CRPL-F60

IONOSPHERIC DATA

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

CRPL and IRPL Reports

[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.
- R5. Criteria for Ionospheric Storminess.
- R6. Experimental Studies of Ionospheric Propagation as Applied to the Loran System.
- R7. Second Report on Experimental Studies of Ionospheric Propagation as Applied to the Loran System.
- R9. An Automatic Instantaneous Indicator of Skip Distance and MUF.
- R10. A Proposal for the Use of Rockets for the Study of the Ionosphere.
- R11. A Nomographic Method for Both Prediction and Observation Correlation of Ionosphere Characteristics.
- R12. Short Time Variations in Ionospheric Characteristics.
- R14. A Graphical Method for Calculating Ground Reflection Coefficients.
- R15. Predicted Limits for *F*2-layer Radio Transmission Throughout the Solar Cycle.
- R17. Japanese Ionospheric Data—1943.
- R18. Comparison of Geomagnetic Records and North Atlantic Radio Propagation Quality Figures—October 1943 Through May 1945.
- R21. Notes on the Preparation of Skip-Distance and MUF Charts for Use by Direction-Finder Stations. (For distances out to 4000 km.)
- R23. Solar-Cycle Data for Correlation with Radio Propagation Phenomena.
- R24. Relations Between Band Width, Pulse Shape and Usefulness of Pulses in the Loran System.
- R25. The Prediction of Solar Activity as a Basis for the Prediction of Radio Propagation Phenomena.
- R26. The Ionosphere as a Measure of Solar Activity.
- R27. Relationships Between Radio Propagation Disturbance and Central Meridian Passage of Sunspots Grouped by Distance From Center of Disc.
- R30. Disturbance Rating in Values of IRPL Quality-Figure Scale from A. T. & T. Co. Transmission Disturbance Reports to Replace T. D. Figures as Reported.
- R31. North Atlantic Radio Propagation Disturbances, October 1943 Through October 1945.
- R33. Ionospheric Data on File at IRPL.
- R34. The Interpretation of Recorded Values of *fEs*.
- R35. Comparison of Percentage of Total Time of Second-Multiple *Es* Reflections and That of *fEs* in Excess of 3 Mc.

IRPL–T. Reports on tropospheric propagation:
- T1. Radar operation and weather. (Superseded by JANP 101.)
- T2. Radar coverage and weather. (Superseded by JANP 102.)

CRPL–T3. Tropospheric Propagation and Radio-Meteorology. (Reissue of Columbia Wave Propagation Group WPG–5.)

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*Items bearing this symbol are distributed only by U. S. Navy. They are issued under one cover as the DNC–14 series.

CRPL-F60 CENTRAL RADIO PROPAGATION LABORATORY
NATIONAL BUREAU OF STANDARDS
WASHINGTON, D.C.

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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 46 and figures 1 to 92 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:

Australian Council for Scientific and Industrial Research,
Radio Research Board:
- Brisbane, Australia
- Canberra, Australia
- Hobart, Tasmania

Australian Department of Supply and Shipping, Bureau of
Mineral Resources, Geophysical Section:
- Watheroo, W. Australia

British Department of Scientific and Industrial Research,
Radio Research Board:
- Falkland Is.
- Fraserburgh, Scotland
- Singapore, British Malaya
- Slough, England

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

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

Indian Council of Scientific and Industrial Research,
Radio Research Committee:
- Calcutta, India

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

New Zealand Radio Research Committee:
- Christchurch, New Zealand (Canterbury University College Observatory)
- Rarotonga I.

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

United States Army Signal Corps:
Okinawa I.

National Bureau of Standards (Central Radio Propagation Laboratory):
Baton Rouge, Louisiana (Louisiana State University)
Boston, Massachusetts (Harvard University)
Huancayo, 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
Wuchang, China (National Wuhan University)

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		114	126	85	38
November		115	124	83	36
October		116	119	81	23
September		117	121	79	22
August		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 47 to 58 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."

IONOSPHERE DISTURBANCES

Table 59 presents ionosphere character figures for Washington, D. C., during July 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 60 lists for the stations whose locations are given the sudden ionosphere disturbances observed on the continuous field intensity recordings made at the Sterling Radio Propagation Laboratory during July 1949.

Table 61 lists for the stations whose locations are given the sudden ionosphere disturbances observed at the Point Reyes, California, receiving station of RCA Communications, Inc., for August 1 and 4, 1949.

Table 62 lists for the stations whose locations are given the sudden ionosphere disturbances observed at the Brentwood, England, receiving station of Cable and Wireless, Ltd., for various days in June and July 1949.

Table 63 lists for the stations whose locations are given the sudden ionosphere disturbances observed at the Riverhead, New York, receiving station of RCA Communications, Inc., for July 29 and 31, 1949.

Table 64 gives provisional radio propagation quality figures for the North Atlantic and North Pacific areas, for 01 to 12 and 13 to 24 GCT, June 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 65a and 65b are listed the intensities of the green (5303A) line of the emission spectrum of the solar corona as observed during July 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 66a and 66b give similarly the intensities of the first red (6374A) coronal line; tables 67a and 67b list the intensities of the second red (6704A) coronal line. The following symbols are used in tables 65, 66, and 67: a, observation of low weight; -, corona not visible; and x, position angle not included in plate estimates.

AMERICAN AND ZÜRICH PROVISIONAL RELATIVE SUNSPOT NUMBERS

Table 68 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 all 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 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.

ERRATA

1. CRPL-F59, p. 56, fig. 64: The lower limiting frequency indicated below the graph should be 3.9 Mc instead of 3 Mc.

2. CRPL-F59, p. 16, table 26: The time indicated under the table should be "local" instead of 112.5°E. (The graphs were drawn correctly, however.)

Table 1

Washington, D.C. (39.0°N, 77.5°W) July 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	270	6.5					3.8	2.8
01	270	5.9					3.6	2.8
02	270	5.6					3.1	2.8
03	265	5.2					3.6	2.8
04	270	4.7					3.8	2.8
05	280	4.6	---	---	---	---	3.9	2.9
06	275	5.6	240	3.9	110	2.3	3.8	3.0
07	310	6.0	230	4.5	100	2.8	4.4	2.9
08	340	6.6	220	4.8	100	3.2	5.2	2.9
09	355	7.0	200	4.9	100	3.4	4.8	2.8
10	370	7.1	210	5.1	100	3.7	5.3	2.9
11	370	7.1	220	5.2	100	(3.8)	5.0	2.8
12	370	7.1	230	5.3	100	(3.8)	4.3	2.7
13	410	6.9	220	5.2	100	(3.8)	4.3	2.7
14	385	7.0	220	5.2	100	3.8	4.0	2.8
15	380	7.1	220	5.0	100	3.7	4.2	2.8
16	350	7.2	220	4.9	100	3.5	4.2	2.8
17	330	7.0	225	4.7	100	3.1	4.3	2.9
18	300	7.2	230	4.3	110	2.5	4.0	2.9
19	250	7.4			120	1.9	4.1	2.9
20	250	7.5					4.0	2.9
21	250	7.2					3.4	2.8
22	260	6.9					3.4	2.8
23	270	6.7					3.2	2.8

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

Teble 2

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	295	5.6						2.6
01	292	5.8						2.5
02	295	5.8						2.6
03	290	4.8						2.7
04	300	4.7						2.7
05	300	5.0						2.8
06	300	5.8	---	---				2.8
07	335	6.3	255	4.8				2.8
08	385	6.9	242	4.9				2.7
09	400	6.8	235	5.0				2.6
10	410	7.2	220	5.1				2.6
11	402	7.4	235	4.9				2.6
12	425	7.2	232	5.0				2.6
13	420	7.2	225	5.0				2.6
14	400	7.0	232	5.0				2.8
15	400	7.3	242	5.0				2.7
16	380	7.3	253	4.9				2.6
17	320	7 5	265	4.7				2.7
18	290	8.0					5.0	2.7
19	275	8.2						2.7
20	270	7.8						2.8
21	275	7.5						2.6
22	300	7.4						2.6
23	300	5.8						2.6

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

Table 3

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	300	5.8					3.0	2.5
01	300	5.7					2.4	2.4
02	300	5.5					2.6	2.4
03	310	5.4					2.6	2.4
04	300	5.2					2.4	2.4
05	280	5.3					2.7	2.6
06	260	6.2	250	4.0	120	2.5	2.7	2.5
07	320	5.5	240	4.5	120	3.0	4.0	2.5
08	380	6.8	220	4.9	120	3.3	5.0	2.5
09	400	7.4	220	5.2	120	3.5	5.4	2.5
10	380	7.8	220	5.4	120	3.5	4.5	2.5
11	420	7.5	200	5.3	120	3.9	4.5	2.5
12	410	8.0	220	5.4	120	3.9	4.3	2.5
13	400	8.2	220	5.4	120	3.8	4.8	2.5
14	375	8.4	220	5.4	120	3.9		2.5
15	360	8.0	225	5.3	120	3.6	4.2	2.5
16	345	7.7	240	5.2	120	3.4	5.1	2.6
17	330	7.8	240	4.7	120	3.1	4.3	2.5
18	260	7.5	260	---	120	2.7	4.0	2.5
19	250	7.8					3.0	2.7
20	260	7.7					2.8	2.7
21	260	7.1					2.8	2.5
22	275	6.5					3.4	2.5
23	300	6.0					3.6	2.5

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

Table 4

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	300	6.3					3.5	2.5
01	300	5.0					2.9	2.5
02	290	5.8					2.8	2.5
03	290	5.4					3.3	2.5
04	290	5.3					2.8	2.5
05	280	5.5			115	1.8	3.6	2.7
06	260	5.2	245	---	110	(2.3)	4.8	2.8
07	335	7.1	240	4.5	110	2.8	5.4	2.7
08	360	7.7	220	4.9	110	3.3	5.4	2.5
09	380	8.3	220	5.2	110	3.5	5.3	2.5
10	400	8.2	220	5.2	110	3.7	5.6	2.5
11	400	8.7	220	5.3	110	3.8	5.4	2.5
12	400	8.8	220	5.3	110	3.9	5.2	2.5
13	400	9.0	220	5.3	110	3.8	4.5	2.5
14	400	8.9	220	5.3	110	3.8	4.8	2.5
15	370	8.8	230	5.2	110	3.5	5.0	2.5
15	365	8.4	230	5.1	110	3.4	4.8	2.5
17	340	7.8	240	4.6	110	3.0	4.6	2.5
18	300	8.0	(255)	---	110	(2.4)	4.8	2.7
19	280	8.2			---	---	4.1	2.7
20	260	8.1					3.8	2.7
21	260	7.2					3.4	2.7
22	280	6.6					4.9	2.6
23	290	5.2					3.5	2.6

Time: 105.0°W.
Sweep: 0.8 Mc to 14.0 Mc in 2 minutes.

Table 5

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	290	6.7					3.0	2.9
01	280	6.6						2.9
02	280	6.3					3.0	3.0
03	280	8.5					2.4	2.9
04	290	5.2						2.9
05	290	5.3						3.0
06	280	6.2	245	3.7	120	2.3		3.0
07	300	7.1	235	4.5	120	3.0	4.3	3.1
08	330	7.5	230	5.0	120	3.4	4.5	2.9
09	340	7.7	205	(5.3)	120	3.5	4.4	2.9
10	375	8.5	(210)	(5.3)	120	(3.6)	4.4	2.8
11	390	8.1	---	---	(120)	3.7	4.3	2.8
12	390	8.4	---	(5.6)	(120)	(3.7)		2.7
13	380	8.4	---	---	120	(3.7)		2.8
14	390	8.5	---	---	120	(3.6)		2.8
15	380	8.2	240	(5.2)	120	3.6		2.8
16	350	8.2	235	5.0	120	3.4	4.0	2.9
17	330	7.8	240	4.6	120	3.2	4.5	2.9
18	300	7.7	250	3.7	120	2.6	4.4	3.0
19	280	7.8					4.4	2.9
20	260	7.7					4.0	3.0
21	270	7.6					3.8	2.9
22	280	6.9					3.8	2.9
23	290	6.7					3.0	2.9

Time: 90.0°W.
Sweep: 2.12 Mc to 15.3 Mc in 8 minutes 30 seconds, automatic operation.

Table 6a*

Maui, Hawaii (20.8°N, 156.5°W) June 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	330	8.9						2.6
01	310	8.6						2.7
02	300	8.2						2.7
03	285	7.8						2.8
04	300	7.0						2.7
05	320	6.3						2.8
06	280	6.4	---	---				2.6
07	260	7.4	---	---	105	2.8		2.6
08	320	8.4	240	5.6	110	3.2		2.8
09	445	9.1	230	5.8	110	3.5	4.4	2.3
10	440	10.0	240	5.6	105	---	4.8	2.3
11	445	10.8	240	5.8	---	---	8.4	2.3
12	430	11.2	220	8.8	---	---	4.5	2.4
13	420	11.7	240	5.7	---	---		2.4
14	400	11.8	230	5.6	---	---		2.4
15	380	12.1	240	5.4	---	---		2.5
16	350	12.2	250	5.2	100	3.6	4.5	2.8
17	310	12.4	250	---	110	3.2	4.1	2.7
18	290	11.6	---	---	120	2.8	3.4	2.7
19	280	10.8					2.8	2.7
20	295	9.8						2.6
21	305	9.6						2.6
22	340	9.5						2.6
23	320	9.4						2.7

Time: 150.0°W.
Sweep: 2.2 Mc to 16.0 Mc in 1 minute.
*Data recorded by old equipment.

Table 6b*

Maui, Hawaii (20.8°N, 156.5°W) June 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	300	8.7					3.1	(2.7)
01	300	8.4					2.7	(2.6)
02	280	7.9					2.9	2.7
03	270	7.5					2.3	2.8
04	280	7.0					1.6	2.6
05	300	6.3					1.6	2.6
06	265	6.2	---	---	120	2.0		2.6
07	240	7.0	240	---	110	2.6	4.0	2.7
08	290	8.0	230	5.2	110	3.3	4.2	2.4
09	445	8.8	220	5.4	110	3.5	4.6	2.2
10	485	9.5	220	5.5	110	3.7	5.0	2.2
11	470	10.2	220	5.6	110	3.9	5.2	(2.3)
12	440	10.7	220	5.6	110	4.0	4.0	(2.4)
13	420	11.3	220	5.6	110	4.0		(2.5)
14	400	11.6	220	5.4	110	4.0	3.5	(2.6)
15	380	11.8	220	5.4	110	3.8		(2.6)
16	360	12.1	230	5.2	110	3.5	4.1	(2.7)
17	320	(12.0)	240	4.8	110	3.0	4.2	(2.8)
18	270	(11.2)	---	---	110	2.4	4.0	(2.8)
19	270	10.3					3.6	2.8
20	275	9.4					4.0	2.6
21	300	9.4					4.2	2.6
22	310	9.3					3.9	2.6
23	300	(9.0)					4.0	(2.7)

Time: 150.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.
*Data recorded by new equipment.

Table 7

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	300	10.5						2.7
01	270	10.0						2.8
02	270	9.0						2.8
03	270	8.3						2.8
04	290	7.6						2.8
05	275	7.0						2.8
06	260	7.0		---				2.9
07	250	7.9		---				2.9
08	280	8.3		4.7		3.3	4.5	2.8
09	325	8.9		5.2		3.7	4.8	2.7
10	360	9.6		5.5		3.7	4.4	2.6
11	360	10.5		5.7		4.0	5.0	2.6
12	355	11.2		5.7		4.0	5.0	2.6
13	340	11.8		5.8		4.0	5.0	2.6
14	355	11.9		5.8		4.0		2.6
15	340	11.7		5.5		3.8	5.5	2.6
16	340	11.8		5.0		3.6	5.0	2.6
17	310	11.8		---		3.3	4.8	2.7
18	290	11.0					3.8	2.7
19	290	10.8						2.7
20	300	(10.6)						(2.8)
21	300	10.4						2.7
22	300	10.2						2.8
23	300	10.3						2.7

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

Table 8

Trinidad, British West Indies (10.6°N, 61.2°W) June 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	260	11.0						2.9
01	250	9.8						3.0
02	250	9.2						3.0
03	250	8.4						3.0
04	250	7.8						3.0
05	260	7.0						3.0
06	260	7.2			100	2.1	2.4	3.0
07	240	8.2			120	2.8	3.3	3.0
08	250	8.6	220	4.5	120	3.3	3.9	3.0
09	300	9.3	220	5.3	120	3.7	4.2	2.7
10	330	10.0	220	5.4	120	3.9	4.6	2.6
11	350	11.0	220	5.6	120	4.0	4.8	2.6
12	360	11.8	220	5.6	120	4.1	5.2	2.6
13	370	12.0	220	5.7	120	4.1	4.8	2.7
14	350	12.5	220	5.5	120	4.0	5.1	2.8
15	340	12.4	220	5.3	120	3.8	5.2	2.8
16	320	11.8	220	5.1	120	3.4	4.8	2.8
17	280	11.4	230	4.4	120	3.0	4.2	2.7
18	260	11.0	---	---	110	2.4	4.4	2.6
19	280	10.8					4.2	2.7
20	300	11.2					3.4	2.7
21	300	11.4					2.4	2.7
22	290	11.4					2.1	2.8
23	280	11.4						2.9

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

Table 9

Palmyra I. (5.9°N, 162.1°W) June 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	270	(11.6)					2.8	2.8
01	280	(10.9)					2.0	(2.8)
02	275	9.8					2.3	2.8
03	265	8.8					2.0	2.9
04	250	7.2					2.0	3.0
05	240	6.2					1.8	3.1
06	290	5.6			---	---	2.1	2.9
07	260	7.1			130	2.7	3.2	2.8
08	240	8.3			120	3.3	3.8	2.6
09	240	9.0	230	---	120	3.6	3.9	2.4
10	250	9.5	230	---	130	3.9		2.3
11	280	9.8	230	---	130	4.0		2.3
12	320	10.0	225	---	130	4.1		2.2
13	340	10.8	240	---	130	4.2		2.2
14	300	11.0	220	---	130	4.0		2.2
15	270	11.0	220	---	130	3.8	3.8	2.3
16	240	11.1	210	---	120	3.4	4.0	2.3
17	240	11.4	---	---	130	2.9	3.6	2.3
18	280	10.9			130	2.3	3.4	2.2
19	335	10.4			---	---	3.7	2.2
20	390	10.0					2.7	2.2
21	380	9.9					2.5	2.3
22	340	10.5					3.2	(2.5)
23	300	12.0					3.6	2.7

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.

Table 10

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	230	7.5						3.1
01	230	7.0						3.2
02	230	6.6						3.2
03	230	5.8						3.2
04	240	4.4						3.2
05	245	3.8						3.2
06	280	4.6				1.4	2.8	2.9
07	250	7.7				2.5	5.5	3.0
08	230	9.4				3.0	10.2	2.8
09	(300)	10.0	220	5.3		3.5	10.4	2.7
10	305	9.7	210	5.4		3.7	10.6	2.5
11	300	9.9	200	5.3		3.8	10.6	2.5
12	(310)	9.5	210	5.2		3.8	10.6	2.4
13	300	9.8	210	5.2		3.8	10.6	2.4
14	---	9.7	210	---		3.7	10.6	2.4
15	220	9.7				3.4	10.6	2.3
16	230	9.5				2.9	10.3	2.4
17	260	9.2				2.2	4.8	2.4
18	320	8.6				1.0		2.4
19	330	8.1						2.4
20	305	8.4						2.5
21	260	8.4						2.6
22	230	7.9						2.8
23	230	7.9						3.0

Time: 75.0°W.
Sweep: 16.0 Mc to 0.5 Mc in 15 minutes, automatic operation.

Table 11

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	260	12.0					3.0	2.7
01	250	11.5					3.2	2.8
02	210	10.0					2.4	2.9
03	210	9.0					2.2	2.9
04	215	7.6					2.4	2.9
05	235	8.1					2.6	2.9
06	210	9.0	---	---	---	---	4.0	3.0
07	220	10.2	200	---	---	---	4.5	3.0
08	240	10.5	200	---	---	---	5.0	2.9
09	250	11.2	200	---	---	---	5.8	2.7
10	280	12.2	190	6.2	---	---	6.9	2.6
11	300	12.8	200	---	---	---	7.0	2.6
12	320	14.3	200	6.2	100	4.1	6.2	2.6
13	305	14.8	200	6.0	90	4.4	6.6	2.7
14	310	15.0	200	6.0	90	4.0	6.2	2.7
15	280	15.8	190	---	80	3.8	4.7	2.9
16	265	15.0	200	6.0	80	3.4	4.9	2.9
17	240	14.7	200	---	80	3.0	5.1	2.9
18	240	14.5	210	---	---	---	4.3	2.9
19	200	14.0					5.0	2.9
20	200	13.3					4.5	2.7
21	220	12.5					4.6	2.8
22	240	12.0					4.0	2.7
23	260	11.8					3.9	2.7

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

Table 12

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	(270)	3.0						2.8
01	(270)	3.2						2.8
02	(270)	3.1						2.8
03	(260)	3.2						2.9
04	(250)	3.2						2.9
05	(260)	3.2						2.8
06	250	3.2						2.9
07	230	6.9			---	2.0		3.2
08	230	9.8	---	---	110	2.7		3.3
09	240	10.7	220	3.7	110	3.2		3.2
10	250	11.7	220	4.6	110	3.5		3.1
11	250	11.8	210	---	110	3.7		3.1
12	250	12.0	210	5.2	110	3.7		3.0
13	250	11.8	210	---	110	3.7		2.9
14	250	12.2	215	---	110	3.5	3.6	2.9
15	240	11.9	220	4.0	110	3.2	3.4	2.9
16	240	11.8	230	---	110	2.8	3.2	2.9
17	230	11.3			110	2.2	2.4	3.1
18	220	9.9			---	---	2.0	3.1
19	210	7.0					1.8	3.1
20	230	6.0					1.7	3.2
21	230	4.8						3.2
22	230	3.4					1.8	3.1
23	(260)	3.0						2.9

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

Table 13

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	275	4.0					2.8	2.8
01	270	4.2					2.8	2.8
02	270	4.1					2.8	2.8
03	260	4.1					2.8	2.9
04	260	4.0					2.8	2.9
05	250	3.7					2.8	2.8
06	250	3.4					3.0	2.9
07	240	6.2				2.0	2.9	3.2
08	240	8.7				2.5	3.3	3.4
09	250	10.2	240	4.5		3.1	3.3	3.2
10	250	11.1	240	4.8		3.3		3.2
11	260	11.6	240	5.0		3.4	3.5	3.2
12	260	11.3	230	4.9		3.3	3.8	3.0
13	265	11.2	230	5.0		3.4	3.7	3.0
14	260	11.2	240	4.4		3.3	3.8	3.0
15	260	11.3	240	4.4		3.1	3.6	3.0
16	250	11.3				2.6	3.3	3.0
17	240	10.8				2.0	3.3	3.1
18	225	9.4					3.3	3.1
19	230	7.0					3.2	3.0
20	240	6.1					2.8	3.1
21	245	4.6					2.9	3.0
22	260	4.0					2.8	2.8
23	270	4.1					2.8	2.8

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

Table 14

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	(270)	2.7						2.8
01	(280)	2.8						2.8
02	(280)	2.9						2.8
03	(280)	3.1						2.8
04	(280)	3.1						2.9
05	(260)	3.2						3.0
06	240	3.2						3.0
07	240	3.4						2.9
08	230	7.0			---	2.1		3.3
09	230	9.0	230	---	110	2.8		3.3
10	240	10.2	220	3.7	110	3.1		3.2
11	250	11.4	220	---	110	3.4		3.1
12	250	12.4	210	---	110	3.6		3.0
13	250	12.1	210	---	110	---		2.9
14	270	13.0	230	---	110	(3.5)		2.9
15	260	13.4	240	---	110	(3.2)		2.9
16	240	12.7	235	---	110	3.0		2.9
17	230	12.1			110	2.4		3.0
18	220	11.0			100	1.7		3.1
19	210	8.0					1.4	3.1
20	230	7.5						3.2
21	220	5.0						3.3
22	230	3.0						3.2
23	(250)	2.6						2.9

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

Table 15

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	290	7.6						2.8
01	290	7.5						2.8
02	280	7.4						2.8
03	280	6.9						2.8
04	280	6.6						2.7
05	265	7.7	---	---	100	1.8		2.8
06	230	9.7	220	---	100	2.4		3.0
07	250	10.6	240	---	100	3.0		3.0
08	250	11.5	220	---	100	3.3	3.5	3.0
09	250	11.8	220	---	100	3.5	4.0	2.8
10	260	12.0	220	---	100	3.7	4.3	2.9
11	250	12.0	210	---	100	3.7		2.8
12	280	12.1	215	---	100	3.6		2.8
13	290	11.9	220	---	100	3.6	(4.0)	2.8
14	290	11.8	220	---	100	3.7		2.8
15	270	11.5	225	---	100	3.4		2.9
16	250	11.3	220	---	100	3.1	3.2	2.9
17	240	10.6	225	---	100	2.5	2.8	2.8
18	245	10.2	---	---	100	1.9	2.5	3.0
19	230	9.3			---	1.5	1.9	2.8
20	240	8.4						3.0
21	250	8.1						2.8
22	270	8.0						(2.9)
23	285	7.8						2.8

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

Table 16

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	300	8.6						2.6
01	290	8.6						2.7
02	280	8.2						2.7
03	275	7.6						2.6
04	290	7.3			---	---		2.6
05	280	8.2	---	---	---	1.6	1.9	2.6
06	250	10.0	---	---	110	2.2		2.9
07	240	11.3	250	---	110	2.9	3.2	3.0
08	250	11.8	---	---	110	3.2	3.4	3.0
09	255	12.1	230	---	110	3.5	3.8	3.0
10	280	12.5	230	---	110	3.6	4.2	2.9
11	290	12.2	230	---	110	3.6	(3.8)	2.8
12	300	12.7	225	---	110	3.4		2.8
13	300	12.5	220	---	110	3.8		2.8
14	280	12.3	230	---	110	3.5	4.1	2.8
15	280	12.2	245	---	110	3.5		2.8
16	260	11.9	240	---	110	3.2	3.4	2.8
17	260	11.7	---	---	110	2.7	3.0	2.9
18	255	11.2	---	---	110	1.9	3.0	2.9
19	250	10.4	---	---			3.0	2.9
20	260	9.3					2.9	2.8
21	280	9.2					2.7	2.6
22	290	9.0					2.2	2.6
23	300	9.0						2.6

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

Table 17

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	290	9.2						2.7
01	280	9.0						2.7
02	270	8.7						2.8
03	255	7.8					2.4	2.7
04	280	7.3					1.7	2.6
05	290	8.0	---	---	---	1.5	2.5	2.7
06	220	10.1	---	---	110	2.4	2.8	3.0
07	230	11.5	220	---	100	3.0	3.4	3.0
08	240	12.6	220	---	100	3.3	4.0	3.0
09	240	13.0	210	---	100	3.6	4.3	2.9
10	270	13.2	210	---	100	3.8	4.8	2.8
11	280	13.5	210	---	100	3.8	4.4	2.8
12	290	13.9	210	---	100	3.9	4.8	2.7
13	290	13.8	220	---	100	3.8	4.2	2.7
14	280	13.5	220	---	100	3.7	4.5	2.8
15	280	13.1	220	---	100	3.5	4.5	2.7
16	260	12.7	230	---	100	3.2	3.9	2.8
17	250	12.0	240	---	100	2.8	3.6	2.8
18	250	11.7	---	---	120	1.9	3.1	2.9
19	250	10.8			---	---	3.0	2.9
20	250	9.5					2.9	2.8
21	280	9.4					2.5	2.7
22	290	9.3					2.7	2.7
23	290	9.2						2.7

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

Table 18

Lanchow, China (36.1°N, 103.8°E) April 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	320	9.2						2.5
01	315	(9.4)						(2.5)
02	335	8.9						2.4
03	330	8.2						2.4
04	320	7.3						2.4
05	330	7.4						2.4
06	300	9.2					2.9	2.5
07	300	11.5	290	---	160	3.0	3.4	2.7
08	320	12.6	300	---	---	---	3.8	2.6
09	320	13.3	320	---	---	---	4.2	2.5
10	340	13.3	305	---	---	---	4.4	2.5
11	350	13.8	320	---	---	---	4.3	2.5
12	355	13.6	320	---	---	---	4.3	2.4
13	380	13.8	320	---	---	---	4.8	2.4
14	385	13.7	340	---	---	---	(4.5)	2.4
15	380	13.6	340	---	---	---	4.5	2.3
16	360	13.2	320	---	---	---	4.5	2.3
17	360	13.0	300	---	140	3.2	4.3	2.4
18	335	12.7	320	---	160	2.8	3.7	2.5
19	310	12.0					3.6	2.5
20	(300)	(11.5)						(2.5)
21	(300)	(11.6)						(2.5)
22	330	(9.9)						(2.4)
23	340	9.4						2.5

Time: 105.0°E.
Sweep: 2.4 Mc to 16.0 Mc in 15 minutes, manual operation.

Table 19

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	270	9.7					1.8	2.8
01	250	9.4					1.6	2.9
02	240	9.0					1.3	3.0
03	230	7.9					1.3	2.8
04	250	7.5			---	E	1.3	2.7
05	270	8.4	---	---	110	1.6	1.7	2.8
06	230	10.4	---	---	110	2.4		3.1
07	220	11.7	220	---	100	2.9	3.5	3.1
08	230	12.6	220	---	100	3.3	4.2	3.0
09	240	13.2	215	5.6	100	3.5	4.6	2.9
10	240	13.4	210	---	100	3.8	4.8	2.9
11	270	14.2	210	6.0	100	3.9	5.0	2.8
12	270	14.4	220	6.2	100	(4.1)	4.8	2.8
13	280	14.5	220	---	100	4.0	5.0	2.8
14	290	14.0	210	6.0	100	3.7	5.0	2.8
15	270	13.8	220	---	100	3.5	4.8	2.8
16	260	13.2	210	---	100	3.3	4.4	2.8
17	240	12.8	220	---	100	2.8	3.8	3.0
18	240	12.4	---	---	110	2.0	4.0	3.0
19	230	11.3	---	---	---	---	3.3	3.0
20	230	10.0					3.0	2.9
21	250	9.8					2.4	2.8
22	270	9.7					2.2	2.8
23	265	9.8					2.2	2.8

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

Table 20

Yamakawa, Japan (31.2°N, 130.6°E) April 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	290	10.4						2.8
01	280	10.4						2.8
02	260	10.0						2.9
03	250	8.8						2.9
04	270	7.6						2.8
05	280	7.4	---	---				2.7
06	280	8.2	260	---	185	1.7		2.8
07	260	10.3	240	---	110	2.4		3.1
08	260	11.2	240	---	110	3.1	3.8	3.1
09	270	11.8	230	---	110	3.4	4.2	2.9
10	280	12.5	220	---	110	3.7	4.8	2.8
11	300	13.7	220	---	110	3.8	5.0	2.7
12	300	14.4	230	---	110	---	4.8	2.8
13	310	14.4	230	---	110	---	5.0	(2.8)
14	310	14.4	230	---	110	---	5.2	2.7
15	315	14.1	240	---	110	3.8	5.0	2.7
16	300	13.8	240	---	115	3.5	4.6	2.7
17	300	13.3	240	---	110	3.1	3.8	2.7
18	300	13.1	250	---	120	2.4	3.8	2.8
19	270	12.1	240	---	---	1.6	3.4	2.9
20	270	10.7	---	---			3.0	2.8
21	280	10.4					2.6	2.7
22	290	10.4					2.2	2.7
23	300	10.6						2.8

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

Table 21

Wuchang, China (30.6°N, 114.4°E) April 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	260	12.5						2.9
01	250	12.0						3.0
02	245	10.0						3.0
03	235	9.0						3.1
04	240	7.8						2.9
05	270	7.4						2.8
06	265	8.1			---	---		2.9
07	230	10.5			122	2.6		3.2
08	220	11.5	---	---	110	3.3		3.1
09	230	12.2	222	5.2	108	3.6		3.0
10	240	13.0	220	7.0	100	3.6		2.8
11	285	14.6	230	6.6	100	3.8		2.8
12	278	15.5	240	6.8	100	---		2.8
13	300	15.5	240	6.8	105	---		2.7
14	320	15.5	230	6.8	100	---		2.7
15	315	15.5	235	6.6	100	---		2.7
16	290	15.4	240	6.4	110	3.6		2.7
17	250	14.6	232	5.5	110	---		2.8
18	250	14.0	240	---	120	2.6		2.8
19	255	13.5			---	---	3.2	2.8
20	250	13.2					2.8	2.8
21	262	12.2						2.7
22	278	13.0						2.8
23	265	13.0						2.9

Time: 120.0°E.
Sweep: 1.2 Mc to 19.0 Mc in 15 minutes, automatic operation; supplemented by manual operation.

Table 22

Okinawa, I. (26.3°N, 127.7°E) April 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00		15.2						2.9
01		14.3						3.0
02		13.2						3.1
03		10.7						3.0
04		8.7						2.9
05		7.7						3.0
06		8.0						2.9
07		10.1				E		3.3
08		11.3				E	3.6	3.1
09		11.7				---	4.4	2.9
10		13.1				---	4.6	2.8
11		14.4				---	4.6	2.7
12		15.6				---	4.6	2.8
13		16.1				---	4.6	2.8
14		16.2				---	4.6	2.7
15		16.5				---	4.4	2.7
16		16.5				---	4.2	2.7
17		16.0				E	3.9	2.8
18		15.4				E	3.6	2.9
19		14.9						2.8
20		14.0						2.8
21		15.0						2.8
22		(14.5)						2.8
23		(14.5)						(2.9)

Time: 135.0°E.
Sweep: 3.2 Mc to 18.0 Mc in 15 minutes, manual operation.

