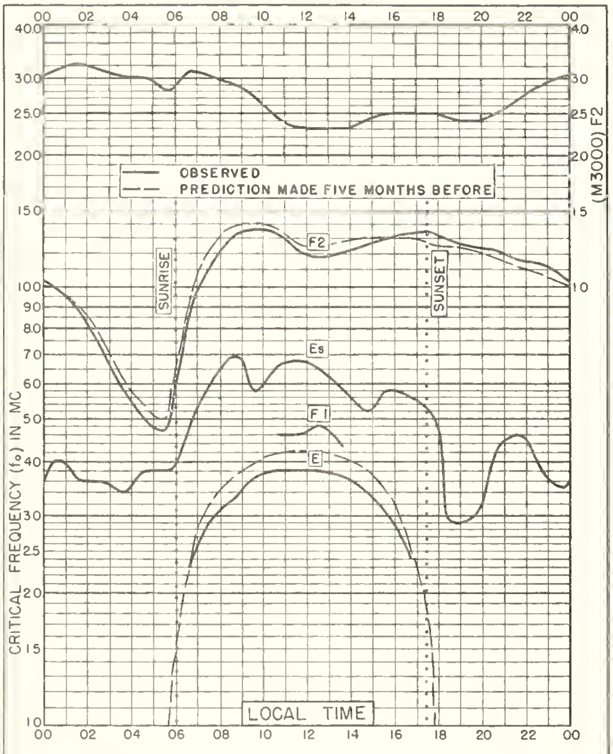


Fig. 17. GUAM I
13.6°N, 144.9°E NOVEMBER 1949

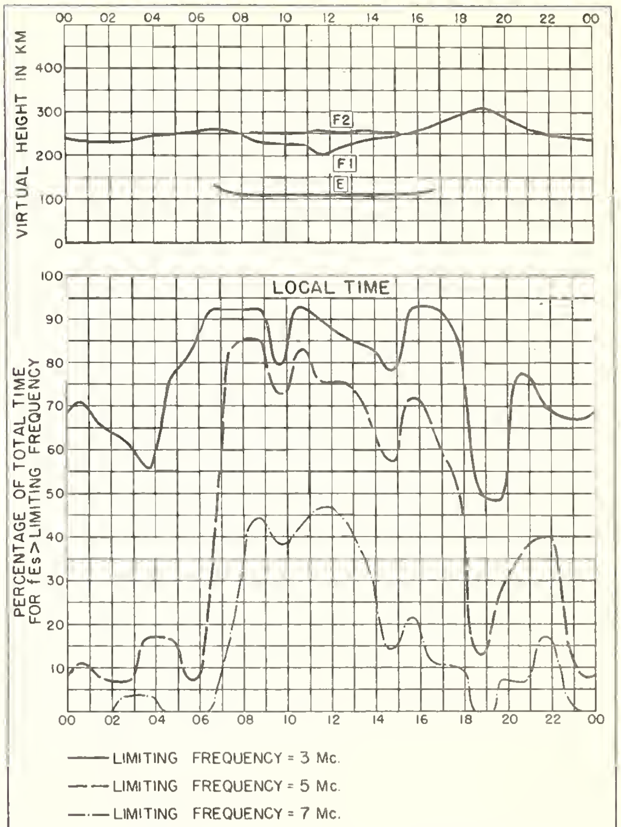


Fig 18. GUAM I. NOVEMBER 1949

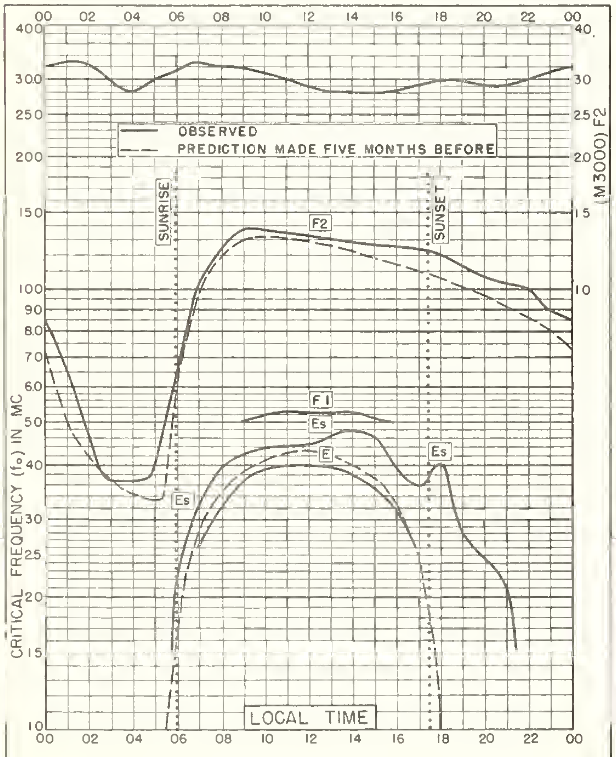


Fig 19. TRINIDAD, BRIT WEST INDIES
10.6°N, 61.2°W NOVEMBER 1949

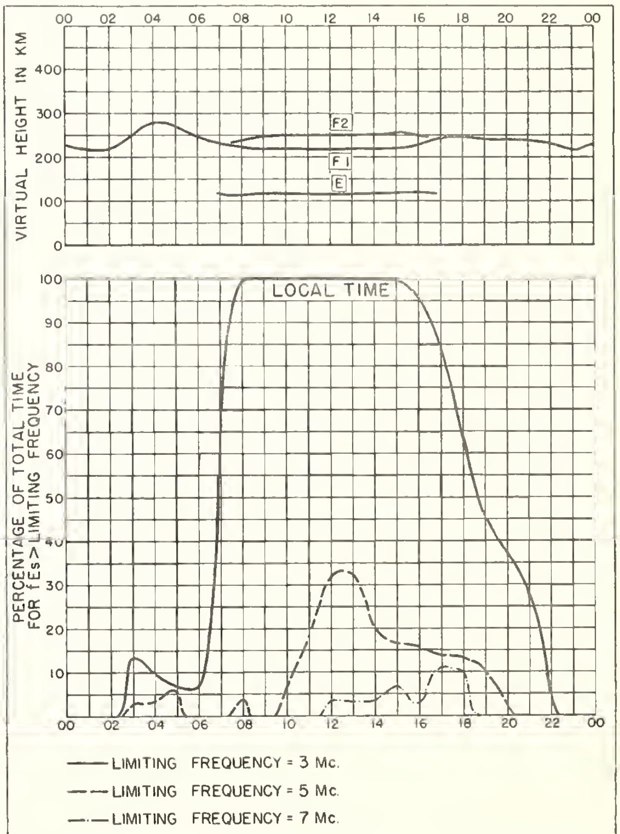


Fig 20. TRINIDAD, BRIT. WEST INDIES NOVEMBER 1949

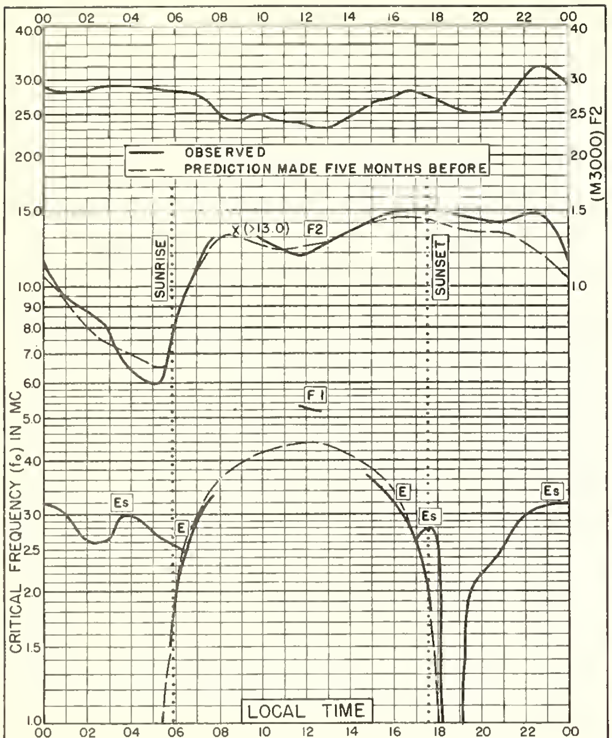


Fig. 21. PALMYRA I.
5.9°N, 162.1°W NOVEMBER 1949

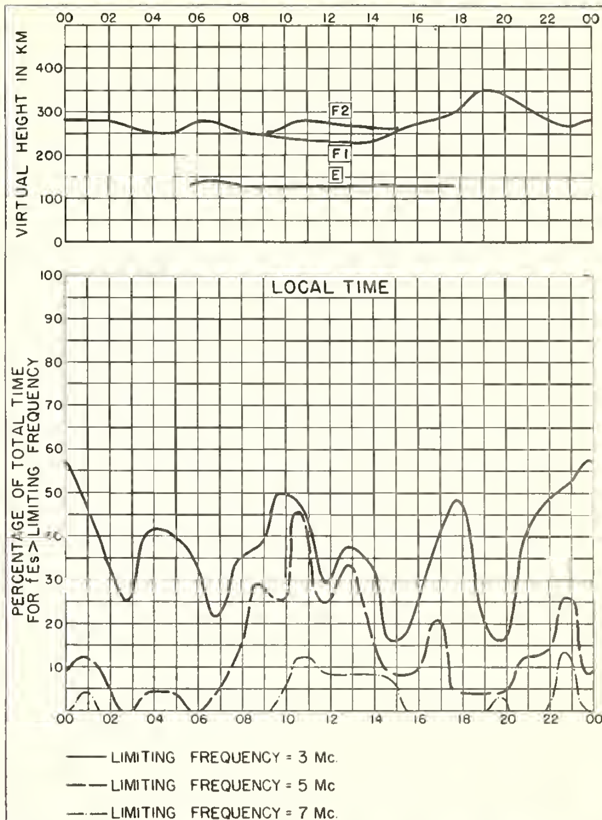


Fig. 22. PALMYRA I. NOVEMBER 1949

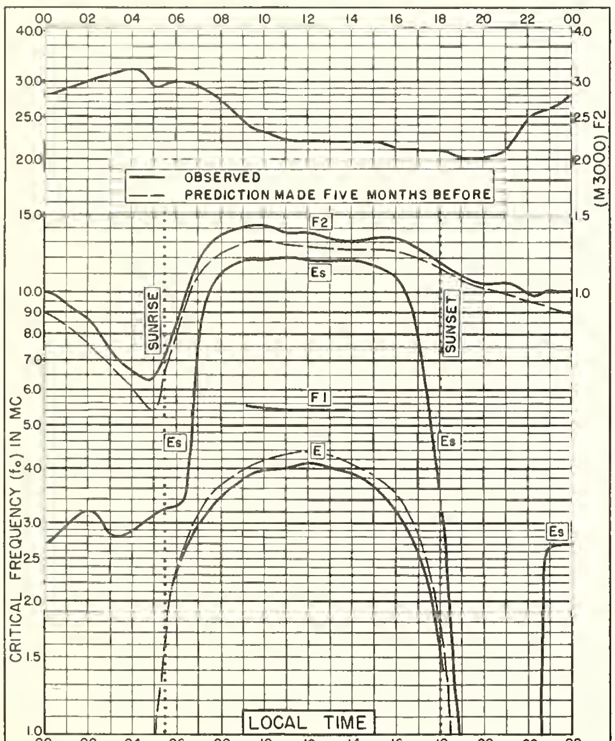


Fig. 23. HUANCAYO, PERU
12.0°S, 75.3°W NOVEMBER 1949

