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## IONOSPHERIC DATA

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CENTRAL RADIO PROPAGATION LABORATORY  
WASHINGTON, D. C.



## IONOSPHERIC DATA

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## SYMBOLS, TERMINOLOGY, CONVENTIONS

Beginning with data reported for January 1952, 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 Sixth Meeting of the International Radio Consultative Committee (C.C.I.R.) in Geneva, 1951. Excerpts concerning symbols and terminology from Document No. 626-E of this Meeting are given on pages 2-7 of the report CRPL-F89, "Ionospheric Data," issued January 1952. Reprints of these pages are available upon request.

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.

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 in Document No. 626-E referred to above.

### a. For all ionospheric characteristics:

Values missing because of A, C, F, L, M, N, Q, S, or T are omitted from the median count.

### b. For critical frequencies and virtual heights:

Values of  $f_{oF2}$  (and  $f_{oE}$  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.

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  $f_{oF2}$ , as equal to or less than  $f_{oFl}$ .
2. For  $h'F2$ , as equal to or greater than the median.

The symbol W is included in the median count only when it replaces a height characteristic. This practice represents a change from that listed in issues previous to CRPL-F78.

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 ( $E_s$ ):

Values of fEs missing because of E or G (and B when applied to the daytime E region only) are counted as equal to or less than the median foE, or equal to or less than the lower frequency limit of the recorder.

Values of fEs missing for any other reason, and values of h'E<sub>s</sub> 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.

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  $f_{oF2}$  is less than or equal to  $f_{cFl}$ , 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  $f_{Es}$  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  $f_{cE}$ . Blank spaces at the beginning and end of columns of  $h'Fl$ ,  $f_{cFl}$ ,  $h'E$ , and  $f_{cE}$  are usually the result of diurnal variation in these characteristics. Complete absence of medians of  $h'Fl$  and  $f_{cFl}$  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 Zurich sunspot numbers were used in constructing the contour charts:

Month	Predicted Sunspot Number								
	1953	1952	1951	1950	1949	1948	1947	1946	1945
December	33	53	86	108	114	126	85	38	
November	38	52	87	112	115	124	83	36	
October	43	52	90	114	116	119	81	23	
September	46	54	91	115	117	121	79	22	
August	49	57	96	111	123	122	77	20	
July	20	51	60	101	108	125	116	73	
June	21	52	63	103	108	129	112	67	
May	22	52	68	102	108	130	109	67	
April	24	52	74	101	109	133	107	62	
March	27	52	78	103	111	133	105	51	
February	29	51	82	103	113	133	90	46	
January	30	53	85	105	112	130	88	42	

#### WORLD - WIDE SOURCES OF IONOSPHERIC DATA

The ionospheric data given here in tables 1 to 60 and figures 1 to 120 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:

Republica Argentina, Ministerio de Marina:  
 Buenos Aires, Argentina  
 Deception I.

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

University of Graz:  
 Graz, Austria

Meteorological Service of the Belgian Congo and Ruanda-Urundi:  
Leopoldville, Belgian Congo

British Department of Scientific and Industrial Research, Radio Research  
Board:

Falkland Is.  
Ibadan, Nigeria (University College of Nigeria)  
Inverness, Scotland  
Khartoum, Sudan (University College of Khartoum)  
Port Lockroy  
Singapore, British Malaya  
Slough, England

Defence Research Board, Canada:

Baker Lake, Canada  
Fort Chimo, Canada  
Resolute Bay, Canada  
St. John's, Newfoundland

Radio Wave Research Laboratories, National Taiwan University, Taipei,  
Formosa, China:

Formosa, China

French Ministry of Naval Armaments (Section for Scientific Research):  
Tananarive, Madagascar

Institute for Ionospheric Research, Lindau Über Northeim, Hannover,  
Germany:

Lindau/Harz, Germany

The Royal Netherlands Meteorological Institute:  
De Bilt, Holland

Ministry of Postal Services, Radio Research Laboratories, Tokyo, Japan:  
Akita, Japan  
Tokyo (Kokubunji), Japan  
Wakkanai, Japan  
Yamagawa, Japan

Christchurch Geophysical Observatory, New Zealand Department of Scientific  
and Industrial Research:

Christchurch, New Zealand  
Rarotonga, Cook Is.