Table 23

Rarotonga I. (21.3°S, 159.8°W) April 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	250	11.2					2.5	2.8
01								
02								
03								
04								
05								
06	260	7.3			---	E	3.1	2.9
07	250	11.0			---	2.3	3.0	3.1
08	250	13.0			110	3.0	3.6	3.1
09	240	13.6			110	3.4	4.2	3.0
10	230	14.7	---	---	110	3.7	4.4	2.9
11	240	14.7	---	---	110	3.9	4.5	2.8
12	250	14.6	250	7.0	110	3.9	4.6	2.7
13	340	15.4	230	7.3	110	3.9	4.9	2.6
14	340	15.2	240	7.0	110	3.8	5.2	2.6
15	335	15.0	245	6.8	110	3.6	5.3	2.6
16	260	14.9	240	---	110	3.3	5.0	2.6
17	260	15.0	---	---	---	2.6	4.9	2.7
18	270	14.6			---	E	4.8	2.7
19	270	14.4					4.5	2.7
20	255	14.0					4.0	2.7
21	260	13.4					3.7	2.8
22	250	12.3					3.6	2.9
23	250	11.7					3.1	2.8

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

Table 24

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	270	7.5					2.0	2.7
01	270	7.4					2.1	2.7
02	260	7.1					2.1	2.8
03	245	6.6					2.2	2.8
04	260	5.8					2.0	2.7
05	270	5.6					1.4	2.7
06	250	7.0			---	1.7		2.9
07	240	10.0			110	2.6		3.2
08	240	12.0			110	3.2		3.1
09	240	12.9	230	5.0	110	3.5		3.1
10	250	13.0	230	5.0	110	3.9		3.0
11	265	13.0	230	6.6	110	3.9		2.9
12	280	13.0	230	7.0	110	4.0		2.8
13	300	13.0	230	6.5	110	3.9	3.4	2.8
14	290	13.0	240	6.5	110	3.7	3.8	2.9
15	250	12.4	230	5.0	110	3.5		2.8
16	240	12.0	---	---	110	3.0	3.0	2.8
17	240	12.0			115	2.3	2.8	2.8
18	240	11.0			---	(1.5)	3.1	2.8
19	250	9.4					3.1	2.8
20	260	9.4					2.2	2.8
21	250	8.5					2.0	2.8
22	250	8.0					2.0	2.8
23	260	7.6					2.2	2.7

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

Table 25

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	255	6.5					2.9	2.9
01	250	6.2					3.0	2.8
02	255	5.8					3.2	2.9
03	250	5.6					3.0	2.9
04	250	5.1					3.0	2.7
05	270	4.8					3.0	2.7
06	250	5.0					2.9	2.8
07	240	8.4				2.0	2.2	3.3
08	240	11.0	---	---		2.8	3.3	3.3
09	240	12.0	230	---		3.3	3.4	3.2
10	240	12.8	230	4.8		3.3	3.7	3.1
11	250	13.0	220	5.0		3.5	3.8	3.0
12	250	13.0	220	4.9		3.6	3.9	2.9
13	250	13.0	230	4.8		3.8	3.8	2.9
14	250	13.1	230	---		3.8	3.8	2.8
15	240	12.8	235	---		3.3	3.6	2.8
16	240	12.4	---	---		3.0	3.3	2.8
17	240	12.0				2.2	3.3	2.9
18	240	11.5					3.0	2.9
19	240	10.0					3.0	2.9
20	240	9.0					2.8	3.0
21	240	8.2					2.8	3.0
22	240	7.4					2.9	2.9
23	250	6.7					3.2	2.9

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

Table 26

Canberra, Australia (35.3°S, 149.0°E) April 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	270	7.0					3.3	2.6
01	265	7.0					2.9	2.7
02	260	6.7					3.2	2.7
03	250	6.3					2.6	2.8
04	250	5.9					2.8	2.8
05	250	5.5					2.6	2.7
06	250	5.5			---	(1.3)	2.5	2.9
07	225	8.5			110	2.2	2.6	3.2
08	220	11.0			100	3.0	4.2	3.2
09	220	11.8	---	---	100	3.3	4.0	3.2
10	225	12.3	210	4.6	100	3.5	4.1	3.1
11	228	12.5	205	4.6	100	3.6	4.2	3.0
12	240	12.6	200	4.6	100	3.7	4.5	3.0
13	240	12.6	202	4.5	100	3.7	3.8	2.9
14	240	12.5	210	4.5	100	3.5	4.5	2.9
15	230	12.2	---	---	100	3.3	3.8	3.0
16	230	12.0	---	---	100	3.0	3.7	3.0
17	230	11.4	---	---	100	2.3	3.5	3.0
18	230	11.0			---	(1.5)	3.4	2.9
19	240	9.8					2.6	2.8
20	240	8.8					2.6	2.9
21	240	8.1					2.4	2.8
22	250	7.6					2.8	2.7
23	260	7.1					3.4	2.7

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

Table 27

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	260	6.7					3.1	2.6
01	270	6.4					3.0	2.6
02	250	6.2					3.0	2.6
03	250	5.6					3.0	2.6
04	250	5.5					2.9	2.7
05	250	5.5					2.4	2.6
06	240	5.3			---	E	2.8	2.7
07	240	7.0			140	(2.0)	2.1	3.2
08	240	10.1			100	2.6	2.1	3.4
09	230	10.5			100	3.0	3.5	3.4
10	230	(11.0)			100	3.3	3.3	(3.4)
11	240	(10.8)			100	3.4		(3.4)
12	240	(10.5)			100	3.6		(3.4)
13	240	(11.0)			100	3.5	4.0	(3.5)
14	230	(11.0)			---	3.3	4.0	3.4
15	230	(11.0)			100	3.1	4.2	(3.2)
16	230	(11.0)			---	2.7	4.0	(3.3)
17	230	---			---	2.0	3.5	---
18	(230)	(10.7)			---	---	(2.7)	(3.2)
19	250	9.7					(2.1)	3.1
20	240	8.5					2.1	3.1
21	250	7.5					2.2	2.8
22	250	7.0					2.7	2.7
23	250	7.0					2.4	2.6

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

Table 28

Christchurch, New Zealand (43.6°S, 172.7°E) April 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	290	6.8					3.2	2.5
01	290	6.4					3.2	2.5
02	285	6.4					3.5	2.6
03	280	6.3					2.8	2.8
04	270	6.0					2.9	2.7
05	280	5.4					3.1	2.7
06	265	5.3				---	3.0	2.8
07	250	8.0	---	---		1.7	3.5	3.1
08	240	10.7	---	---		2.6	3.9	3.1
09	240	12.4	---	---		3.0	4.4	3.0
10	240	13.1	---	---		3.3	4.5	3.0
11	240	D	230	4.7		3.4	4.5	(2.9)
12	240	D	---	---		3.5	4.5	(2.9)
13	240	D	---	---		3.5	4.6	2.8
14	240	D	---	---		3.3	4.3	2.8
15	250	D	---	---		3.1	4.4	2.8
16	250	12.8	---	---		2.6	4.2	2.8
17	240	12.3				2.0	4.0	2.8
18	240	11.2				---	3.4	2.8
19	250	9.8					3.2	2.8
20	250	8.8					3.0	2.8
21	270	7.9					3.1	2.6
22	280	7.3					3.3	2.6
23	280	7.0					3.2	2.6

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

Table 29

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	280	6.5						2.8
01	270	6.4					1.9	2.8
02	280	6.3					2.0	2.8
03	280	6.0					1.3	2.6
04	290	5.6						2.6
05	396	6.8			---	---		2.6
06	246	7.2	---	---	100	1.8		2.8
07	(240)	(9.8)	---	---	(100)	(2.5)		(2.9)
08	220	11.8	220	---	100	3.1		3.0
09	230	12.5	210	---	100	3.3	3.3	3.0
10	225	12.8	---	---	100	3.5	3.8	3.0
11	250	12.9	210	---	100	3.5	3.8	3.0
12	250	12.7	200	---	100	3.6		3.0
13	260	12.6	210	---	100	3.5		2.9
14	280	12.3	210	---	100	3.5	3.6	2.9
15	250	11.8	210	---	100	3.3	3.4	3.0
16	230	11.5	220	---	100	2.9		3.0
17	220	10.6	---	---	100	2.3		3.1
18	220	9.6	---	---	---	1.6	2.2	3.0
19	220	8.6					2.0	3.0
20	220	7.2						3.0
21	250	6.7						2.9
22	260	6.5						2.9
23	270	6.6						2.8

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

Table 30

Fukaura, Japan (40.8°N, 139.9°E) March 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	290	7.4					2.0	2.7
01	280	7.2					2.0	2.7
02	270	6.9					2.0	2.7
03	270	6.5					1.2	2.6
04	300	6.2					2.0	2.5
06	310	6.2					2.0	2.5
06	260	7.8			120	1.8		2.9
07	230	10.8	---		110	2.6		3.1
08	240	(12.1)	---		110	3.1	3.2	(3.2)
09	240	(12.6)	---		110	3.3	(3.8)	(3.1)
10	240	(12.0)	---		110	3.4	(4.2)	(3.0)
11	250	---	---		(110)	---	(4.5)	---
12	250	(12.7)	---		(110)	---	(4.0)	(2.9)
13	260	(12.6)	---		(110)	---		(3.0)
14	260	(12.4)	---		(110)	---	(3.7)	(3.0)
15	240	(12.1)	---		110	3.2	(3.0)	(3.0)
16	250	12.0	---		110	3.0	3.2	2.9
17	250	11.7	---		110	2.4	2.9	3.0
18	240	11.1			106	1.8	2.4	3.0
19	240	9.4					2.4	2.9
20	250	8.4					2.0	2.8
21	270	7.8						2.7
22	280	7.7						2.7
23	290	7.8						2.7

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

Table 31

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	275	7.6						2.8
01	270	7.6					2.1	2.8
02	260	7.3						2.8
03	260	6.6						2.7
04	280	6.0					1.7	2.6
05	300	6.2					2.4	2.6
08	260	7.6	230	---	165	1.7	2.3	3.0
07	220	11.0	---	---	100	2.6	2.8	3.1
08	220	12.7	220	---	100	3.1	3.6	3.1
09	220	13.3	---	---	100	3.4	3.8	3.1
10	240	13.9	210	---	100	3.6	4.3	3.0
11	240	14.2	215	---	100	3.8	4.9	2.9
12	250	14.0	210	---	100	3.9	4.4	2.8
13	250	14.4	200	---	100	3.8	4.3	2.8
14	235	13.8	210	---	100	3.7	4.2	2.8
15	230	13.4	210	---	100	3.4	4.0	2.8
16	230	12.7	220	---	100	3.0	3.6	2.8
17	230	12.1	---	---	100	2.4	3.0	3.0
18	230	11.3	220	---	---	1.8	2.8	3.0
19	220	9.5					2.6	2.9
20	230	8.6					2.0	2.8
21	250	7.8						2.8
22	270	7.7						2.8
23	275	7.8						2.8

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

Table 32

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	260	8.1					2.0	2.9
01	250	8.1					2.2	2.9
02	230	7.5					1.8	3.0
03	230	6.6					2.0	2.8
04	240	6.2					2.0	2.8
05	280	6.2					2.0	2.8
06	245	7.9	---	---	115	(1.8)		3.0
07	210	10.8	---	---	100	2.6		3.3
08	215	12.6	215	---	100	3.2	3.5	3.2
09	210	13.5	210	---	100	3.5	3.8	3.2
10	220	14.0	210	---	100	3.8	4.6	3.0
11	230	14.5	200	---	100	3.9	4.2	3.0
12	235	14.5	205	---	100	4.0	4.6	2.9
13	240	14.4	210	---	100	3.9	4.7	2.9
14	240	14.1	215	---	100	3.6	4.4	2.9
15	235	13.6	210	---	100	3.5	4.0	2.9
16	230	13.2	220	---	100	3.2	3.5	2.9
17	220	12.5	230	---	100	2.6	3.0	3.0
18	215	11.7	---	---	100	1.8	3.0	3.1
19	210	9.8					2.4	3.0
20	230	8.5					2.1	2.9
21	240	8.7					2.2	2.8
22	250	8.4					2.0	2.9
23	260	8.5					2.1	2.8

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

Table 33

Yamakawa, Japan (31.2°N, 130.6°E) March 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	280	9.2						2.7
01	280	8.7						2.8
02	250	8.4						2.9
03	250	7.3						3.0
04	250	5.9						2.7
05	300	5.4						2.6
06	300	5.8	---	---	---	E		2.6
07	250	8.8	---	---	120	2.2		3.0
08	230	11.1	---	---	110	2.8		3.2
09	240	12.7	235	---	110	3.2	3.7	3.0
10	285	13.4	230	---	110	3.6	3.9	2.8
11	290	13.8	220	---	110	3.8	4.4	2.9
12	300	14.2	220	---	110	(4.0)	5.0	2.8
13	300	14.5	220	---	110	(4.0)	5.0	2.8
14	300	14.6	220	---	110	3.8	4.8	2.7
15	300	14.1	220	---	110	3.4	4.3	2.7
16	300	13.9	230	---	110	3.4	3.8	2.8
17	280	13.2	230	---	110	3.0	3.6	2.3
18	250	12.8	---	---	110	2.3		2.8
19	240	11.8			---	---	2.3	2.8
20	240	10.9						2.8
21	250	10.2						2.7
22	260	9.8						2.8
23	270	9.3						2.7

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

Table 34

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

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	250	11.5						2.6
01	250	10.0						2.7
02	240	8.6						2.8
03	225	7.6						2.8
04	230	6.5						2.6
05	270	6.1						2.5
06	280	6.8	---	---				2.6
07	240	10.6	240	---	120	2.4	2.9	2.9
08	240	12.6	230	---	90	3.0	3.8	3.0
09	245	13.4	210	---	---	---	4.1	2.8
10	260	14.5	210	---	100	4.0	4.2	2.6
11	275	15.4	210	---	100	4.1	4.3	2.8
12	275	16.2	205	---	95	4.0	4.4	2.6
13	285	16.5	220	7.2	100	4.0	4.6	2.5
14	290	16.8	200	---	100	4.0	4.6	2.5
15	280	15.9	190	---	95	3.8	4.0	2.7
16	265	15.6	200	---	90	3.2	4.0	2.7
17	240	14.9	200	---	90	2.9	3.6	2.7
18	260	15.0	---	---	---	---	2.8	2.6
19	250	15.0					1.7	2.6
20	245	15.0						2.6
21	240	14.6						2.6
22	240	14.8						2.7
23	240	12.4						2.7

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

Table 35

Delhi, India (28.6°N, 77.1°E) March 1949

Time	*	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000 **
00	360	9.6						2.8
01	340	9.4						
02	---	---						
03	---	---						
04	(295)	(7.4)						2.9
05	350	7.0						
06	310	7.9						
07	290	10.7						
08	300	12.6						3.2
09	320	13.5						
10	310	13.9						
11	340	14.4						
12	380	14.3						3.2
13	355	(14.5)						
14	360	(14.5)						
15	340	(14.2)						
16	(350)	(14.0)						
17	320	13.8						
18	(320)	(13.6)						
19	---	(13.2)						
20	330	(12.5)						3.2
21	300	11.7						
22	340	10.5						
23	340	10.4						

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 36

Bombay, India (19.0°N, 73.0°E) March 1949

Time	*	f°F2	h'F1	f°F1	h'E	f°E	fEs	** F2-M3000
00								
01								
02								
03								
04								
05								
06								
07	360	10.6						
08	360	12.3						2.9
09	420	13.6						
10	---	(14.2)						
11	---	(14.6)						
12	---	(14.8)						
13	---	(14.9)						
14	---	(14.9)						
15	---	(14.9)						
16	---	(14.9)						
17	---	(14.9)						
18	---	(14.8)						
19	(480)	(14.6)						
20	---	(14.7)						2.6
21	---	(14.2)						
22	(420)	(13.7)						2.6
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 37

Madras, India (13.0°N, 80.2°E) March 1949

Time	*	f°F2	h'F1	f°F1	h'E	f°E	fEs	** F2-M3000
00								
01								
02								
03								
04								
05								
06								
07	390	10.4						
08	420	13.1						2.6
09	510	(14.0)						
10	(540)	(14.0)						
11	540	(13.7)						
12	555	12.9						2.3
13	570	12.3						
14	600	12.3						
15	600	12.5						
16	600	12.8						2.2
17	600	12.6						
18	600	12.2						
19	600	(11.8)						
20	(540)	(11.8)						2.3
21	(540)	(12.0)						
22	540	(12.0)						
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 38

Tiruchirapalli, India (12.0°N, 78.8°E) March 1949

Time	*	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00								
01								
02								
03								
04								
05								
06								
07	360	9.2						
08	390	12.0						
09	480	13.0						
10	510	12.8						
11	600	12.8						
12	600	12.8						
13	600	12.4						
14	620	12.4						
15	660	12.6						
16	615	12.0						
17	600	11.9						
18	600	11.2						
19	660	10.9						
20	660	9.8						
21	600	10.5						
22	530	9.9						
23								

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

Table 39

Rarotonga I. (21.3°S, 159.8°W) March 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	290	11.2					2.9	2.6
01								
02								
03								
04								
05								
06	270	10.0			---	---	2.5	2.9
07	250	11.6			115	2.4	3.2	3.1
08	250	12.5			110	3.0	4.1	3.1
09	240	12.9	---	---	110	3.4	4.6	2.9
10	240	13.9	220	5.8	110	3.7	4.9	2.7
11	245	14.6	225	7.1	105	3.9	4.8	2.7
12	310	14.7	240	6.9	105	4.1	4.9	2.6
13	350	15.1	230	7.7	105	4.1	5.2	2.6
14	350	15.4	235	7.2	105	4.1	4.4	2.6
15	350	14.6	240	7.4	105	4.0	4.8	2.6
16	300	14.1	245	6.8	110	3.6	4.8	2.6
17	260	13.7	250	6.6	110	3.0	4.4	2.6
18	270	13.2	---	---	120	2.0	3.8	2.7
19	290	12.7	---	---			3.6	2.6
20	300	12.0	---	---			3.5	2.6
21	300	11.7					3.1	2.6
22	300	11.7					3.2	2.6
23	290	11.2					2.9	2.7

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

Table 40*

Fraserburgh, Scotland (67.6°N, 2.1°W) February 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	350	3.8						2.5
01	360	3.5						
02	370	3.0						2.4
03	370	3.2						
04	360	3.0						2.5
05	340	3.1						2.6
06	320	3.4						2.5
07	300	4.4	270#	(3.1)#				2.6
08	250	7.0						
09	240	8.7	290#	4.1#	140	2.4		3.0
10	240	10.0			140	2.9		2.9
11	240	10.6			140	3.0		2.6
12	240	10.5			130	3.1		2.9
13	240	10.4			130	3.1		2.8
14	240	(10.6)			130	2.9		3.0
15	240	(10.4)			140	2.8		2.6
16	240	(10.5)			140	2.5		2.9
17	240	10.0						2.9
18	240	9.4						2.8
19	250	7.3						2.7
20	260	6.4						2.6
21	290	6.0						2.5
22	310	5.0						2.4
23	340	4.6						2.4

Time: Local.
Sweep: 2.2 Mc to 16.0 Mc in 1 minute.
*Average values except foF2, which are median values.
#One or two observations only.

Table 41*

Slough, England (51.6°N, 0.6°W) February 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	291	5.3					2.6	2.5
01	297	4.9					3.3	2.6
02	299	4.6					3.6	2.6
03	303	4.2					3.2	2.5
04	289	3.8					3.4	2.6
05	277	3.5					3.6	2.6
06	278	3.5					3.8	2.6
07	258	5.2			133	1.6	4.0	2.8
08	235	8.6	250#	4.5#	128	2.2	4.4	3.0
09	229	10.8	265#	4.4#	122	2.7	4.6	3.0
10	232	12.2	236	4.6	121	3.1	4.8	3.0
11	234	12.5	221	4.5	119	3.3	4.8	3.0
12	229	13.2	226	4.6	119	3.3	4.8	3.0
13	229	12.9	221	4.4	119	3.3	4.8	2.9
14	227	12.8	220	4.3	123	3.2	4.7	2.9
16	227	12.4			122	3.0	4.8	2.9
16	226	11.8			123	2.6	4.8	3.0
17	232	11.2			133	1.9	4.0	3.0
18	221	10.2					2.8	2.9
19	224	8.4					2.8	2.8
20	237	7.4					2.6	2.8
21	255	6.6					2.4	2.7
22	273	6.2					2.6	2.6
23	283	5.6					2.6	2.5

Time: Local.
Sweep: 0.65 Mc to 16.5 Mc in 5 minutes.
*Average values except foF2 and fEs, which are median values.
#One or two observations only.

Table 42

Lanchow, China (36.1°N, 103.8°E) February 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	390	6.0						2.3
01	380	5.6						2.3
02	370	5.6						2.4
03	360	6.0						2.3
04	325	6.0						2.4
05	330	4.8						2.3
06	390	4.6						2.3
07	340	6.6	340	---				2.4
08	320	10.2	320	---	---	---	3.1	2.6
09	340	12.5	300	---	160	3.5	4.1	2.5
10	340	14.0	310	---	160	3.7	4.2	2.4
11	345	14.8	300	---	160	4.2	4.3	2.4
12	355	14.5	300	---	---	---	4.4	2.4
13	360	14.0	300	---	---	---	4.5	2.4
14	360	14.0	300	---	---	---	4.5	2.3
15	340	13.8	305	---	---	---	4.2	2.3
16	360	13.0	310	---	150	3.3	3.8	2.3
17	360	12.5	320	---	---	---	3.3	2.4
18	330	11.5	310	---				2.4
19	320	10.5						2.4
20	320	9.8						2.4
21	320	8.1						2.4
22	350	6.8						2.3
23	380	6.4						2.3

Time: 105.0°E.
Sweep: 2.4 Mc to 16.0 Mc in 15 minutes, manual operation.

Table 43

Calcutta, India (22.6°N, 88.4°E) February 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	270	13.9				1.1		2.8
01		12.9				1.0		
02		13.0				1.0		
03	(240)	(10.7)				1.0		(3.1)
04		(7.6)				1.0		
05		(6.9)				---		
06	---	(7.6)				1.4		(3.0)
07		(9.7)				2.2		
08		11.2				3.1		
09	270	12.9				3.5		2.8
10		(13.0)				3.6		
11		(13.5)				---		
12	(270)	13.5				3.8		2.7
13		13.2				---		
14		13.0				---		
16	---	13.2				---		(2.7)
16		13.1				---		
17		13.2				3.1		
18	270	13.1				2.8		2.8
19		(13.0)				2.0		
20		(13.0)				---		
21	270	14.8				2.5		2.8
22		14.8				1.7		
23		15.6				1.2		

Time: Local.
*Probably includes fEs observations.

Table 44*

Singapore, British Malaya (1.3°N, 103.8°E) February 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	230	9.6						2.8
01	250	(10.4)						2.5
02	260	(10.3)						2.6
03	255	9.4						2.8
04	245	8.5						3.0
05	235	7.4						3.4
06	245	5.6						2.8
07	250	9.0			105	2.6	3.2	2.9
08	240	10.5			110	3.3	4.0	2.7
09	250	11.6			110	3.7	4.4	2.3
10	270	11.6			110	4.1	4.4	2.1
11	225	(11.4)			110	4.3		2.0
12	315	(11.7)			110	4.4	4.8	1.9
13	285	(10.9)	210#	5.2#	110	4.3	4.5	1.9
14	320	(11.2)			110	4.1		1.9
15	330	11.4			110	3.9	4.4	1.9
16	290	11.4			110	3.4	4.0	2.0
17	275	(11.2)			110	3.1	3.8	(2.1)
18	275	(11.4)				2.5	2.9	
19	370	---						
20	395	---						(2.2)
21	315	---						
22	255	---					2.4	(2.7)
23	225	(11.1)						(2.6)

Time: Local.
Sweep: 2.2 Mc to 16.0 Mc in 1 minute.
*Average values except foF2 and fEs, which are median values.
#One or two observations only.

Table 45

Calcutta, India (22.6°N, 88.4°E) January 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E*	fEs	F2-M3000
00	(270)	10.8				1.1		(3.0)
01		10.0				1.2		
02		8.8				1.7		
03	(240)	7.8				1.2		(3.0)
04		6.1				1.1		
05		---				---		
06	(270)	6.8				---		(2.8)
07		8.8				2.2		
08		10.4				2.6		
09	(270)	12.2				3.2		(2.8)
10		13.2				3.5		
11		13.3				---		
12	(300)	13.3				3.8		(2.7)
13		13.4				3.6		
14		13.6				3.6		
15	270	13.5				3.6		2.8
16		13.5				3.6		
17		13.6				3.0		
18	270	13.5				2.6		2.8
19		13.3				2.3		
20		12.8				1.8		
21	270	12.4				1.3		2.9
22		11.2				1.4		
23		11.0				1.2		

Time: Local.
*Probably includes fEs observations.

Table 46*

Falkland Is. (51.7°S, 57.8°W) January 1949

Time	h'F2	f°F2	h'F1	f°F1	h'E	f°E	fEs	F2-M3000
00	346	(9.2)					2.8	
01	342	(9.1)						
02	329	(9.0)					2.7	
03	334	(9.0)						2.4#
04	353	(9.1)		5.7#				2.5#
05	365	(9.4)	272	3.4#				
06	356	(10.5)	270	4.3	145#	2.4#		
07	336	(10.6)	249	4.7#	125			2.5#
08	358	(10.6)	248	5.2	117#	2.8		2.4
09	371	(10.5)	247#	5.6	117#			2.5
10	391	(10.4)	240#	5.6				2.5
11	393	(10.2)	250#	6.1#				2.4
12	347	(10.7)	250#	5.9#				2.5
13	362	10.5		5.8#				2.5
14	354	10.3	250#	5.7				2.5
15	352	9.4	250#	5.5				2.6
16	353	9.2	250#	5.3				2.6
17	352	8.8	254	5.3			5.3	2.6
18	329	(8.8)	253	4.9	120#		5.0	2.6#
19	311	(9.1)	250#			2.7#	4.6	
20	304	---					4.3	
21	318	---					4.2	
22	329	---					4.6	
23	348	---					4.2	

Time: Local.
Sweep: 2.2 Mc to 16.0 Mc in 1 minute.
*Average values except foF2 and fEs, which are median values.
#One or two observations only.

Form adopted June 1946

TABLE 47

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

IONOSPHERIC DATA

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

Observed at Washington, D.C.

Lat 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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	*(280)S	*280	*270	*280	*270	*280	*320	*420	*380	380	360	400	370	420	400	380	380	330	320	260	270	270	270	270
2	260	250	250	250	260	280	260	230	350	340	380	400	420	420	390	380	380	330	320	(270)A	260	260	250	280
3	300	270	250	(270)S	280	(280)S	[300]A	330	330	350	400	350	400	A	A	390	340	320	240	250	(280)A	250	270	300
4	(270)S	270	270	250	280	260	240	300	280	[330]A	370	(320)S	420	400	370	370	350	330	280	250	250	260	260	250
5	240	240	250	280	280	270	240	300	300	310	380	380	360	350	340	350	350	340	240H	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	310	330	[370]C	390	380	380	380	350	330	310	270	250	250	[270]A	300
7	320	260	310	270	250	300	330H	380	250	400	340	(360)A	370	340	380	380	350	330	(270)A	280	250	(270)S	280	270
8	260	260	300	300	300	370	370	320	450	N	N	380	410	[430]S	420	370	350	320	270	[250]A	250	250	260	260
9	250	250	260	280	270	250	240	230	370	330	350	350	370	370	350	320	330	[320]L	300	240	250	250	260	270
10	260	250	250	220	250	260	280	270	290	350	340	310	330	370	340	380	350	330	280	270	250	250	250	230
11	270	[270]A	270	260	250	250	230	320	300	310	340	(320)A	(350)A	370	330	320	300	280	300	260	230	250	230	250
12	250	250	250	250	290	250F	(270)A	280	300	380	320	340	340	330	340	330	350	300	330	240	250	270	270	250
13	290	300	300	300	270	250	[340]L	430	430	480	(380)A	580	380	380	400	380	350	300	280	250	260	(280)A	290	300
14	300	280	280	260	(270)S	250	270	310	360	400S	420	[430]C	430	370	350	[340]C	330	330	250	250	250	250	240	230
15	260	(300)A	270	270	260	250	250	[280]A	300	320	330	330	350	330	330	340	330	300	240	250	(240)A	250	250	280
16	250	250	(250)S	250	250	260	320	270	300	290	300	380	330	420	360	350	320	320	330	(280)A	270	250	270	(270)S
17	250	300	250	(290)A	(370)A	290	300	370K	400K	540K	550K	530K	(570)S	570K	610K	500K	400K	360K	300	250K	270	260	270	300
18	290	(270)S	270	260	280	250	280	280	350	(350)A	380	410	400	440	390	400	420	380	330	260	250	250	270	280
19	280	280	300	300	300	300	300	450	460	[460]S	450	340	[370]S	450	420	[420]C	430	350	*300	260	(260)S	250	270	250
20	270	270	240	260	*(270)S	*280	*250FK	*(230)AK	300K	430K	450K	S K	S K	480K	500K	480K	430K	370	320	250	250	250	270	(270)S
21	250	330F	300	250	230	250	250	200	280	360	350	300	[310]A	410	420	400	390	300	300	240	260	250	260	270
22	270	270	260	250	270	280	370	350	400F	350	380	370	350	430	410	360	340	[330]A	320	250	(270)A	250	270	300
23	300	[280]C	270	270	280	290	360	320	420	430	350	350	360	370	380	400	340	350	300	260	270	(280)A	250	270
24	280	280	(300)A	280	300	300	240	330	430	380	(370)S	460	400	430	380	330	350	330	270	250	250	260	260	(330)A
25	(270)S	280	280	290	280	280	370F	380	410	470	500	450	450	[450]B	450	450	400	380	300	250	250	250	(350)A	310
26	300	260	300	280	280	250	250	250	[320]A	450	480	430	480	420	450	400	400	360	(330)A	250	260	280	270	270
27	260	250	250	230	280	290	290	330	350	370	[420]A	440	420	410	(410)S	400	400	[380]A	(320)A	250	250	250	230	250
28	270	270	280	250	260	280	240	280	300	380	360	C	B	460	450	410	400	370	310	270	250	250	260	300
29	300	250	260	270	270	280	370	320	350	350	350	450	430	450	430	420	370	350	(330)A	280	270	260	250	280
30	260	260	270	250	250	280	250	310	330	350	380	370	360	(380)S	350	350	330	330	280	250	250	260	260	280
31	270	290	280	250	250	270	250	280	280	320	350	[350]B	350	330	360	350	380	300	270	250	240	250	250	280
Median	270	270	270	265	270	280	275	310	340	355	370	370	370	410	385	380	350	330	300	250	250	250	260	270
Count	30	30	30	30	30	30	30	30	30	30	30	29	29	30	30	31	31	31	31	30	30	30	30	30

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LONG. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U. S. GOVERNMENT PRINTING OFFICE: 1946 O - 703319

TABLE 48

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

IONOSPHERIC DATA

Form adopted June 1946

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

Observed at Washington, D.C.

Lat. 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., B.E.B., J.J.S.

Calculated by: J.J.S., B.E.B., J.M.W.

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	*6.6	*6.4	*5.8	*5.3	*4.9	*4.8	*5.4	*(6.0)^{J}	*7.0	7.2	7.4	7.4	7.8	(7.4)^{J}	7.4	7.5	7.7	7.9	8.1	8.0	8.0	(7.7)$^{J}_{S}$	8.0	7.6
2	7.2	7.1	6.5	6.1	5.7	5.4	6.5	6.5	7.0	7.1	7.5	7.3	(7.2)$^{J}_{S}$	7.3	(7.4)$^{J}_{S}$	7.2	7.2	7.5	7.7	7.9	7.9	77	7.3	6.9
3	6.7	6.7	6.5	5.5	5.0^{F}	5.2^{F}	6.2	6.9	(7.2)$^{J}_{S}$	(7.1)^{S}	7.5	(7.6)$^{J}_{P}$	(7.3)$^{J}_{S}$	7.4	(7.6)$^{J}_{S}$	(7.8)$^{J}_{S}$	7.9	7.9	7.5	7.6	8.0	7.7	(7.4)^{S}	7.0
4	7.0	6.8	6.5	6.1	5.4	5.8	6.6	7.3	7.3	[7.2]^{A}	7.3	[7.1]^{S}	7.2	7.4	(7.7)$^{J}_{S}$	7.6	(7.5)$^{J}_{S}$	7.7	7.4	7.5	7.3	(7.7)^{P}	7.7	78
5	(6.9)^{J}	5.9	5.5	5.3	5.2	5.6	6.3	7.3	7.4	7.1	7.1	7.5	(7.8)$^{J}_{S}$	7.9	(7.8)^{J}	7.5	72	7.3	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	(7.1)^{J}	(7.3)$^{J}_{P}$	(7.0)^{J}	7.0	68	(7.0)^{J}	7.1	(7.0)^{J}	7.0	7.2	7.6	7.5	(7.5)$^{J}_{S}$	(7.0)$^{S}_{P}$	6.9
7	6.7^{F}	6.5^{F}	5.9^{F}	5.6^{F}	5.3^{F}	5.4^{F}	6.0^{F}	6.9	7.4	(7.5)^{P}	7.9	8.2	7.9	7.9	(7.1)^{S}	7.0	7.2	7.3	7.3	7.5	(8.3)^{S}	7.1	7.1	69
8	6.3	5.8	5.3	5.0	4.2	4.2	4.9	5.5	(5.7)$^{S}_{P}$	[5.8]^{N}	5.8	6.8	6.3	[6.0]^{S}	(6.4)^{P}	6.7	6.8	69	7.0	[7.0]^{A}	7.1	6.9	6.7	6.6
9	6.2	5.9	5.3	4.4	4.2	4.0	5.3	5.7^{F}	6.5	7.1	7.7	7.0	(6.7)^{S}	(69)^{S}	7.4	7.4	7.2	6.9	7.1	7.2	7.2	7.3^{F}	6.9	7.2
10	6.3	6.4	5.6	5.4	4.5	4.5	5.5	5.9	6.4	6.8	7.4	7.3	7.3	7.0	(6.8)^{J}	6.9	7.0	7.3	(7.6)$^{J}_{S}$	7.8	8.1	7.5^{F}	6.7^{F}	69^{F}
11	6.8^{F}	5.9^{F}	5.6^{F}	5.7^{F}	5.5^{F}	5.3^{F}	5.4^{F}	6.0	6.8	7.8	8.0	8.4	7.7	7.6	8.1	7.9	83	(79)$^{J}_{S}$	8.2	8.1	86	7.5	7.1	6.1
12	(5.6)^{S}	5.0	5.0^{F}	4.5^{F}	3.7^{F}	4.2^{F}	(5.6)$^{J}_{S}$	6.2	6.9	6.9	(7.2)$^{J}_{S}$	(7.5)$^{J}_{S}$	(8.1)^{S}	8.0	7.8	7.1	7.4	(6.9)^{S}	6.8	7.2	(7.1)$^{J}_{S}$	6.9^{F}	6.7^{F}	6.5
13	6.5	5.2	5.2^{F}	4.9^{F}	4.7^{F}	4.5	4.4	5.0	5.3	5.5	5.9	5.4	6.7	6.5^{F}	6.5	6.5	6.6	6.9	6.5	6.1^{F}	(6.2)$^{J}_{S}$	(7.1)$^{F}_{J}$	6.9	(6.0)$^{J}_{F}$
14	5.3^{F}	5.0^{F}	4.9^{F}	3.9^{F}	3.9^{F}	4.0^{F}	5.3	5.6	5.9	(5.9)^{S}	6.1	[6.2]^{C}	6.3	6.7^{F}	6.7	[7.0]^{C}	7.0	7.1	7.1	6.9	7.6	7.9	7.5	6.4^{F}
15	5.8^{F}	5.3^{F}	5.4^{F}	5.1^{F}	4.7^{F}	4.8^{F}	6.1^{F}	6.5	7.7	7.3	8.2	83	8.5	8.3	7.9	7.9	7.9	8.0	8.1	80	(8.0)$^{J}_{S}$	7.4	7.3	7.0^{F}
16	6.7	5.9^{F}	5.7^{F}	5.3^{F}	4.8^{F}	4.6^{F}	5.8	6.7	7.3	7.1	7.1	(7.6)^{J}	8.0	7.8	8.7	8.9	8.5	8.2	8.0	7.7	8.0	(7.0)^{S}	6.4	68
17	6.5	6.4	5.8	4.9	3.7^{F}	4.2	5.1	6.0^{K}	55^{K}	(5.5)$^{S}_{K}$	5.4^{K}	5.6^{K}	(5.3)$^{S}_{K}$	5.6^{K}	5.7^{K}	5.8^{K}	5.8^{K}	6.0^{K}	6.1^{K}	6.1^{K}	5.9	6.0	5.9^{F}	5.6
18	5.4	5.0^{P}	4.8^{F}	4.5^{F}	(4.1)$^{F}_{S}$	(4.7)$^{F}_{S}$	6.3	6.9	7.0	7.8	6.5	6.9	6.9	6.5	6.9	6.7	6.6	69	7.4	(77)^{S}	7.0	7.1	6.9	6.4
19	5.9	5.3	5.3	4.9	4.2	3.8	4.7	4.9	5.5	[6.0]^{S}	6.3	7.1	[6.2]^{S}	6.2	6.5	[62]^{C}	6.3	6.8	*6.9	(7.2)$^{J}_{S}$	[7.2]^{C}	6.8	6.6	6.7
20	5.0^{F}	5.3^{F}	4.7^{F}	4.4^{F}	*4.1^{F}	*(4.5)$^{J}_{F}$	*5.4^{K}	*5.1^{K}	5.2^{K}	5.8^{K}	5.7^{K}	[5.4]$^{S}_{K}$	[5.8]$^{S}_{K}$	5.9^{K}	5.6^{K}	5.9^{K}	6.2^{K}	6.5	6.7	6.8	6.9	67	6.5	6.2
21	5.8	(5.7)$^{J}_{F}$	(5.3)^{F}	5.3^{F}	4.7^{F}	4.5	6.1	6.1	(6.5)^{J}	7.3	7.4	(7.1)^{S}	[7.0]^{N}	6.7	(6.8)^{J}	7.1	7.3	7.4	7.7	7.8	(77)^{J}	7.1	6.7	6.5
22	6.2	5.8	5.2^{F}	5.1	4.0^{F}	4.0^{F}	4.8^{F}	5.3	5.8^{F}	(6.7)^{J}	6.8	6.8	(6.2)^{S}	7.1	7.3	7.9	(7.9)^{J}	7.3	7.5	7.9	7.5	7.2	6.8	6.5
23	6.6	[6.4]^{C}	6.0	5.2^{F}	4.7	4.6	5.3	5.7	6.0	6.6	7.0	(7.7)^{J}	(7.4)^{J}	6.7	(6.9)^{J}	6.9	6.8	7.0	7.5	7.9	7.9	7.4	7.1	6.6
24	6.6	5.7	5.8	5.3	4.9	4.6	5.5	5.9	6.6	(7.0)$^{J}_{S}$	(6.7)^{S}	6.9	7.3	7.0	(7.4)^{P}	7.3	7.3	6.9	7.1	6.9	7.0	7.1	6.7	68
25	6.4	6.0	5.8	5.4	5.5	4.6	5.1	5.8	6.0^{H}	6.0	(6.4)$^{S}_{P}$	6.5	6.5	[6.5]^{B}	(6.5)^{P}	6.6	6.7	6.8	6.9	68^{F}	7.2^{F}	7.1	6.6	6.5
26	6.1^{F}	5.7	5.3^{F}	5.0	4.9	4.9	5.7	5.9	(6.1)^{J}	6.2	6.3	6.5	6.4	6.7	(6.3)^{S}	6.7	6.7	6.7	6.8	68	6.9	6.9	6.7	6.6
27	6.6	6.1	5.6	4.8	4.2	4.3	5.6^{V}	6.5	6.5	6.5	[6.6]^{A}	6.8	6.7	(6.7)^{P}	6.6	6.7	6.8	6.9	7.1	7.0	7.5	7.3	6.9	6.1
28	5.9	5.5	5.5	5.2	4.3	4.6	6.1	6.7	6.6	6.9	6.7	C	B	6.9	7.0	7.0	7.0	(6.8)^{J}	7.1	7.3	7.0	6.9	6.7	6.7
29	6.5	6.4	6.2	5.3^{F}	49	4.7	5.3	6.2^{H}	6.9	7.3	7.3	6.5	6.8	6.9	6.8	69	6.8	6.5	6.6	6.9	7.3	7.2	6.9	68
30	6.5^{V}	6.5	6.2	6.0^{F}	5.1	47^{F}	5.6	6.6	7.1	(7.0)$^{J}_{S}$	7.1	(7.9)$^{J}_{S}$	7.9	[84]^{S}	8.1	7.9	7.8	7.6	7.7	7.3	(76)$^{J}_{S}$	75	7.0	6.7
31	6.6	6.4	6.1	6.0	5.3	5.1	6.2	(7.0)^{S}	7.7	7.9	8.6	[8.6]^{B}	8.8	8.7	8.5	8.5	8.2	84	(8.3)$^{J}_{S}$	(84)^{S}	8.6	7.7	6.9	67
Median	6.5	5.9	5.6	5.2	4.7	4.6	5.6	6.0	6.6	7.0	7.1	7.1	7.1	6.9	7.0	7.1	7.2	7.0	7.2	7.4	7.5	7.2	6.9	6.7
Count	30	30	30	30	30	30	30	30	30	31	31	30	30	31	31	31	31	31	30	30	30	30	30	30

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LONG. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U.S. GOVERNMENT PRINTING OFFICE, 1946 O - 703519

Form adopted June 1946

TABLE 49

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

IONOSPHERIC DATA

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

Observed at Washington, D.C.