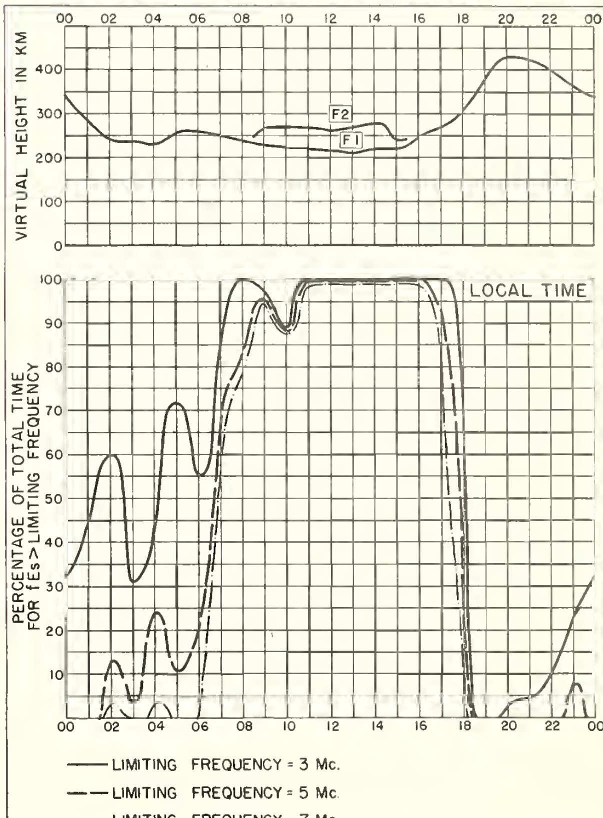


Fig. 24. HUANCAYO, PERU NOVEMBER 1949

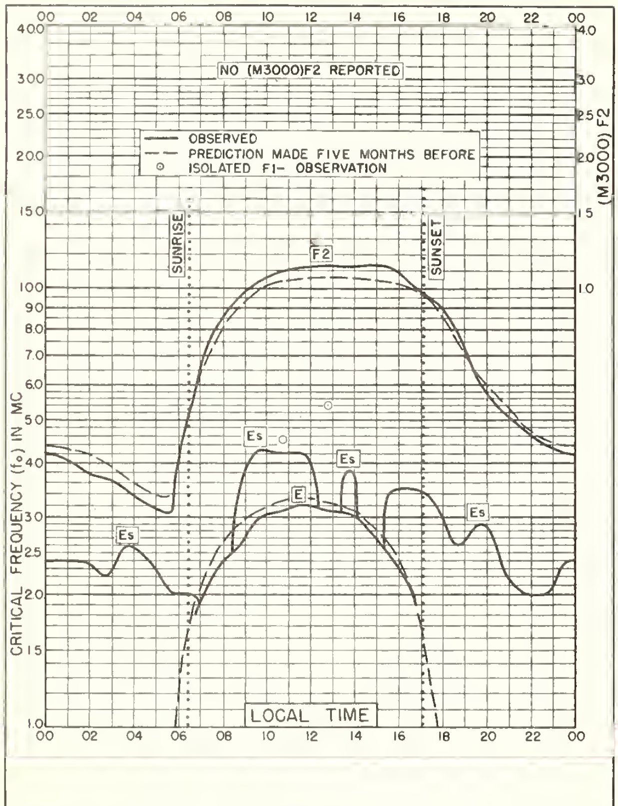


Fig. 25. LINDAU/HARZ, GERMANY
51.6°N, 10.1°E OCTOBER 1949

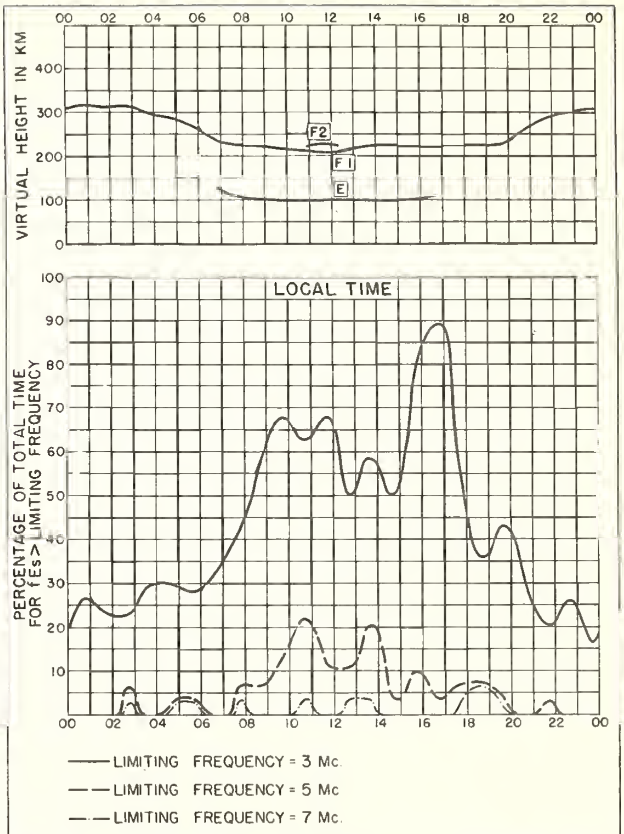


Fig 26. LINDAU/HARZ, GERMANY OCTOBER 1949

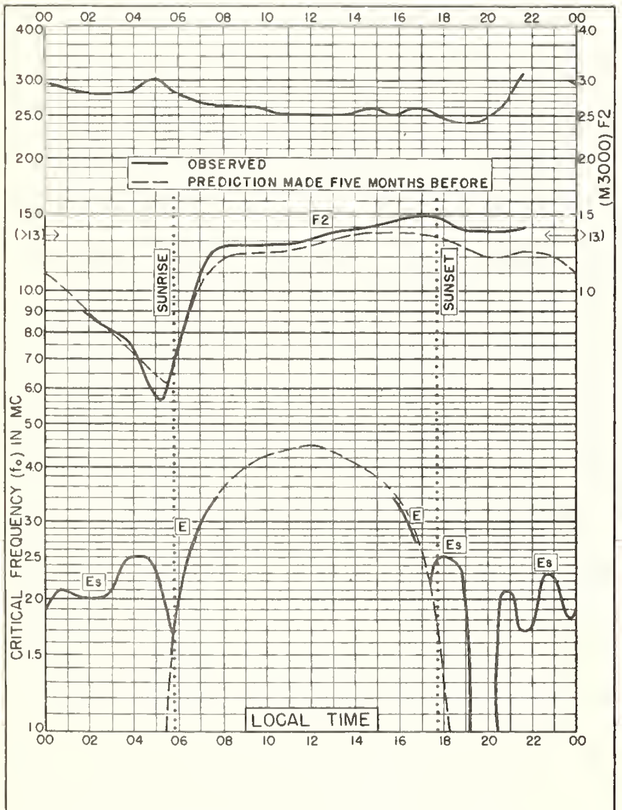


Fig 27. PALMYRA I.
5.9°N, 162.1°W OCTOBER 1949

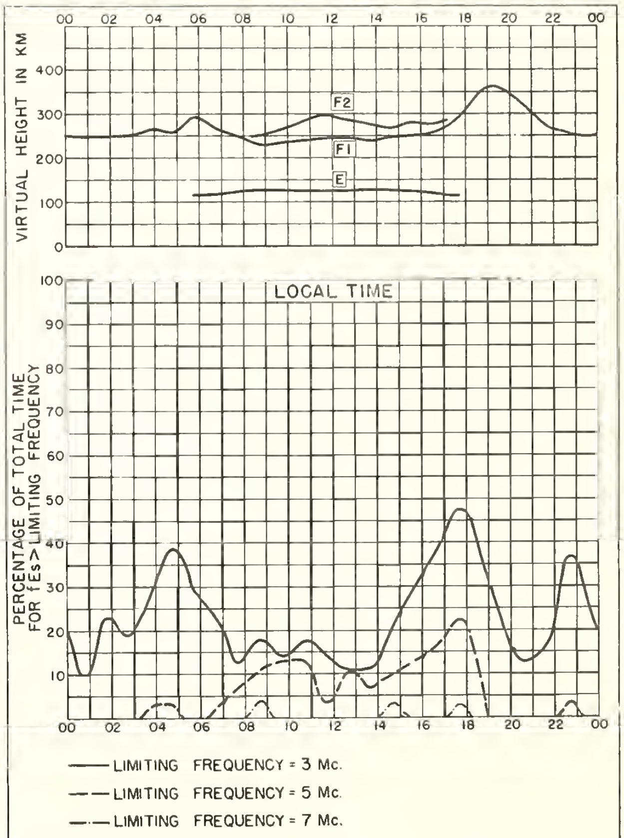


Fig. 28. PALMYRA I. OCTOBER 1949

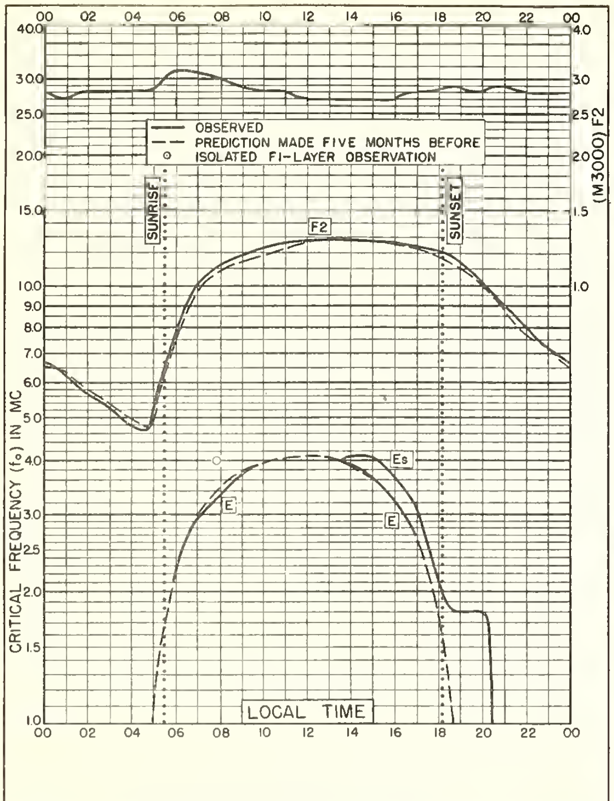


Fig. 29. JOHANNESBURG, U. OF S. AFRICA
26.2°S, 28.0°E OCTOBER 1949

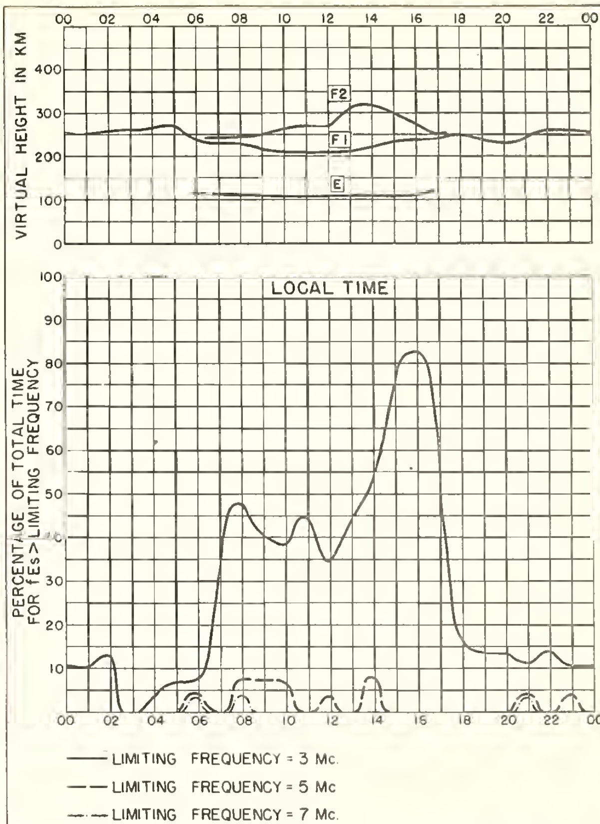


Fig. 30. JOHANNESBURG, U. OF S. AFRICA OCTOBER 1949