Norwegian Defence Research Establishment, Kjeller per Lillestrom, Norway:  
Oslo, Norway  
Tromso, Norway

Manila Observatory:  
Baguio, P. I.

Research Laboratory of Electronics, Chalmers University of Technology,  
Gothenburg, Sweden:  
Kiruna, Sweden

Research Institute of National Defence, Stockholm, Sweden:  
Upeala, Sweden

Royal Board of Swedish Telegraphs, Radio Department, Stockholm, Sweden:  
Lulea, Sweden

Post, Telephone and Telegraph Administration, Berne, Switzerland:  
Schwarzenburg, Switzerland

United States Army Signal Corps:  
Adak, Alaska  
Okinawa I.  
White Sands, New Mexico

National Bureau of Standards (Central Radio Propagation Laboratory):  
Anchorage, Alaska  
Baton Rouge, Louisiana (Louisiana State University)  
Fairbanks, Alaska (Geophysical Institute of the University of Alaska)  
Guam I.  
Huancayo, Peru (Instituto Geofisico de Huancayo)  
Maui, Hawaii  
Narsarssuak, Greenland  
Panama Canal Zone  
Puerto Rico, W. I.  
San Francisco, California (Stanford University)  
Washington, D. C.

#### HOURLY IONOSPHERIC DATA AT WASHINGTON, D. C.

The data given in tables 61 through 72 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, Terminology, Conventions." Beginning with September 1949, the data are taken at Ft. Belvoir, Virginia.

#### IONOSPHERIC STORMINESS AT WASHINGTON, D.C.

Table 73 presents ionosphere character figures for Washington, D. C., during July 1953, as determined by the criteria given in the report IRPL-B5, "Criteria for Ionospheric Storminess," together with Cheltenham, Maryland, geomagnetic K-figures, which are usually covariant with them.

Tables 74a and 74b give for June 1953 the radio propagation quality figures for the North Atlantic area, CRPL advance and short-term forecasts, a summary geomagnetic activity index and sundry comparisons, specifically as follows:

- (a) radio propagation quality figures, separately for each 6-hour interval of the Greenwich day, viz., 00-06, 06-12, 12-18, 18-24 hours UT (Universal Time or GCT).
- (b) whole-day radio quality indices (beginning October 1952). Each index is a weighted average of the four quarter-day Q-figures, before rounding off, with half weight given to quality grades 5 and 6. This procedure tends to give whole-day indices suitable for comparison with whole-day advance forecasts which designate whenever possible the days when significant disturbance or unusually quiet conditions will occur.
- (c) short-term forecasts, issued by CRPL every six hour (nominally one hour before 00<sup>h</sup>, 06<sup>h</sup>, 12<sup>h</sup>, 18<sup>h</sup> UT) and applicable to the period 1 to 13 (especially 1 to 7) hours ahead. Note that new scoring rules have been adopted beginning with October 1952 data.
- (d) advance forecasts, issued semiweekly (CRPL-J reports) and applicable 1 to 3 or 4 days ahead, 4 or 5 to 7 days ahead, and 8 to 25 days ahead. These forecasts are scored against the whole-day quality indices.
- (e) half-day averages of the geomagnetic K indices measured by the Cheltenham Magnetic Observatory of the U. S. Coast and Geodetic Survey.
- (f) illustration of the comparison of short-term forecasts and Q-figures.
- (g) illustration of the outcome of advance forecasts (1 to 3 or 4 days ahead) and for comparison the outcome of a type of "blind" forecast. For the latter the frequency for each quality grade, as determined from the distribution of quality grades in the four most recent months of the current season, is partitioned among the grades observed in the current month in proportion to the frequencies observed in the current month.