Lat. 39.0°N, Long. 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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	6.4	6.0	5.5	5.0	4.6	5.2	5.6	6.5	7.0	7.6	7.2	7.4	7.7	(7.4)JS	7.6	7.7	7.8	8.0	8.1	7.8	8.1	7.8	7.7	(7.6)JS
2	7.2	6.6	6.2	6.0	5.4	5.8	6.5	6.8	7.3	7.4	7.2	(7.5)JS	7.2	(7.3)JS	7.2	7.1	7.7	7.7	7.9	7.9	7.8	7.5	6.9	6.9
3	6.7	6.4	(6.0)JS	5.3	4.9	5.8	6.6	6.8	(7.3)JS	7.1	7.6	(7.5)JS	7.3	7.7	7.7	7.8	7.7	8.0	(7.7)JS	7.7	8.0	7.6	7.0	7.0
4	6.6	6.6	6.4F	5.7F	5.5F	6.4	7.0	(7.8)JS	7.4	7.1	7.2	(7.1)S	(7.3)JS	(7.6)JS	[7.6]S	7.6	7.7	7.8	7.7	7.2	(7.7)JS	7.7	7.7	7.2
5	6.4	5.8	5.3	5.2	5.1	5.9	(6.8)S	7.2	(7.2)JS	(7.4)J	7.6	(7.6)JS	8.0	[7.8]S	7.4	(7.2)JS	7.0	7.2	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	(7.0)J	7.5	7.1	7.1	[6.9]C	[7.0]C	7.2	(7.0)S	7.0	7.2	7.4	7.3	(7.5)J	(7.4)JS	6.7F	6.5F
7	6.6F	6.3F	6.9F	5.6F	5.2F	5.8	(6.1)SP	[7.2]A	7.4	(7.5)S	7.6	7.6	8.1	(7.2)S	(7.1)JS	7.1	7.2	(7.2)JS	(7.3)JS	7.9	(7.7)SP	(7.1)S	(7.1)S	6.5
8	6.1	5.5	5.1	4.7	4.0	4.3	5.3	(5.8)S	6.0	[5.9]N	(5.8)S	5.9	6.2	6.1	6.5	6.7	(6.8)JS	6.9	7.0	(6.9)S	7.0	6.7	6.7	6.5
9	5.9	5.5	4.5	4.5	(3.7)F	4.9	5.6	6.9	7.0	7.6	7.5	[6.8]S	7.0	7.5	7.5	(7.3)P	(7.0)P	7.0	7.1	(7.1)S	(7.2)JF	7.0	6.8F	6.6
10	6.5F	5.8	5.2	(4.9)F	4.6F	5.3	5.7F	6.0	6.6	(7.1)S	7.4	7.1	[6.8]S	(6.9)J	6.8	7.3	7.2	7.5	7.6	7.9	7.9F	7.5	6.9	7.1F
11	5.6F	5.7F	5.7F	5.7F	5.3F	5.4F	5.6F	6.3	(7.0)JS	8.0	8.2	[7.8]A	7.5	(7.8)JS	8.1	8.1	(8.0)JS	(7.9)JS	8.0	8.2	(7.8)J	7.4	6.5	5.8
12	5.3	5.1	4.7F	(4.5)JS	3.7F	(5.1)JS	[5.8]A	6.8	6.7	[7.4]A	7.4	8.1	8.1	7.5	7.4	7.0	7.0	6.9	7.1	6.9	(7.1)JS	7.0	6.7	6.7
13	5.5	5.0	5.0F	4.9F	4.5F	4.5F	4.7	5.2	5.4	5.7	5.6	5.9	(6.8)J	5.9	6.7	6.6	6.8	6.7	6.6	(6.3)JS	(7.0)JF	(7.1)FS	(5.9)FF	(5.7)S
14	5.3F	4.9F	4.6F	4.2F	3.7F	4.5	5.3	6.5	(5.9)S	6.1	[6.2]C	6.2F	6.7	6.7	6.9	7.0	(7.1)JF	(7.0)JS	(7.0)S	7.3	7.9	8.2	6.9F	5.9F
15	5.4F	5.3F	5.2F	4.8F	4.5F	5.6	6.6	7.3	7.2	8.3	8.3	8.3	8.8	8.2	(7.8)JS	7.9	8.0	(7.9)S	8.4	7.8	7.9	7.4	6.9	6.8F
16	6.2	5.7F	(5.7)S	5.0F	4.6F	4.9	6.5	7.2	7.6	6.9	(7.0)JS	8.0	7.3	8.2	9.0	8.9	8.3	8.0	7.9	7.9	7.8	6.7	6.6	6.9
17	6.5	6.3	5.2	4.3	3.8F	4.7	5.3H	(5.8)SK	5.2K	(5.6)NK	5.6K	(5.6)K	<5.0EK	5.6K	5.7K	5.9K	5.9K	(6.0)SK	6.1K	6.0K	6.1	6.0	5.9F	5.4
18	5.2F	4.9F	4.6F	4.6F	4.0F	5.5F	6.5	6.7	7.9	7.1	(6.8)S	(6.8)S	(6.8)S	6.8	7.0	6.9	6.6	6.9	7.7	7.5	7.2	7.0	6.6	6.0
19	5.7	5.5	4.9	4.7F	3.7F	4.3	4.5	5.0	(5.0)S	(6.0)S	[6.3]S	(6.2)JS	[6.3]S	[6.1]C	(6.3)S	6.2	6.7	6.7	*7.2	*7.3	6.9	6.6	*6.5	[5.8]FS
20	5.5F	*5.2F	[4.4]C	4.2F	*3.9F	*4.9F	K[5.2]FC	[5.0]CK	*5.4K	6.0K	(5.3)AK	[5.6]SK	6.0K	6.1K	5.9K	5.9K	6.3K	6.6	6.8	6.7	6.9	6.7	6.4	(6.0)SF
21	(5.4)JS	(5.6)JF	5.4F	5.1F	3.9F	5.0	6.1F	6.7	6.8	7.8	(7.5)JS	7.2	6.7	6.3	6.9	7.1	7.3	7.7	(7.5)JS	(7.5)JS	7.2	7.0	6.7	6.3
22	5.9	5.8	5.4	4.8F	4.1F	4.3	5.3	5.4	6.1	6.5	6.9	6.5	6.9	7.2	7.6	7.7	7.8	7.3	7.6	7.5	7.1	6.9	6.6	6.3
23	6.3	(6.5)S	[5.6]C	[5.0]C	[4.6]C	4.9	[5.5]C	[5.8]C	[6.3]P	[6.8]C	[7.4]C	7.2	7.1	[6.9]S	6.8	(6.9)JS	6.8	7.2	7.8	7.6	7.9	7.3	6.9	6.1
24	5.9	5.9	5.5	5.2	4.8	5.0	5.8	6.3	6.7	(6.6)JS	(6.7)S	[6.9]S	(7.2)S	7.2	7.6	7.3	7.1	6.9	6.9	7.0	7.1	6.9	6.7	6.7
25	6.3	6.1	5.3	5.0F	5.1	4.7	5.2F	(5.9)JS	(6.0)J	[6.4]S	[6.4]C	6.3	[6.4]B	6.5	6.6	6.5	6.9	6.9	6.9	7.1F	(7.0)S	6.6	(6.5)S	6.5
26	6.0	5.3F	6.1F	4.9F	4.8	5.2	5.7	6.1	6.4	(6.0)P	6.7	6.8	(6.0)J	6.9	6.6	6.8	6.7	6.7	6.9	6.8	6.8	6.9	6.7	6.7
27	6.5	5.8	4.9F	(4.6)JS	4.0	4.9	6.1	6.5	[6.5]S	6.6	6.7	(6.6)P	6.7	6.8	6.6	6.7	7.0	[7.0]A	(7.2)JS	7.5	7.4	7.2	6.7	5.9
28	5.7	5.4	5.3	4.9	4.5	5.3	6.7	7.0	6.6	6.9	C	C	B	B	6.7	6.9	6.9	6.8	(7.2)S	7.1	6.9	6.8	6.8	6.6
29	6.5	6.3	5.9	5.0F	4.7	4.8	5.9	6.9	6.8	(7.1)B	6.8	(6.6)P	7.0	7.1	6.8	6.9	(6.7)P	(6.5)JS	6.7	7.0	7.5	(7.5)JS	6.9	6.9
30	6.7	6.3	6.7F	5.5	4.6F	5.2F	6.1	6.8	(7.1)JS	7.3	(7.3)S	(7.7)JS	7.9	(8.2)JS	(7.9)P	7.9	7.5	7.8	7.4	7.4	(7.5)JS	7.3	6.8	6.8
31	6.6	6.4	6.2	5.9	5.4	5.5	6.7	7.4	7.6	8.6	(8.6)D	8.5	8.6	8.8	8.5	8.1	9.0	(8.5)JS	8.4	8.5	8.1	7.1	6.7	6.6
Median	6.2	5.8	5.3	5.0	4.6	5.0	5.8	6.6	6.8	7.1	7.2	7.1	7.0	7.2	7.1	7.1	7.0	7.2	7.4	7.4	7.4	7.1	6.7	6.6
Count	30	30	30	30	30	30	30	30	31	31	30	30	30	30	31	31	31	31	30	30	30	30	30	30

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LAT. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U. S. GOVERNMENT PRINTING OFFICE: 1946 O - 712319

Form adopted June 1946

TABLE 50

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

IONOSPHERIC DATA

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

Observed at Washington, D.C.

Lat 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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							*240	*(220)^A	*(200)^A	220	210^H	S	200	250	210	210	(230)^A	230	240^H					
2							Q	Q	220	250	210	210	(230)^S	200	230	230	210	220	240					
3							Q	(240)^A	(220)^A	230	A	A	(250)^A	A	A	230	A	(230)^A	Q					
4							Q	220	200	A	(220)^A	(220)^S	(220)^H	200	200	220^H	200	210	(230)^A					
5							Q	A	A	(230)^S	230	200	220	200	A	200^H	200	220	Q					
6							C	C	Q	A	(220)^A	200	200	230	200	230	(230)^A	210	230					
7							230	240	A	200	200^H	A	A	(220)^A	210	200	200	230	Q					
8						280	230	(250)^A	200	200	200	200	(260)^S	(240)^S	230	210	A	A	Q					
9							Q	Q	200	200	200	240	230	(220)^A	(220)^A	200	220	230	230					
10							(230)^A	200	(230)^A	200^F	A	A	A	220	200	210	210	A	(230)^A					
11							Q	A	230	A	A	A	A	A	A	A	(230)^A	A	210					
12							Q	A	A	A	A	S	(250)^S	240	A	220	240	220	220					
13							220	230	(230)^A	(250)^A	A	230	A	200	200	A	(250)^A	220	220					
14							Q	A	(220)^A	220	(220)^A	C	230	(250)^A	(220)^A	C	250	210	200					
15							Q	Q	A	A	A	A	(220)^A	200	220	200	A	(230)^A	Q					
16							240	(230)^A	250	200	A	(230)^A	230^H	210	230	240	220	220	250					
17							Q	230^K	210^K	180^K	200^K	230^K	260^HK	180^K	(240)^SK	230^HK	220^K	230^HK	A					
18							Q	Q	A	A	A	(230)^A	A	S	210	240	210	230	A					
19							250	200	200	200	200	220	230	220	210	C	200	260	*A					
20							*Q^K	*Q^K	A^K	190^K	200^K	190^K	190^K	200^K	250^K	210^K	220^K	A	230					
21							Q	Q	200	240	230^H	(220)^A	(230)^H	200	200	220	200^H	220	200^H					
22							(240)^A	(250)^A	220	210	A	A	200	210	230	A	A	A	(220)^A					
23							(240)^A	230	220	(220)^A	200	A	230	C	220	200	210	220	240					
24							Q	230	(230)^A	200	230	200	220	A	(220)^S	200	230	230	230					
25							230	230	220	200	210	240	200	B	(250)^S	250	200	230^H	A					
26							Q	210	A	200	200	210	230	220	210	230	230	A	A					
27							A	230	230	200	A	210	190	220	200	230	A	A	A					
28							Q	230	220^H	200	N	C	B	240	210	250	230	230	250					
29							240	A	(230)^A	(200)^A	S	(250)^P	200	200	250	200	A	(250)^A	A					
30							Q	250	A	A	250	220	S	210	200	210	(250)^S	220	230					
31							Q	230	230	A	A	B	B	220	B	220	220	220	230					
Median						—	240	230	220	200	210	220	230	220	220	220	220	225	230					
Count						1	11	19	22	23	18	19	23	25	26	26	25	24	19					

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LONG. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U. S. GOVERNMENT PRINTING OFFICE 1946 O - 703519

Form adopted June 1946

TABLE 51

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

IONOSPHERIC DATA

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

Observed at Washington, D.C.

Lat 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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							*3.7	*4.7	*4.8	5.1	5.3	(5.6)S	5.5	5.6	5.5	5.3	5.3	L	L					
2							Q	Q	4.9	5.3	5.3	5.6	5.8	5.8	5.6	5.2	4.9	4.3	L					
3							Q	4.7	4.9H	5.3	5.8	5.4	5.6	A	A	L	4.9	4.9	Q					
4							Q	4.3	L	A	5.4	(5.4)S	5.3	5.3	5.3H	5.2	5.1	4.3	L					
5							Q	L	A	4.9	5.5	5.3	5.4	4.9	4.9	4.8	4.9	L	Q					
6							C	C	C	4.9	5.0	5.3	5.0	5.0	(4.8)P	5.0	4.9F	4.9	4.3					
7							4.3	4.8	[4.8]A	4.7	4.9	[5.0]A	5.2	5.3	5.3	(5.0)S	4.8	4.7	Q					
8						2.7	3.5	4.3	(4.5)P	4.9	4.9	(5.2)P	5.1	5.2	4.9H	5.0	A	A	Q					
9							Q	Q	5.3	4.9	4.9	5.0	(5.1)S	5.1	5.0	4.9	4.8	L	L					
10							L	4.1	L	4.7	A	A	A	5.2	(4.9)S	4.8	4.9	A	L					
11							Q	L	4.5	4.7	A	A	A	A	A	A	4.9	(4.5)P	3.9					
12							Q	A	4.6	5.3	A	S	5.2	5.0	5.0	4.7	4.9H	L	L					
13							3.9F	4.1	4.3	4.7	[4.8]A	4.9	(4.9)S	4.9	5.1	[5.0]A	4.9	4.4	L					
14							Q	A	4.5	4.9	5.0	[5.0]C	4.9	5.2	4.9	[5.1]C	4.8	4.5	3.2					
15							Q	Q	A	(4.9)A	5.1	[5.2]A	5.3	5.3	4.9	4.9	[4.6]A	4.4	Q					
16							L	4.5	4.9	L	A	5.3	5.5	5.1	5.0	5.3	4.9	4.5	3.9					
17							Q	4.4K	4.9K	4.7HK	4.7K	5.0K	5.0K	4.9K	4.9K	4.9K	4.5K	3.9K	3.9K					
18							Q	Q	A	A	A	5.4	[5.3]A	5.2	5.4	5.0	5.0	4.8	A					
19							3.6	4.3	(4.3)S	4.9	5.1H	5.1	4.9	5.3	5.2	[5.0]C	4.9H	4.8	*A					
20							*QK	*QK	4.5K	4.8K	5.0K	5.1K	4.9K	(5.2)P	5.1K	5.0K	4.9K	4.7	(4.3)P					
21							Q	Q	L	(5.5)P	5.5	5.2H	5.5	5.5	5.7	5.4H	5.2H	4.7	L					
22							4.0	4.5	4.8	5.1	(5.1)S	5.3	5.5	5.3	5.3	(5.2)P	A	A	4.6					
23							L	4.3	4.7	5.4	5.2H	(5.1)P	5.5	[5.5]C	5.5	5.0	4.9	4.9	L					
24							Q	4.5	5.3	4.9H	5.2H	(5.1)P	5.4	(5.6)P	5.3	5.3	5.0	(5.0)P	L					
25							(4.2)P	4.4	(4.6)S	5.1	5.2	5.3	(5.0)S	[5.0]B	5.1	5.4	4.9	4.8	L					
26							Q	L	A	5.1	(5.0)P	5.0	5.4	5.5	5.3	4.9	5.1	4.9	A					
27							L	4.5	4.9	4.9	[5.0]A	5.1	5.3	5.3	5.1	5.0	A	A	A					
28							Q	4.6	(5.0)P	5.2	N	C	B	5.2	5.3	5.0	5.1	4.7	L					
29							L	4.5	4.9	5.0	5.3	5.4	5.3	5.3	5.5	(5.3)P	[5.1]A	4.9	A					
30							Q	L	5.0	5.5	5.2	5.3	[5.2]S	[5.2]P	5.3	5.3	5.0	4.8	(4.3)S					
31							Q	L	L	5.1	A	B	B	5.3	[5.2]B	5.4	4.9Y	4.2	L					
Median						—	3.9	4.5	4.8	4.9	5.1	5.2	5.3	5.2	5.2	5.0	4.9	4.7	4.3					
Count						1	7	17	22	28	24	26	27	29	29	29	28	23	7					

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LONG. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U.S. GOVERNMENT PRINTING OFFICE, 1946 O - 703318

TABLE 52

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

IONOSPHERIC DATA

Form adopted June 1946

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

Observed at Washington, D. C.

Lat 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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							*110	*100	*100	100	100	100	100	100	100	100	110	110	110	130				
2							110	110	100	100	100	100	100	100	100	100	(110)S	100	(120)A	110				
3							(100)A	(100)A	(110)A	100	100	100	100	(100)A	100	100	100	110	(120)A	120				
4							(100)A	100	100	100	100	100	(100)A	(100)A	100	100	100	100	110					
5							110	100	100	100	100	100	100	100	100	100	100	100	110	C				
6							C	C	C	100	100	100	100	100	(100)A	100	(100)A	(100)A	100					
7							110	100	100	100	100	(100)A	(100)A	100	100	100	110	100	110					
8							120	110	100	100	100	100	100	100	100	100	100	100	(110)S					
9							110	110	100	100	100	100	100	100	100	100	100	100	110	(120)S				
10							(130)A	110	100	100	100	100	100	100	110	100	100	100	110					
11							110	110	100	100	100	100	100	100	100	100	100	100	100	(120)A				
12							110	100	100	100	100	100	100	100	100	100	100	100	100	120				
13							100	100	100	100	100	100	100	90	100	100	100	100	100	130				
14							110	100	100	100	100	C	100	100	100	C	100	100	110					
15						130	120	100	100	100	100	100	100	100	100	100	100	110	100	130				
16							100	(100)A	100	100	100	100	100	100	100	100	100	100	110	130				
17							110	100K	100K	100K	100K	(100)AK	100K	100K	100K	100K	100K	100K	100K					
18							(120)A	100	100	100	100	100	100	100	100	100	100	100	100					
19						120	110	100	100	100	(100)A	100	(100)A	100	100	C	100	100	*110					
20							*120K	*100K	110K	100K	100K	100K	100K	100K	100K	100K	100K	110	110					
21							120	110	(100)A	100	100	100	100	100	100	100	100	100	110					
22							110	110	100	100	100	100	100	100	100	100	100	100	100					
23							110	110	100	100	100	100	100	100	100	100	100	100	100	120				
24							A	100	100	100	100	100	100	100	100	100	100	100	100					
25							100	100	120	100	100	100	100	B	100	100	100	100	100					
26							(130)A	100	100	100	100	100	100	100	100	100	100	100	110					
27							A	A	100	A	100	100	100	100	100	100	100	100	110					
28							(130)A	100	100	100	100	C	B	100	100	120	100	100	100					
29							110	100	100	100	100	100	100	100	100	100	100	100	100					
30							A	110	100	110	100	100	100	100	100	100	100	100	(100)A					
31							120	110	100	100	(120)B	B	B	100	B	100	100	100	100	(130)A				
Median						–	110	100	100	100	100	100	100	100	100	100	100	100	110	120				
Count						2	27	29	30	30	31	28	29	30	30	29	31	31	31	11				

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LONG. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U S GOVERNMENT PRINTING OFFICE 1946 O - 702519

Form adopted June 1946

TABLE 53

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

IONOSPHERIC DATA

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

Observed at Washington, D.C.

Lat. 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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							*2.6	*2.8	*3.4	3.7	(3.7)A	(3.8)A	(3.8)P	[3.7]A	(3.6)A	(3.6)A	A	A	2.7	2.0H				
2							2.6H	3.1	3.3H	3.6	[3.8]A	(4.0)A	(3.7)P	[3.8]A	3.8	3.6	3.7H	3.1	A	1.9				
3							A	A	A	(3.5)A	(3.7)A	(3.8)P	4.0	4.0	4.0	3.6	3.4	(3.1)A	A	A				
4							2.5	(3.0)A	(3.2)A	A	A	A	4.0	4.0	3.9	3.8	(3.5)A	3.2	A					
5							2.3H	3.0	3.3	3.5	3.6	3.6	(3.8)P	(3.7)S	A	A	3.3	3.1	(2.5)S	C				
6							C	C	C	3.3	3.5	A	A	A	(3.7)A	3.7	(3.5)A	[3.0]A	2.5					
7							(2.3)A	2.8	3.1	3.3	3.4	A	A	A	A	(3.4)S	3.4	3.1	2.5					
8							(2.2)A	2.8	3.1	[3.4]A	3.7	A	A	A	(3.7)A	3.5	3.3	2.9	(2.5)A					
9							2.2	(2.7)A	3.1	3.2	(3.5)A	3.6	(3.7)P	A	A	A	A	(3.1)A	2.5	2.0F				
10							2.3	2.9	A	A	A	A	A	(3.7)A	3.8	3.5	3.3	[2.9]A	2.5					
11							2.3	2.7	3.1	3.2	(3.4)A	(3.6)A	(3.8)A	3.7	3.7	3.7	3.2	3.1	A	A				
12							2.1	(2.7)A	3.1	3.3	(3.3)A	(3.7)P	3.7	[3.8]A	3.9	3.5	3.3	3.1	2.5	1.9				
13							2.3F	A	A	A	A	A	3.7	[3.5]A	3.3	[3.3]A	3.3	(2.9)A	2.6	2.1F				
14							2.3	2.8	3.1	3.4	3.5	[3.5]C	3.5	3.4	3.4	[3.5]C	3.3	3.1	2.5					
15						1.8	2.3	2.9	3.1	(3.3)A	(3.4)A	A	A	A	A	3.6	[3.3]A	(3.0)A	2.6	1.8				
16							2.4	[2.8]A	3.3	3.4	3.5	3.6	[3.7]A	3.8	(3.6)A	(3.5)A	A	A	2.7H	1.9				
17							2.1	2.8K	3.1K	3.6K	3.7K	AK	AK	AK	3.9K	3.7K	3.3K	3.0K	2.5K					
18							2.1	2.7	3.1	(3.2)A	A	A	A	A	A	3.7	3.5	3.2	2.6					
19						1.8	A	A	A	(3.4)A	(3.7)P	[3.8]A	3.9	(3.9)S	(3.9)S	[3.7]C	3.5	(3.1)A	*(2.5)A					
20							*(2.3)AK	[2.7]AK	3.1K	AK	AP	(3.9)PK	(3.9)SK	AK	AK	3.9K	(3.5)AK	3.1	A					
21							2.2	(3.1)A	3.5	3.7	(3.7)P	4.0	[4.0]A	4.1	3.9	3.9	3.6	3.2	2.7					
22							2.4	[2.8]A	3.2	[3.4]A	3.7	(3.7)P	3.9	[3.9]A	3.9	[3.7]A	(3.5)P	3.2	A					
23							2.5H	2.9	3.5	3.3	3.7	(3.7)P	[3.7]A	(3.7)C	A	A	3.5	3.1	2.7	A				
24							A	2.7	A	A	A	A	3.9	A	A	3.8	3.5	3.1	2.7					
25							2.4	3.1	(3.3)A	A	A	A	A	B	3.8	3.8	3.5	3.2	2.5					
26							2.5	2.9	3.1	[3.4]A	3.7	S	S	4.1	4.0	3.8	3.6	3.2	2.5					
27							A	A	3.2	A	A	A	A	4.1	3.9	3.9	3.6	3.1	(2.5)A					
28							2.5	(3.1)A	(3.4)A	A	A	C	B	A	A	4.0	3.7	3.2H	2.7					
29							2.4H	3.0	3.2	3.4	3.7	(4.1)A	[4.0]A	3.9	4.0	3.8	3.5	3.2	(2.5)H					
30							A	3.0	3.3	3.7	3.9	(3.9)S	3.8	[3.8]S	3.7	3.7	3.5	[3.2]A	(2.8)A					
31							2.5H	3.1	3.5	3.5	3.9	B	B	(4.1)A	[4.0]B	(3.9)A	[3.5]A	3.1	2.6	1.9				
Median						—	2.3	2.8	3.2	3.4	3.7	(3.8)	(3.8)	(3.8)	3.8	3.7	3.5	3.1	2.5	1.9				
Count						2	25	26	25	23	22	16	19	20	22	28	28	29	25	8				

* SUPPLEMENTARY DATA FROM FT. BELVOIR LAT. 38.7°N, LONG. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U. S. GOVERNMENT PRINTING OFFICE 1946 O - 703819

TABLE 54

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

Form adopted June 1946

IONOSPHERIC DATA

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

Observed at Washington, D.C.

Lat. 39.0°N, Long. 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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	C	C	C	C	C	C	C	C	C	4.9 120	4.4 120	6.7 110	4.3 110	4.1 110	4.0 120	4.4 110	4.0Y 100	4.1 120	3.4 130	3.4 130	3.2 120	3.4 120	3.1 120	3.4 110
2	2.1 120	2.8 110	G	3.8Y 100	3.5 110	G	G	G	4.0 110	4.0 130	3.8 120	4.2 130	4.2 110	4.8 110	4.2 120	4.2 130	G	7.2Y 110	4.0 120	5.4 130	5.8Y 120	4.4 120	6.0 120	3.6 110
3	4.6 110	6.6 110	6.8 110	7.8 110	7.0 100	7.4 100	8.0 100	5.4Y 110	6.5 110	5.4 120	6.2 120	6.0 130	5.8Y 120	8.0 120	7.2 120	6.2 110	4.4 120	4.6 110	3.4 120	3.2 130	4.6 120	4.0 120	4.3 110	4.4 110
4	7.2 110	4.7 100	5.3 110	5.5 100	5.2 100	3.8Y 110	3.6 140	3.9 110	3.8 100	10.4 110	5.3 100	4.8 110	4.4 130	4.4 100	G	4.0 130	4.2 130	3.9Y 130	5.6 120	8.8Y 100	4.2 100	3.2 110	2.4 130	2.3 120
5	G	2.2 120	2.3Y 110	3.1Y 100	G	4.2 100	4.6Y 120	4.8 120	5.8 120	5.4 120	5.2Y 110	3.9 120	3.8 120	3.8 120	5.3 100	4.7Y 110	3.8Y 100	G	G	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	5.5 100	5.0 110	4.7 100	4.0 100	3.5 100	3.7 100	3.9 130	4.3 100	4.6 100	2.0 100	3.4 100	2.7Y 100	2.5 100	5.8 110	3.2 100
7	5.8 110	5.3 100	5.5Y 100	4.4 100	5.0Y 110	5.8 120	3.7 120	4.5 120	8.1 120	3.9 120	3.8 110	7.1 110	5.4 110	5.6 120	3.8 110	G	G	G	4.3 120	4.4 120	4.3 120	5.4 110	3.5 110	3.5 100
8	2.4 100	3.5 100	G	G	3.0Y 120	4.0 130	4.2Y 120	4.5 120	4.3Y 120	4.6 120	4.4Y 120	4.2 120	4.0 100	4.0 120	4.0Y 130	7.2 120	9.8Y 120	6.3 120	4.6 120	8.5 120	3.0Y 130	G	G	5.6 130
9	5.6 120	3.7 120	2.3 130	2.8 100	G	1.8 130	3.6 130	4.3 120	3.8 120	4.0 110	3.7 110	4.2 120	6.6 110	6.0 110	5.2 110	4.3 110	4.6 100	3.8 110	3.2 110	G	G	3.4 90	3.1 120	3.1 110
10	4.2 110	3.6 110	2.8 110	4.8Y 100	4.0 100	4.2Y 100	3.5 110	3.5 120	7.3 120	4.3 110	5.9Y 120	7.6 110	6.5 110	5.4Y 110	G	G	G	5.0 120	7.0 130	4.2 120	11.2 120	6.4 110	6.3 110	5.2 110
11	5.8Y 110	9.0 100	3.8 100	2.9 110	4.1 100	7.1Y 120	4.0 120	5.4 120	5.8 120	7.0 120	6.9 120	7.6 110	8.0 100	6.2 110	7.2 100	[illegible] 100	4.8 100	11.0 110	4.4 120	3.9 110	3.8Y 120	3.4 120	3.4Y 120	5.8Y 100
12	4.8Y 110	3.1 110	3.1 110	6.3Y 100	8.6 100	4.9 120	9.4 120	9.0 120	5.2 120	7.0 110	6.0 100	7.9Y 110	4.3 110	5.4 100	4.9 130	4.1 130	4.0 100	G	2.8 120	3.5 120	3.4Y 120	5.6 100	4.9 100	G
13	2.3 90	G	2.7 100	G	6.7Y 110	3.5 90	3.6 100	3.8 100	12.5Y 100	5.0 100	7.7 100	5.2Y 100	5.5 100	4.8 100	6.2 100	6.0 100	4.8 120	4.9Y 110	G	G	4.0 130	4.7 120	5.5 120	6.8 110
14	7.8 100	4.9 110	2.5 100	3.8 100	4.2 100	1.7 130	3.6 100	5.9 110	6.9 120	6.0Y 120	4.3 120	C	4.4 110	4.3 100	5.5 100	C	5.6 120	G	3.6 130	4.3 120	G	2.8Y 120	2.4 110	2.6 110
15	6.8 100	7.1 100	4.0 100	3.8 100	3.7 100	2.3 100	4.1 100	7.0 120	7.0 110	8.0 110	7.4Y 110	8.8 110	5.3 110	4.0 110	3.8 110	G	5.6 120	4.3 120	3.8 120	3.5 120	3.4 120	6.8 120	4.2 120	4.6 110
16	3.0 110	3.4 100	2.4 100	3.1Y 100	2.8 100	3.0Y 100	3.6 100	4.5 120	6.0 120	3.7 130	7.8 120	5.4 120	4.6 120	5.4 100	6.8 120	4.6 120	3.6 120	4.6 120	G	6.6 120	6.6 120	2.6 120	G	3.0 120
17	3.8 120	4.8 110	5.2 110	6.6 110	6.8 100	5.5 100	4.6 120	4.3 120	4.2 120	4.2 120	G	4.0 110	3.7 110	3.9 100	G	4.6 130	3.8 120	4.0 120	4.9 120	4.2 100	4.0 100	3.0 100	3.5 110	5.6 110
18	7.0 100	5.6 100	4.2 100	5.2 100	7.2 100	5.4 100	6.3 120	6.1 110	7.0 110	9.6 100	9.0 110	8.2 100	7.0 100	5.8 100	4.0 100	G	G	G	4.9 120	4.3 120	4.6 110	2.4 110	4.7 110	3.0 130
19	2.4 120	G	2.4 120	G	2.2 130	G	3.3 120	4.4 110	5.4 100	4.0 110	4.0Y 100	3.4 100	3.1 100	G	G	G	G	5.9 120	C	2.1 120	3.2 120	G	G	G
20	G	3.5 130	2.6 130	2.5 110	C	C	C	C	5.2 110	5.3 110	6.0 110	4.5Y 110	3.9 110	4.3 110	4.0 120	6.8 130	4.6 120	4.7 120	3.7 120	4.9Y 100	3.9 100	3.4 90	G	3.2 120
21	G	7.2 100	4.2 100	3.6 100	2.7 110	G	3.2 130	4.7Y 120	4.3 110	4.4 120	4.2 120	4.3 120	4.3 100	6.3Y 120	4.6 120	7.6Y 130	4.1 120	4.0 130	8.8Y 100	5.7Y 100	3.4Y 100	4.0Y 100	3.1 100	3.0Y 100
22	3.7 100	3.7 110	3.5 100	2.6 100	3.2 100	6.2 120	5.8Y 120	5.9Y 110	3.8 120	4.5 120	6.2 120	6.0 110	6.0 100	4.8 120	4.6 120	5.4 120	6.0 100	5.5 100	5.6 100	3.9 100	5.9 100	G	G	G
23	4.0 100	C	4.4 120	3.0 100	6.6Y 110	5.6Y 110	3.8 100	4.2 120	G	5.4 110	5.6Y 120	4.0 120	4.1 120	G	4.0 110	4.1Y 100	3.8 120	3.8 120	4.0 120	6.0 120	6.6 100	5.4 100	3.4 100	2.2 100
24	5.4Y 130	3.6 100	4.4 100	6.3Y 100	4.0 100	5.8 100	5.0 100	4.2 110	8.8 100	4.5 100	4.2 100	5.5Y 100	3.6 100	6.2 100	4.8Y 100	3.8 100	3.4 100	3.5 120	4.0 110	3.0Y 120	G	G	3.1 100	6.6 110
25	4.2 110	3.1 100	3.1Y 100	3.2 100	2.7 100	3.2 120	G	4.0 120	3.4 130	3.9 110	4.1 110	3.7 100	3.8 100	B	G	G	G	4.4 120	5.7Y 100	12.0Y 100	4.7 110	5.4Y 100	7.2 120	7.0 120
26	6.6 110	5.7 100	6.0 100	4.3 100	3.9 100	3.1 100	2.3 100	4.0Y 100	5.4 120	3.9 110	3.9 130	G	3.9 100	G	G	5.6 130	4.9 130	5.4 120	6.4 110	3.6 100	6.4 100	3.6 100	G	G
27	G	2.8 120	2.6 120	3.2 100	4.2 110	6.0 120	4.9 100	4.5 100	3.8 120	3.7 100	6.0 100	5.8 100	5.8 100	4.2 100	4.1 100	G	6.2 120	7.6 110	9.4 100	3.9 100	4.0 100	2.2 100	3.1 100	2.6 100
28	3.2 100	3.2 100	3.2 100	3.3 110	3.0 110	3.0 110	6.0 100	3.1 100	3.7 110	4.2Y 120	4.0 100	5.4 100	4.1 100	3.5 110	4.0 110	G	4.2 130	3.7 130	4.3 120	4.7 120	G	G	4.1 110	4.3 110
29	3.8 100	3.8 130	3.7 100	4.0 100	2.9 100	4.0 100	3.1 110	5.2 120	6.8 110	5.6 100	5.5Y 100	4.1 100	4.0 100	3.9 110	G	3.9 130	6.1 120	5.4 120	7.3 100	8.5 100	6.0 100	3.8 100	6.7 110	4.9Y 100
30	3.7 100	3.5 110	4.0 100	3.7 100	3.8 110	3.7 100	3.9 110	4.2 130	5.0Y 130	4.8 130	5.4Y 130	4.3 130	5.0Y 120	4.3 130	4.0 120	4.0 130	G	4.0 120	4.0 100	3.5Y 100	3.0Y 100	3.7 100	3.6 110	G
31						3.2 100	8.1 110	4.2 120	4.9 130	6.2 120	6.6 110	7.0Y 110	4.2 100	4.2 130	B	4.2 120	4.3 120	3.9 120	(3.9)S 100	(3.8)S 100	3.1 120	3.8 100	3.8 100	3.0 100
Median	3.8	3.6	3.1	3.6	3.8	3.9	3.8	4.4	5.2	4.8	5.3	5.0	4.3	4.3	4.0	4.2	4.2	4.3	4.0	4.1	4.0	3.4	3.4	3.2
Count	29	28	29	29	28	28	28	28	29	31	31	30	31	30	30	0	31	31	30	30	30	30	30	30

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

TABLE 55

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

Form adopted June 1946

IONOSPHERIC DATA

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

Observed at Washington, D.C.