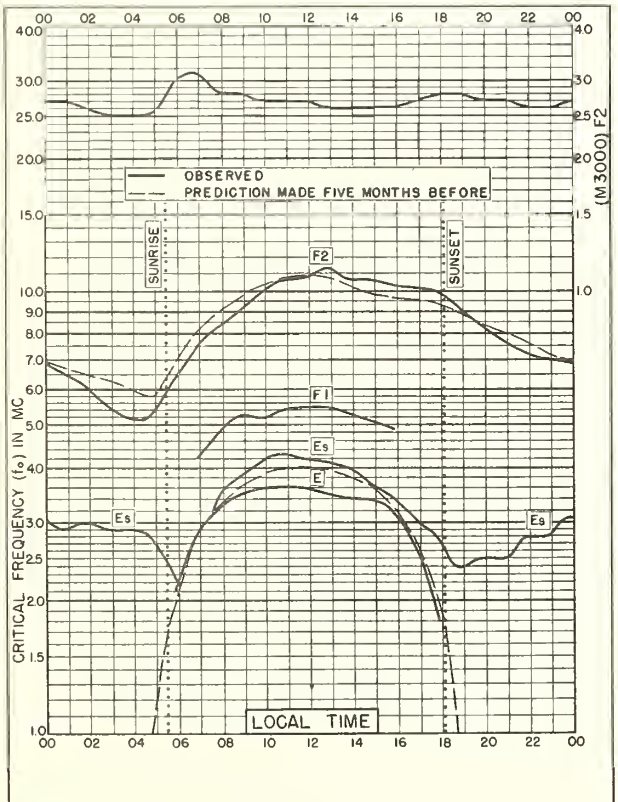


Fig. 31. WATHEROO, W. AUSTRALIA
30.3°S, 115.9°E OCTOBER 1949

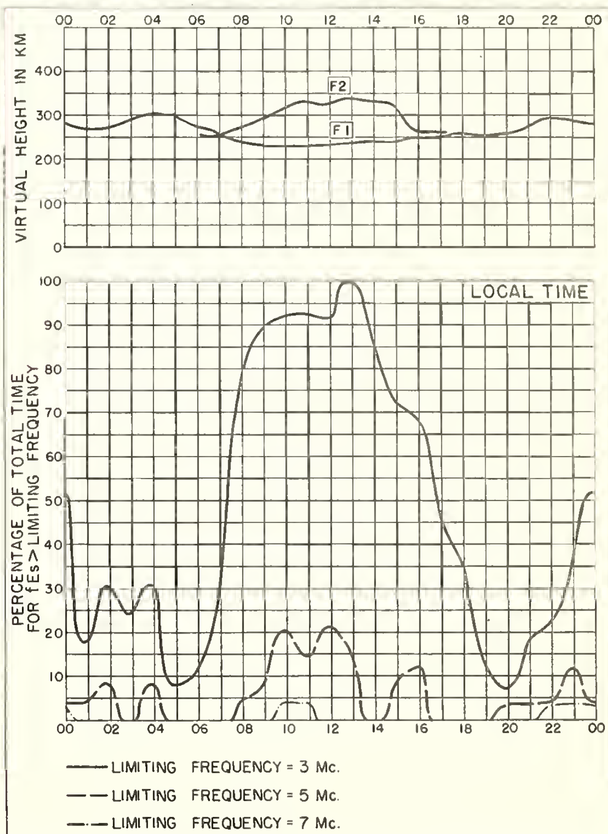


Fig. 32. WATHEROO, W. AUSTRALIA OCTOBER 1949

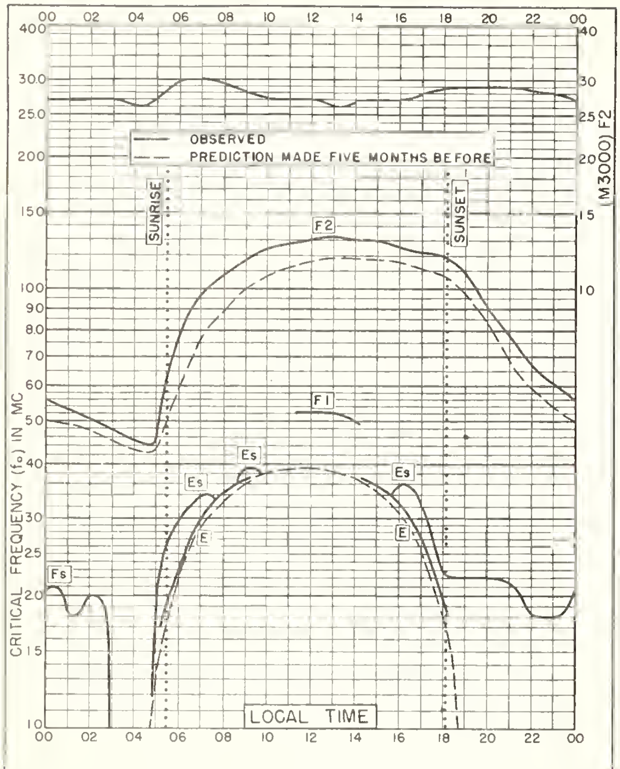


Fig 33 CAPETOWN, U OF S AFRICA
34.2°S, 18.3°E OCTOBER 1949

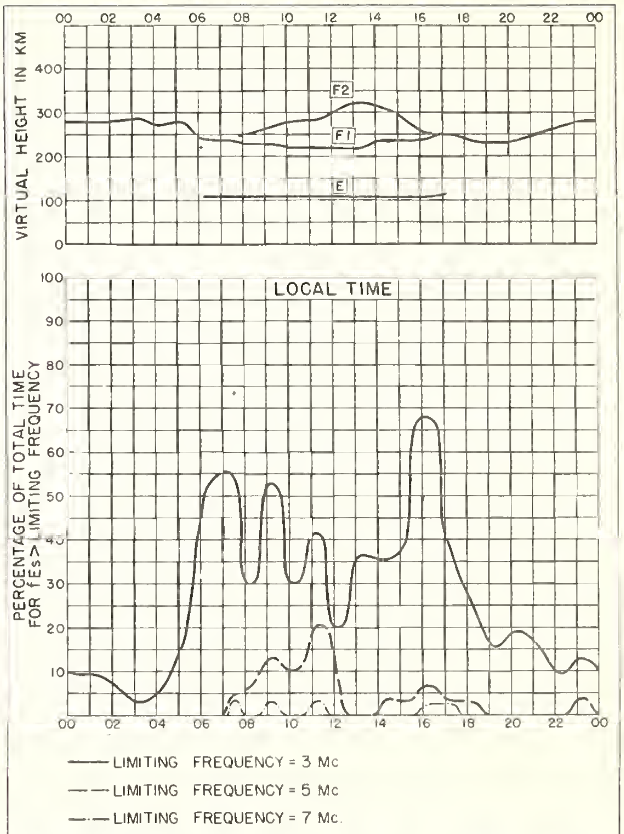


Fig. 34. CAPETOWN, U. OF S. AFRICA OCTOBER 1949

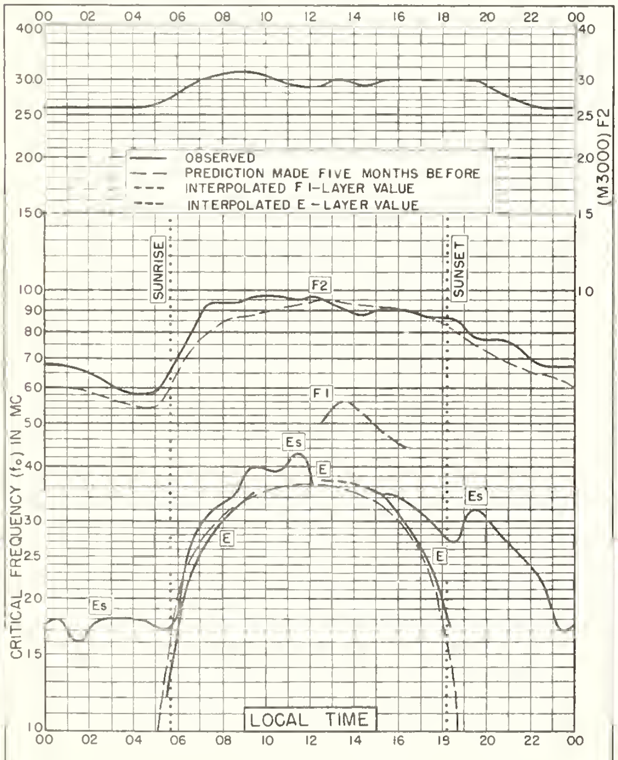


Fig 35 WAKKANAI, JAPAN
45.4°N, 141.7°E SEPTEMBER 1949

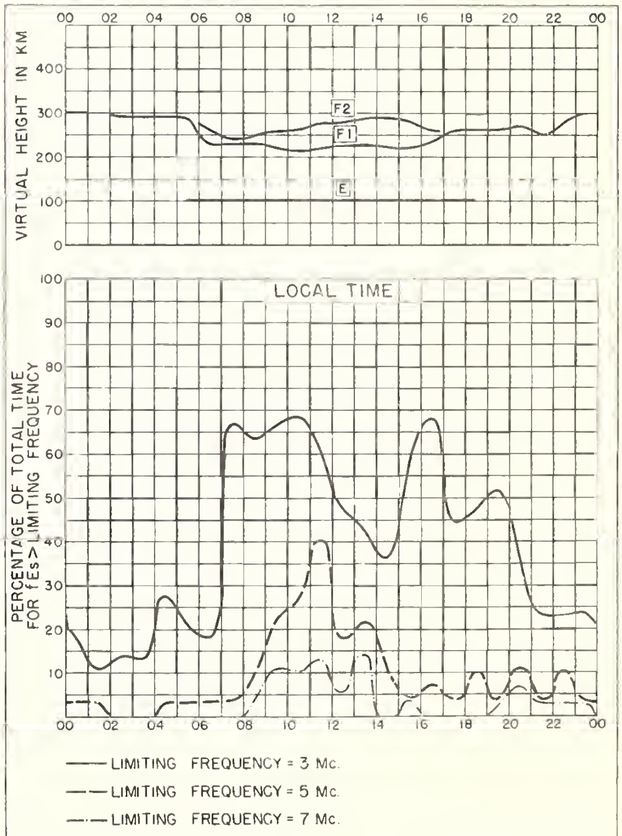


Fig. 36. WAKKANAI, JAPAN SEPTEMBER 1949

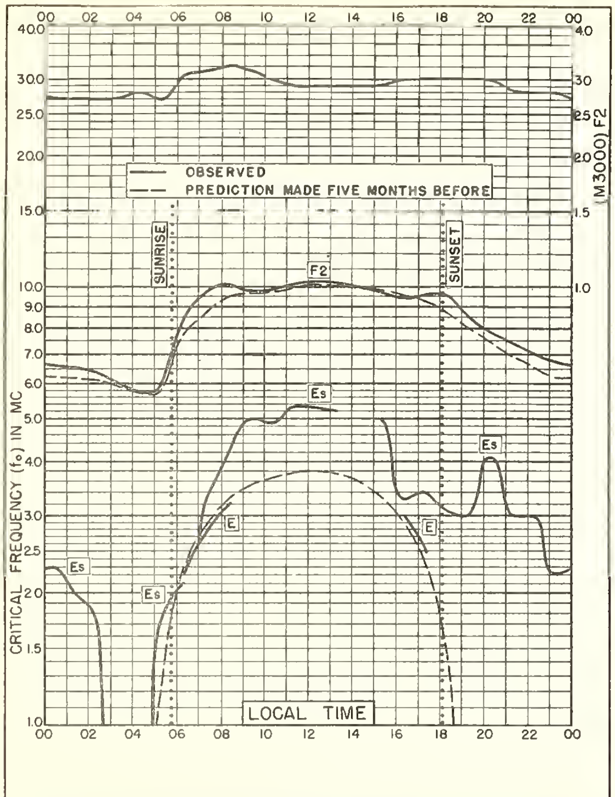


Fig. 37. FUKAURA, JAPAN
40.6°N, 139.9°E SEPTEMBER 1949