The radio propagation quality figures are prepared from radio traffic data reported to CRPL by American Telephone and Telegraph Company, Mackay Radio and Telegraph Company, RCA Communications, Inc., Marconi Company, British Admiralty Signal and Radar Establishment, and the following agencies of the U. S. government: --FCC, Coast Guard, Navy, Army Signal Corps, and State Department. The method of calculation, summarized below, is similar to that described in a 1946 report, IRPL-R31, now out of print. Beginning with recalculated figures for January 1952, only reports of radio transmission on North Atlantic paths closely approximating New York-London are included in the estimation of quality. Observations of selected ionospheric characteristics, even though strongly correlated with radio transmission quality, and traffic reports for paths such as New York-Stockholm or New York-Tangier, previously included in the quality-figure determination with low weight, have been left out of the present calculations inasmuch as a sufficient number of homogeneous reports are now available.

The original reports are submitted on various scales and for various time intervals. The observations for each 6-hour interval are averaged on the quality scale of the original reports. These 6-hour indices are then adjusted to the 1 to 9 quality-figure scale by a conversion table prepared by comparing the distribution of these indices for at least four months, usually a year.

with a master distribution determined from analysis of the reports originally made on the 1 to 9 quality-figure scale. A report whose distribution is the same as the master is thereby converted linearly to the Q-figure scale. The 6-hourly quality figures are (subjectively) weighted means of the reports received for that period. These 6-hourly quality figures replace, beginning January 1953, the half-daily quality figures which formerly appeared in this table.

These quality figures are, in effect, a consensus of reported radio propagation conditions in the North Atlantic area. The reasons for low quality are not necessarily known and may not be limited to ionospheric storminess. For instance, low quality may result from improper frequency usage for the path and time of day. Although, wherever it is reported, frequency usage is included in the rating of reports, it must often be an assumption that the reports refer to optimum working frequencies. It is more difficult to eliminate from the indices conditions of low quality because of multipath, interference, etc. These considerations should be taken into account in interpreting research correlations between the Q-figures and solar, auroral, geomagnetic or similar indices.

Note. The North Pacific quality figures, which were published through October 1951, have been temporarily discontinued. Since the establishment of the North Pacific Radio Warning Service at Anchorage, Alaska, a larger number of reports are being received than were previously available in Washington. The preparation of the quality figures will be resumed when sufficient data have been accumulated for determination of conversion tables for these new reports.

## OBSERVATIONS OF THE SOLAR CORONA

Tables 75 through 77 give the observations of the solar corona during July 1953, obtained at Climax, Colorado, by the High Altitude Observatory of Harvard University and the University of Colorado. Tables 78 through 80 list the coronal observations obtained at Sacramento Peak, New Mexico, during July 1953, derived by Harvard College Observatory as a part of its performance of a research contract with the Upper Air Research Observatory, Geophysical Research Directorate, Air Force Cambridge Research Center. The data are listed separately for east and west limbs at 5-degree intervals of position angle north and south of the Solar Equator at the limb. The time of observation is given to the nearest tenth of a day, GCT.

Table 75 gives the intensities of the green (5303A) line of the emission spectrum of the solar corona; table 76 gives similarly the intensities of the first red (6374A) coronal line; and table 77, the intensities of the second red (6702A) coronal line; all observed at Climax in July 1953.

Table 78 gives the intensities of the green (5303A) coronal line; table 79, the intensities of the first red (6374A) coronal line; and table 80, the intensities of the second red (6702A) coronal line; all observed at Sacramento Peak in July 1952.

The following symbols are used in tables 75 through 80: a, observation of low weight; -, corona not visible; and X, position angle not included in plate estimates.

## RELATIVE SUNSPOT NUMBERS

Table 81 lists the daily provisional Zürich relative sunspot number,  $R_Z$ , as communicated by the Swiss Federal Observatory. Table 82 continues the new series of American relative sunspot numbers,  $R_A'$ . Beginning with 1951, the observations collected by the Solar Division, AAVSO, have been reduced according to a new procedure, such that only high quality observations of experienced observers are combined into  $R_A'$ . Observatory coefficients for each of the 28 selected observers were recomputed on data for 1948-1950, years when there was a wide range of solar activity. Otherwise, the procedure is that outlined in Publication of the Astronomical Society of the Pacific, 61, 13, 1949. The scale of the American numbers in 1951 differs from that of the reports for earlier years because of these changes, and the new series is designated  $R_A'$  rather than  $R_A$ . The American relative sunspot numbers appear monthly in these pages as communicated by the Solar Division.