Lat 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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	*1.8	*1.9	*1.8	*1.8	*1.8	*1.9	*1.9	*$(1.8)^{J}$	*1.7	1.9	1.9	1.7	1.9	$(1.7)^{J}$	1.8	1.9	1.8	1.8	1.8	1.9	1.8	$(1.9)^{J}_{S}$	1.8	1.9
2	1.9	1.9	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.8	1.7	$(1.7)^{J}_{S}$	1.7	$(1.7)^{J}_{S}$	1.9	1.8	1.9	1.9	1.9	1.9	1.8	1.8	1.8
3	1.8	1.9	1.9	1.9	1.9^{F}	1.9^{F}	1.9	2.0	$(2.0)^{J}_{S}$	$(1.8)^{S}$	1.7	$(1.9)^{J}_{P}$	$(1.8)^{J}_{S}$	1.7	$(1.8)^{J}_{S}$	$(1.8)^{J}_{S}$	1.9	1.9	1.9	1.9	1.9	1.9	$(1.9)^{S}$	1.8
4	1.9	1.7	1.8	2.0	1.9	1.9	1.9	2.0	2.1	A	1.9	$(2.1)^{S}$	1.8	1.8	$(1.8)^{J}_{S}$	1.8	$(1.9)^{J}_{S}$	1.9	1.9	2.0	1.8	$(1.8)^{P}$	1.9	1.9
5	$(2.0)^{J}$	1.9	1.9	1.8	1.8	2.0	1.9	2.1	2.0	2.0	1.8	1.9	$(1.8)^{J}_{S}$	1.9	$(1.9)^{J}$	1.8	1.9	1.9	1.9	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	$(2.1)^{J}$	$(2.0)^{J}_{P}$	$(1.8)^{J}$	1.8	1.9	$(1.9)^{J}$	1.8	$(1.9)^{J}$	1.9	1.9	1.9	1.9	$(1.9)^{J}_{S}$	$(1.8)^{S}_{P}$	1.7
7	1.8^{F}	1.9^{F}	1.8^{F}	1.8^{F}	1.9^{F}	2.0^{F}	1.9^{F}	1.8	2.4	$(1.7)^{P}$	1.9	1.9	1.8	1.9	$(1.9)^{S}$	1.9	1.9	1.9	1.9	1.9	$(1.8)^{S}$	1.9	1.8	1.9
8	1.8	1.7	1.8	1.7	1.7	1.8	1.8	2.1	$(1.7)^{S}_{P}$	N	N	1.9	1.8	S	$(1.8)^{P}$	1.9	1.9	2.0	1.9	A	2.0	1.8	1.8	1.8
9	1.9	1.8	1.9	1.8	1.8	1.8	2.1	2.0^{F}	1.8	2.1	2.0	2.0	$(1.9)^{S}$	$(2.0)^{S}$	1.9	2.0	1.9	1.9	2.0	1.9	1.9	1.9^{F}	1.8	1.9
10	1.9	1.9	1.9^{F}	2.0^{F}	1.9^{F}	1.9^{F}	2.1	2.3	2.1	1.9	2.0	2.0	2.1	1.9	$(2.0)^{J}$	1.9	1.9	2.0	$(1.9)^{J}_{S}$	2.0	2.0	1.9^{F}	2.1^{F}	1.9^{F}
11	1.9^{F}	1.9^{F}	2.0^{F}	1.9^{F}	2.0^{F}	2.1^{F}	2.2^{F}	2.1	2.1	2.0	1.9	1.9	1.9	1.8	2.0	2.0	2.0	$(2.0)^{J}_{S}$	2.0	2.0	2.0	1.9	2.0	2.0
12	$(2.0)^{S}$	2.0	2.0^{F}	2.0^{F}	2.0^{F}	2.1^{F}	$(2.0)^{J}_{S}$	2.0	2.1	1.8	$(2.0)^{J}_{S}$	$(1.9)^{J}_{S}$	$(1.9)^{S}$	1.9	1.9	1.8	1.9	$(1.9)^{S}$	1.9	2.0	$(1.9)^{J}_{S}$	1.8^{F}	1.9^{F}	1.8
13	1.8	1.7	1.7^{F}	1.7^{F}	1.7^{F}	1.8	1.6	1.8	1.7	1.6	1.9	1.5	1.9	1.9^{F}	1.8	1.8	1.9	2.1	2.0	2.0^{F}	$(1.9)^{J}_{S}$	$(1.8)^{F}_{S}$	1.9	$(1.9)^{J}_{F}$
14	1.8^{F}	1.8^{F}	1.9^{F}	2.0^{F}	1.8^{F}	2.0^{F}	2.2	1.8	1.9	$(1.8)^{S}$	1.8	C	1.7	1.8^{F}	1.9	C	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.8^{F}
15	1.9^{F}	1.9^{F}	1.9^{F}	1.9^{F}	2.1^{F}	2.1^{F}	2.2^{F}	1.9^{F}	2.0	2.0	2.0	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	$(1.9)^{J}_{S}$	1.9	1.8	1.8^{F}
16	1.9	1.8^{F}	1.9^{F}	2.0^{F}	2.0^{F}	2.0^{F}	2.0	1.9	1.9	1.8	1.7	$(1.8)^{J}$	1.9	1.7	1.7	1.8	1.9	1.9	1.8	1.9	1.9	$(1.9)^{S}$	1.7	1.8
17	1.8	1.8	2.0	2.0	1.8^{F}	1.9	2.0	1.9^{K}	1.9^{K}	$(1.6)^{S}_{K}$	1.6^{K}	1.6^{K}	$(1.6)^{S}_{K}$	1.6^{K}	1.5^{K}	1.7^{K}	1.8^{K}	1.8^{K}	2.0^{K}	1.9^{K}	1.9	1.8	1.8^{F}	1.8
18	1.8	1.8^{F}	1.8^{F}	1.6^{F}	$(1.9)^{F}_{S}$	$(2.3)^{F}_{S}$	2.1	2.2	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.7	1.8	1.8	$(2.0)^{S}$	1.9	1.8	1.7	1.8
19	1.8	1.7	1.7	1.6	1.7	1.7	2.0	1.8	1.7	S	1.8	2.1	S	1.8	1.8	C	1.7	1.9	*2.0	$(1.9)^{J}_{S}$	C	1.9	1.7	1.9
20	1.8^{F}	1.8^{F}	2.0^{F}	1.8^{F}	*1.9^{F}	*$(2.0)^{J\,S}_{F}$	*2.0^{K}	*2.3^{K}	2.2^{K}	1.8^{K}	1.7^{K}	S^{K}	S^{K}	1.7^{K}	1.7^{K}	1.7^{K}	1.7^{K}	1.8	1.8	1.9	1.9	1.8	1.8	1.8
21	1.9	$(1.7)^{J}_{F}$	$(1.8)^{F}$	2.0^{F}	1.9^{F}	2.0	2.1	2.1	$(2.2)^{J}$	1.8	2.0	$(2.2)^{S}$	N	1.7	$(1.8)^{J}$	1.8	1.8	1.9	1.9	1.9	$(1.8)^{J}_{S}$	1.8	1.8	1.8
22	1.8	1.8	1.8^{F}	1.8	1.9^{F}	2.0^{F}	1.9^{F}	1.9	1.7^{F}	$(1.8)^{J}$	1.9	1.9	$(2.0)^{S}$	1.7	1.7	1.8	$(1.8)^{J}$	2.0	1.9	2.0	1.8	1.8	1.8	1.7
23	1.7	C	1.8	1.7^{F}	1.7	1.8	1.8	1.9	1.8	1.8	2.0	$(1.9)^{J}$	$(1.9)^{J}$	1.9	$(1.8)^{J}$	1.8	1.9	1.9	1.8	1.9	1.8	1.9	1.8	1.8
24	1.8	1.8	1.8	1.8	1.7	1.8	2.0	2.0	1.7	$(1.9)^{J}_{S}$	$(2.0)^{S}$	1.7	1.8	1.7	$(1.8)^{P}$	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8
25	1.7	1.7	1.8	1.7	1.8	1.9	1.8	1.9	1.8^{H}	1.7	$(1.6)^{S}_{P}$	1.7	1.7	B	$(1.8)^{P}$	1.7	1.8	1.8	1.9	1.9^{F}	1.9^{F}	1.9	1.7	1.6
26	1.9^{F}	1.9	1.7^{F}	1.8	1.8	2.0	2.1	2.1	$(2.2)^{J}$	1.8	1.7	1.8	1.6	1.8	$(1.7)^{S}$	1.7	1.8	1.9	1.9	1.9	1.8	1.7	1.8	1.8
27	1.8	1.9	2.0	1.8	1.9	1.9	2.0^{V}	1.9	1.9	1.9	A	1.7	1.8	$(1.8)^{F}$	1.8	1.7	1.7	1.9	1.9	2.0	1.9	1.9	1.9	1.9
28	1.8	1.8	1.8	1.9	1.9	1.9	2.1	2.1	2.1	1.9	2.0	C	B	1.7	1.7	1.8	1.8	$(2.0)^{J}$	1.9	2.0	1.9	1.9	1.8	1.8
29	1.7	1.7	1.8	1.7^{F}	1.7	1.8	1.9	1.9^{H}	1.8	1.9	2.0	1.7	1.7	1.7	1.7	1.8	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8
30	1.7^{V}	1.9	1.8	1.8^{F}	1.8	1.8^{F}	2.0	2.0	1.9	$(2.0)^{J}_{S}$	1.9	$(1.7)^{J}_{S}$	1.9	S	1.8	1.8	1.9	1.9	2.0	1.9	$(1.8)^{J}_{S}$	1.8	1.9	1.8
31	1.8	1.7	1.8	1.9	1.8	1.9	2.1	$(2.1)^{S}$	2.1	1.8	2.0	B	1.8	2.0	1.8	1.8	1.8	1.9	$(1.9)^{J}_{S}$	$(1.9)^{S}$	2.0	1.9	1.8	1.8
Median	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.0	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8
Count	30	29	30	30	30	30	30	30	30	28	29	27	27	28	31	29	31	31	31	29	29	30	30	30

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LONG. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U. S. GOVERNMENT PRINTING OFFICE 1946 O - 702519

TABLE 56

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

Form adopted June 1946

IONOSPHERIC DATA

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

Observed at Washington, D.C.

Lat 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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	*2.7	*2.8	*2.6	*2.8	*2.6	*2.8	*2.9	*(2.5)J	*2.9	2.8	2.9	2.6	2.8	(2.6)J	2.8	2.8	2.8	2.8	2.7	2.8	2.8	(2.8)JS	2.8	2.9
2	2.9	2.8	2.6	2.8	2.8	2.7	2.9	2.8	2.9	2.8	2.7	2.6	(2.5)JS	2.6	(2.7)JS	2.8	2.8	2.8	2.8	2.9	2.8	2.7	2.7	2.7
3	2.7	2.7	2.8	2.8	2.8F	2.9F	2.9	3.0	(3.0)JS	(2.7)S	2.7	(2.8)JP	(2.7)JS	2.6	(2.7)JS	(2.7)JS	2.8	2.9	2.9	2.9	2.8	2.8	(2.9)S	2.7
4	2.9	2.7	2.8	3.0	2.8	2.9	2.9	3.0	3.1	A	2.9	[2.9]S	2.7	2.7	(2.7)JS	2.7	(2.9)JS	2.9	2.9	3.0	2.7	(2.8)P	2.8	2.9
5	(3.0)J	2.8	2.8	2.7	2.7	2.9	2.9	3.1	3.0	3.0	2.8	2.9	(2.7)JS	2.8	(2.9)J	2.7	2.9	2.8	2.9	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	(3.1)J	(3.0)JP	(2.7)J	2.8	2.9	(2.9)J	2.8	(2.9)J	2.9	2.9	2.9	2.9	(2.8)JS	(2.8)JS	2.5
7	2.7F	2.8F	2.7F	2.8F	2.9F	2.8F	2.8F	2.8	3.5	(2.7)P	2.9	2.8	2.8	2.9	(2.8)S	2.9	2.9	2.9	2.9	2.9	(2.8)S	2.8	2.8	2.9
8	2.7	2.6	2.7	2.6	2.5	2.7	2.7	3.1	(2.6)SP	N	N	2.9	2.7	S	(2.7)P	2.9	2.9	2.9	2.8	A	2.9	2.8	2.8	2.8
9	2.8	2.7	2.8	2.7	2.7	2.8	3.0	2.9F	2.8	3.0	2.9	3.0	(3.0)S	(3.0)S	2.9	3.0	2.9	2.9	2.9	2.9	2.9	2.8F	2.8	2.8
10	2.9	2.8	3.0F	3.0F	2.8F	2.9F	3.1	3.4	3.0	2.9	2.8	2.9	3.1	2.9	(3.0)J	2.8	2.8	2.9	(2.9)JS	2.9	2.9	2.8F	3.0F	2.9F
11	2.8F	2.9F	2.9F	2.8F	2.9F	3.0F	3.2F	3.0	3.1	3.0	2.9	2.9	2.9	2.8	2.9	2.9	3.0	(2.9)JS	2.9	2.9	2.9	2.9	3.0	3.0
12	(2.9)S	3.0	3.0F	3.0F	2.9F	3.3F	(3.0)JS	3.1	3.2	2.8	(3.0)JS	(2.9)JS	(2.8)S	2.8	2.9	2.8	2.9	(2.9)S	2.9	3.1	(2.9)JS	2.8F	2.8F	2.8
13	2.8	2.7	2.6F	2.7F	2.6F	2.7	2.3	2.7	2.7	2.6	2.9	2.3	2.8	2.8F	2.8	2.8	2.9	3.1	3.1	3.0F	(2.9)JS	(2.8)FS	2.9	(2.9)JF
14	2.7F	2.8F	2.9F	3.0F	2.7F	3.0F	3.2	2.8	2.9	(2.8)S	2.7	C	2.7	2.9F	3.0	C	2.9	3.1	2.9	2.9	2.9	2.9	2.9	2.8F
15	2.8F	2.8F	2.9F	2.8F	3.1F	3.1F	3.3F	2.9F	3.0	3.0	3.0	2.9	2.7	2.8	2.9	2.8	2.8	2.9	2.9	3.1	(2.8)JS	2.8	2.8	2.8F
16	2.9	2.8F	2.8F	3.0F	2.9F	3.1F	3.0	2.9	3.0	2.7	2.6	(2.8)J	2.8	2.6	2.6	2.7	2.8	2.9	2.7	2.8	2.9	(2.9)S	2.6	2.6
17	2.8	2.8	3.1	3.0	2.7F	2.7	2.9	2.9K	2.9K	(2.4)SK	2.4K	2.5K	(2.4)SK	2.4K	2.3K	2.6K	2.8K	2.8K	3.0K	2.9K	2.8	2.8	2.8F	2.8
18	2.7	2.8F	2.8F	2.7F	(2.9)FS	(3.4)FS	3.0	3.3	2.9	2.8	2.9	2.7	2.7	2.7	2.8	2.8	2.6	2.7	2.8	(3.0)S	2.9	2.8	2.7	2.7
19	2.7	2.7	2.7	2.4	2.5	2.6	3.0	2.7	2.7	S	2.7	3.1	S	2.7	2.7	C	2.6	2.8	*3.0	(2.8)JS	C	2.9	2.6	2.9
20	2.8F	2.8F	3.1F	2.7F	*2.8F	*(3.0)JS	*3.1K	*3.4K	3.2K	2.7K	2.6K	SK	SK	2.6K	2.6K	2.5K	2.6K	2.8	2.8	2.9	2.9	2.8	2.7	2.8
21	2.9	(2.5)JF	(2.8)F	3.0F	2.9F	2.9	3.2	3.1	(3.2)J	2.8	3.0	(3.3)S	N	2.7	(2.8)J	2.8	2.7	2.9	2.9	2.9	(2.8)JS	2.8	2.8	2.7
22	2.7	2.8	2.8F	2.9	2.8F	2.9F	2.9F	2.9	2.7F	(2.8)J	2.9	2.9	(3.0)S	2.6	2.6	2.8	(2.7)J	3.0	2.8	3.0	2.8	2.8	2.7	2.6
23	2.6	C	2.8	2.7F	2.6	2.7	2.8	2.8	2.8	2.7	3.0	(2.8)J	(2.8)J	3.0	(2.8)J	2.8	2.9	2.9	2.8	2.9	2.8	2.9	2.8	2.8
24	2.7	2.7	2.8	2.7	2.7	2.7	2.9	3.0	2.6	(2.9)JS	(3.0)S	2.6	2.7	2.7	(2.8)P	2.8	3.0	2.9	2.8	2.9	2.9	2.8	2.8	2.7
25	2.6	2.7	2.7	2.6	2.8	2.9	2.7	2.8	2.8H	2.6	(2.5)SP	2.6	2.6	B	(2.7)P	2.6	2.8	2.8	2.9	2.9F	2.9F	3.0	2.7	2.6
26	2.9F	2.9	2.6F	2.8	2.9	3.1	3.2	3.1	(3.2)J	2.7	2.6	2.7	2.5	2.7	(2.7)S	2.7	2.7	2.8	2.8	2.9	2.8	2.6	2.7	2.7
27	2.8	2.9	3.0	2.7	2.9	2.8	2.9V	2.9	2.9	2.9	A	2.6	2.7	(2.8)P	2.7	2.7	2.7	2.9	2.8	3.0	3.0	2.9	2.9	2.9
28	2.7	2.7	2.7	2.8	2.9	2.8	3.2	3.1	3.2	2.9	3.0	C	B	2.6	2.6	2.7	2.8	(3.1)J	3.0	3.0	2.9	2.8	2.7	2.7
29	2.6	2.7	2.7	2.6F	2.7	2.7	2.9	2.9H	2.8	2.9	3.0	2.6	2.6	2.6	2.6	2.7	2.9	2.9	2.8	2.9	2.8	2.8	2.8	2.8
30	2.7V	2.9	2.7	2.8F	2.8F	3.0F	3.0	2.9	2.9	(2.9)JS	2.7	(2.9)JS	2.9	S	2.8	2.8	2.9	2.9	3.0	2.9	(2.8)JS	2.8	2.9	2.7
31	2.8	2.7	2.7	2.8	2.8	2.9	3.2	(3.1)S	3.1	2.8	2.9	B	2.7	2.9	2.7	2.8	2.7	2.8	(2.8)JS	(2.9)S	2.9	2.9	2.8	2.7
Median	2.8	2.8	2.8	2.8	2.8	2.9	3.0	2.9	2.9	2.8	2.9	2.8	2.7	2.7	2.8	2.8	2.8	2.9	2.9	2.9	2.9	2.8	2.8	2.8
Count	30	29	30	30	30	30	30	30	30	28	29	27	27	28	31	29	31	31	31	29	29	30	30	30

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LONG. 77.1°W

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 57

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

IONOSPHERIC DATA

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

Observed at Washington, D.C.

Lat 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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							*3.6	*3.4	*3.7	3.6	3.6	(3.5)S	3.8	3.5	3.4	3.7	3.4	L	L					
2							Q	Q	3.5	3.4	3.6	3.4	3.2	3.6	3.4	3.7	3.8	3.7	L					
3							Q	3.4	3.7H	3.6	3.1	3.2	3.6	A	A	L	3.5	3.4	Q					
4							Q	3.6	L	A	3.7	(3.7)S	3.8	3.6	3.6H	3.5	3.5	4.0	L					
5							Q	L	A	3.7	3.5	3.4	3.5	3.9	3.7	3.9	3.5	L	Q					
6							C	C	C	3.5	3.8	3.6	3.9	3.8	(4.0)P	3.6	3.3F	3.3	3.3					
7							3.5	3.5	A	3.8	3.8	A	3.3	3.4	3.4	(3.5)S	3.6	3.3	Q					
8						3.0	3.4	3.5	(3.8)P	3.7	3.9	(3.5)P	3.4	3.5	3.9H	3.4	A	A	Q					
9							Q	Q	3.4	3.5	3.7	3.6	(3.7)S	3.5	3.5	3.6	3.6	L	L					
10							L	3.6	L	3.8	A	A	A	3.6	(3.8)S	3.7	3.4	A	L					
11							Q	L	3.6	3.6	A	A	A	A	A	A	3.3	(3.5)P	3.5					
12							Q	A	3.7	3.1	A	S	3.5	3.8	3.3	3.8	3.5H	L	L					
13							3.1F	3.4	3.7	3.4	A	3.7	(3.3)S	3.8	3.7	A	3.3	3.6	L					
14							Q	A	(3.8)A	3.7	3.7	C	3.9	3.6	4.0	C	3.5	3.8	4.1					
15							Q	Q	A	(3.8)A	3.7	A	3.8	3.6	3.8	3.8	A	3.6	Q					
16							L	3.5	3.5	L	3.6	3.5	3.7	3.6	3.2	3.3	3.1	3.4	3.4					
17							Q	3.5K	3.5K	4.3HK	3.8K	3.6K	3.8K	4.1K	3.8K	3.7K	3.3K	3.6K	3.6K					
18							Q	Q	A	A	A	3.5	A	3.2	3.3	3.6	3.4	3.3	A					
19							3.3	3.3	(4.0)S	3.6	3.9H	2.9	3.3	3.6	3.6	C	3.4H	3.2	*A					
20							*QK	*QK	3.6K	4.0K	3.6K	4.0K	4.1K	(3.7)PK	3.5K	3.6K	3.5K	3.4	(3.3)P					
21							Q	Q	L	(3.6)P	3.4	3.7H	3.6	3.7	3.5	3.5H	3.5H	3.4	L					
22							3.1	3.2	3.3	3.8	(3.7)S	3.6	3.6	3.7	3.6	(3.4)P	A	A	3.3					
23							L	3.3	3.6	3.4	3.8H	(3.9)P	3.6	C	3.6	3.9	3.7	3.2	L					
24							Q	3.4	3.4	3.8H	3.7H	(3.9)P	3.7	(3.3)P	3.3	3.3	3.6	(3.2)P	L					
25							(3.0)P	3.3	(3.9)S	3.6	3.6	3.6	(4.0)S	B	3.5	3.5	3.5	3.5	L					
26							Q	L	A	3.9	(3.8)P	4.0	3.7	3.3	3.8	3.9	3.5	3.2	A					
27							L	3.5	3.6	3.8	A	3.7	3.9	3.6	3.7	3.6	A	A	A					
28							Q	3.4	(3.6)P	3.6	N	C	B	3.8	3.8	3.7	3.7	3.4	L					
29							L	3.5	3.6	3.7	3.6	3.5	3.8	3.8	3.5	(3.6)P	A	3.3	A					
30							Q	L	3.4	3.8	3.7	3.5	S	(4.0)P	3.8	3.4	3.4	3.3	(3.5)S					
31							Q	L	L	3.5	A	B	B	3.6	B	3.3	3.8V	3.8	L					
Median						—	3.3	3.4	3.6	3.6	3.7	3.6	3.7	3.6	3.6	3.6	3.5	3.4	3.5					
Count						1	7	17	21	28	23	23	25	27	28	26	26	23	7					

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LONG. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

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U.S. GOVERNMENT PRINTING OFFICE 1948 O-702510

TABLE 58

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

Form adopted June 1946

IONOSPHERIC DATA

(M1500)E (Characteristic), ____ (Unit), July (Month), 1949

Observed at Washington, D.C.

Lat 39.0°N, Long 77.5°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: E.J.W., J.J.S., B.E.B.

Calculated by: J.J.S., B.E.B., J.M.W.

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							*4.3	*4.2	*4.1	4.1	(4.3)^A	(4.3)^A	(4.2)^P	A	(4.2)^A	(4.2)^A	A	A	4.2	4.2^H				
2							3.8^H	4.1	4.2^H	4.3	A	(4.2)^A	(4.3)^P	A	4.1	4.2	3.8^H	4.2	A	4.2				
3							A	A	A	(4.6)^A	(4.3)^A	(4.2)^P	4.0	4.0	4.0	4.2	4.1	(4.5)^A	A	A				
4							4.0	(3.9)^A	(4.1)^A	A	A	A	4.0	4.0	4.1	4.2	(4.3)^A	4.1	A					
5							4.5^H	4.0	4.1	4.1	4.3	4.4	(4.2)^F	(4.3)^S	A	A	4.2	3.9	(4.3)^S	C				
6							C	C	C	4.5	4.3	A	A	A	(4.1)^A	4.1	(4.3)^A	A	4.2					
7							(3.9)^A	4.3	4.2	4.2	4.4	A	A	A	A	(4.3)^S	4.0	3.9	4.3					
8							(4.5)^A	4.3	4.2	A	4.4	A	A	A	(4.5)^A	4.3	4.4	4.1	(4.0)^A					
9							4.5	(4.4)^A	4.3	4.4	(4.3)^A	4.4	(4.3)^P	A	A	A	A	(3.9)^A	4.2	3.7^F				
10							4.3	4.1	A	A	A	A	A	(4.3)^A	4.2	4.2	3.9	A	4.2					
11							4.3	4.4	3.9	4.1	(4.1)^A	(4.2)^A	(4.2)^A	4.3	4.3	4.3	4.5	4.2	A	A				
12							4.6	(4.4)^A	4.0	4.2	(4.3)^A	(4.1)^F	4.1	A	4.3	4.3	4.2	4.1	4.4	4.1				
13							4.3^F	A	A	A	A	A	4.3	A	4.4	A	4.2	(4.5)^A	4.3	3.8^F				
14							4.0	4.3	4.1	4.2	4.2	C	4.2	4.4	4.4	C	4.2	4.1	4.4					
15						4.4	4.0	4.1	4.2	(4.3)^A	(4.3)^A	A	A	A	A	4.1	A	(4.1)^A	4.2	3.9				
16							4.0	A	3.9	4.2	4.3	4.2	A	3.9	(4.0)^A	(4.1)^A	A	A	4.1^H	4.3				
17							4.4	4.1^K	4.2^K	4.2^K	4.1^K	A^K	A^K	A^K	3.8^K	4.0^K	4.2	4.3^K	4.2^K					
18							4.8	4.4	4.2	(4.4)^A	A	A	A	A	A	4.0	4.0	4.3	4.2					
19						4.3	A	A	A	(4.4)^A	(3.9)^P	A	3.9	(4.0)^S	(4.0)^S	C	4.2	(4.2)^A*	(4.4)^A					
20							*(4.3)^A_K	*A^K	4.3^K	A^K	A^K	(4.3)^P_K	(4.4)^S_K	A^K	A^K	3.8^K	(4.2)^A_K	4.4	A					
21							4.1	(3.9)^A	4.0	4.2	(4.3)^P	4.3	A	4.0	4.4	4.0	3.9	4.3	4.3					
22							4.5	A	4.3	A	4.4	(4.1)^P	4.3	A	4.1	A	(4.3)^A	4.2	A					
23							4.2^H	4.1	4.1	4.4	4.1	(4.1)^P	A	(4.1)^C	A	A	4.3	4.2	4.1	A				
24							A	4.4	A	A	A	A	4.1	A	A	4.0	4.1	4.2	4.2					
25							4.2	4.4	(3.9)^A	A	A	A	A	B	4.1	3.9	4.0	4.4	4.4					
26							4.0	4.0	4.4	A	4.2	S	S	4.2	4.0	4.2	4.2	4.4	4.4					
27							A	A	4.4	A	A	A	A	4.0	4.3	4.3	4.2	4.2	(4.4)^A					
28							4.0	(3.9)^A	(4.1)^A	A	A	C	B	A	A	3.8	4.1	4.3^H	4.2					
29							4.2^H	4.3	4.4	4.4	4.2	(4.1)^A	A	4.4	4.3	4.1	4.3	4.3	(4.4)^A					
30							A	4.3	4.2	4.1	4.2	(4.4)^S	4.4	S	4.1	3.9	4.0	A	(4.2)^A					
31							4.0^H	4.1	4.1	4.3	4.3	B	B	(4.1)^A	B	(4.1)^A	A	4.3	4.2	4.2				
Median						—	4.2	4.2	4.2	4.2	4.3	4.2	4.2	4.1	4.1	4.1	4.2	4.2	4.2	4.2				
Count						2	25	23	25	20	21	14	15	14	21	24	26	26	25	8				

* SUPPLEMENTARY DATA FROM FT. BELVOIR, LAT. 38.7°N, LONG. 77.1°W.

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

U. S. GOVERNMENT PRINTING OFFICE 1948 O - 702519

Table 59

Ionospheric Storminess at Washington, D. C.

July 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	2	1			2	2
2	1	2			2	1
3	2	1			1	2
4	2	1			1	1
5	0	1			1	1
6	***	1			1	1
7	2	1			2	2
8	2	3			2	3
9	1	2			3	1
10	1	2			1	2
11	1	2			1	1
12	1	1			1	3
13	2	3			3	2
14	2	2			2	2
15	1	3			0	1
16	1	2			1	4
17	2	5	1200	----	3	2
18	2	2	----	0100	2	4
19	2	3			4	3
20	2	4	1100	2200	2	2
21	2	2			1	2
22	1	1			2	3
23	2	1			3	3
24	2	1			2	2
25	2	3			3	3
26	2	3			1	1
27	0	2			0	0
28	1	3			0	1
29	2	3			1	2
30	1	2			2	2
31	2	3			2	2

*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 48 for detailed explanation.

----Dashes indicate continuing storm.

Table 60

Sudden Ionosphere Disturbances Observed at Washington, D. C.

July 1949

1949 Day	GCT Beginning	GCT End	Location of transmitters	Relative intensity at minimum*	Other phenomena
July 14	2040	2110	Ohio, D.C., England	0.03	Terr.mag.pulse** 2044-2100
27	1220	1240	Ohio, England	0.1	Terr.mag.pulse** 1222-1230
28	1510	1600	Ohio, D.C., England	0.03	
29	1411	1455	Ohio, D.C., England	0.0	Terr.mag.pulse** 1411-1430
29	2125	2200	Ohio, D.C.	0.05	
30	1707	1850	Ohio, D.C.	0.1	
31	1420	****	Ohio, D.C., England, New Brunswick	0.0	Solar flare*** 1505
31	1845	1925	Ohio, D.C., New Brunswick	0.0	

*Ratio of received field intensity during SID to average field intensity before and after, for station W8XAL, 6080 kilocycles, 600 kilometers distant.

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

***Time of observation at McMath-Hulbert Observatory, Michigan.

****Incomplete recovery of SID.

Table 61

Sudden Ionosphere Disturbances Reported by RCA Communications, Inc., as Observed at Point Reyes, California

1949 Day	GCT Beginning	GCT End	Location of transmitters
August 1	2013	2300	Australia, China, Hawaii, Japan, New Zealand, Philippine Is.
4	0100	0445	Australia, China, Japan, Java, Philippine Is.

Table 62

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	Other phenomena
June 16	0925	0955	Brentwood	Bulgaria, Canary Is., French Equatorial Africa, Greece, Iran, Southern Rhodesia, Switzerland	Solar flare* 0900
17	0850	0915	Brentwood	Afghanistan, India, Iran, Kenya, Madagascar, Palestine, Southern Rhodesia, Spain, Switzerland, Turkey, U.S.S.R., Yugoslavia, Zanzibar	Solar flare* 0912
July 11	0635	0700	Brentwood	Bahrein I., Greece, India, Iran, Kenya, Southern Rhodesia, Trans-Jordan, Zanzibar	
13	1505	1530	Brentwood	Bahrein I., Barbados, Eritrea, French Equatorial Africa, India, Turkey, Uruguay, Venezuela	

*Time of observation at Meudon Observatory, France.

Table 63

Sudden Ionosphere Disturbances Reported by RCA Communications, Inc., as Observed at Riverhead, New York

1949 Day	GCT Beginning	GCT End	Location of transmitters	Other phenomena
July 29	1423	1430	Argentina, England, Italy, Morocco, Panama	Terr.mag.pulse* 1411-1430
31	1445	1600	Argentina, Canada, England, Italy, Morocco, Panama	Solar flare** 1505

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

**Time of observation at McMath-Hulbert Observatory, Michigan.

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 64

Provisional Radio Propagation Quality Figures
(Including Comparisons with CRPL Warnings and CRPL Probable Disturbed Period Forecasts)
June 1949

Day	North Atlantic: Quality figure 01-12 GCT	North Atlantic: Quality figure 13-24 GCT	North Atlantic: CRPL* Warning 01-12 GCT	North Atlantic: CRPL* Warning 13-24 GCT	North Atlantic: CRPL** Forecast of probable disturbed periods	North Atlantic: Geomagnetic K_{Ch} 01-12 GCT	North Atlantic: Geomagnetic K_{Ch} 13-24 GCT	North Pacific: Quality figure 01-12 GCT	North Pacific: Quality figure 13-24 GCT	North Pacific: CRPL* Warning 01-12 GCT	North Pacific: CRPL* Warning 13-24 GCT	North Pacific: CRPL** Forecast of probable disturbed periods	North Pacific: Geomagnetic K_{Ch} 01-12 GCT	North Pacific: Geomagnetic K_{Ch} 13-24 GCT
1	6	6	X			4	2	6	6	X			4	2
2	7	6				2	2	6	5				2	2
3	7	6				3	2	6	6				3	2
4	(4)	(4)		X		4	5	6	5		X		4	5
5	(2)	(3)	X	X		4	5	(2)	(4)	X	X		4	5
6	(2)	(4)	X	X		3	3	(4)	5	X	X		3	3
7	5	(4)	X			3	2	(4)	5	X			3	2
8	6	6				2	2	5	6				2	2
9	6	6				2	2	5	7				2	2
10	6	6				1	1	5	6				1	1
11	7	6				0	2	6	6				0	2
12	5	5				4	4	5	(4)				4	4
13	5	5	X			3	2	5	5	X			3	2
14	6	6				1	2	6	5				1	2
15	6	7				3	3	6	6				3	3
16	7	6				3	2	6	6				3	2
17	8	6				1	3	6	7				1	3
18	5	6			X	3	3	6	7			X	3	3
19	8	7			X	3	2	6	7			X	3	2
20	7	6				2	1	6	6				2	1
21	7	7				1	2	5	6				1	2
22	6	6				2	3	6	6				2	3
23	6	6				1	1	6	7				1	1
24	7	7				1	2	6	6				1	2
25	6	6				3	2	6	6				3	2
26	7	6				1	2	6	6				1	2
27	7	6			X	3	2	6	7			X	3	2
28	7	6			X	2	3	5	6			X	2	3
29	7	6				2	3	6	6				2	3
30	6	6				2	2	6	6				2	2
Score:														
H			3		0					3		0		
M			1		4					1		4		
G			24		22					23		22		
(S)			1		1					2		1		
S			1		3					1		3		

*Broadcast on WWV, Washington, D.C. Times of warnings recorded to nearest half day as broadcast.

**In addition to dates marked X, the following were designated as probable disturbed days on forecasts more than eight days in advance of said dates: June 8 and 9.

Quality Figure Scale:
1 - Useless
2 - Very poor
3 - Poor
4 - Poor to fair
5 - Fair
6 - Fair to good
7 - Good
8 - Very good
9 - Excellent

Symbols:
- X Warning given or probable disturbed date
- H Quality 4 or worse on day or half day of warning
- M Quality 4 or worse on day or half day of no warning
- G Quality 5 or better on day of no warning
- (S) Quality 5 on day of warning
- S Quality 6 or better on day of warning
- ( ) Quality 4 or worse (disturbed)

Geomagnetic K_{Ch} on the standard scale of 0 to 9, 9 representing the greatest disturbance.

Table 65a

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																																					
July 1.7	X	X	X	X	X	X	X	X	5	5	4	3	3	5	5	10	12	11	5	5	5	4	3	14	13	14	5	5	4	-	-	-	-	-	-	-	-
2.7	X	-	-	-	-	-	-	3	3	3	4	5	6	7	9	8	6	5	4	4	3	4	4	9	6	4	4	4	-	-	-	-	-	-	-	-	-
3.6	-	-	-	-	-	-	-	-	-	4	5	9	10	12	11	10	9	9	10	13	11	8	9	10	10	8	7	5	-	-	-	-	-	-	-	-	-
4.7	-	-	-	-	-	-	-	-	-	-	4	7	9	10	11	9	8	9	14	14	12	13	13	7	4	-	-	-	-	-	-	-	-	-	-	-	-
5.6	-	-	-	-	-	-	-	-	-	-	5	10	10	11	11	6	8	9	10	10	10	11	17	16	8	-	-	-	-	-	-	-	-	-	-	-	-
6.6	-	-	-	-	-	-	-	-	3	3	4	7	10	8	10	9	11	10	11	11	10	10	10	7	4	3	-	-	-	-	-	-	-	-	-	-	-
8.8	X	-	-	-	-	-	-	-	-	3	4	5	7	8	10	11	9	10	11	10	7	5	6	4	4	4	3	-	-	-	-	-	-	-	-	-	X
9.6	-	-	-	-	-	-	-	-	-	-	4	5	7	9	10	11	11	8	8	7	7	8	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-
11.8	-	-	-	-	-	-	-	-	3	4	6	6	8	8	12	10	9	10	7	4	3	5	8	8	6	4	3	3	3	-	-	-	-	-	-	-	-
12.6	-	-	-	-	-	-	-	-	-	-	6	9	10	11	10	9	8	9	9	8	5	3	3	4	5	4	3	-	-	-	-	-	-	-	-	-	-
13.6	-	-	-	-	-	-	-	-	-	-	4	5	6	7	13	10	11	11	10	10	11	8	8	8	7	6	4	-	-	-	-	-	-	-	-	-	-
14.7	-	-	-	-	-	-	-	-	-	-	3	6	9	11	14	13	10	5	6	10	10	9	4	3	4	-	-	-	-	-	-	-	-	-	-	-	-
15.6	-	-	-	-	-	-	-	-	-	-	-	-	4	5	12	13	11	10	5	6	6	7	7	6	5	3	-	-	-	-	-	-	-	-	-	-	-
16.6	-	-	-	-	-	-	-	-	-	-	-	-	6	8	12	11	15	14	8	7	5	6	6	9	8	5	-	-	-	-	-	-	-	-	-	-	-
17.6	-	-	-	-	-	-	-	-	-	-	3	3	4	5	5	9	11	11	10	7	5	6	8	8	8	7	4	-	-	-	-	-	-	-	-	-	-
18.7	-	-	-	-	-	-	-	-	-	3	3	4	4	7	9	10	10	11	11	11	10	11	11	7	4	5	4	3	-	-	-	-	-	-	-	-	-
19.6	-	-	-	-	-	-	-	-	-	-	-	7	8	9	8	7	7	8	9	10	10	8	7	5	-	-	-	-	-	-	-	-	-	-	-	-	-
20.8	-	-	-	-	-	-	-	-	-	-	-	3	3	11	9	7	5	5	4	4	7	5	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-
21.6	-	-	-	-	-	-	-	-	-	-	-	6	9	13	14	13	13	10	5	5	10	10	9	9	7	4	3	-	-	-	-	-	-	-	-	-	-
22.8	-	-	-	-	-	-	-	-	-	-	-	6	7	8	11	11	10	7	8	8	10	10	8	9	11	6	-	-	-	-	-	-	-	-	-	-	X
23.6	-	-	-	-	-	-	-	-	-	-	-	-	4	6	11	11	7	4	4	5	11	13	13	13	10	4	-	-	-	-	-	-	-	-	-	-	-
24.6	-	-	-	-	-	-	-	-	-	-	-	-	2	18	19	15	12	11	10	10	18	23	23	22	13	12	7	2	-	-	-	-	-	-	-	-	-
26.6	-	-	-	-	-	-	-	-	-	-	-	-	2	5	15	19	13	11	12	12	13	13	14	16	12	5	2	-	-	-	-	-	-	-	-	-	-
27.6	-	-	-	-	-	-	-	-	-	-	-	-	3	4	12	12	12	11	10	12	12	13	13	12	10	11	8	-	-	-	-	-	-	-	-	-	-
28.6	-	-	-	-	-	-	-	-	-	-	-	-	3	5	5	5	8	9	10	13	19	13	13	13	11	10	10	4	-	-	-	-	-	-	-	-	-
29.6	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	6	6	7	8	10	13	12	9	10	9	9	7	5	3	-	-	-	-	-	-	-	-
30.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	6	8	10	12	7	5	4	4	5	4	-	-	-	-	-	-	-	-	-	-
31.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	5	8	9	10	11	11	11	6	5	-	-	-	-	-	-	-	-	-	-	-	-

Table 66a

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																																					
July 1.7	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	2	1	-	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.7	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	1	1	-	-	-	1	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	4	6	1	1	-	-	-	-	-	-	-	-	-	-	-	-
5.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	2	1	5	4	1	-	-	-	-	-	-	-	-	-	-	-	-
6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	4	5	3	1	-	-	-	-	-	-	-	-	-	-	-	-
8.8	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	3	2	-	-	-	-	1	1	1	-	-	-	-	-	X
9.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	7	7	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	2	3	4	1	1	-	1	1	3	1	-	-	-	-	-	-	-	-	-	-
16.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	2	1	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17.6	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	7	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.7	-	-	-	-	-	-	-	-	-	-	-	-	4	2	2	4	1	1	-	-	-	-	-	-	-	-	-	1	1	2	1	-	-	-	-	-	-
19.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.8	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	7	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
23.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	-	-	1	2	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-
24.6	1	1	-	-	1	1	1	2	1	-	1	1	3	7	10	6	2	1	-	-	5	15	10	8	10	4	1	-	-	-	-	-	-	-	-	-	-
26.6	-	-	-	-	-	-	1	1	1	1	1	1	1	1	11	5	5	1	1	-	-	11	1	5	2	1	1	1	1	-	1	1	-	-	-	-	-
27.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	10	11	-	8	5	5	5	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-
28.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	9	9	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8	9	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
30.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
31.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 65b