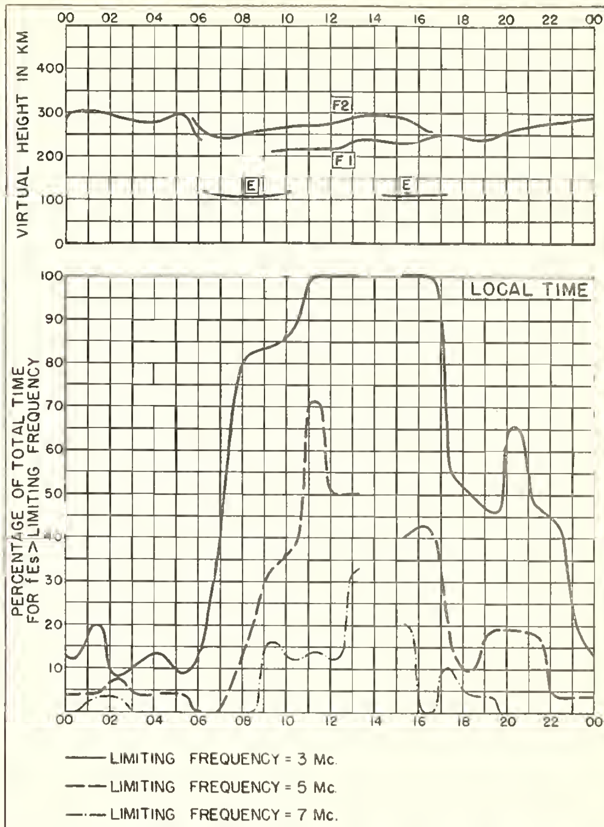


Fig. 38. FUKAURA, JAPAN SEPTEMBER 1949

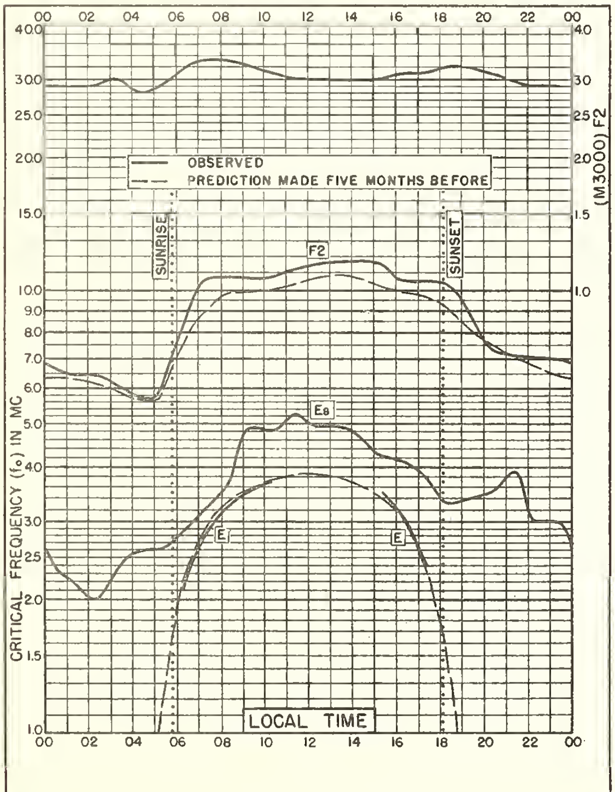
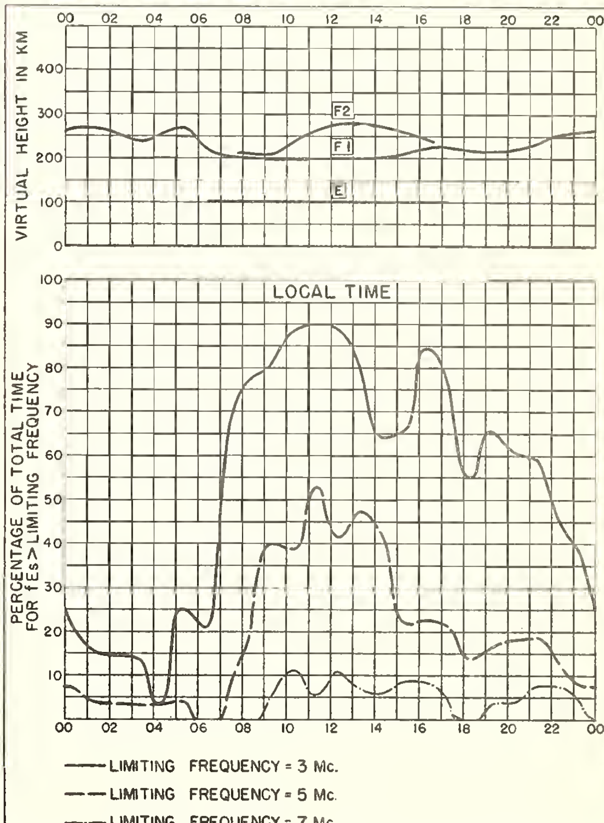


Fig. 39. SHIBATA, JAPAN
37.9°N, 139.3°E SEPTEMBER 1949



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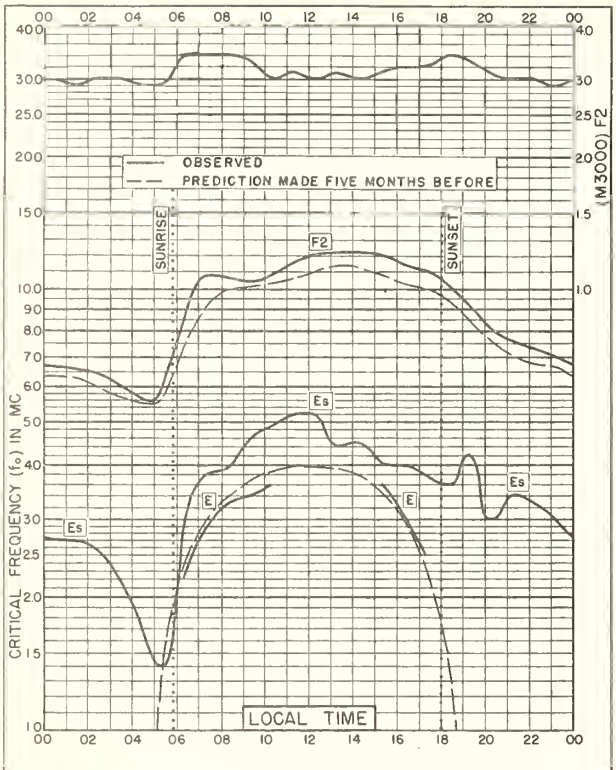

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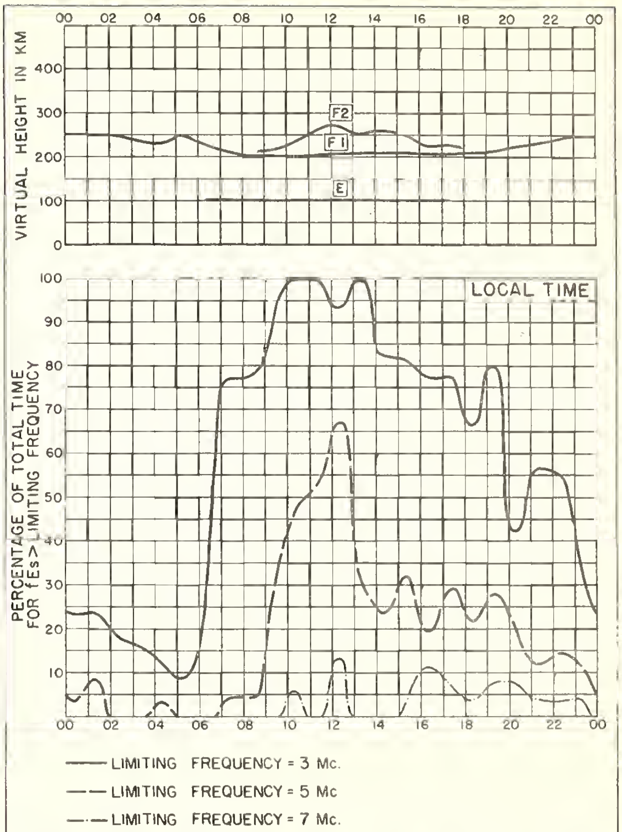

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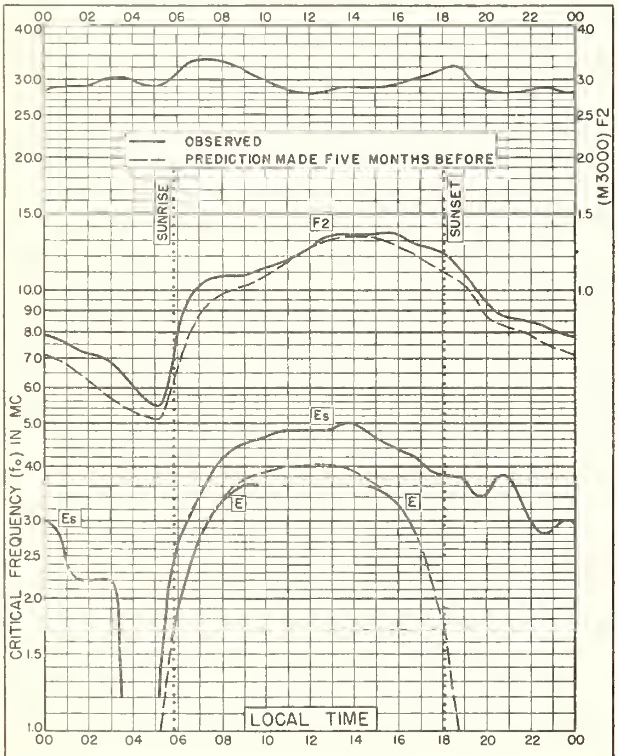

Fig. 43. YAMAGAWA, JAPAN
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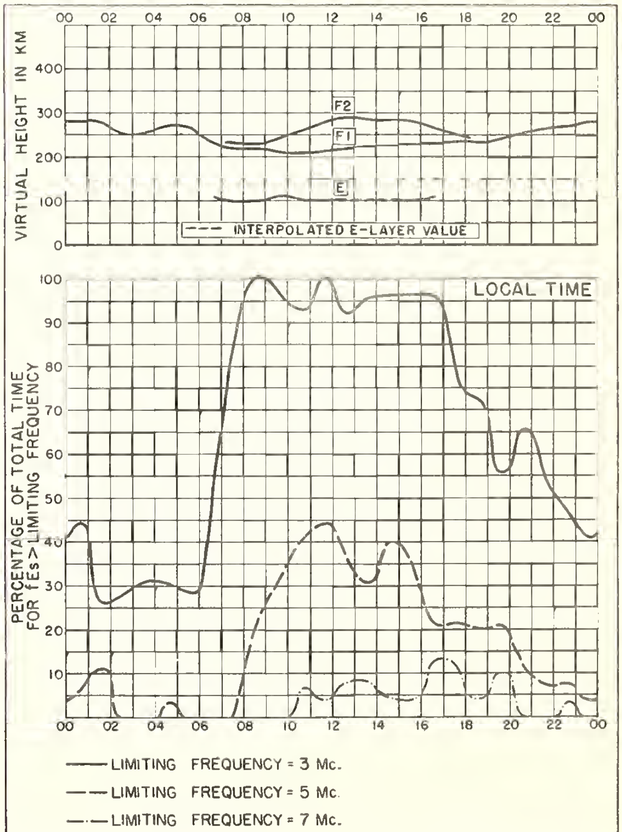