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																																					
July 1.7	-	-	-	-	-	-	-	-	-	-	5	7	8	10	11	12	14	15	15	15	20	21	25	13	6	3	-	-	-	-	-	-	-	-	-	-	X
2.7	-	-	-	-	-	-	-	-	-	-	4	5	7	7	8	9	9	9	10	10	20	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.6	-	-	-	-	-	-	-	-	-	3	5	6	7	7	6	11	13	8	8	15	21	20	15	12	10	7	5	4	-	-	-	-	-	-	-	-	-
4.7	-	-	-	-	-	-	-	-	-	-	4	4	5	3	5	11	14	10	9	13	14	14	10	5	3	-	-	-	-	-	-	-	-	-	-	-	-
5.6	-	-	-	-	-	-	-	-	-	-	4	9	7	6	10	13	9	12	12	13	16	14	11	11	10	9	4	4	-	-	-	-	-	-	-	-	-
6.6	-	-	-	-	-	-	-	-	-	3	4	4	3	3	10	12	11	10	10	10	12	14	16	13	17	10	5	3	-	-	-	-	-	-	-	-	-
8.8	X	X	X	X	X	X	X	X	X	X	X	-	3	6	6	7	7	8	8	9	12	11	10	7	6	4	X	X	X	X	X	X	X	X	X	X	X
9.6	-	-	-	-	-	-	-	-	-	-	-	6	11	20	17	17	12	9	8	9	14	16	14	12	8	9	6	4	-	-	-	-	-	-	-	-	-
11.8	-	-	-	-	-	-	-	-	-	-	-	4	4	4	5	7	6	3	-	-	-	5	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-
12.6	-	-	-	-	-	-	-	-	-	-	-	10	11	10	8	10	6	5	5	4	6	10	12	9	7	3	-	-	-	-	-	-	-	-	-	-	-
13.6	-	-	-	-	-	-	-	-	-	-	-	5	9	7	5	4	3	5	6	8	9	10	9	8	5	-	-	-	-	-	-	-	-	-	-	-	-
14.7	-	-	-	-	-	-	-	-	-	-	3	8	6	5	5	4	6	6	3	3	8	6	7	7	3	-	-	-	-	-	-	-	-	-	-	-	-
15.6	-	-	-	-	-	-	-	-	-	-	-	-	4	4	4	4	8	7	5	3	-	3	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-
16.6	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	4	4	4	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17.6	-	-	-	-	-	-	-	-	-	-	-	-	-	5	6	5	7	8	8	4	5	3	-	5	4	3	-	-	-	-	-	-	-	-	-	-	-
18.7	-	-	-	-	-	-	-	-	-	-	-	-	-	10	13	10	9	10	11	9	9	8	7	7	6	4	3	3	-	-	-	-	-	-	-	-	-
19.6	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	6	5	10	9	8	9	5	5	6	4	4	-	-	-	-	-	-	-	-	-	-	-
20.8	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	5	6	9	10	9	9	9	10	8	8	6	5	4	3	-	-	-	-	-	-	-	-
21.6	-	-	-	-	-	-	-	-	-	-	-	-	4	5	3	-	7	13	12	10	11	14	8	9	6	7	5	3	-	-	-	-	-	-	-	-	-
22.8	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	4	5	6	9	8	7	5	5	-	-	-	-	-	-	-	-	-	-	-
23.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	4	7	9	11	8	3	-	-	-	-	-	-	-	-	-	-	-	-
24.6	-	-	-	-	-	-	2	2	3	5	6	8	9	8	8	8	10	9	8	9	12	18	15	11	9	9	7	4	3	3	2	2	1	1	-	-	-
26.6	-	-	-	-	-	-	-	-	2	3	4	6	5	6	6	9	11	9	7	7	7	9	9	10	10	9	7	3	2	-	-	-	-	-	-	-	-
27.6	-	-	-	-	-	-	-	-	3	5	5	7	10	10	8	12	14	14	11	9	11	12	13	13	11	10	9	4	3	-	-	-	-	-	-	-	-
28.6	-	-	-	-	-	-	-	-	-	-	4	4	6	10	8	8	13	14	11	9	9	12	13	15	8	8	6	3	-	-	-	-	-	-	-	-	-
29.6	-	-	-	-	-	-	-	-	-	-	3	8	15	13	12	13	15	15	13	14	23	20	24	28	16	12	13	5	3	-	-	-	-	-	-	-	-
30.6	-	-	-	-	-	-	-	-	-	-	-	5	11	10	9	10	13	11	10	14	19	20	13	7	11	5	5	4	-	-	-	-	-	-	-	-	-
31.7	-	-	-	-	-	-	-	-	-	-	-	-	6	9	10	8	10	10	9	9	11	13	10	7	5	-	-	-	-	-	-	-	-	-	-	-	-

Table 66b

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																																					
July 1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	7	10	10	6	5	-	-	-	-	-	-	-	-	-	-	-	-	X
2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	9	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	1	10	12	12	2	-	-	-	-	-	-	-	-	-	-	-	-	-
4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	1	1	9	10	1	-	-	-	-	-	-	-	-	-	-	-	-	-
5.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	9	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5	8	3	2	5	1	-	-	-	-	-	-	-	-	-	-
8.8	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	10	10	-	-	-	X	X	X	X	X	X	X	X	X	X	X
9.6	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-	-	2	15	3	4	1	-	-	-	-	-	-	-	-	-	-	-	-
11.8	-	-	-	-	-	-	-	-	-	-	1	1	1	2	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.6	-	-	-	-	-	-	-	-	-	-	-	5	5	4	3	1	1	-	-	-	1	4	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
13.6	-	-	-	-	-	-	-	-	-	-	-	3	4	3	1	-	-	-	-	-	-	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.7	-	-	-	-	-	-	-	-	-	-	-	-	-	9	8	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.6	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.8	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	7	5	5	5	1	-	-	-	-	-	-	-	-	-	-	-	-
22.8	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	1	3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
23.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-
24.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	5	3	3	2	1	-	-	-	-	-	-	-	-	-	-	-
26.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27.6	-	-	-	-	-	-	-	-	1	-	-	-	2	2	2	-	-	-	-	-	3	2	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
28.6	-	-	-	-	-	-	-	-	-	-	-	-	4	1	-	-	3	-	-	2	5	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29.6	-	-	-	-	-	-	-	-	1	1	1	1	2	3	-	-	1	1	-	1	3	5	5	3	2	-	-	-	-	-	-	-	-	-	-	-	-
30.6	-	-	-	-	-	-	-	1	1	1	1	1	1	2	-	2	-	1	1	2	3	2	3	4	1	1	1	-	-	-	-	-	-	-	-	-	-
31.7	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	-	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-

Table 67a

Coronal observations at Climax, Colorado (6704Å), 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																																					
July 1.7	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.7	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.8	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
9.6	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15.6	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16.6	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-
17.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
23.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.6	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	1	-	1	1	2	3	3	3	1	-	-	-	-	-	-	-	-	-	-	-
26.6	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	-	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-
27.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 67b

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

Date GCT	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5	0°	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
	Degrees south of the solar equator																			Degrees north of the solar equator																	
1949																																					
July 1.7	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	X
2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
4.7	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.8	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X
9.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.8	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 68

American and Zürich Provisional Relative Sunspot Numbers

July 1949

Date	R_A*	R_Z**	Date	R_A*	R_Z**
1	200	156	17	127	105
2	172	124	18	159	109
3	142	138	19	183	136
4	98	100	20	196	144
5	82	67	21	181	142
6	114	79	22	172	150
7	108	86	23	194	171
8	88	61	24	224	182
9	72	57	25	207	187
10	68	52	26	205	164
11	87	59	27	201	182
12	129	95	28	202	164
13	127	107	29	198	185
14	131	91	30	214	185
15	148	113	31	193	196
16	140	113	Mean:	153.6	125.8

*Combination of reports from 49 observers; see page 9.
**Dependent on observations at Zürich Observatory and its stations at Locarno and Arosa.

GRAPHS OF IONOSPHERIC DATA

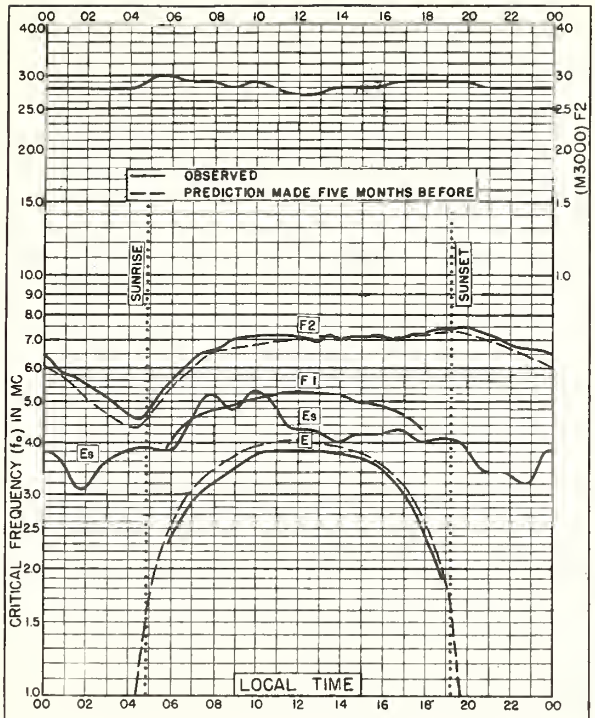


Fig. 1. WASHINGTON, D. C.
39.0°N, 77.5°W JULY 1949

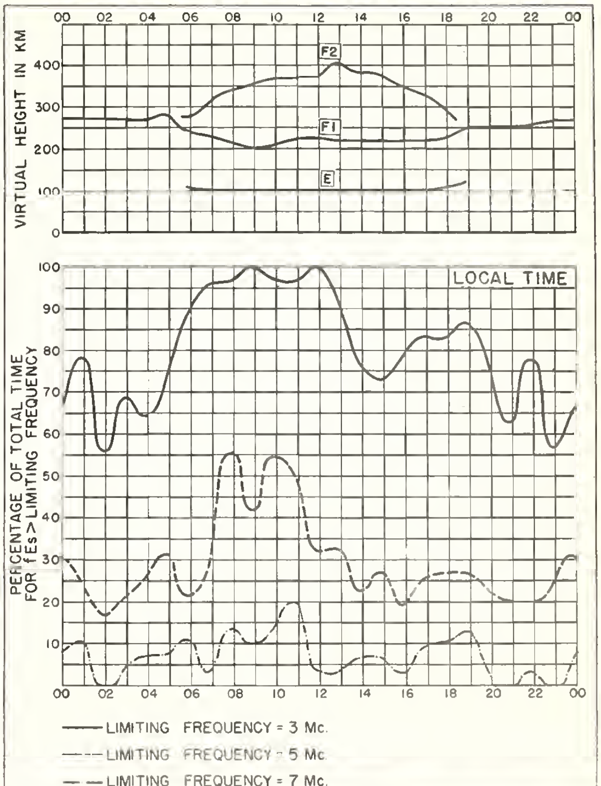


Fig. 2. WASHINGTON, D. C. JULY 1949

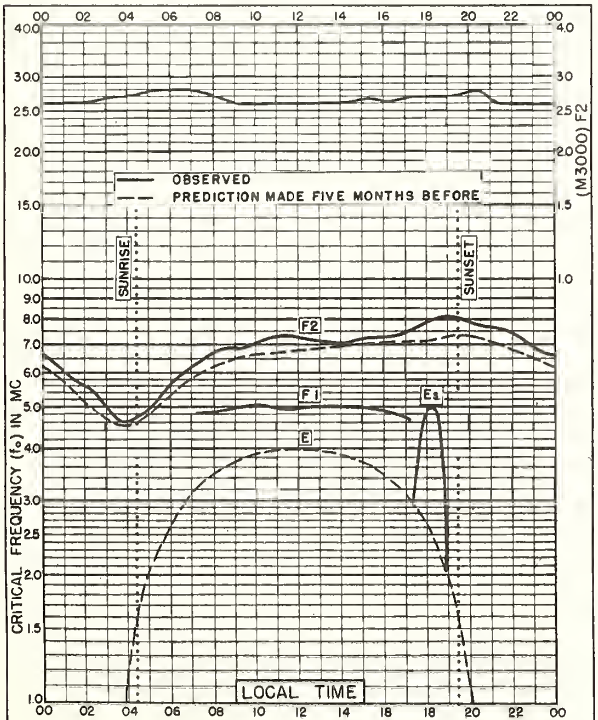


Fig. 3. BOSTON, MASSACHUSETTS
42.4°N, 71.2°W JUNE 1949

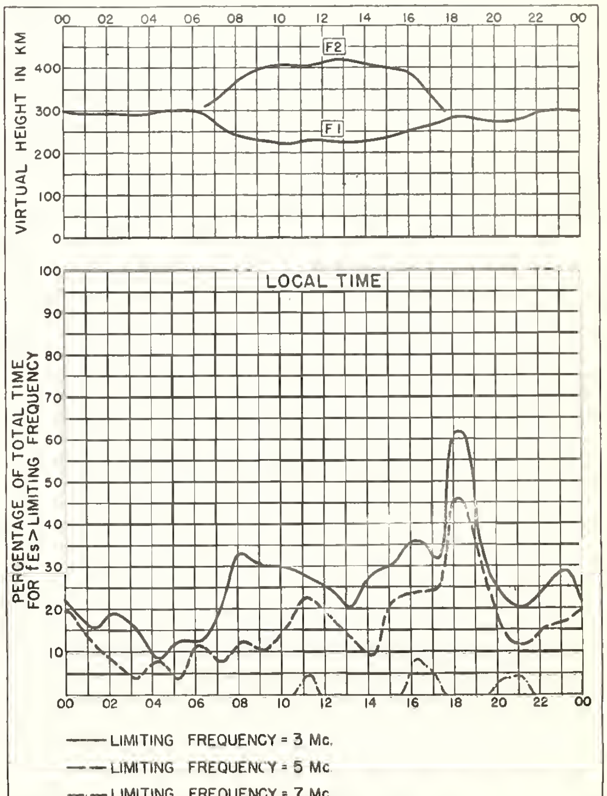


Fig. 4. BOSTON, MASSACHUSETTS JUNE 1949

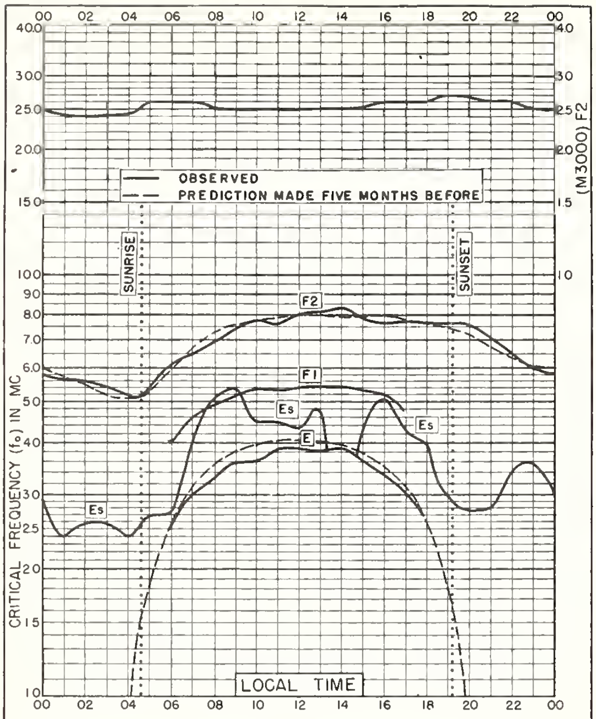


Fig. 5. SAN FRANCISCO, CALIFORNIA 37.4°N, 122.2°W JUNE 1949

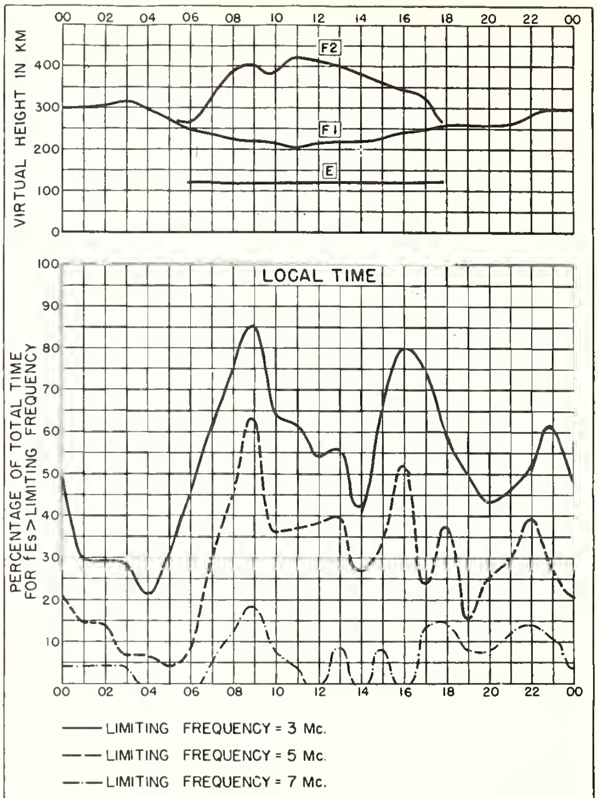


Fig. 6. SAN FRANCISCO, CALIFORNIA JUNE 1949

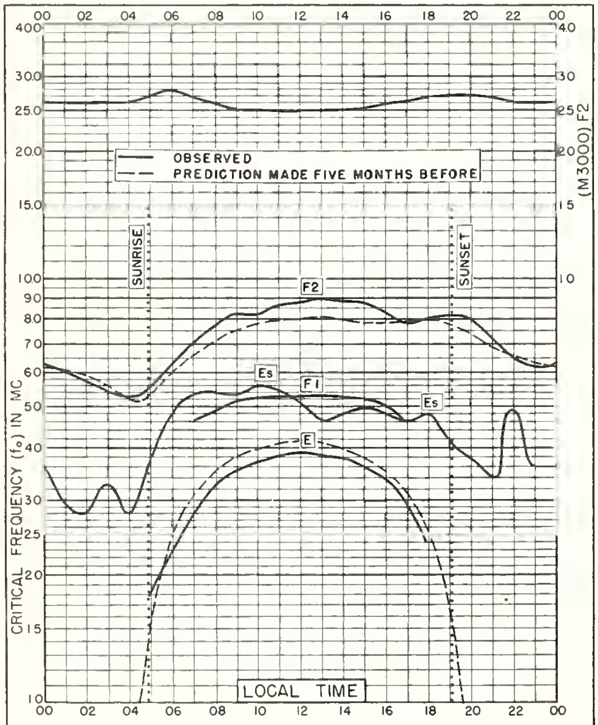


Fig. 7. WHITE SANDS, NEW MEXICO 32.3°N, 106.5°W JUNE 1949

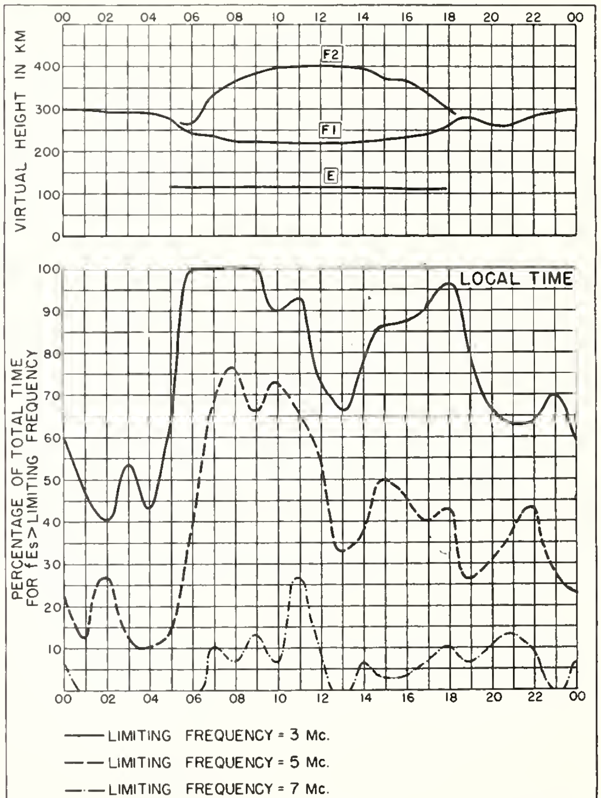


Fig. 8. WHITE SANDS, NEW MEXICO JUNE 1949

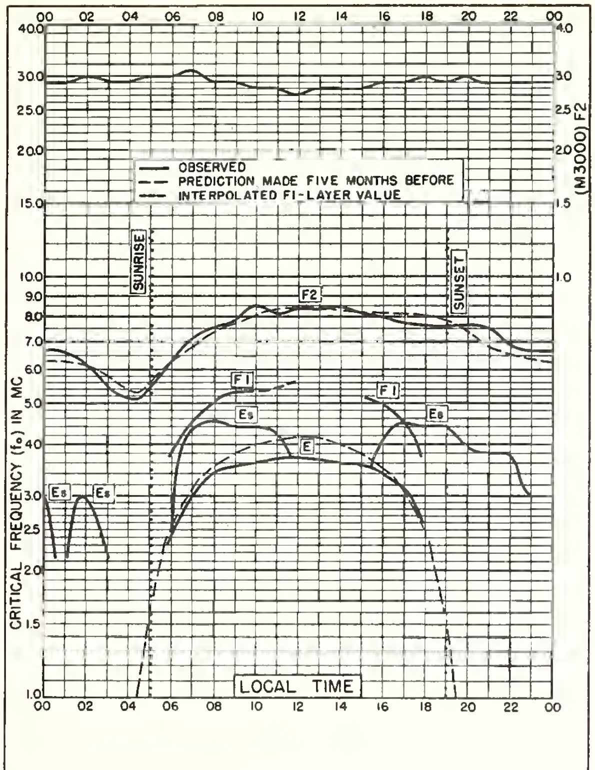


Fig. 9. BATON ROUGE, LOUISIANA
30.5°N, 91.2°W JUNE 1949

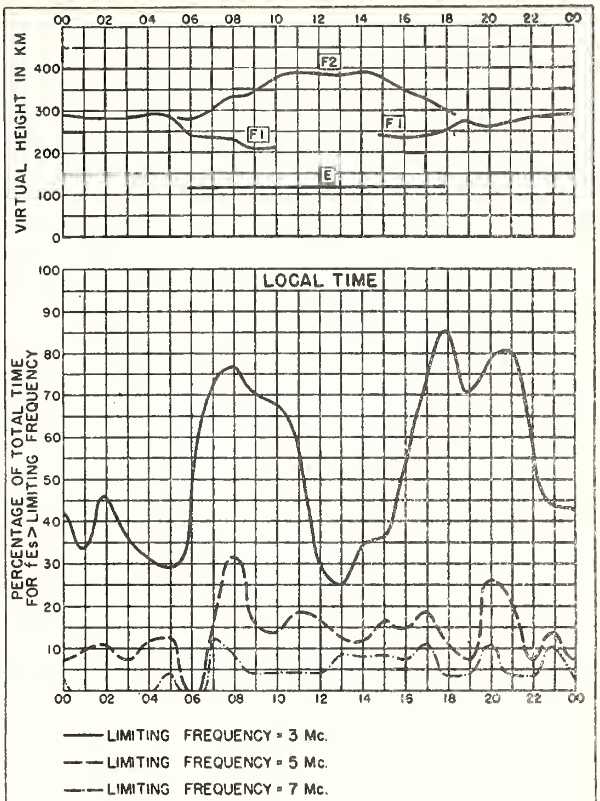


Fig. 10. BATON ROUGE, LOUISIANA JUNE 1949

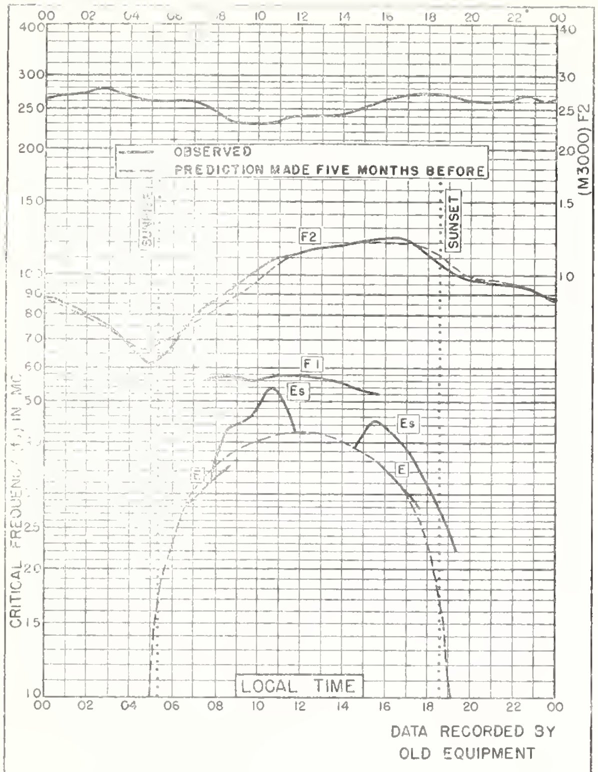


Fig. 11a. MAUI, HAWAII
20.8°N, 156.5°W
JUNE 1949

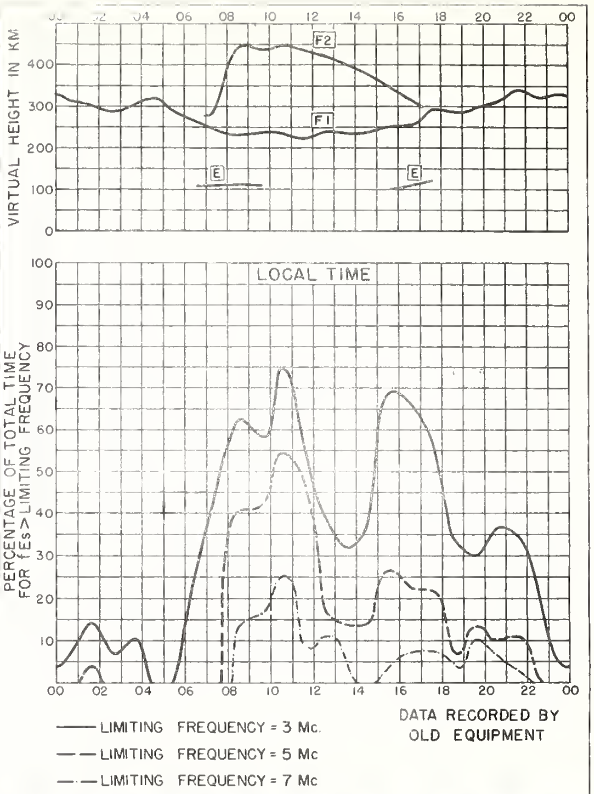


Fig 12a. MAUI, HAWAII
JUNE 1949

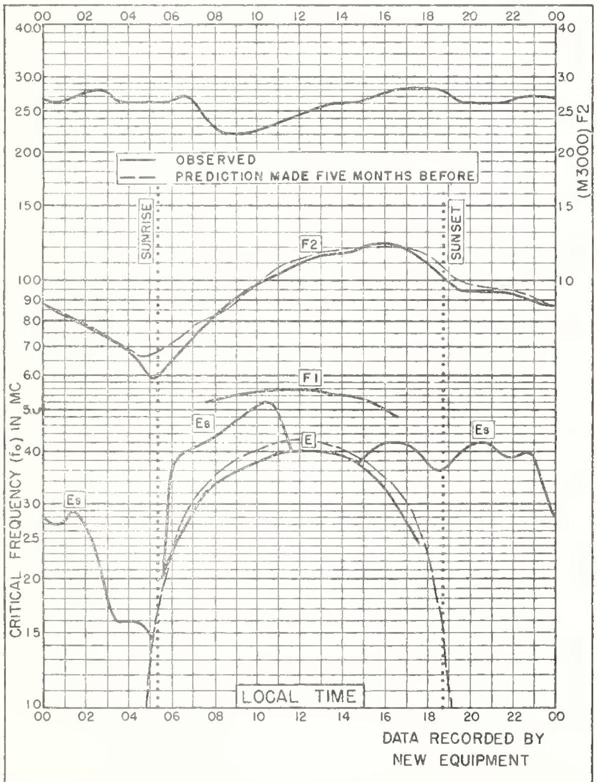


Fig. 11b. MAUI, HAWAII
20.8°N, 156.5°W
JUNE 1949

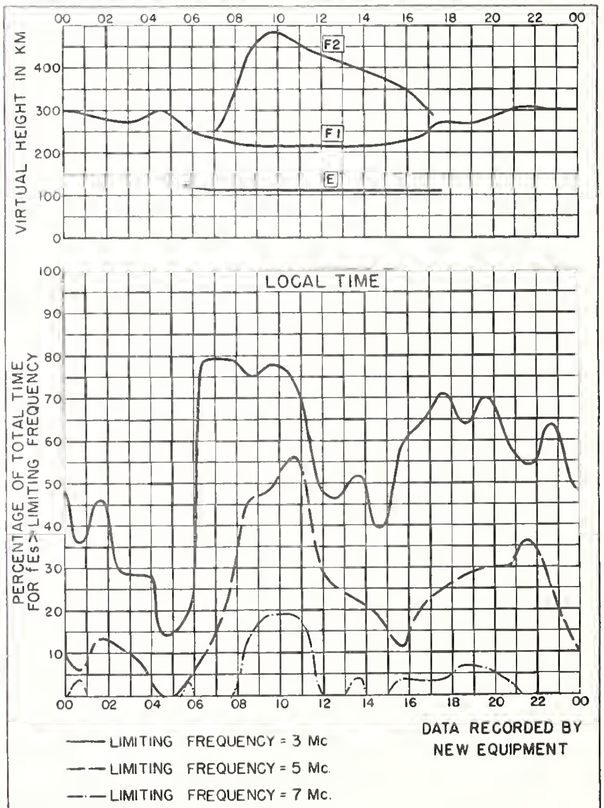


Fig. 12b. MAUI, HAWAII
JUNE 1949

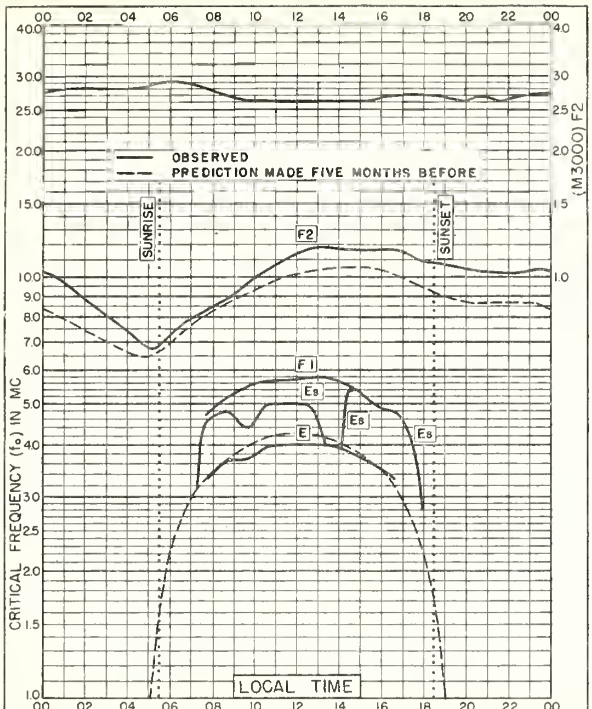


Fig. 13. SAN JUAN, PUERTO RICO
18.4°N, 66.1°W JUNE 1949

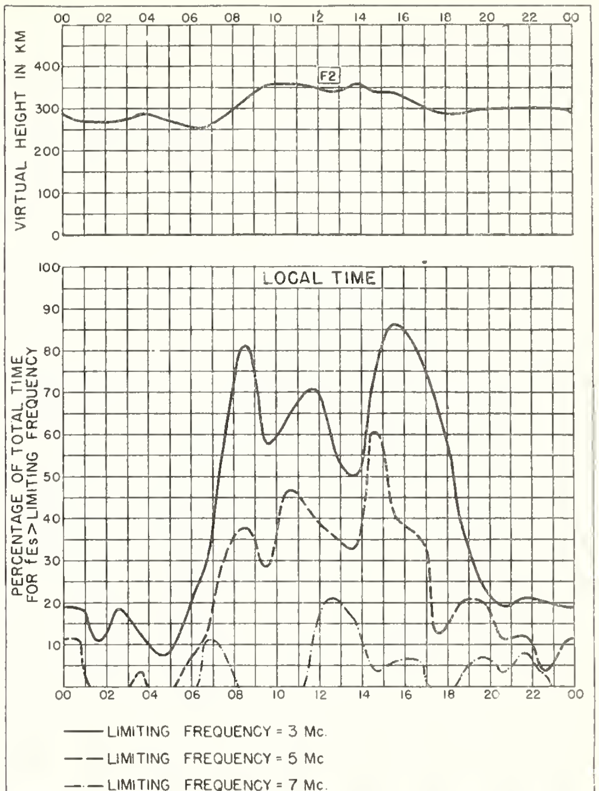


Fig. 14. SAN JUAN, PUERTO RICO JUNE 1949

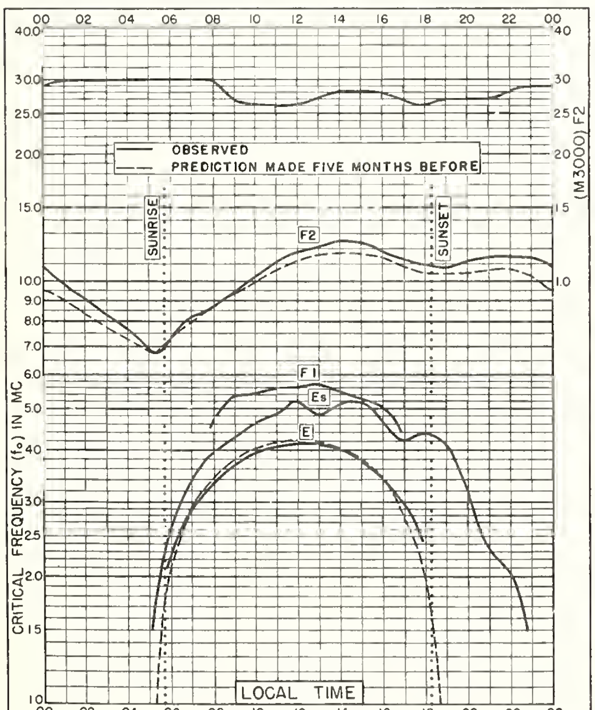


Fig. 15. TRINIDAD, BRIT. WEST INDIES
10.6°N, 61.2°W JUNE 1949

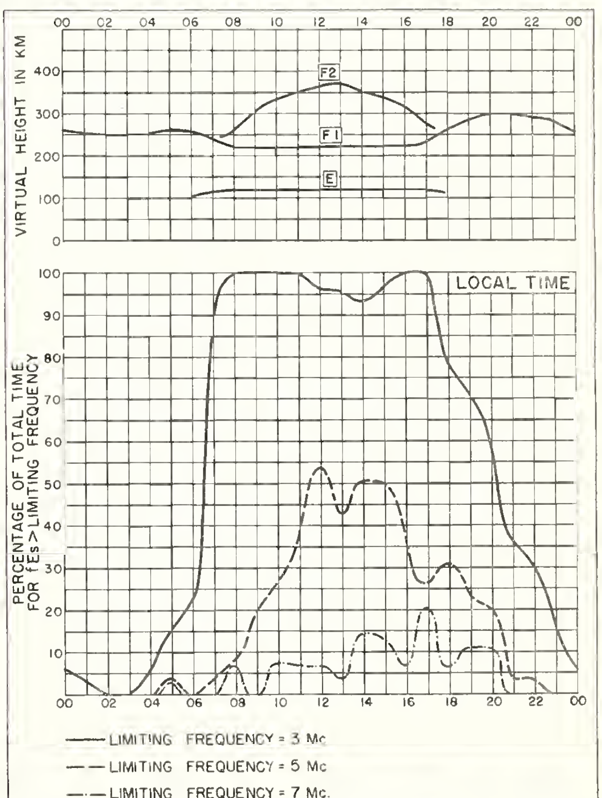


Fig. 16. TRINIDAD BRIT. WEST INDIES JUNE 1949

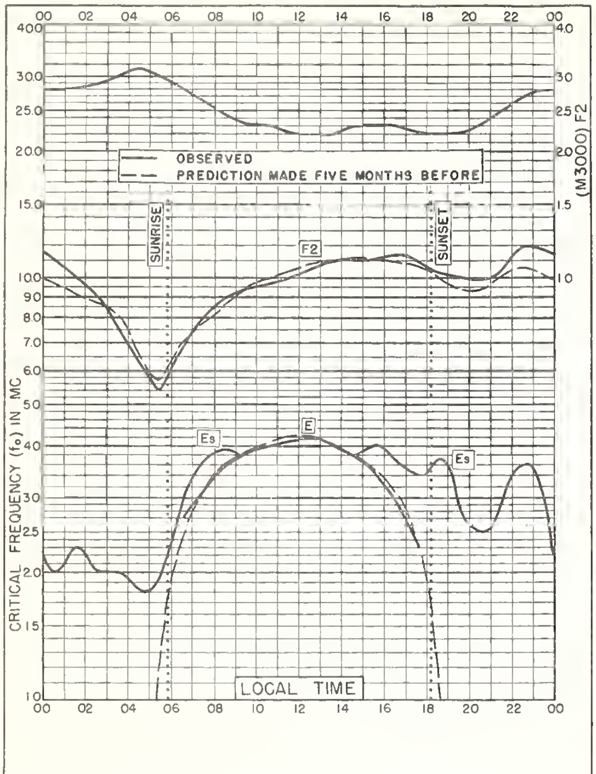


Fig. 17. PALMYRA I.
5.9°N, 162.1°W JUNE 1949

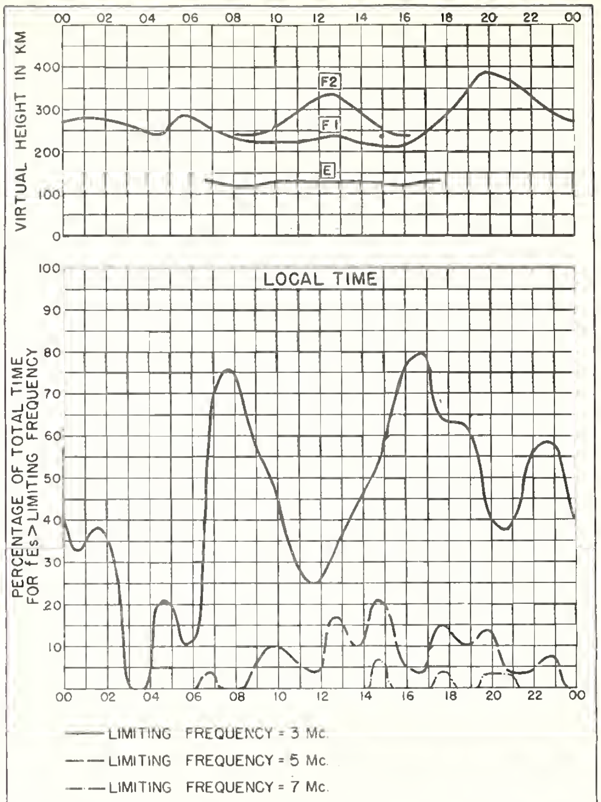


Fig. 18. PALMYRA I. JUNE 1949

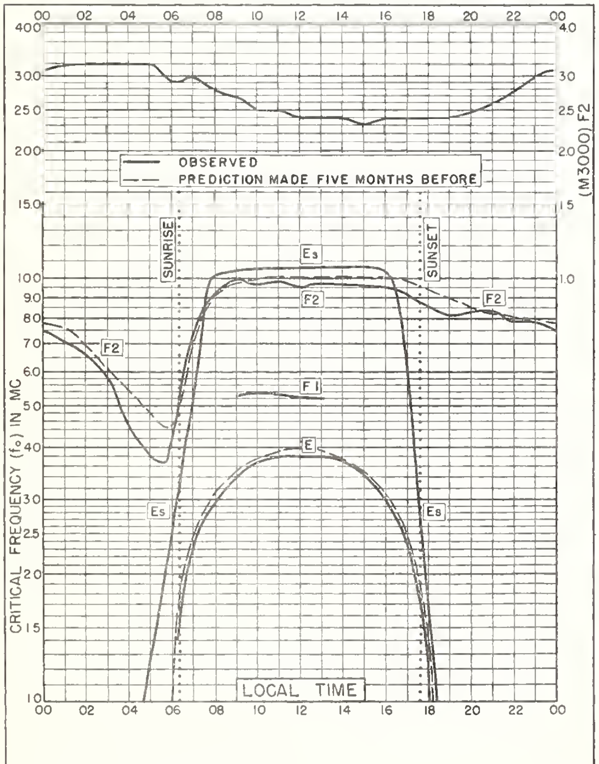


Fig. 19. HUANCAYO, PERU
12.0°S, 75.3°W JUNE 1949

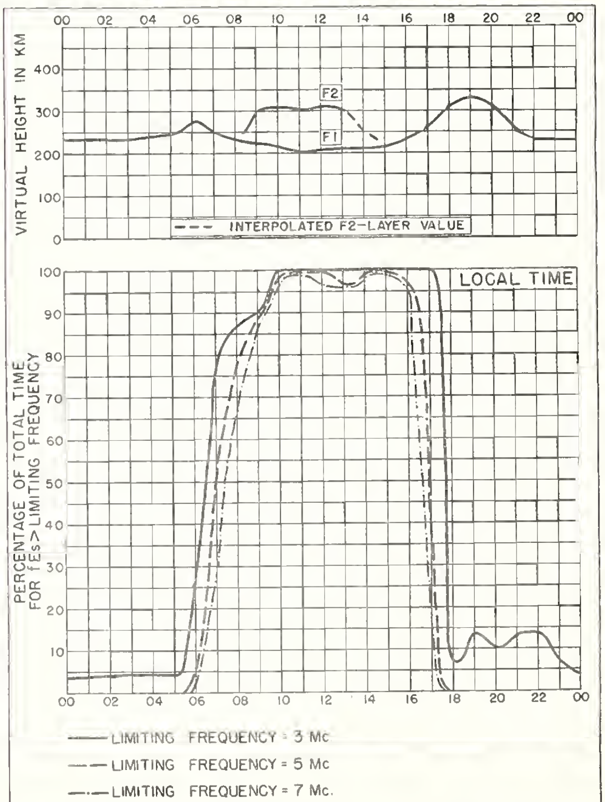


Fig. 20. HUANCAYO, PERU JUNE 1949

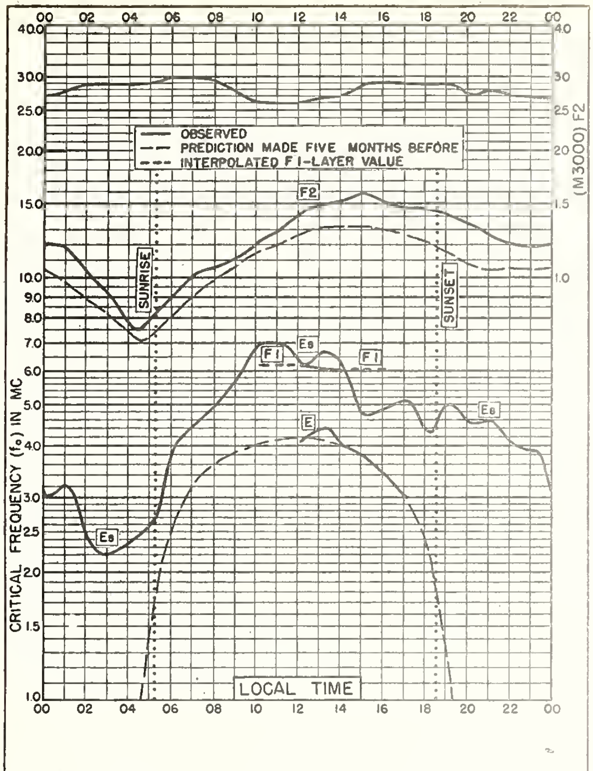


Fig. 21. CHUNGKING, CHINA
29.4°N, 106.8°E MAY 1949

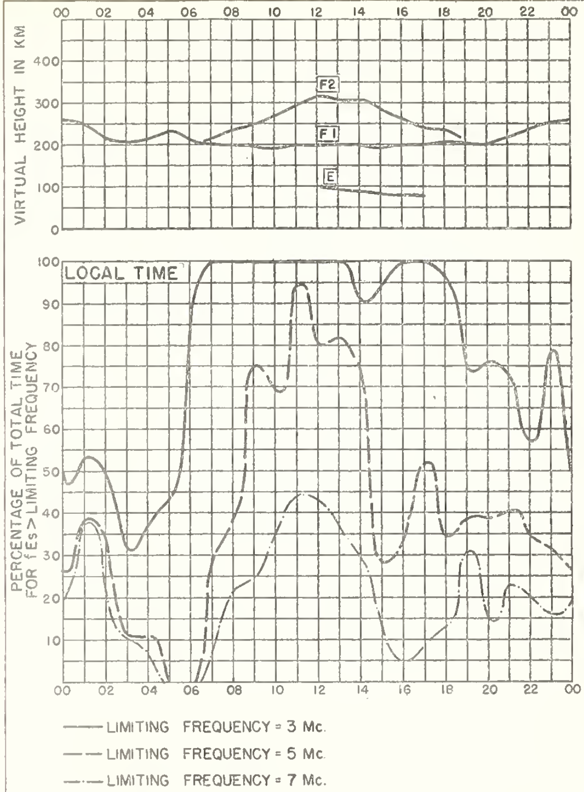


Fig. 22. CHUNGKING, CHINA MAY 1949

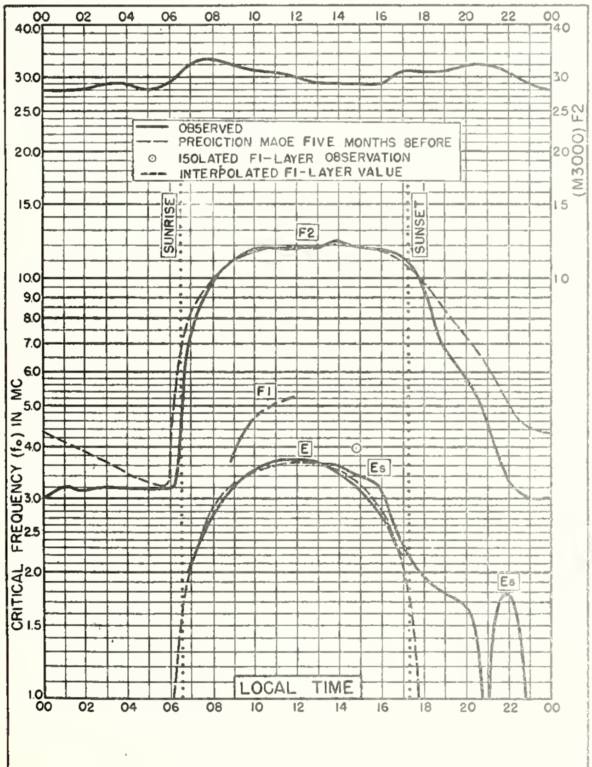


Fig. 23. JOHANNESBURG, U. OF S. AFRICA
26.2°S, 28.0°E MAY 1949

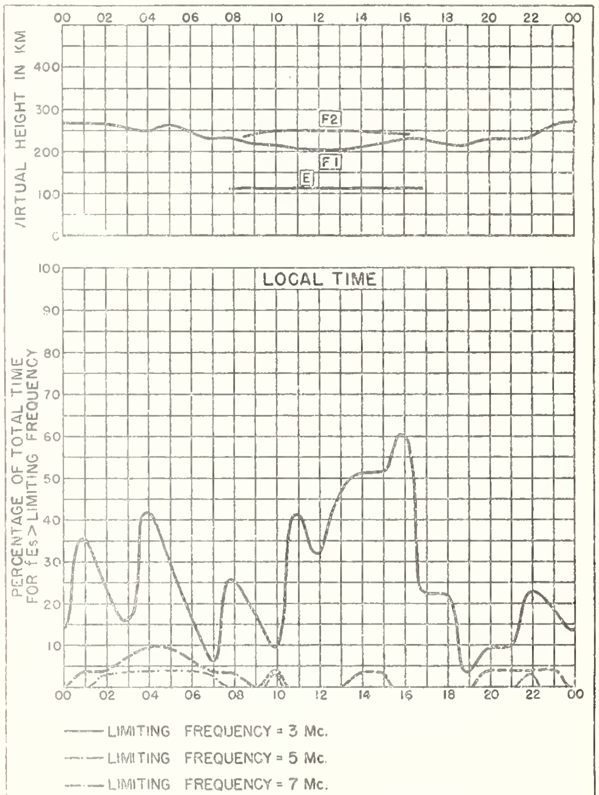


Fig. 24. JOHANNESBURG, U. OF S. AFRICA MAY 1949

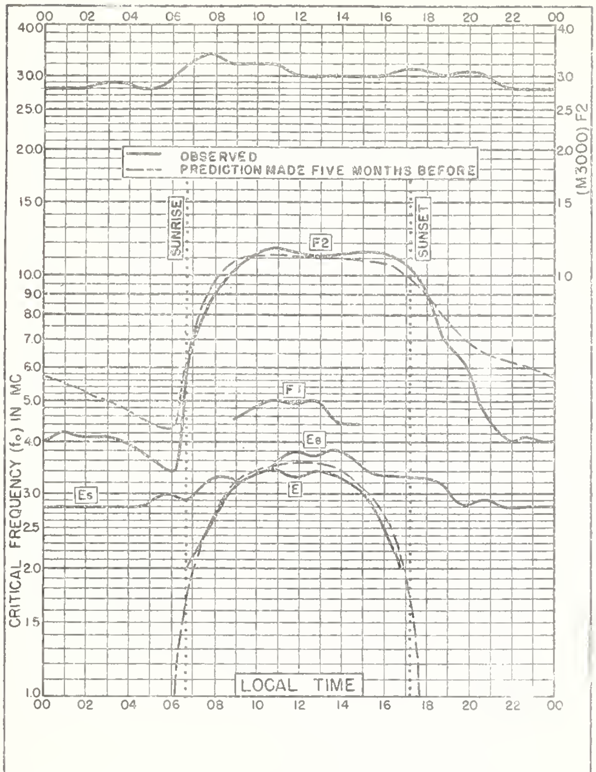


Fig. 25. WATHEROO, W. AUSTRALIA
30.3°S, 115.9°E MAY 1949

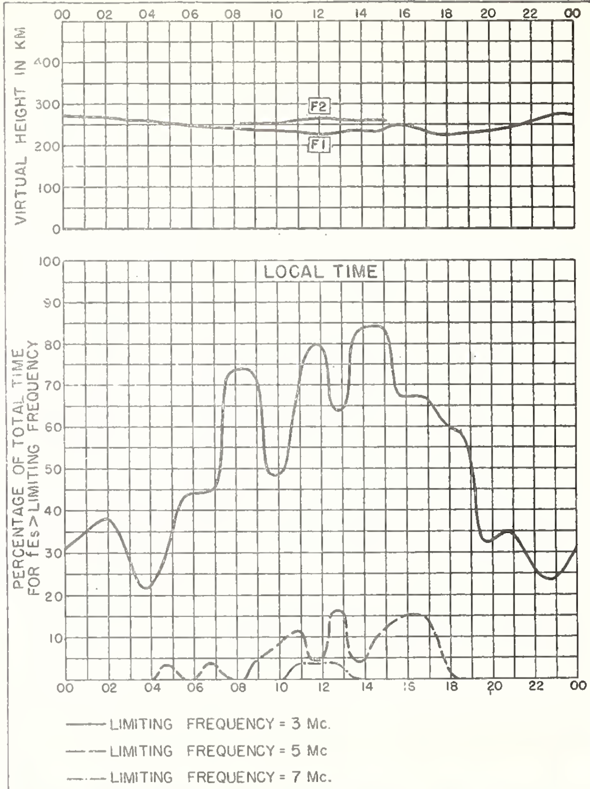


Fig. 26. WATHEROO, W. AUSTRALIA MAY 1949

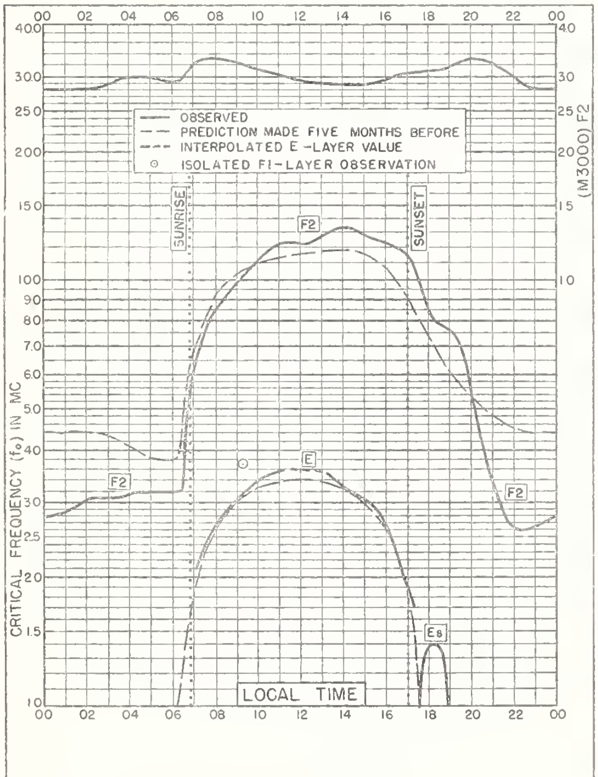


Fig. 27 CAPETOWN, U. OF S. AFRICA
34. 2°S, 18.3°E MAY 1949

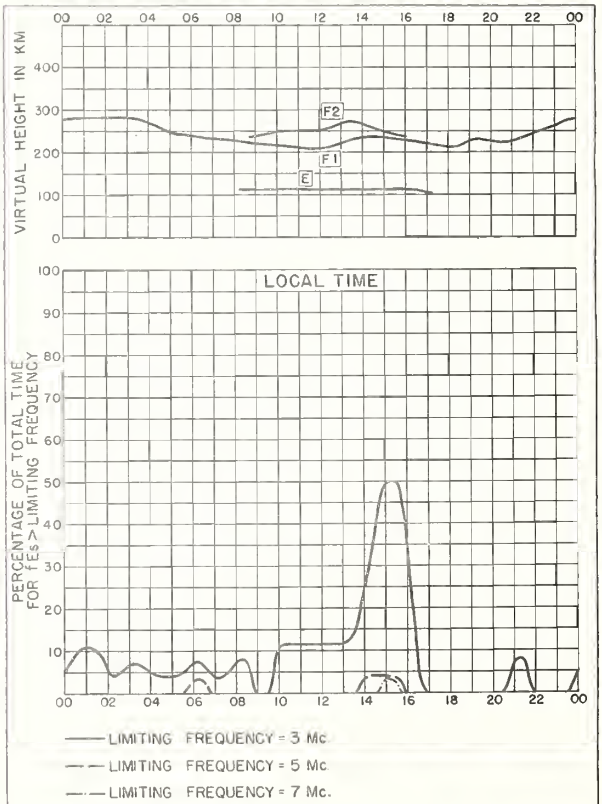


Fig. 28. CAPETOWN, U.OF S. AFRICA MAY 1949

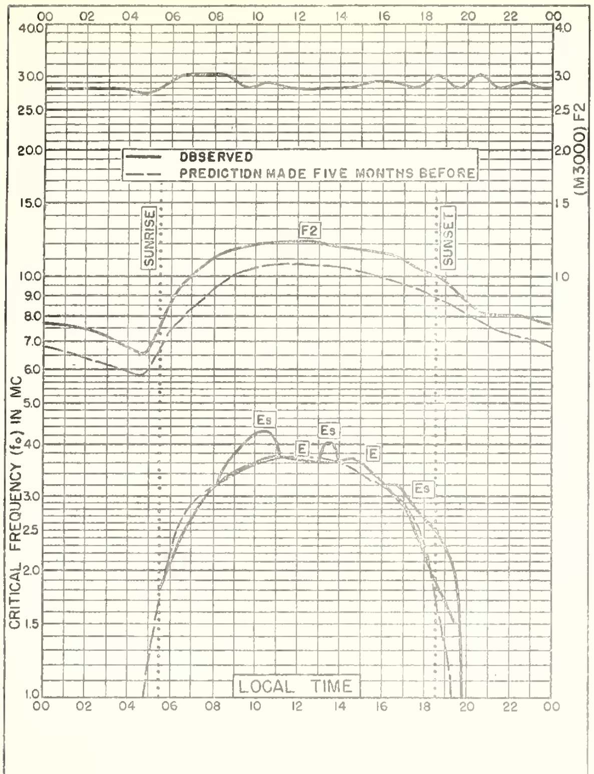


Fig. 29. WAKKANAI, JAPAN
45.4°N, 141.7°E APRIL 1949

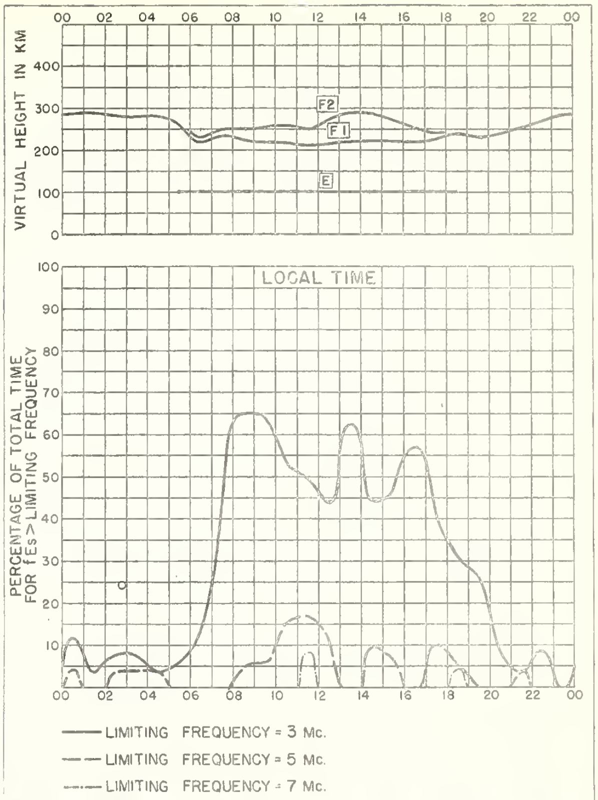


Fig. 30. WAKKANAI, JAPAN APRIL 1949

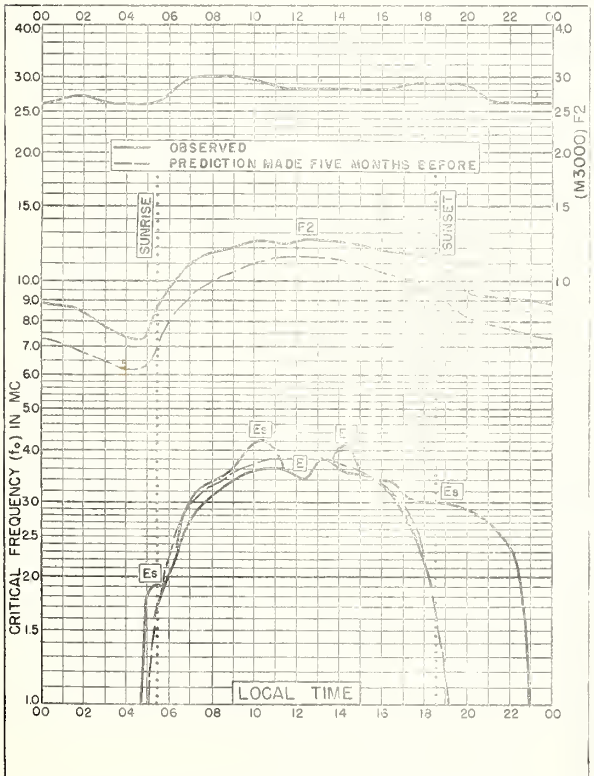


Fig. 31. FUKAURA, JAPAN
40.6°N, 139.9°E APRIL 1949

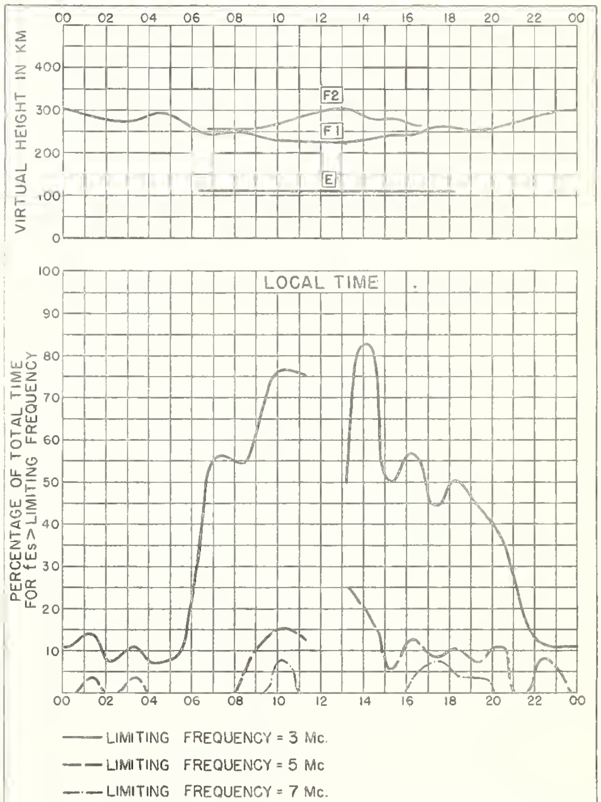


Fig. 32. FUKAURA, JAPAN APRIL 1949

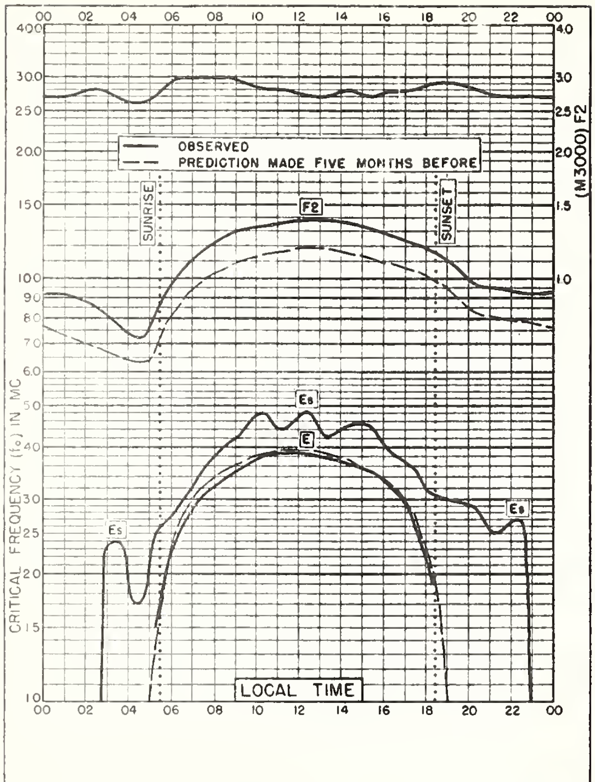


Fig. 33. SHIBATA, JAPAN
37.9°N, 139.3°E APRIL 1949

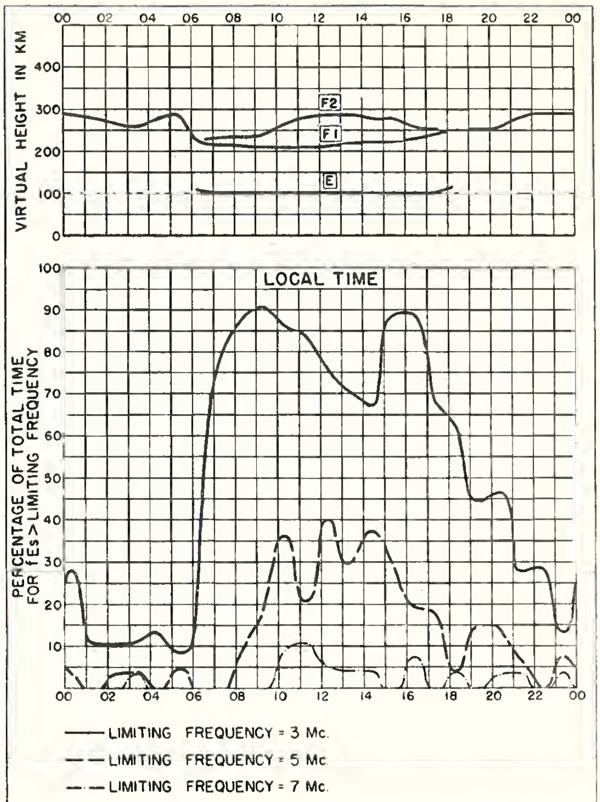


Fig. 34. SHIBATA, JAPAN APRIL 1949

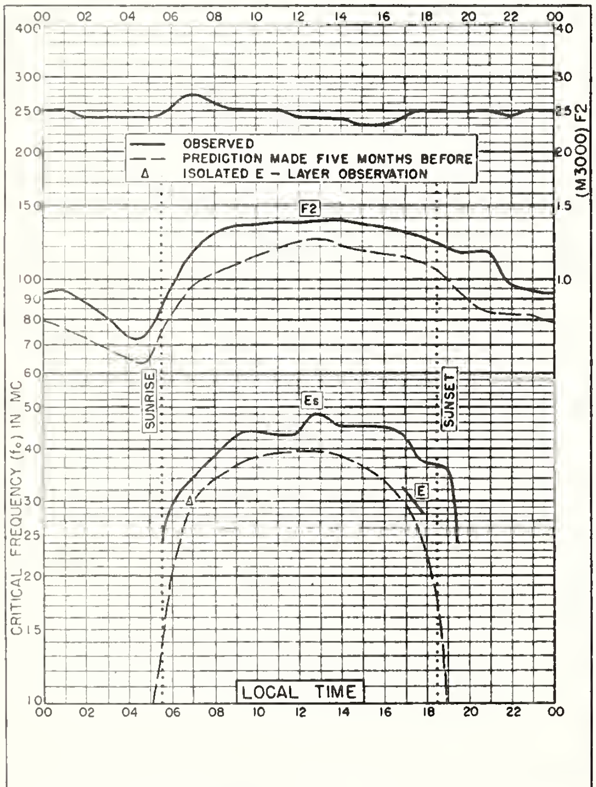
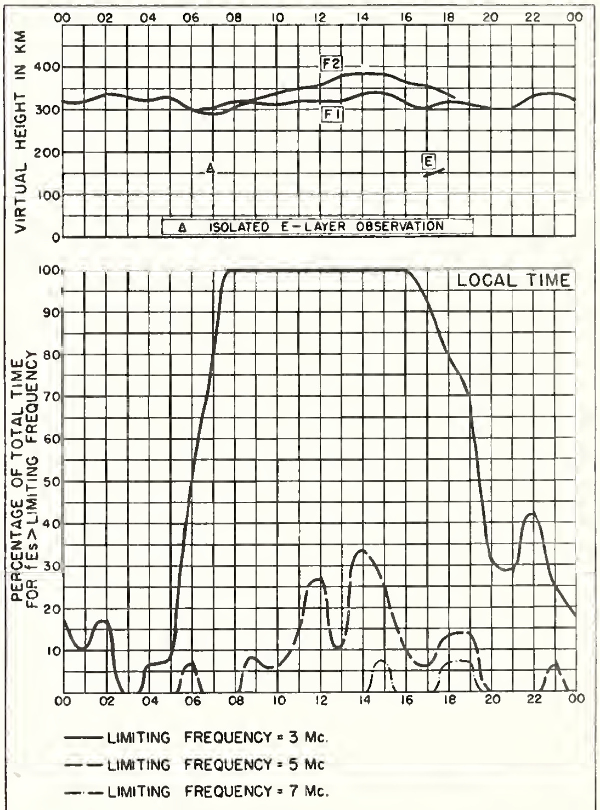


Fig. 35. LANCHOW, CHINA
36.1°N, 103.8°E APRIL 1949



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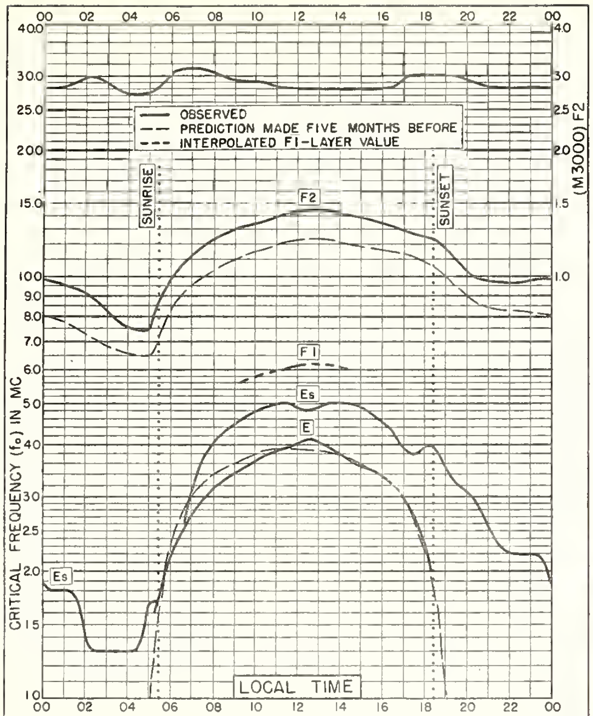
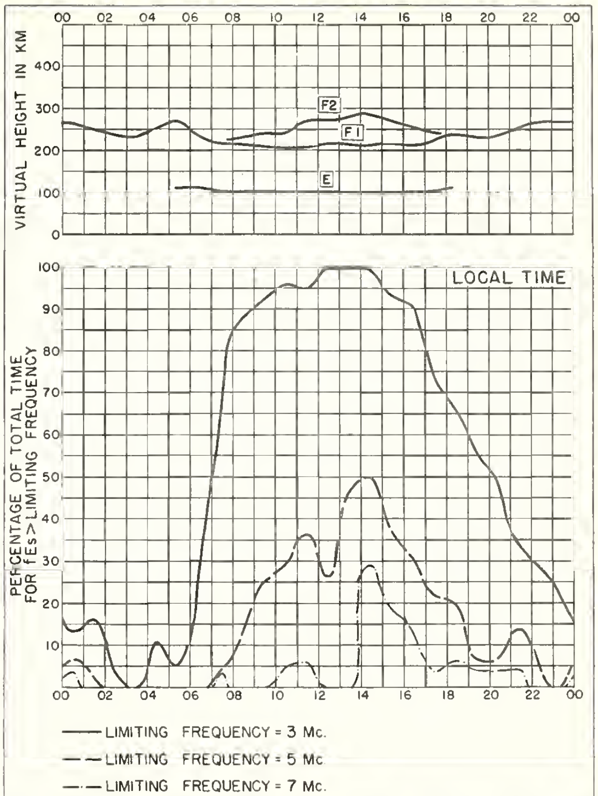


Fig. 37 TOKYO, JAPAN
35.7°N, 139.5°E APRIL 1949



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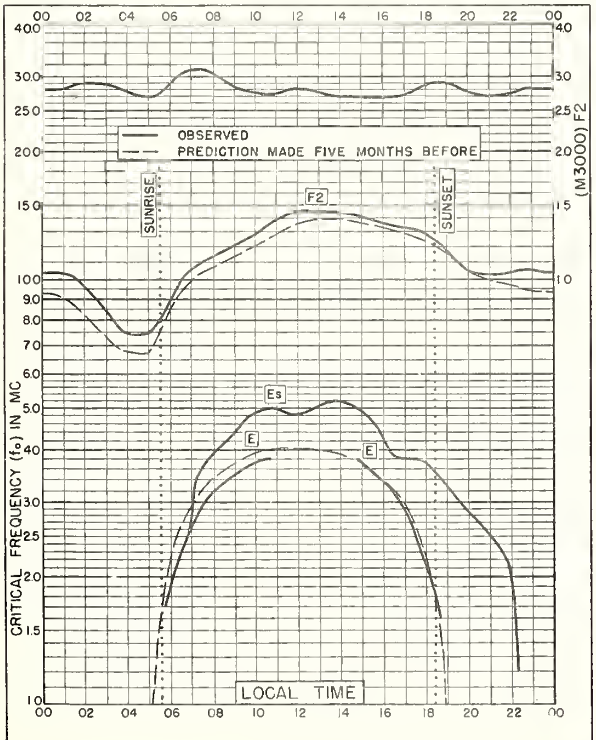
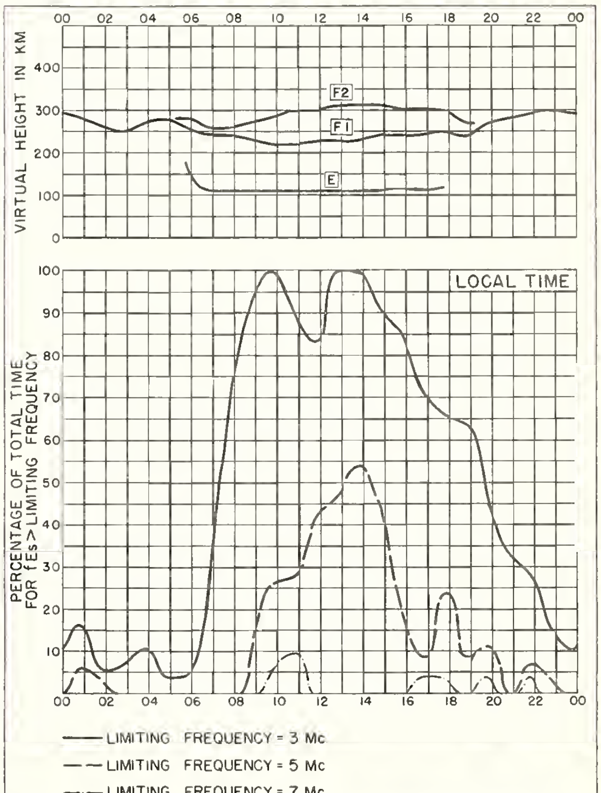


Fig. 39. YAMAKAWA, JAPAN
31.2°N, 130.6°E APRIL 1949



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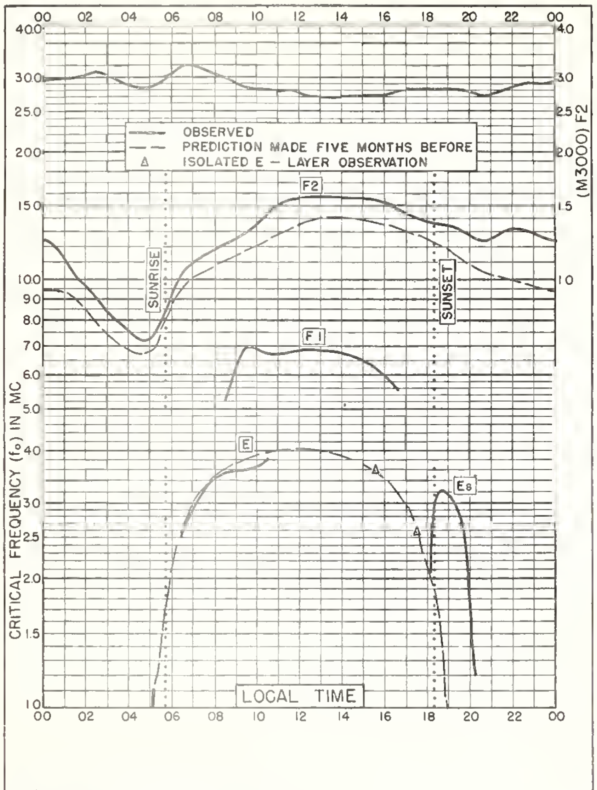