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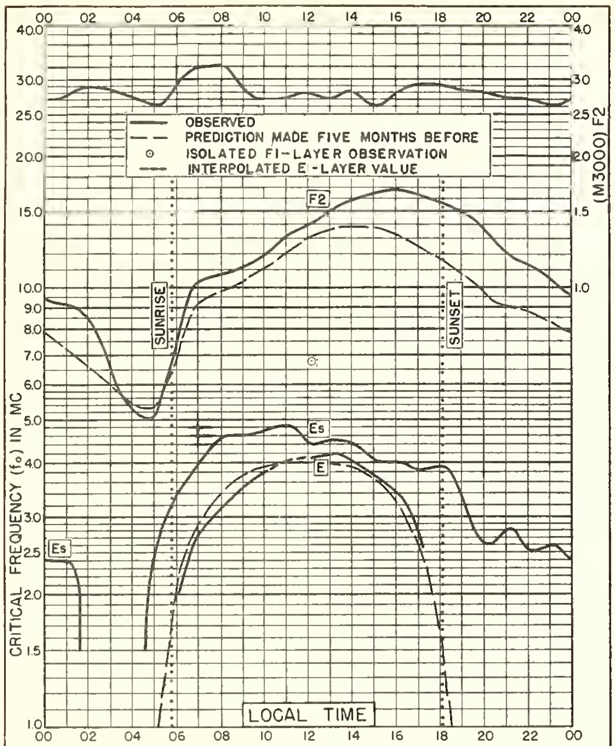

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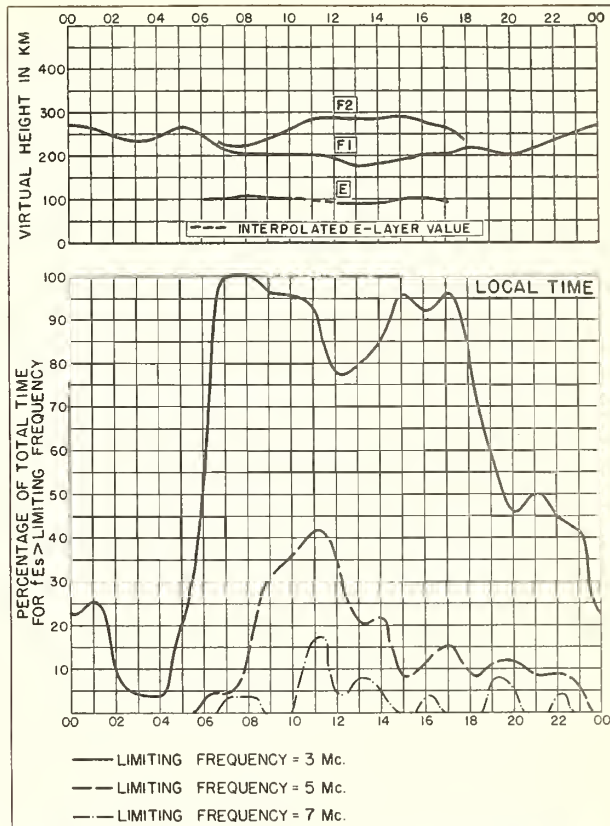

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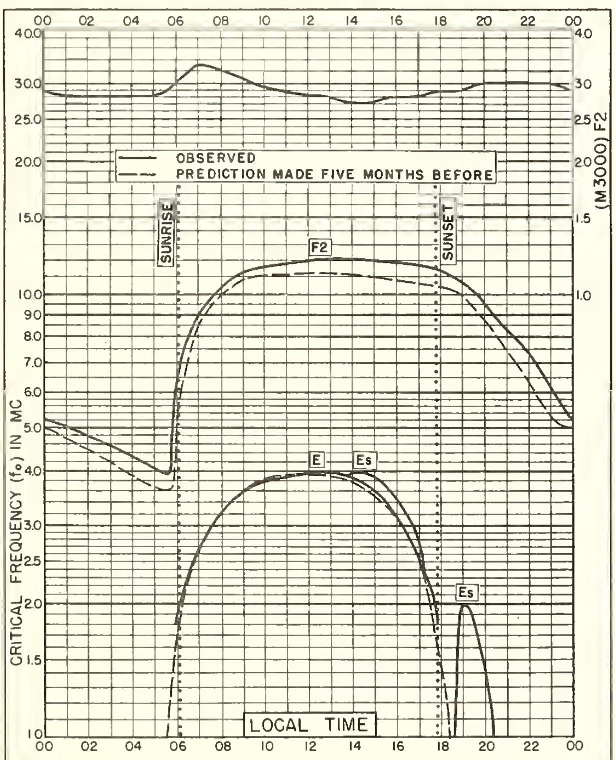

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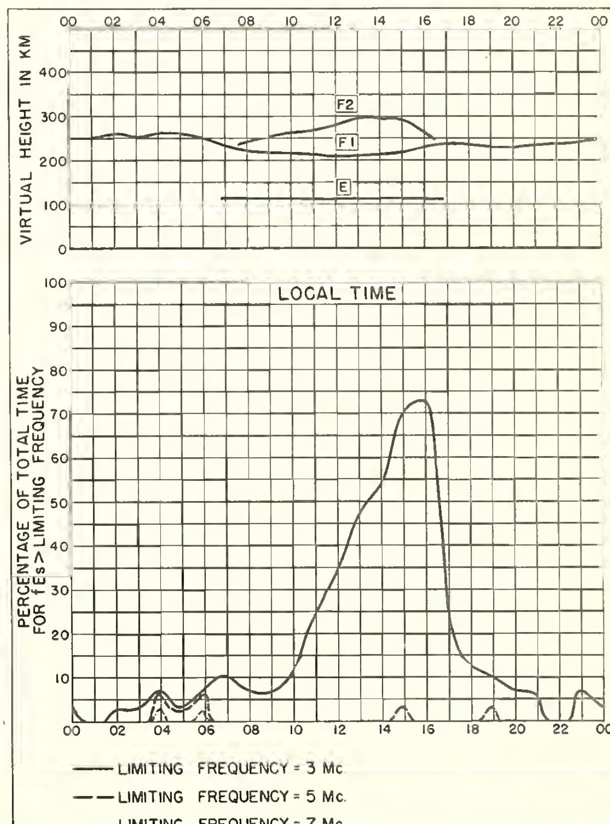

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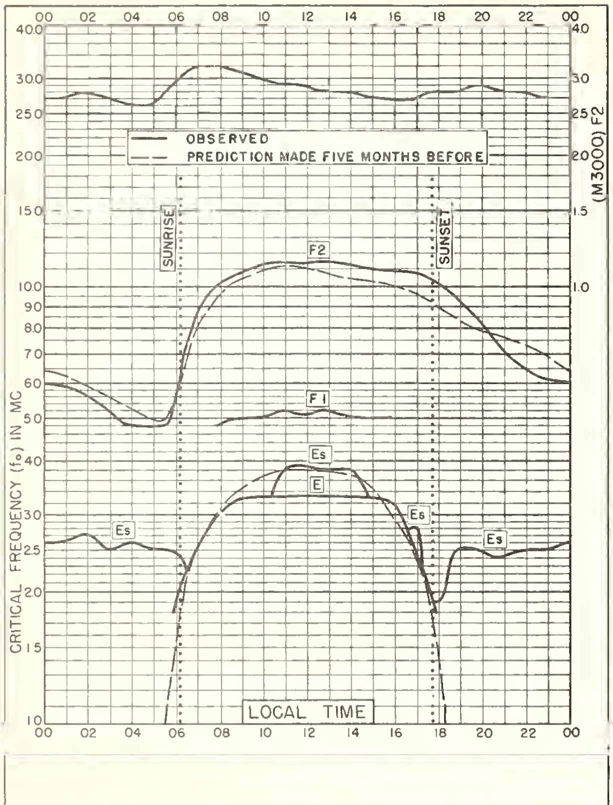

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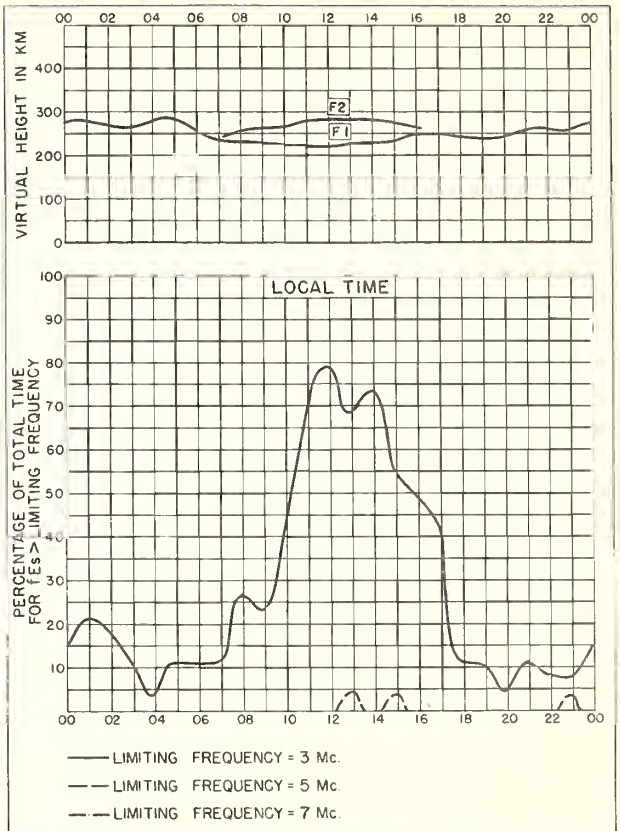

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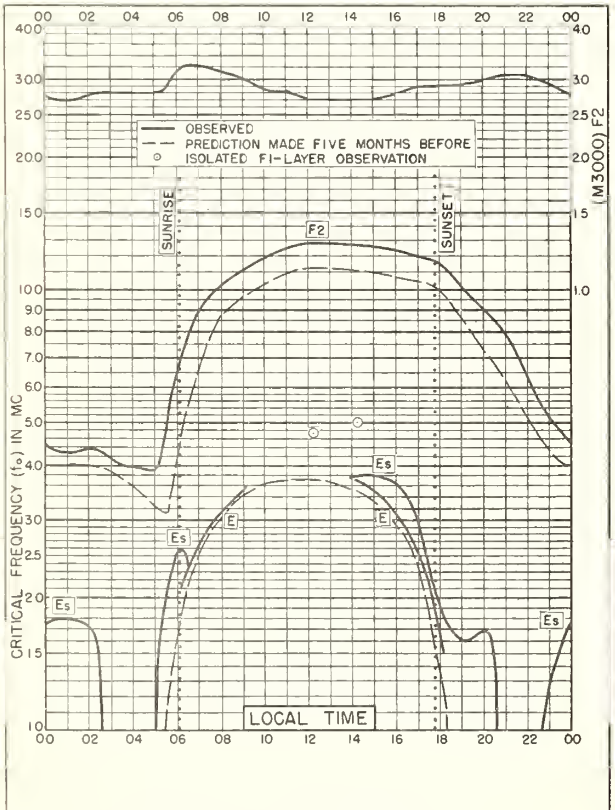