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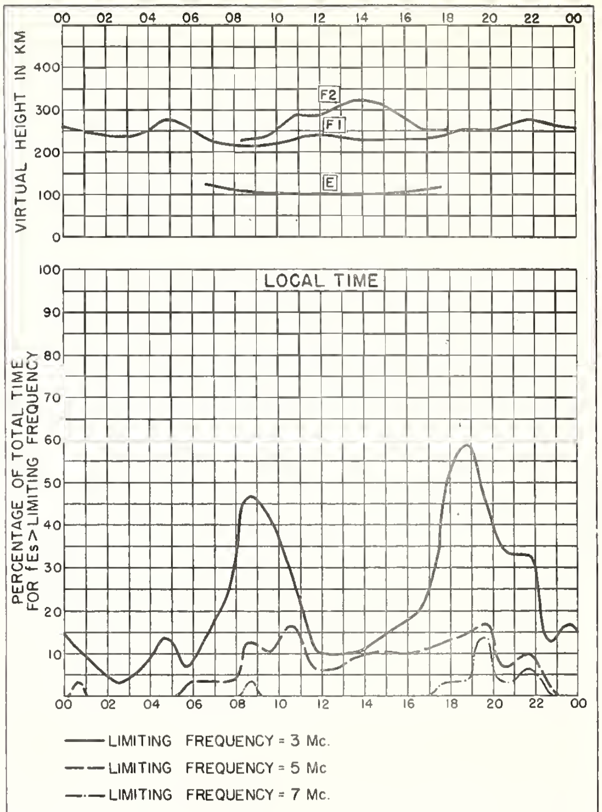


Fig. 42. WUCHANG, CHINA APRIL 1949

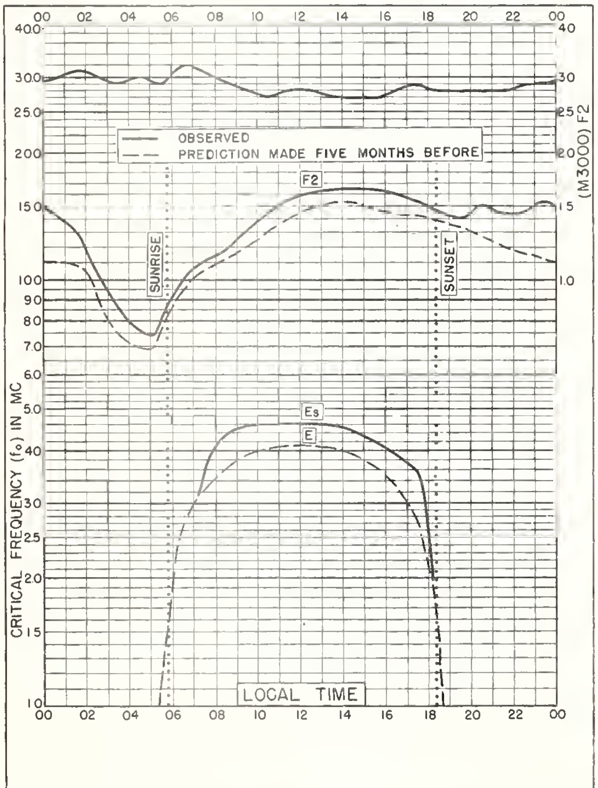
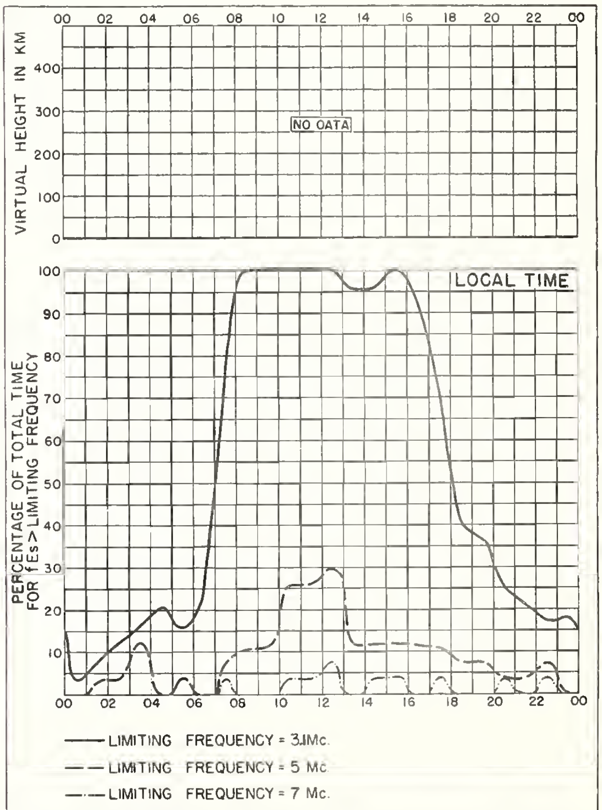


Fig. 43 OKINAWA I.
26.3°N, 127.7°E APRIL 1949



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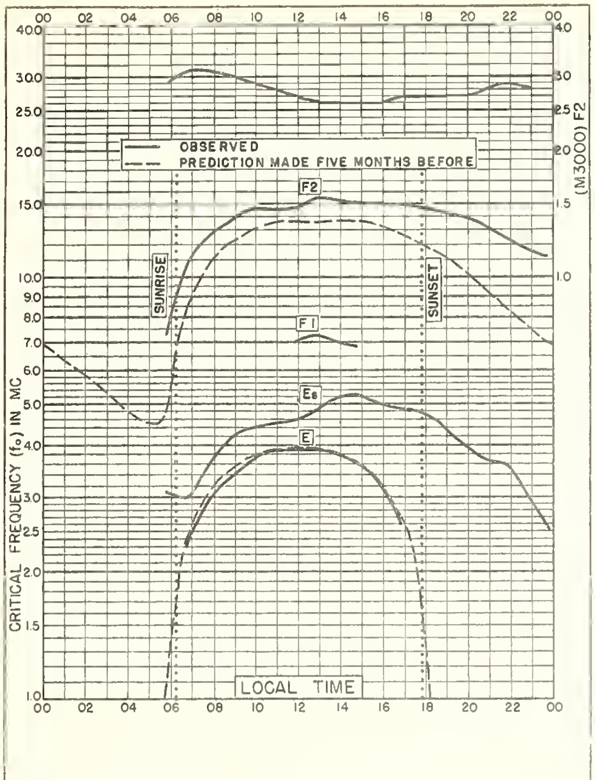

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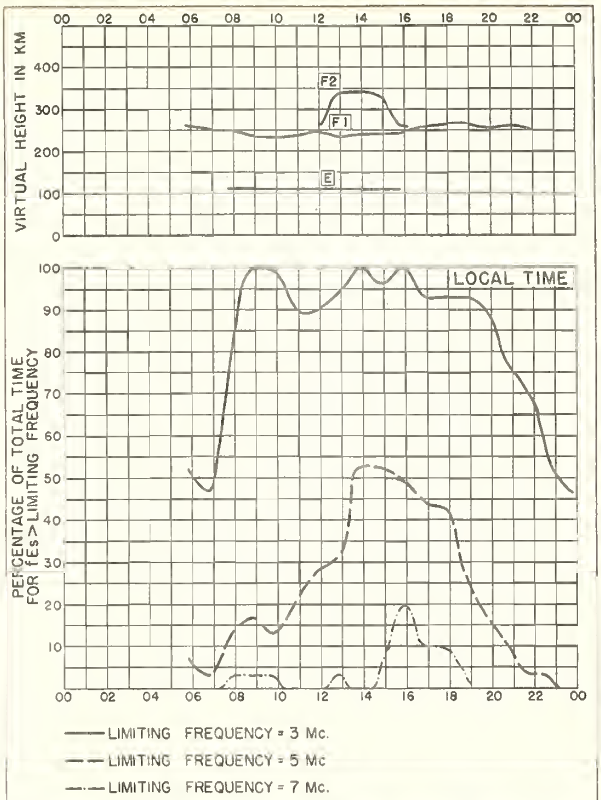

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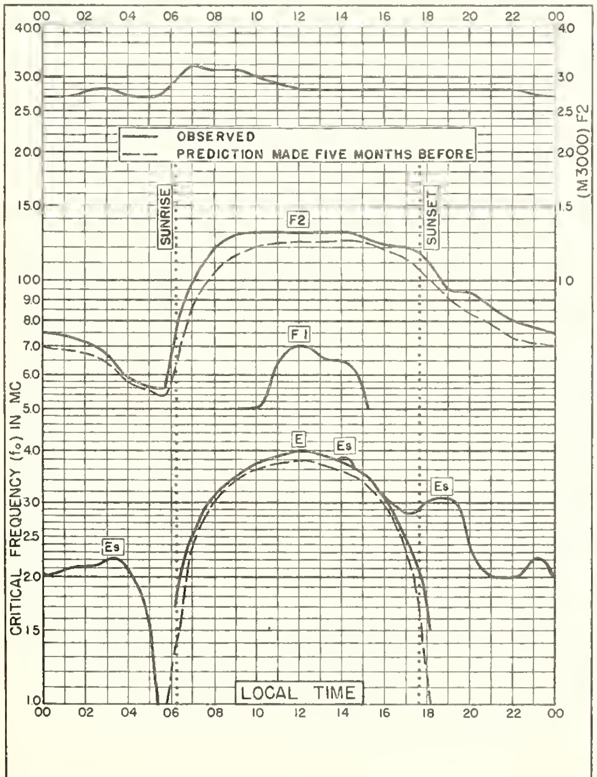

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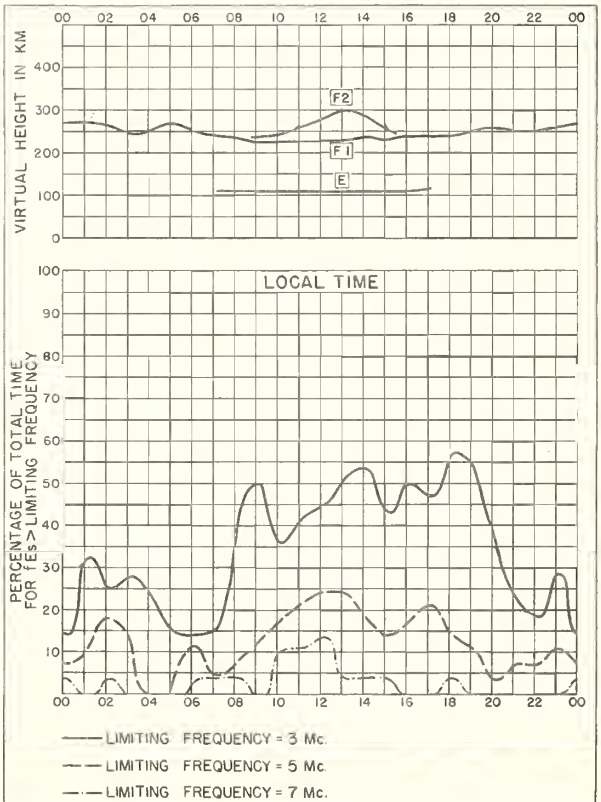

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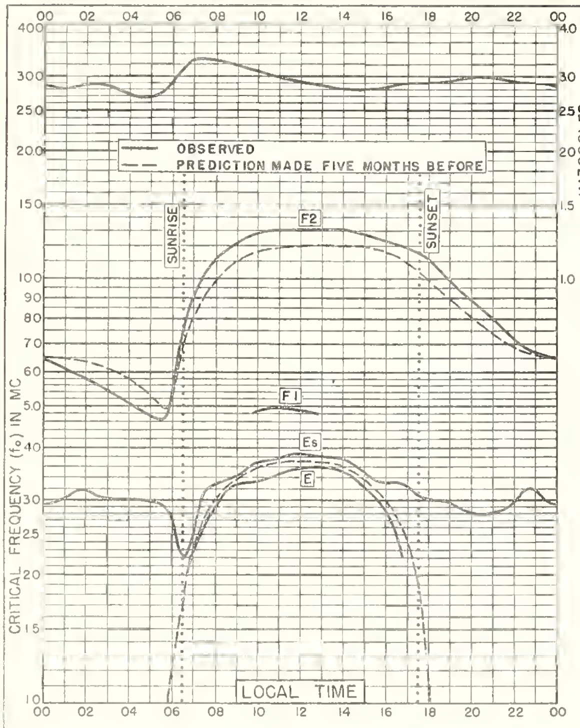

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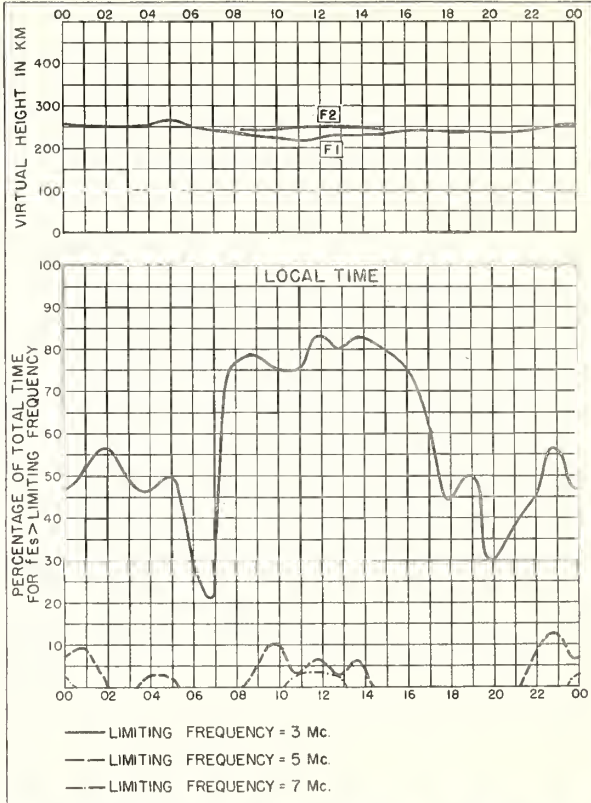

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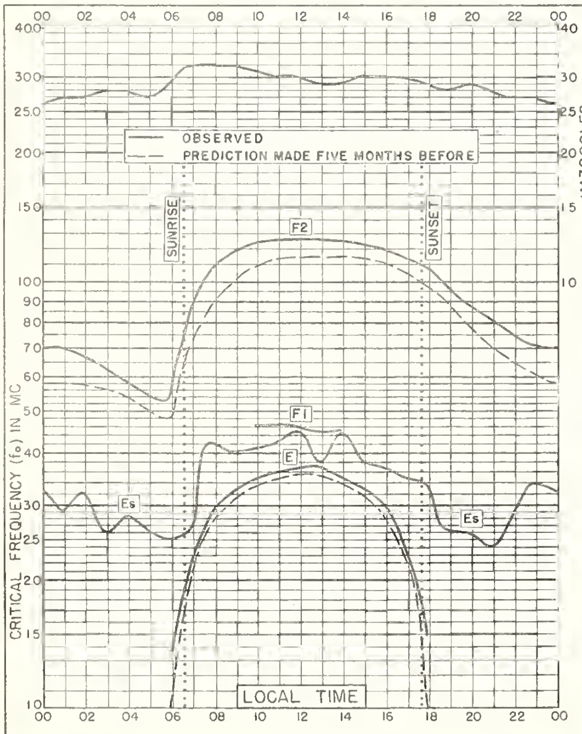

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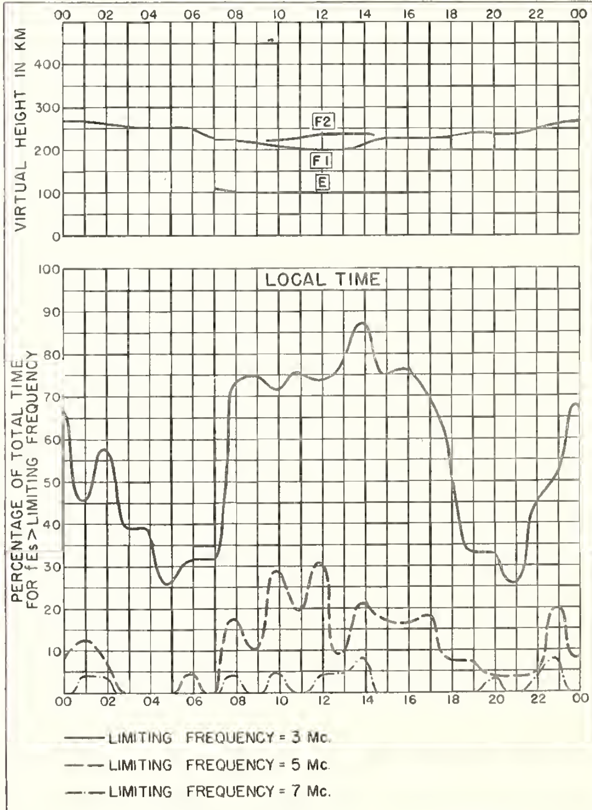

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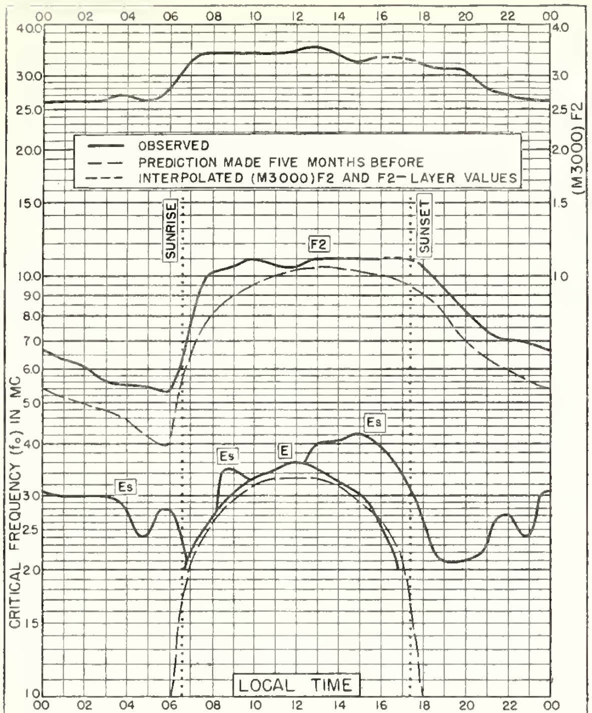

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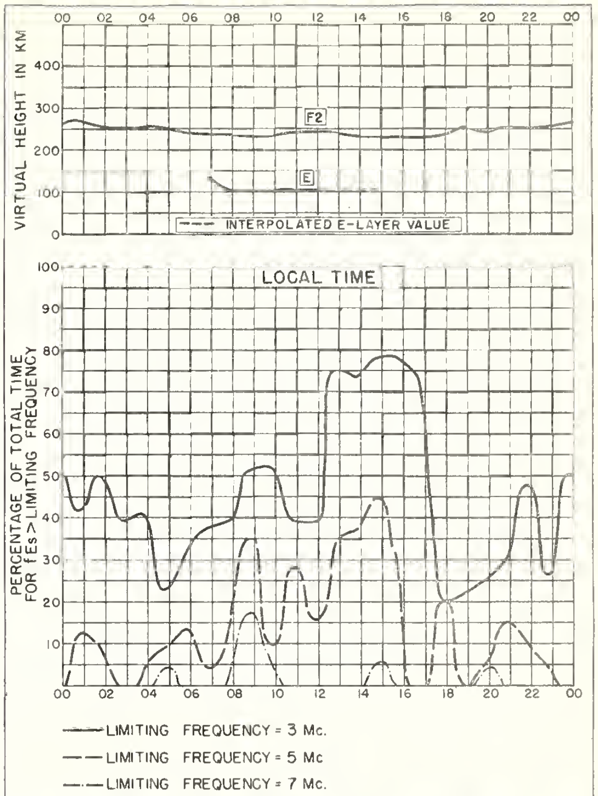

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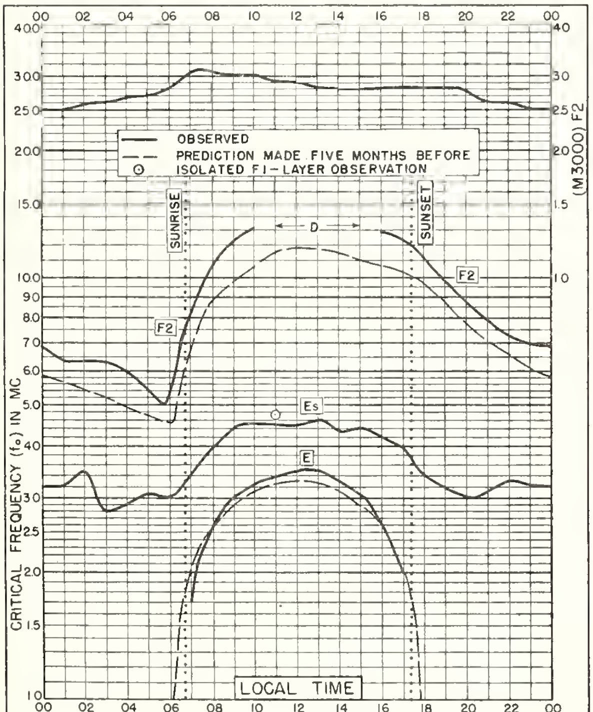

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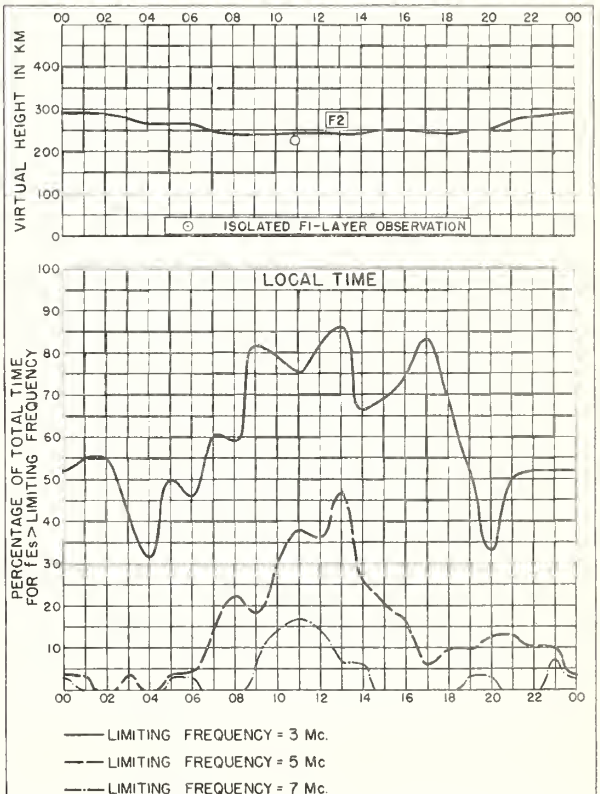

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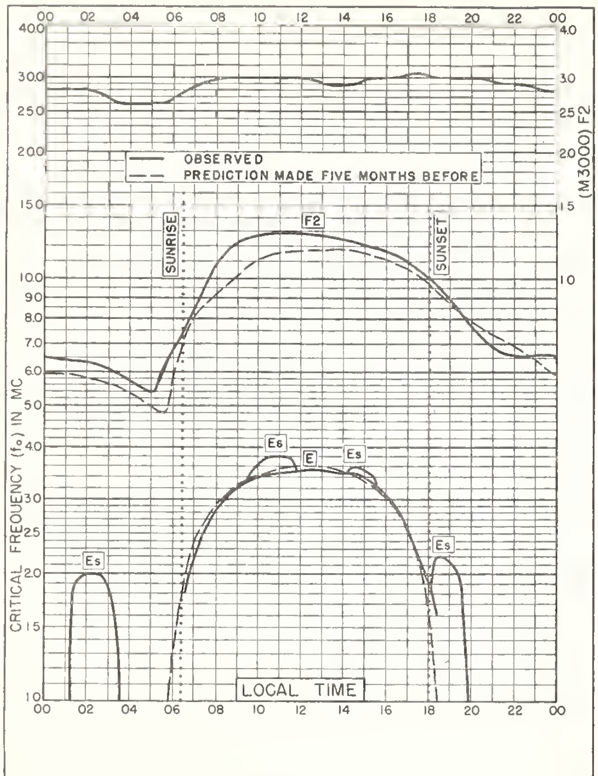

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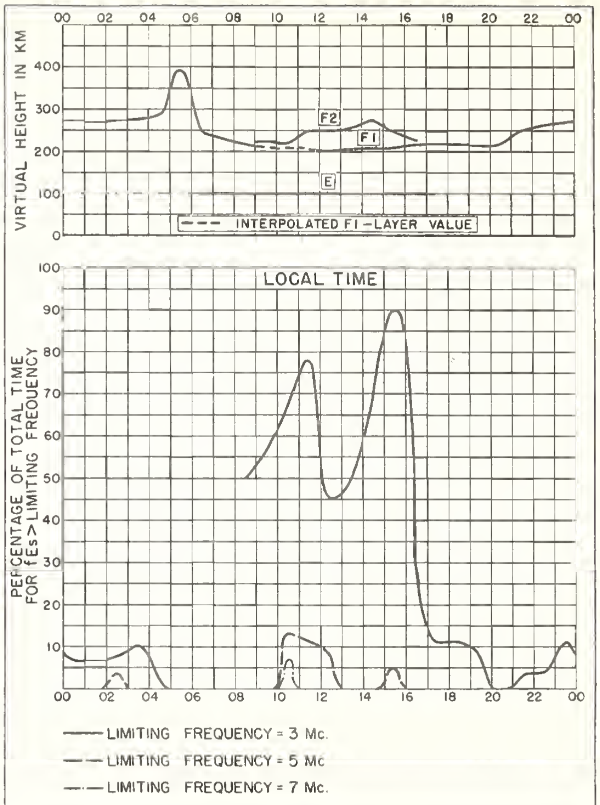

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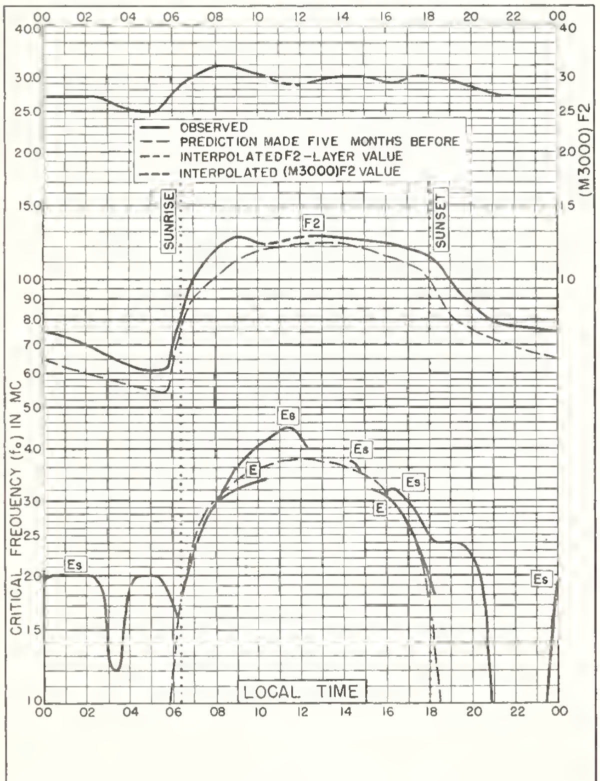

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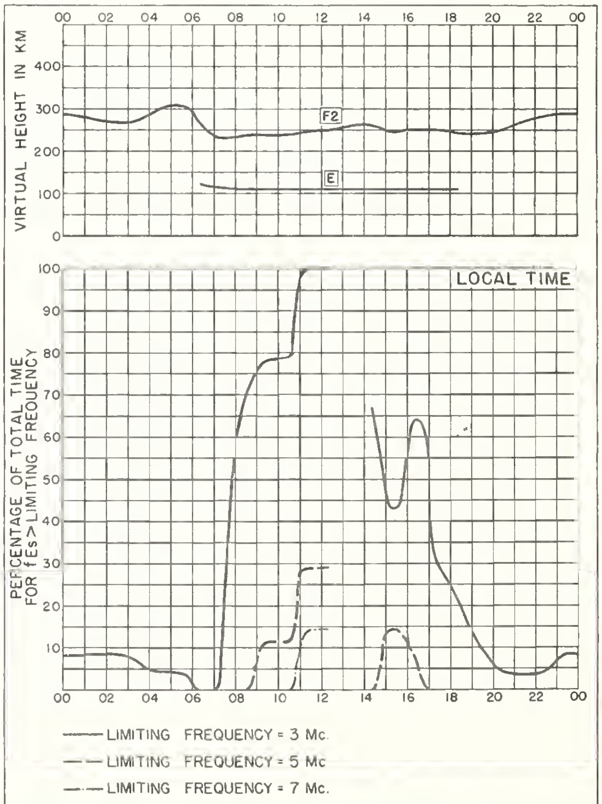

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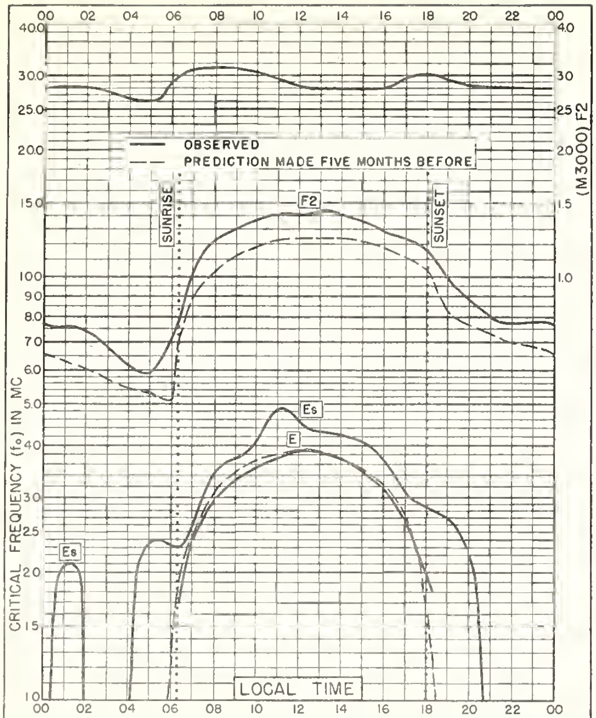

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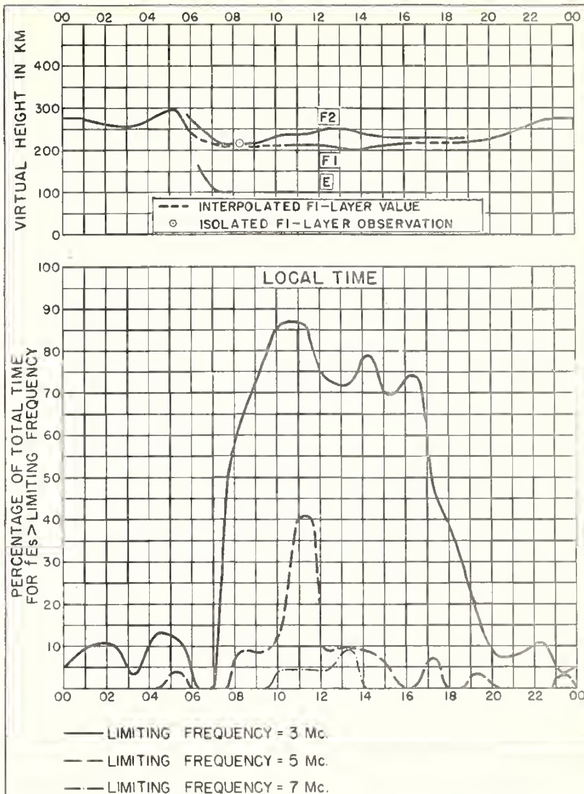

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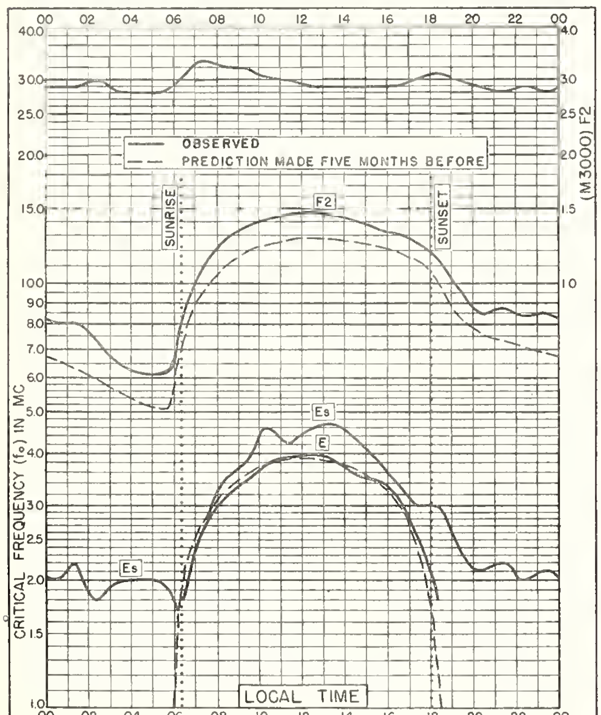

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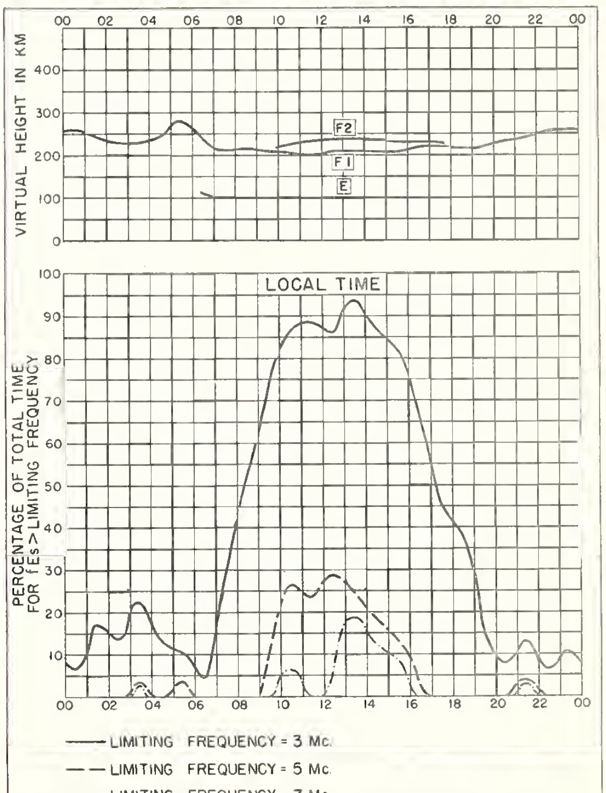

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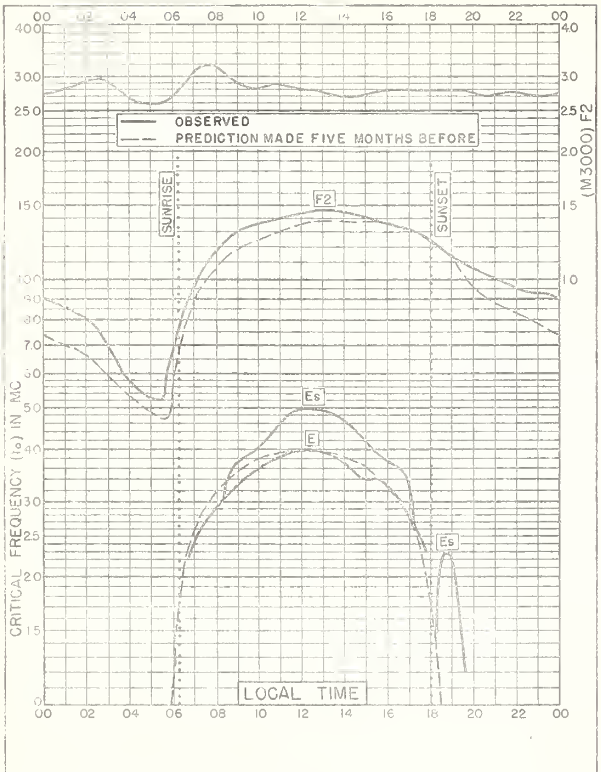

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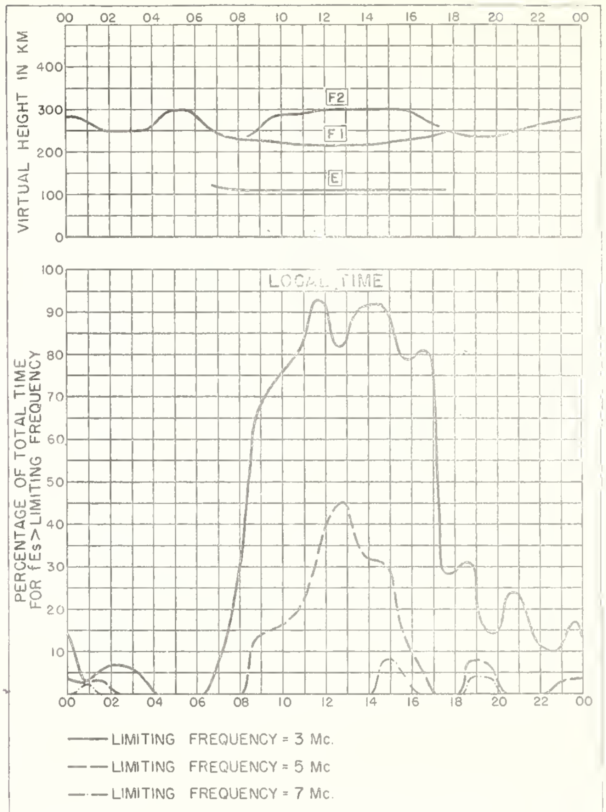

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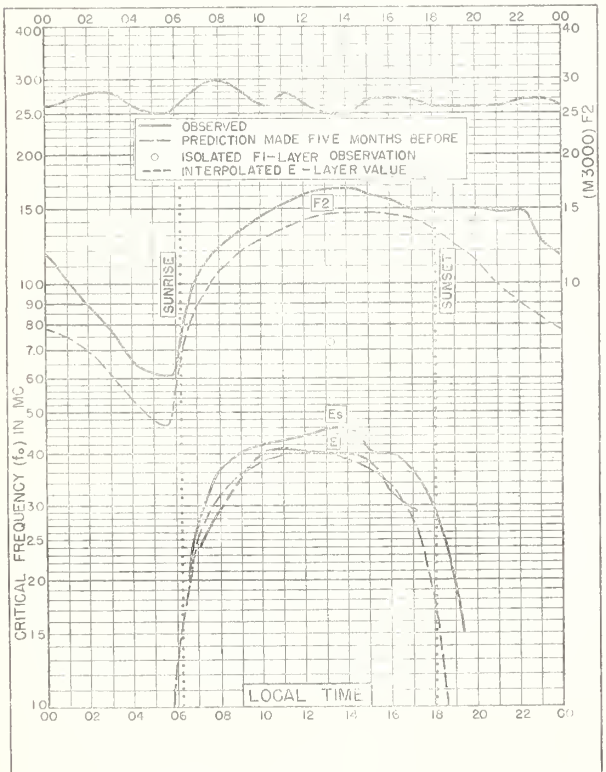