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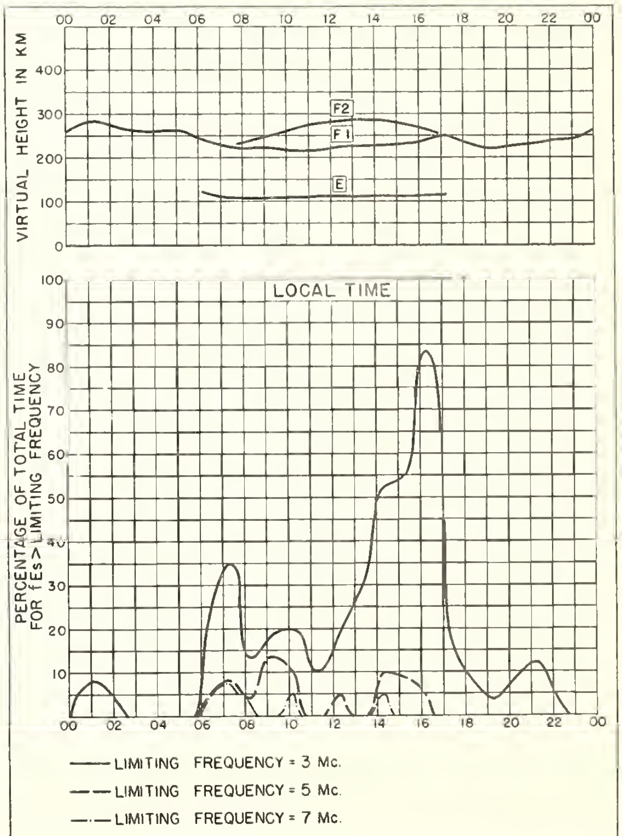

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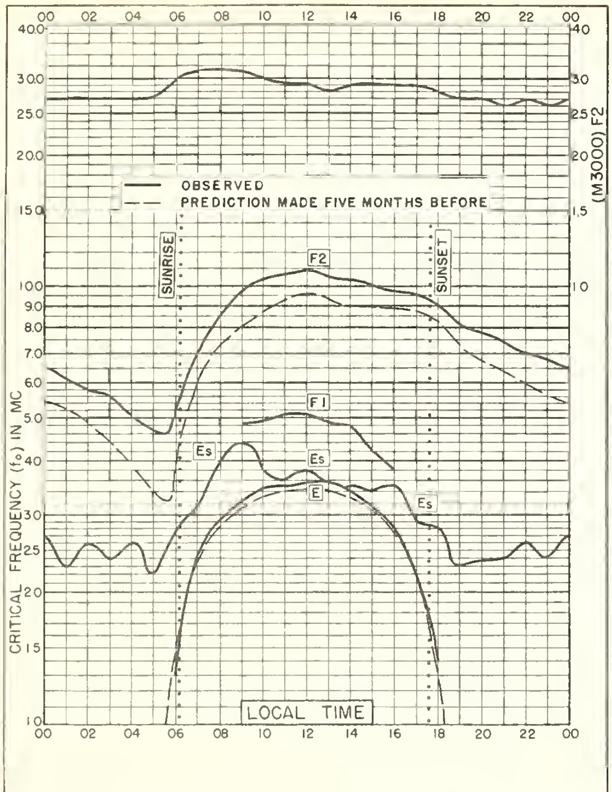

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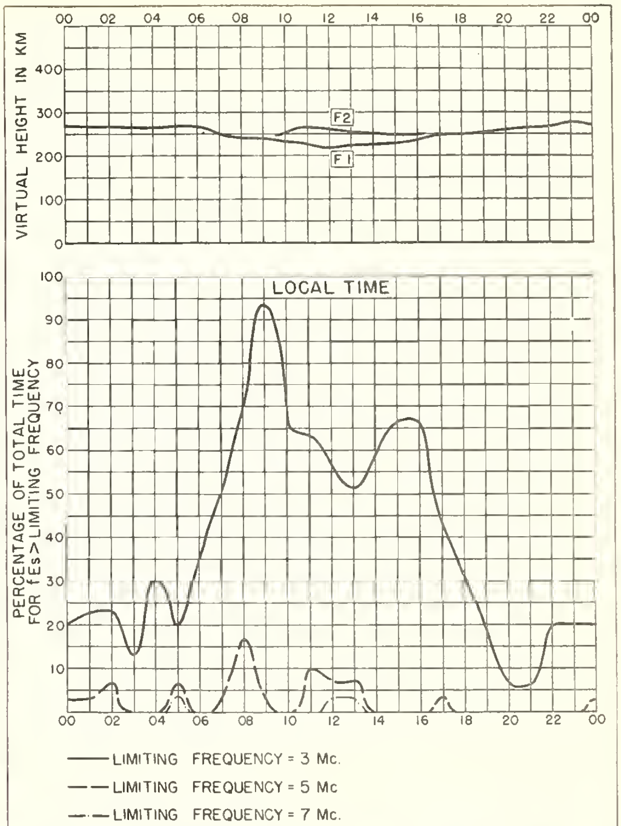

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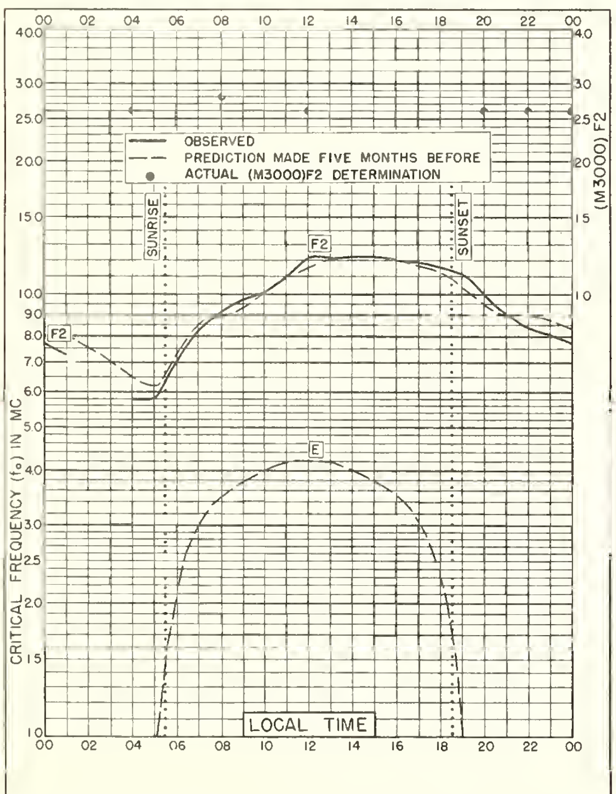

Fig 55. DELHI, INDIA
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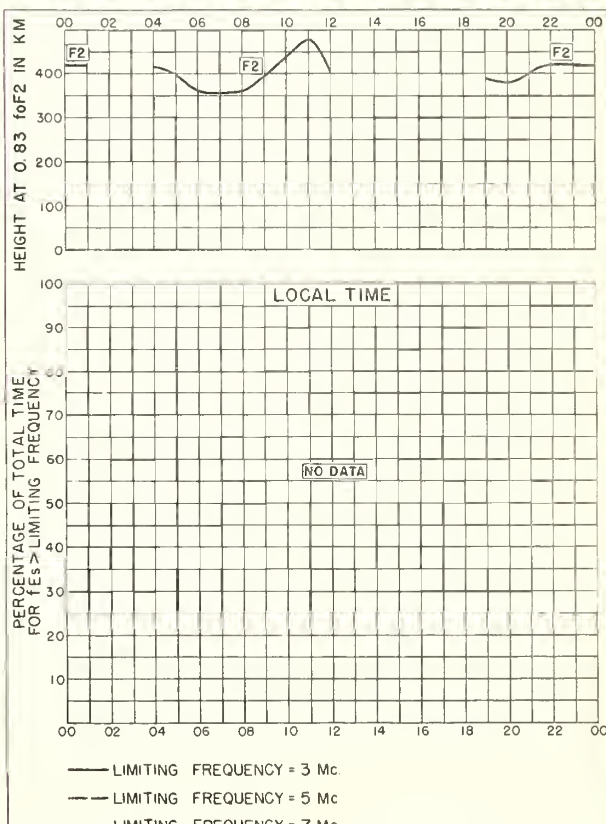

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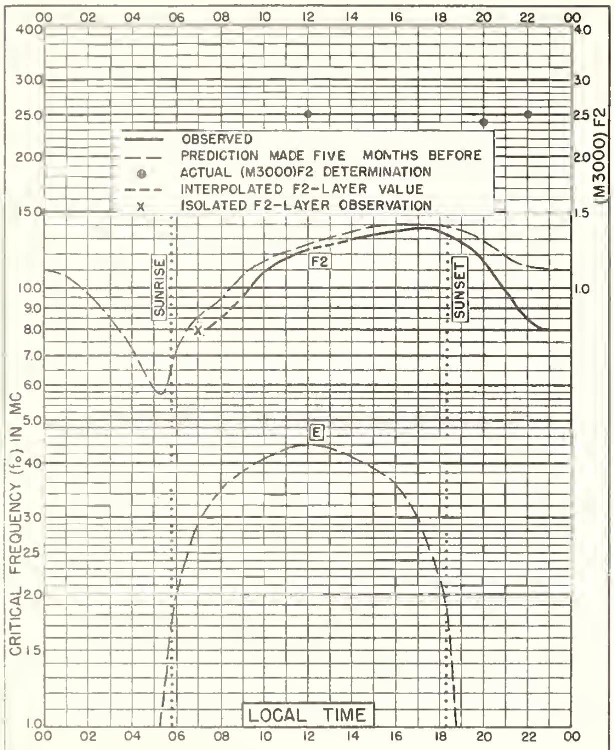

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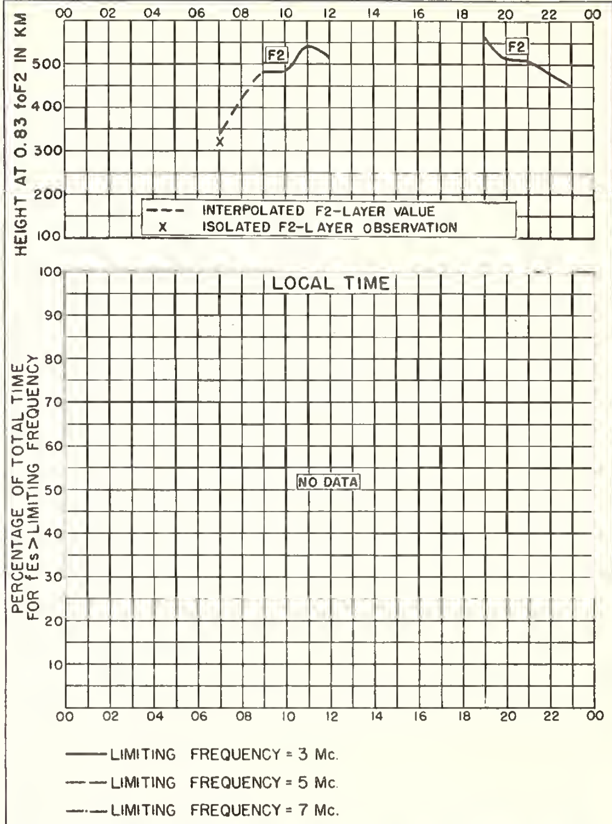

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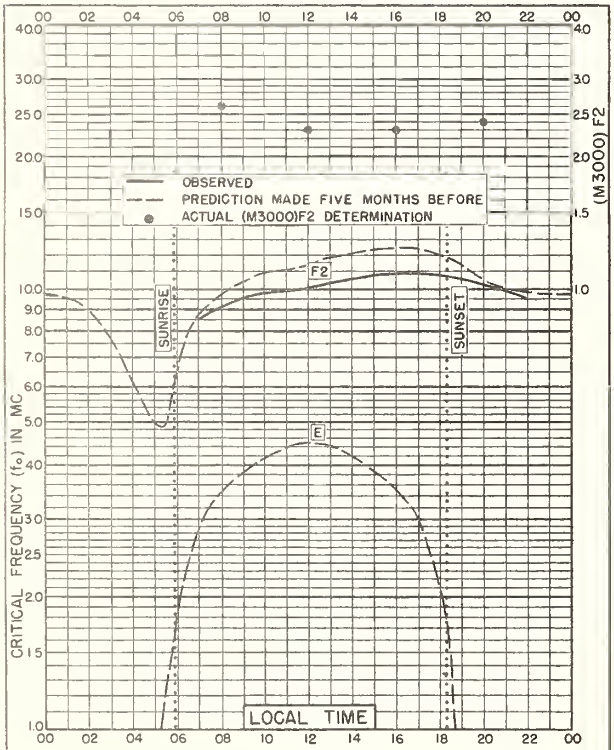

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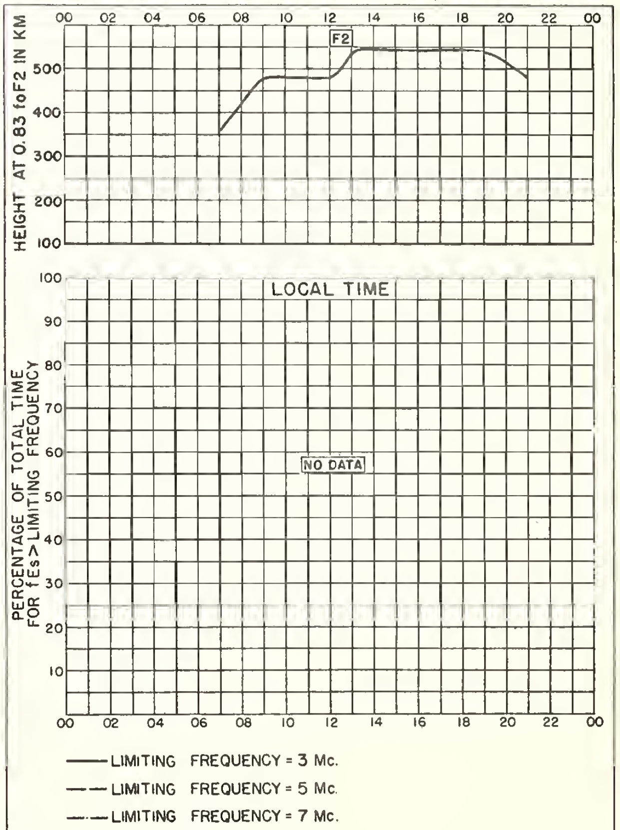

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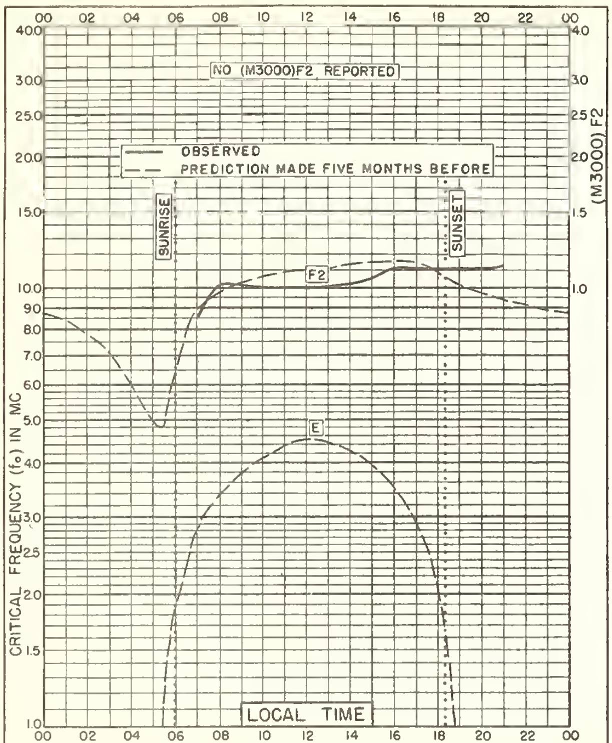

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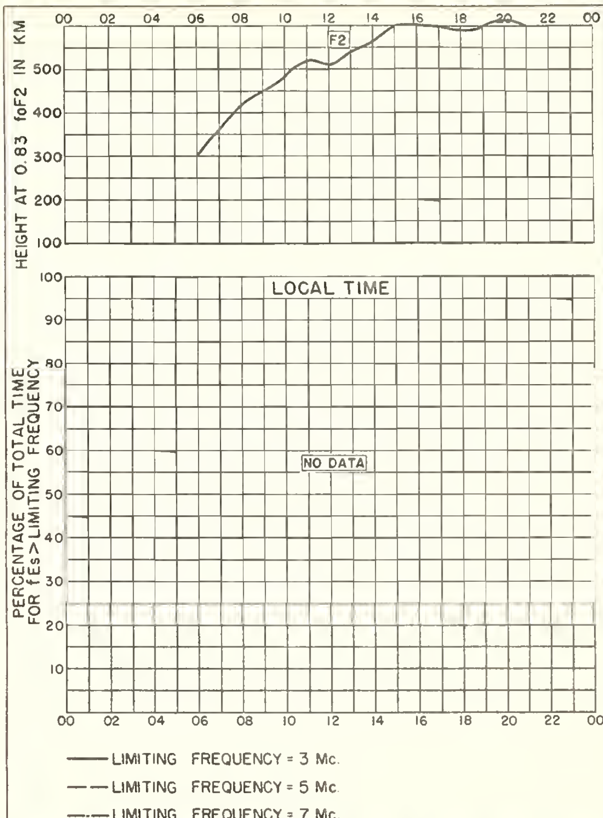

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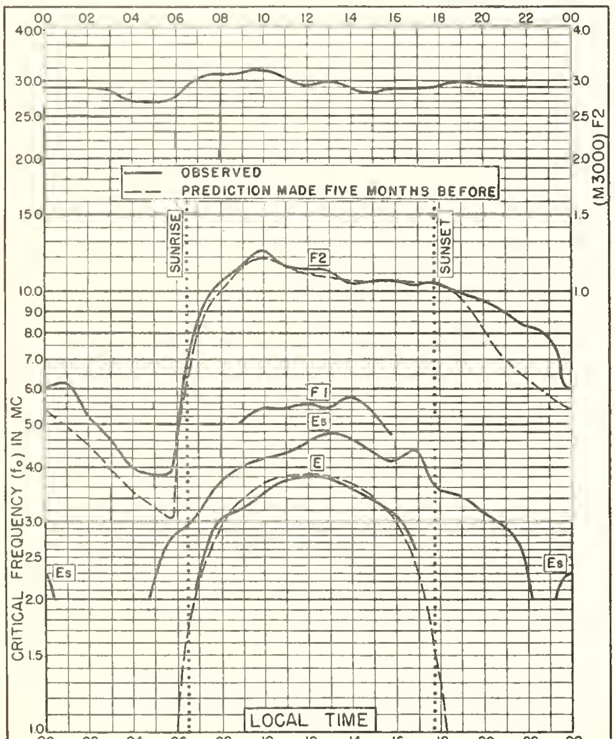

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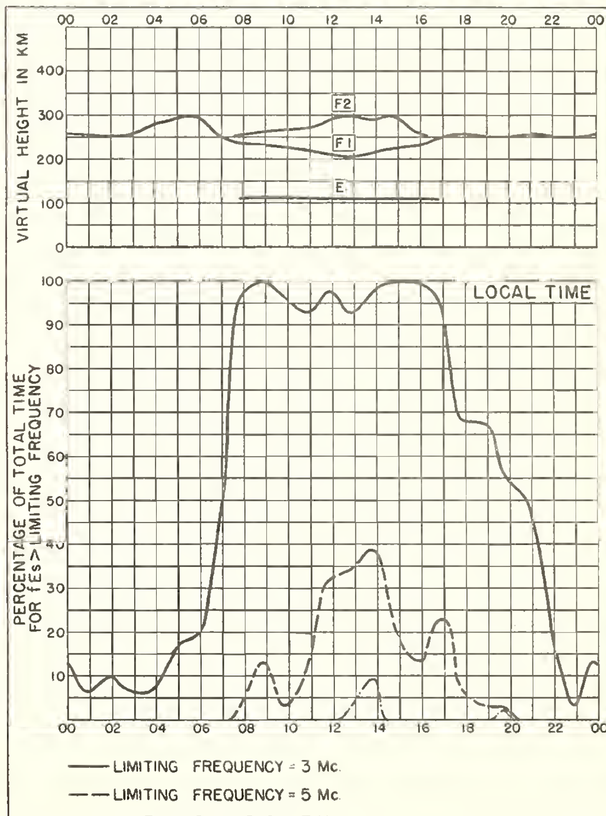

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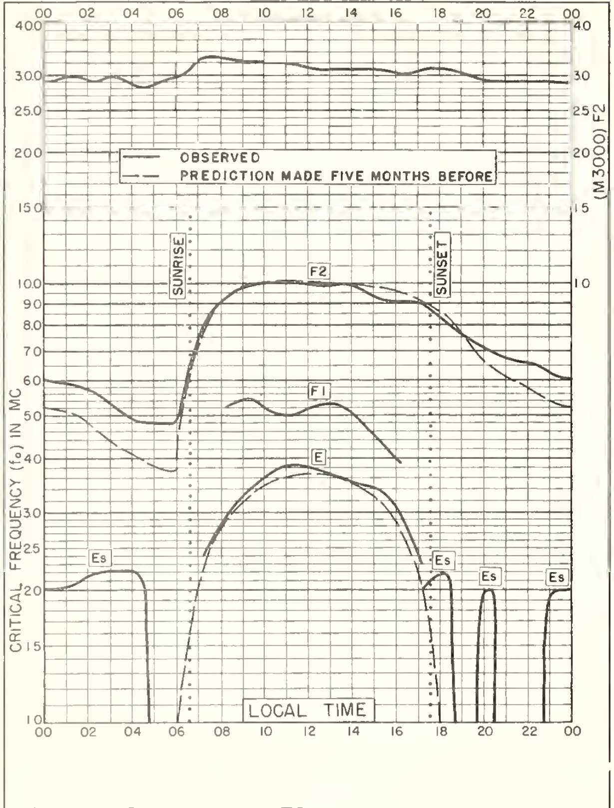

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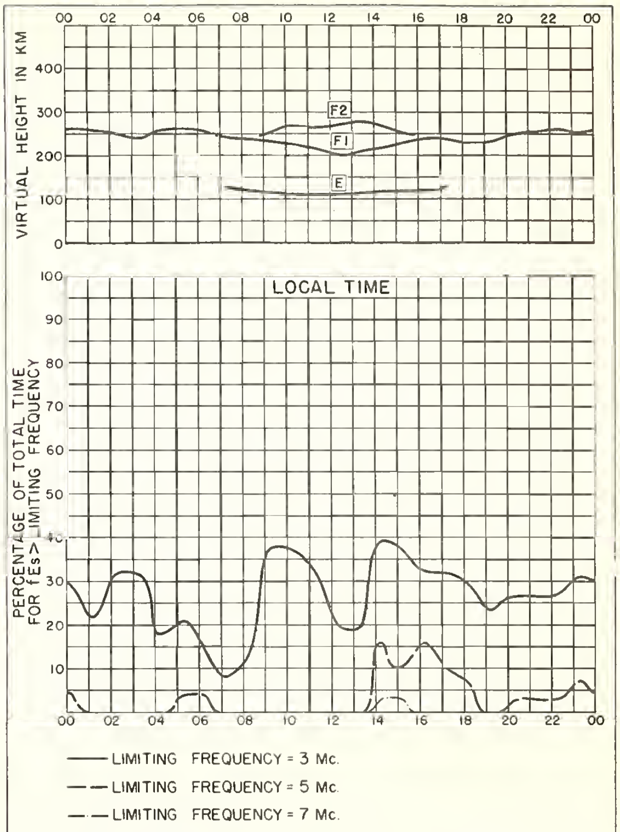