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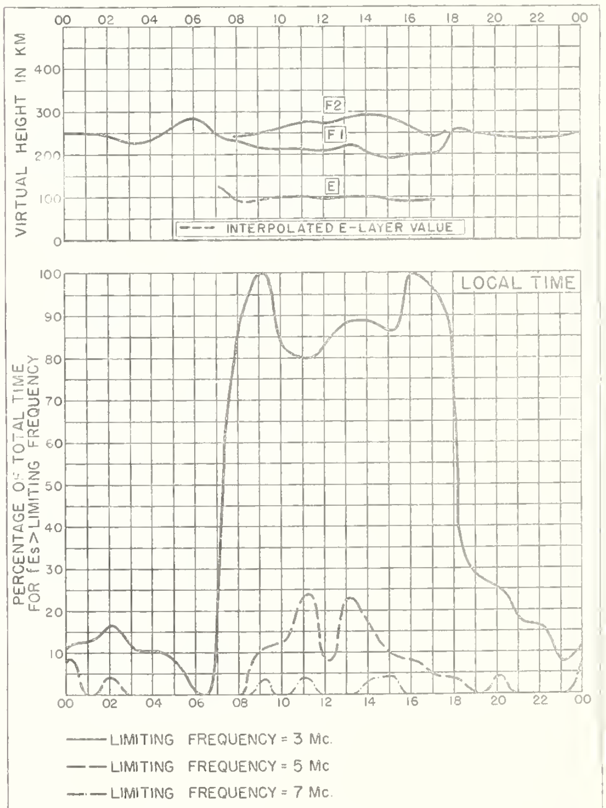

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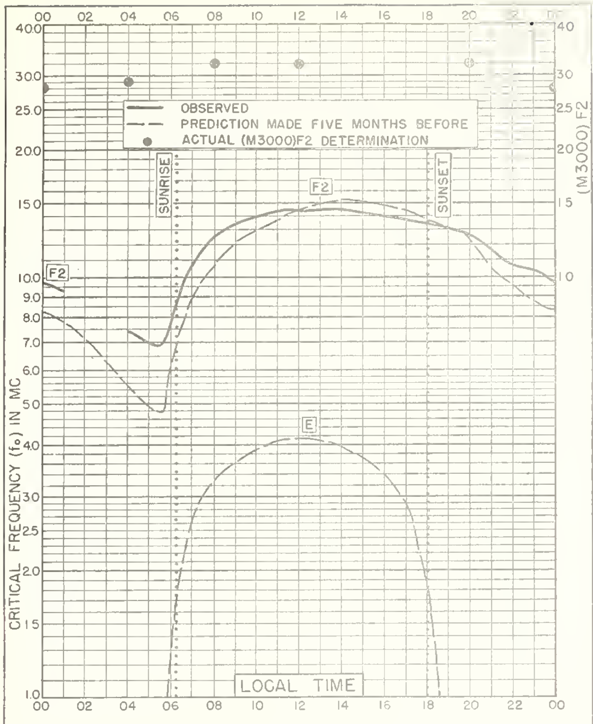

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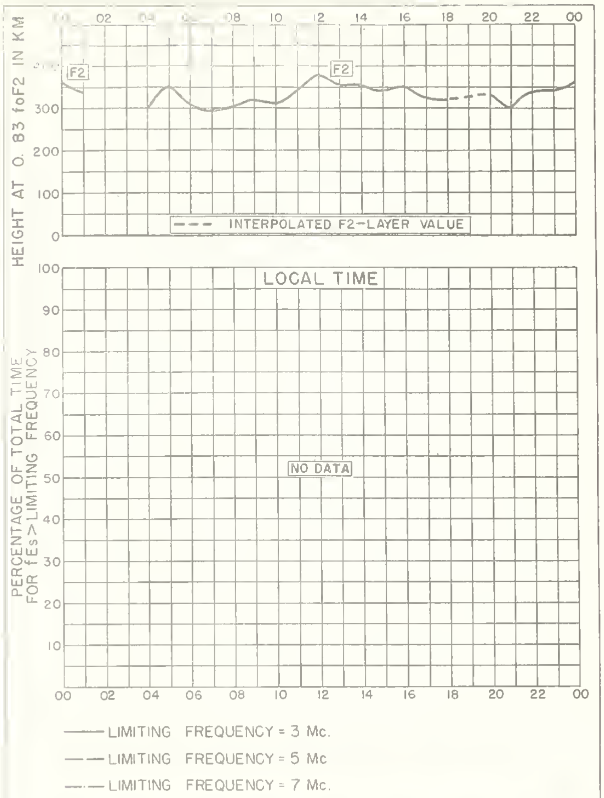

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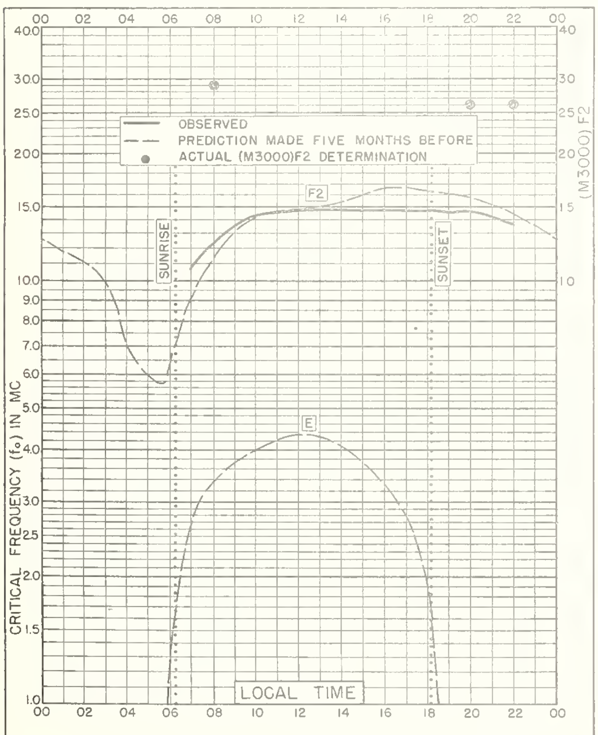

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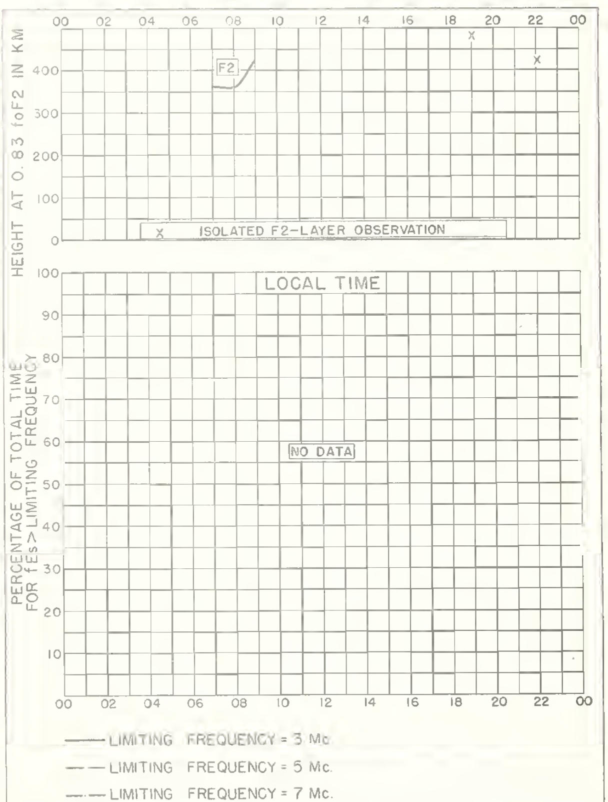

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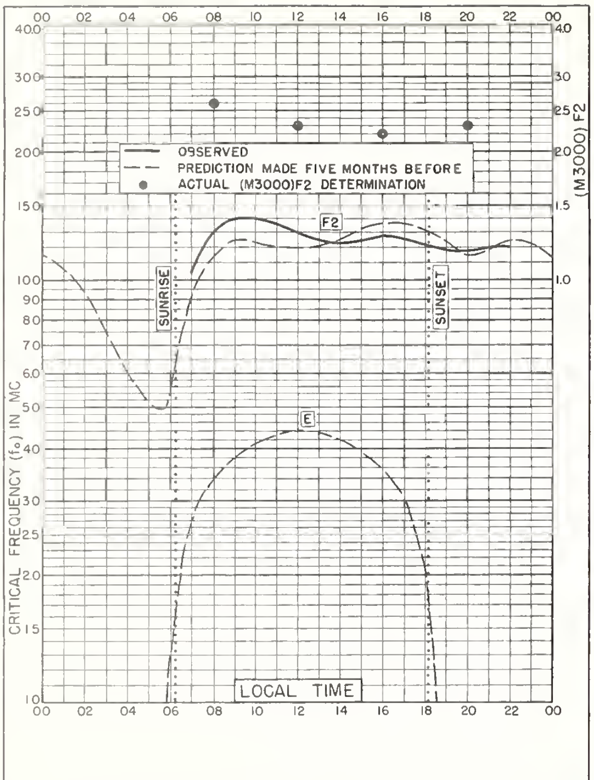

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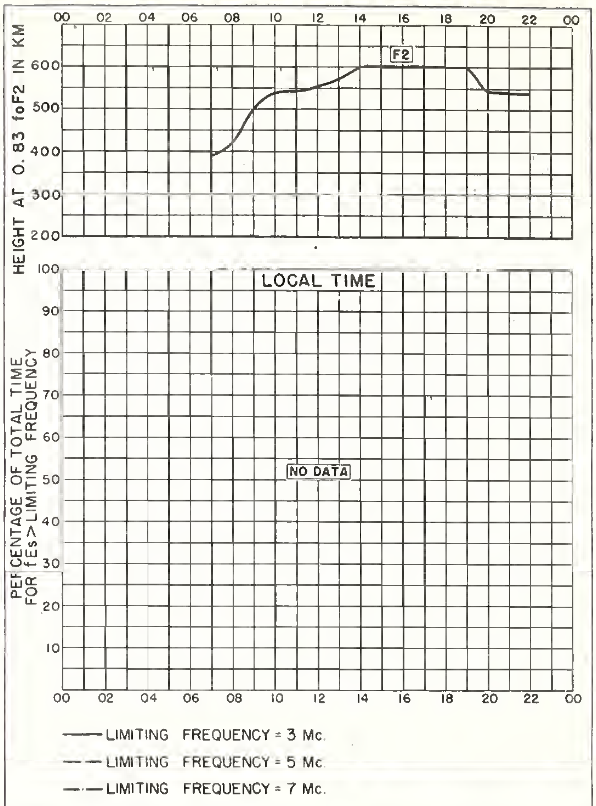

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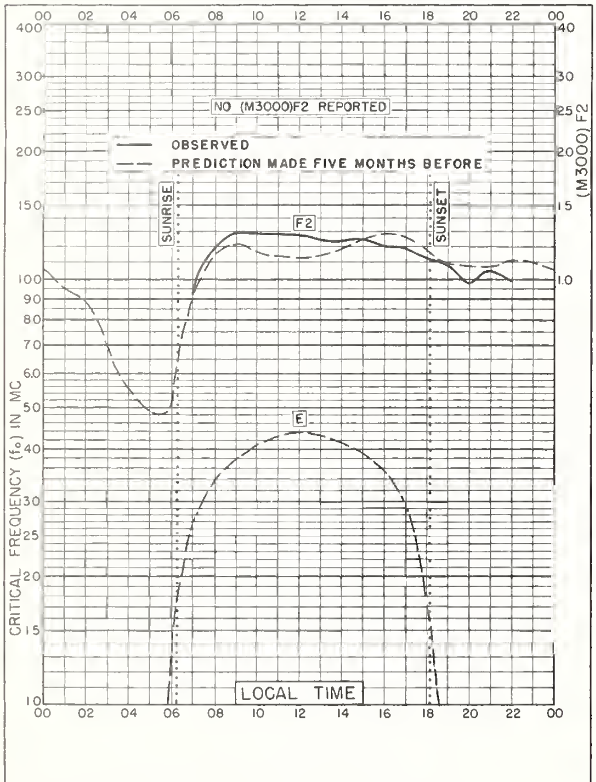

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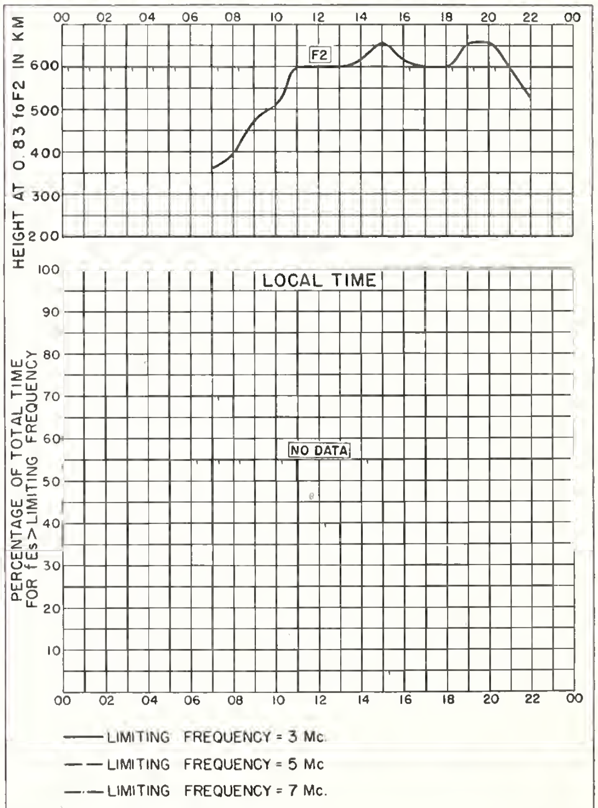

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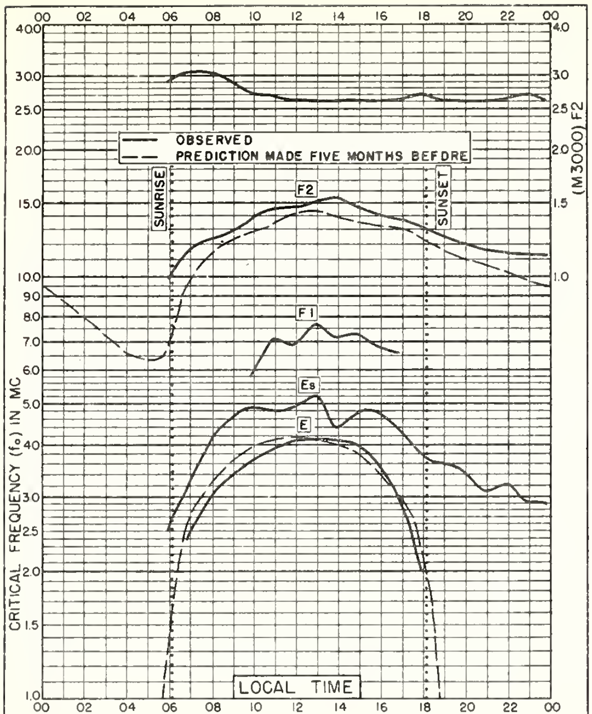

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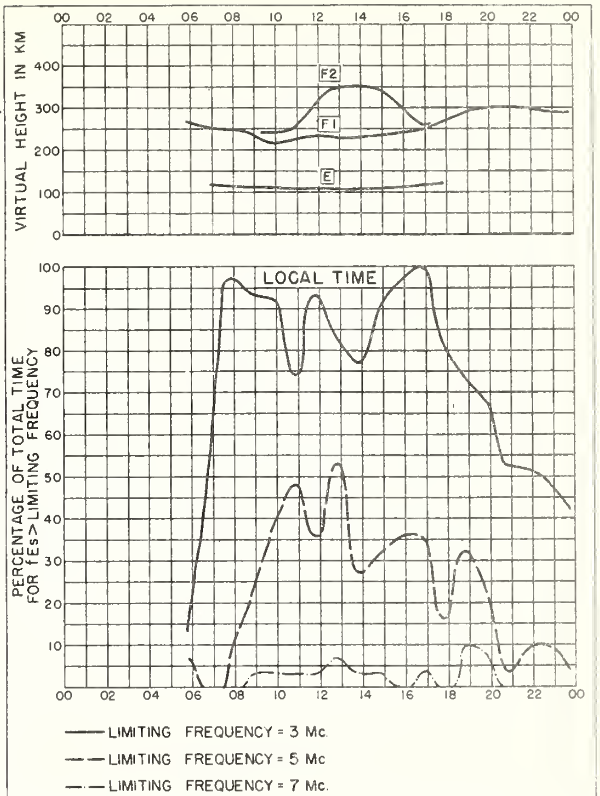

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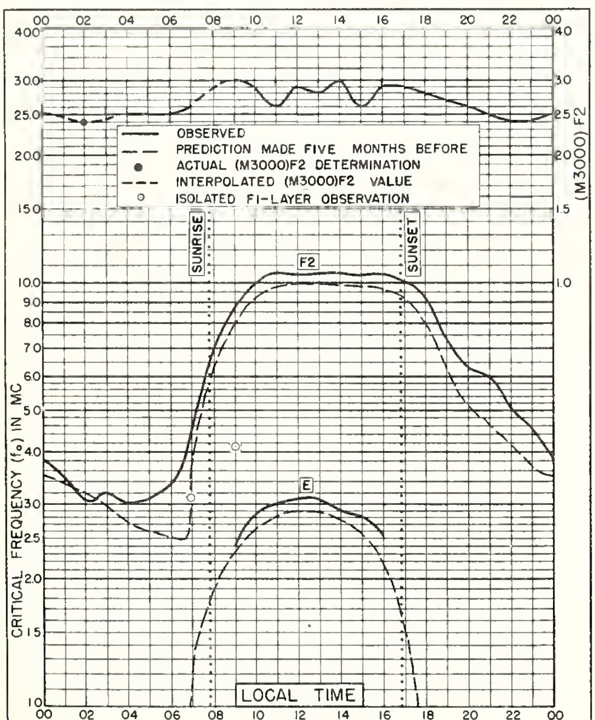

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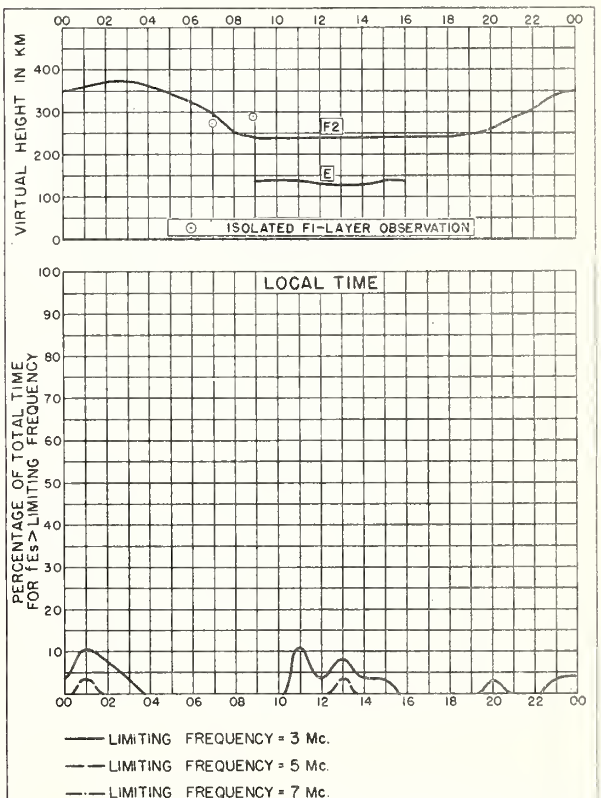

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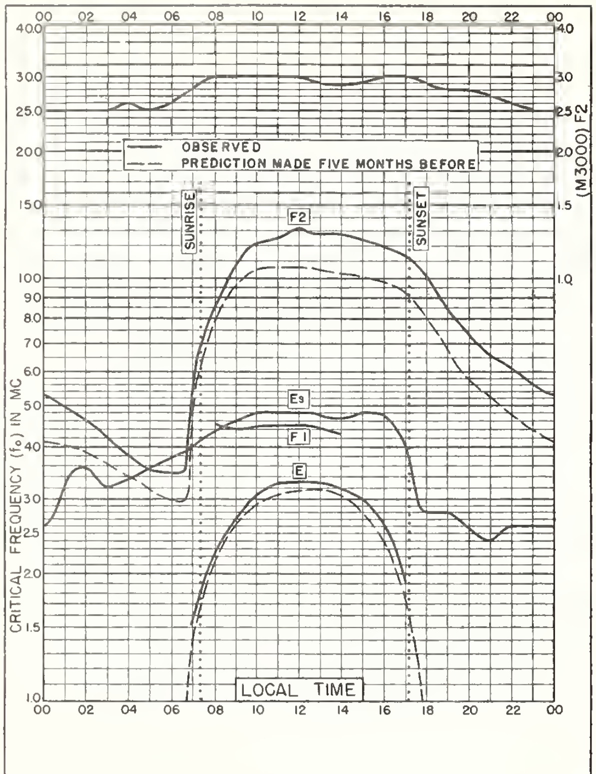

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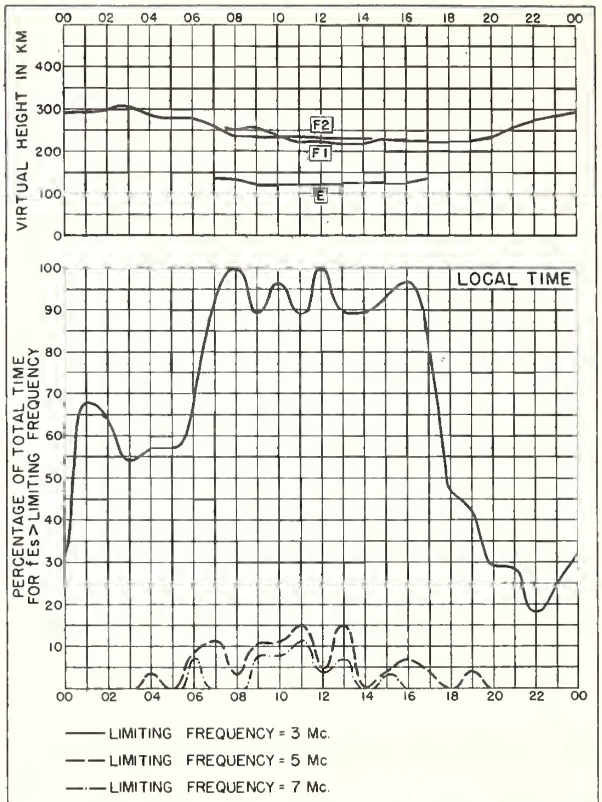

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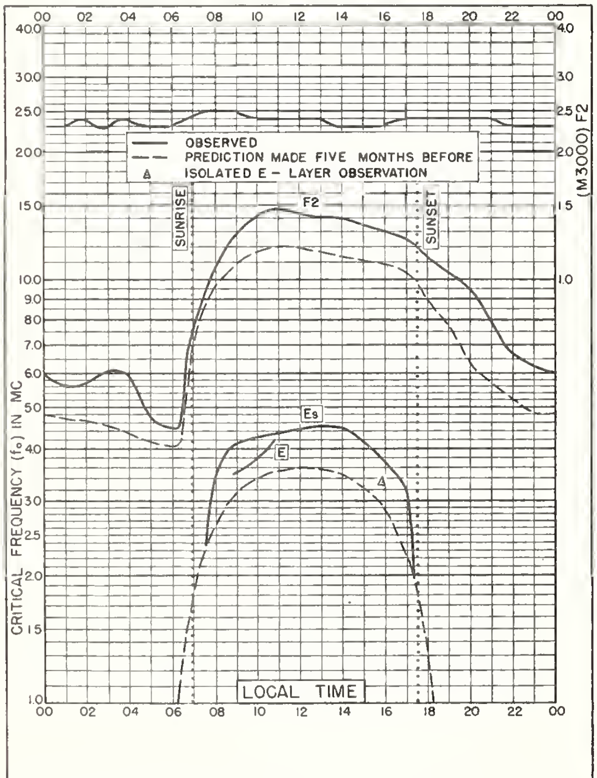

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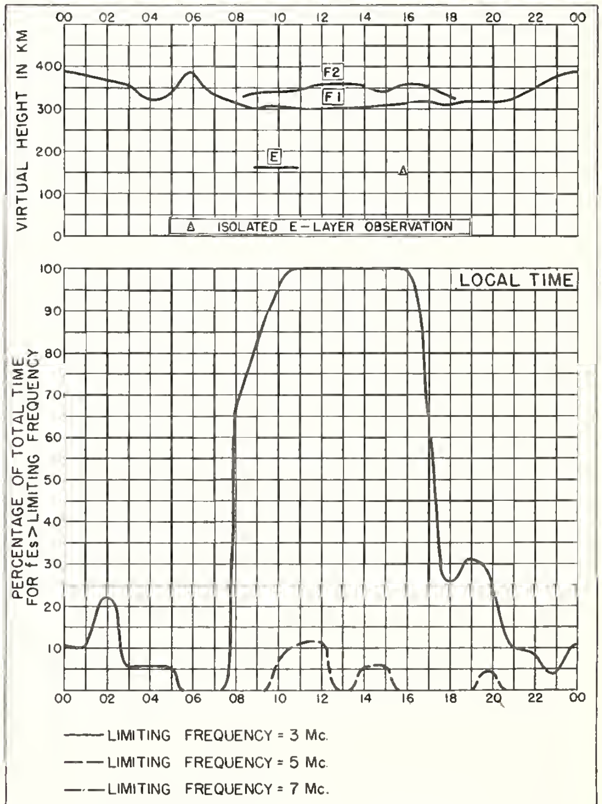

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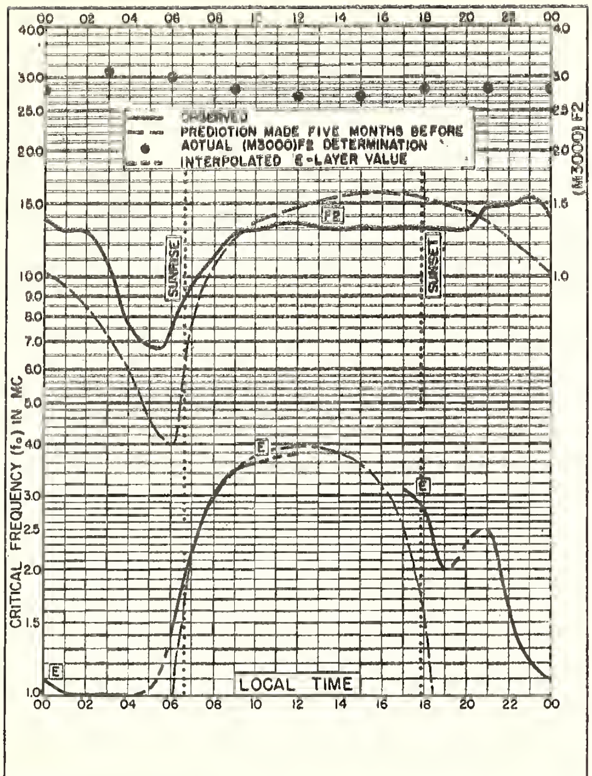

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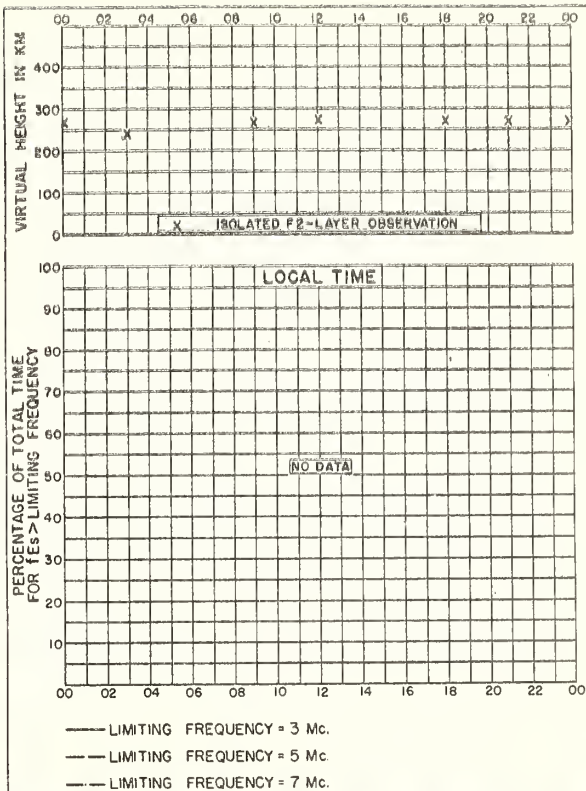

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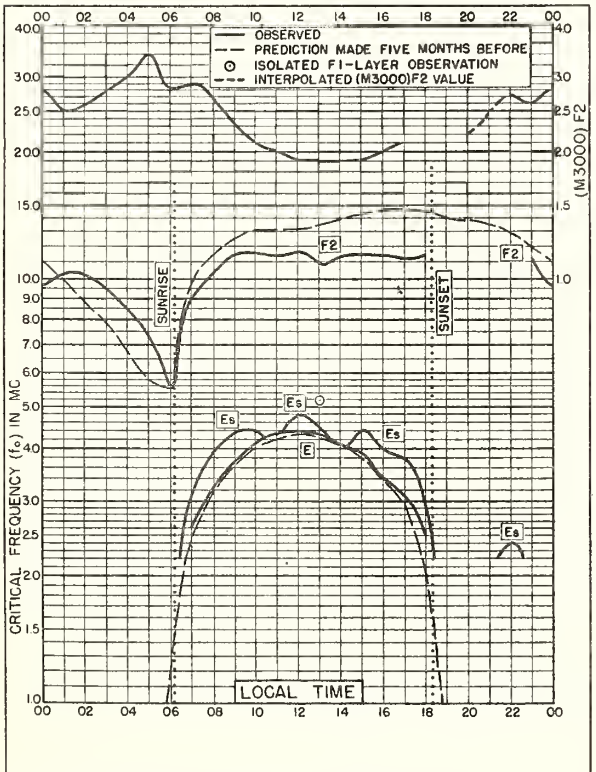

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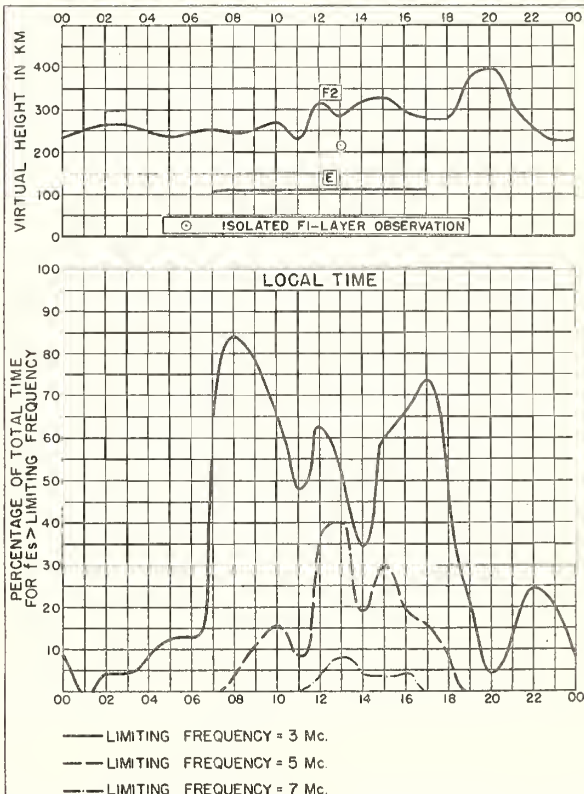

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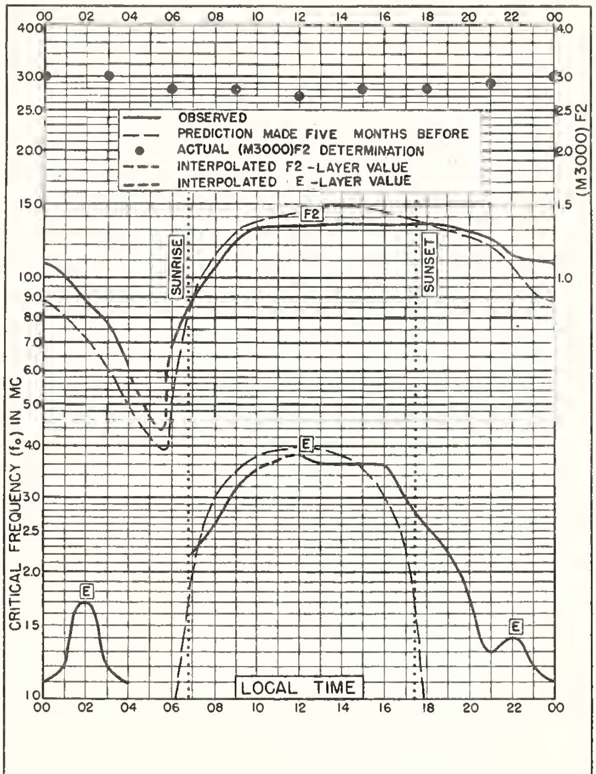

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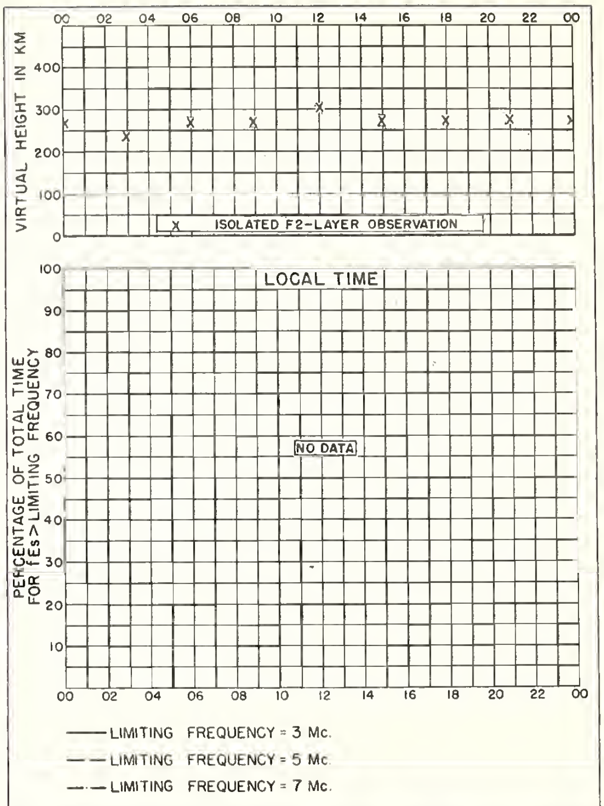

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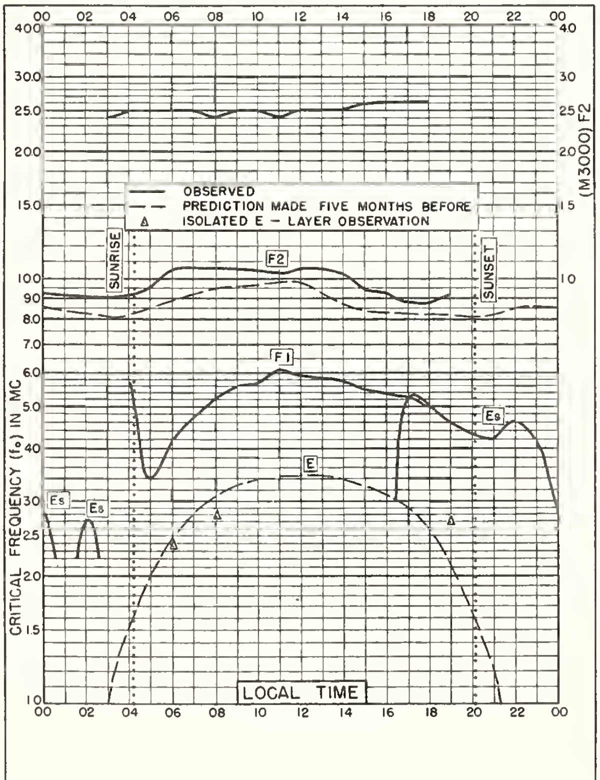

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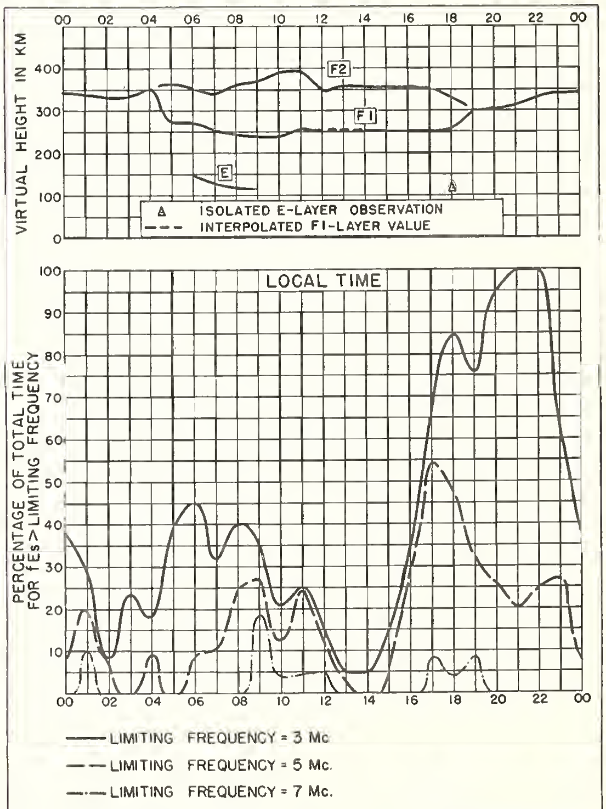

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April 1949	13	51
March 1949	17	58
Washington, D. C.		
July 1949	10	43
Watheroo, W. Australia		
May 1949	13	50
April 1949	16	56
White Sands, New Mexico		
June 1949	10	44
Wuchang, China		
April 1949	15	54
Yamakawa, Japan		
April 1949	15	53
March 1949	18	60