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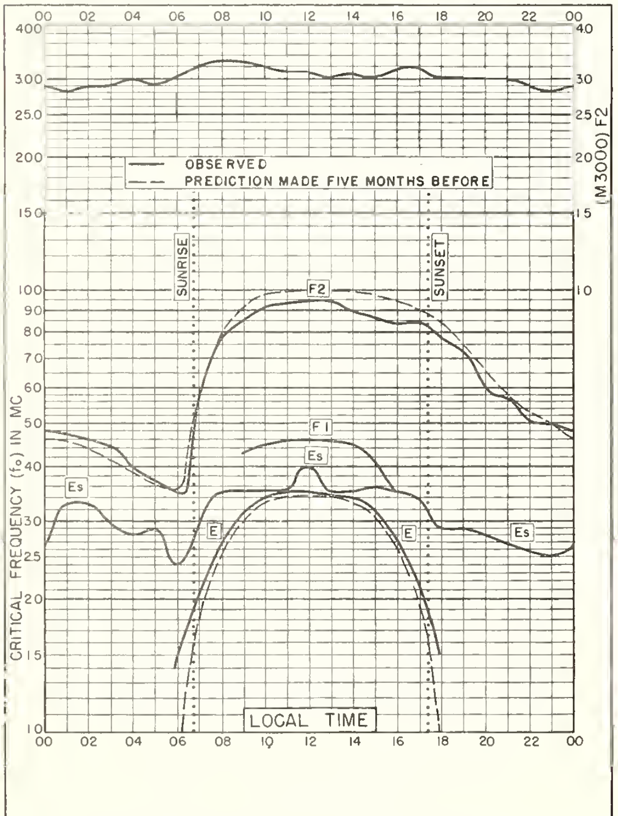

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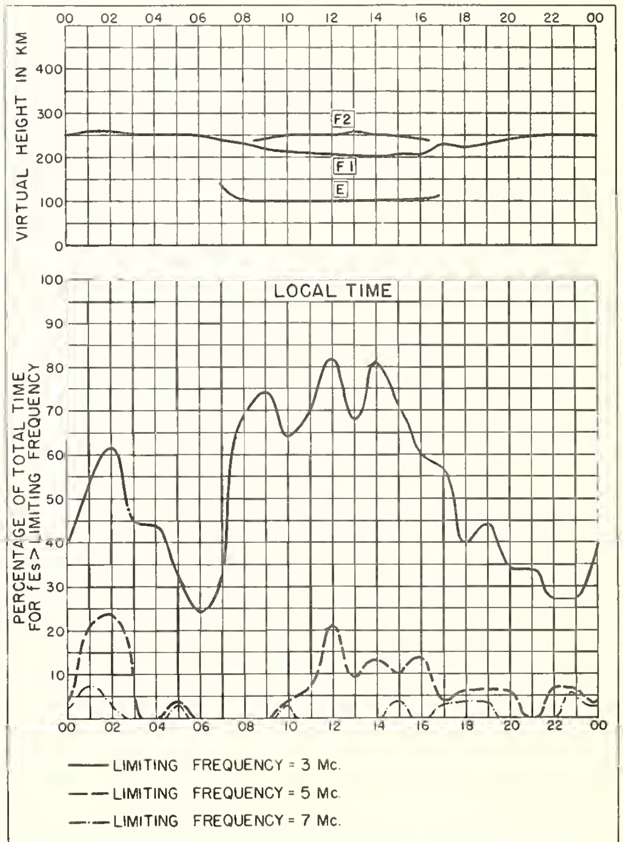

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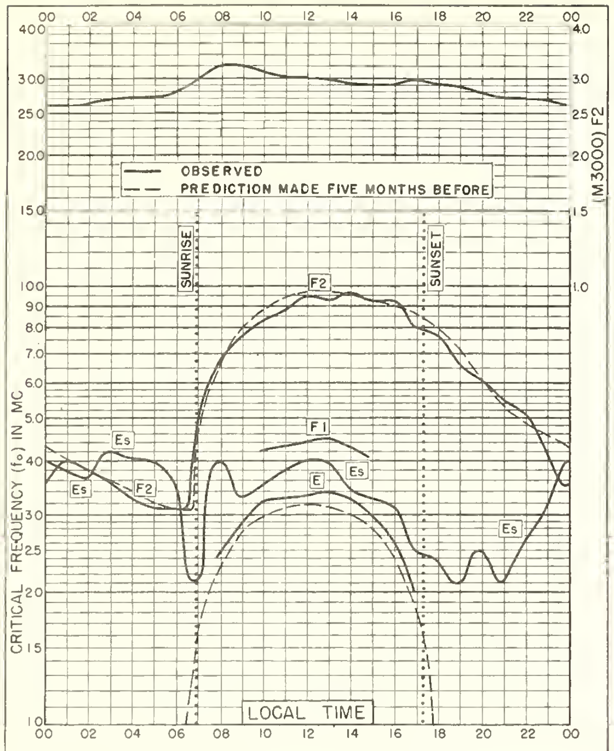

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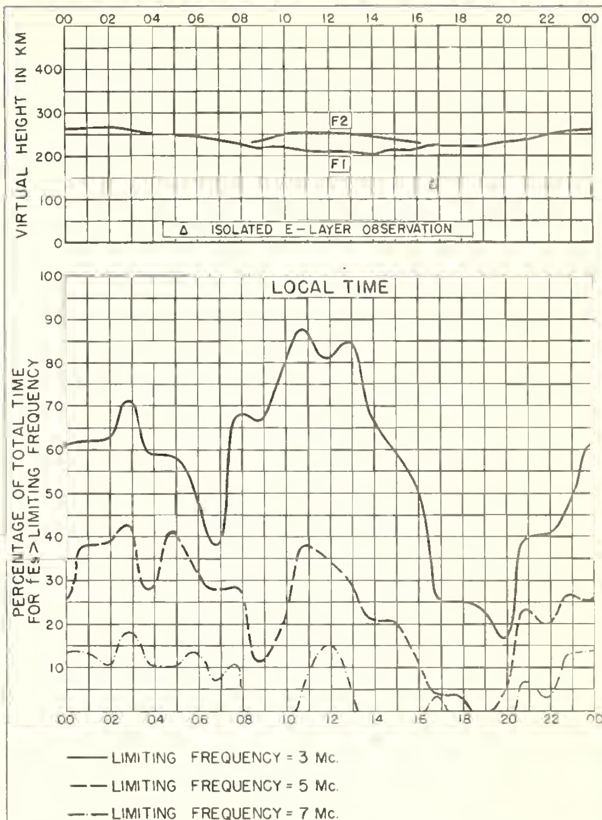

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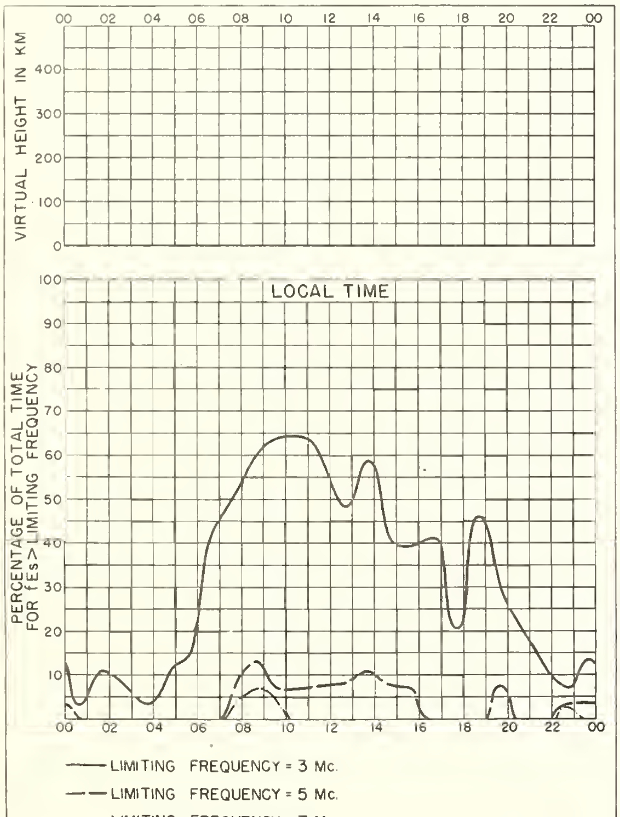

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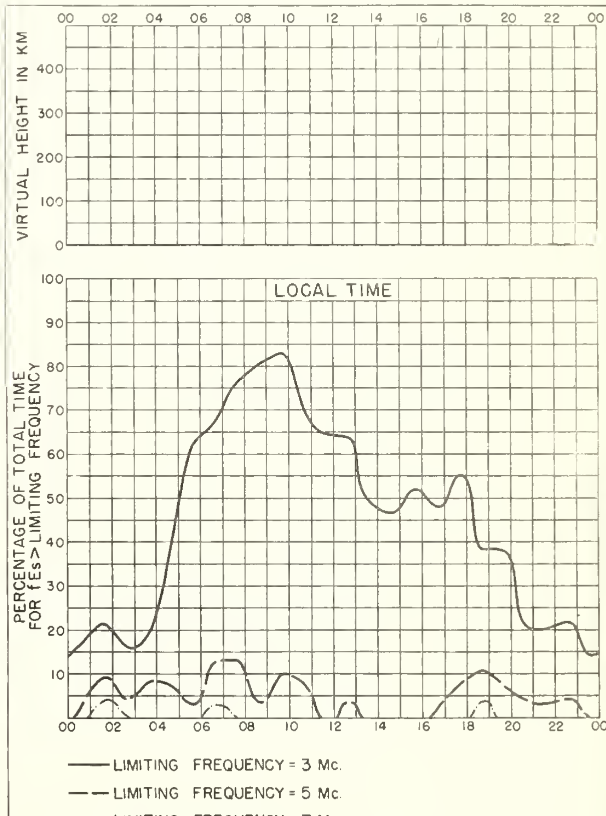

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[A list of CRPL Section Reports is available from the Central Radio Propagation Laboratory upon request]

Daily:
Radio disturbance warnings, every half hour from broadcast station WWV of the National Bureau of Standards.
Telephoned and telegraphed reports of ionospheric, solar, geomagnetic, and radio propagation data.

Weekly:
CRPL–J. Radio Propagation Forecast (of days most likely to be disturbed during following month).

Semimonthly:
CRPL–Ja. Semimonthly Frequency Revision Factors for CRPL Basic Radio Propagation Prediction Reports.

Monthly:
CRPL–D. Basic Radio Propagation Predictions—Three months in advance. (Dept. of the Army, TB 11–499–, monthly supplements to TM 11–499; Dept. of the Navy, DNC–13–1 ( ), monthly supplements to DNC–13–1.).
CRPL–F. Ionospheric Data.

Quarterly:
*IRPL–A. Recommended Frequency Bands for Ships and Aircraft in the Atlantic and Pacific.
*IRPL–H. Frequency Guide for Operating Personnel.

Circulars of the National Bureau of Standards:
NBS Circular 462. Ionospheric Radio Propagation.
NBS Circular 465. Instructions for the Use of Basic Radio Propagation Predictions.

Reports issued in past:
IRPL–C61. Report of the International Radio Propagation Conference, 17 April to 5 May 1944.
IRPL–G1 through G12. Correlation of D. F. Errors With Ionospheric Conditions.
IRPL–R. Nonscheduled reports:
- R4. Methods Used by IRPL for the Prediction of Ionosphere Characteristics and Maximum Usable Frequencies.
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- T2. Radar coverage and weather. (Superseded by JANP 102.)

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