## OBSERVATIONS OF SOLAR FLARES

Table 83 gives the preliminary record of solar flares reported to the CERL. These reports are communicated on a rapid schedule at the sacrifice of detailed accuracy. Definitive and complete records are published later in the Quarterly Bulletin of Solar Activity, I.A.U., in various observatory publications, and elsewhere. The present listing serves to identify and roughly describe the phenomena observed. Details should be sought from the reporting observatory.

Reporting directly to the CRPL are the following observatories: Mt. Wilson, McMath-Hulbert, U. S. Naval, Wendelstein, Kanzel and High Altitude at Sacramento Peak, New Mexico. The remainder report to Meudon (Paris) and the data are taken from the Paris-URSigram broadcast, monitored fairly regularly by the CRPL. The data on solar flares reported from Sacramento Peak, New Mexico, communicated by the High Altitude Observatory at Boulder, Colorado, are provided by Harvard University as the result of work undertaken on an Air Materiel Command Research and Development Contract administered by the Air Force Cambridge Research Laboratories.

The table lists for each flare the reporting observatory, date, times of beginning and ending of observation, duration (when known), total area (corrected for foreshortening), and heliographic coordinates. For the maximum phase of the flare is given the time, intensity, area relative to the total area, and the importance. The column "SID observed" is to indicate when a sudden ionosphere disturbance, noted elsewhere in these reports, occurred at the time of a flare. Times are in Universal Time (GCT).

## INDICES OF GEOMAGNETIC ACTIVITY

Table 84 lists various indices of geomagnetic activity based on data from magnetic observatories widely distributed throughout the world. The indices are: (1) preliminary international character-figures, C; (2) geomagnetic planetary three-hour-range indices, K<sub>p</sub>; (3) magnetically selected quiet and disturbed days. Table 85 lists K<sub>p</sub> for the years 1937, 1938 and 1939.

The C-figure is the arithmetic mean of the subjective classification by all observatories of each day's magnetic activity on a scale of 0 (quiet) to 2 (storm). The magnetically quiet and disturbed days are selected by the international scheme outlined on pages 219-227 in the December 1943 issue of Terrestrial Magnetism and Atmospheric Electricity. The details of the currently used method follow. For each day of a month, its geomagnetic activity is assigned by weighting equally the following four criteria: (1) C; (2) the sum of the eight K<sub>p</sub>'s; (3) the greatest K<sub>p</sub>; and (4) the sums of the squares of the eight K<sub>p</sub>'s.

K<sub>p</sub> is the mean standardized K-index from 11 observatories between geomagnetic latitudes 47 and 63 degrees. The scale is 0 (very quiet) to 9 (extremely disturbed), expressed in thirds of a unit, e.g., 5 is 4 2/3, 5o is 5 0/3, and 5+ is 5 1/3. This planetary index is designed to measure solar particle-radiation by its magnetic effects, specifically to meet the needs of research workers in the ionospheric field. A complete description of K<sub>p</sub> has appeared in Bulletin 12b, "Geomagnetic Indices C and K, 1948," published in Washington, D. C., 1949, by the Association of Terrestrial Magnetism and Electricity, International Union of Geodesy and Geophysics.

With the publication in this issue of  $K_p$  for 1937, 1938 and 1939 (Table 85), this geomagnetic index is complete back to the time systematic and detailed ionospheric observations began. The data for 1940-44 appear in F65, F66 and F67; for 1945-48 in Bulletin 12b of ATME; for 1949 in F67; and for 1950 to date monthly in these F-reports beginning with F68.

The Committee on Characterization of Magnetic Disturbance, ATME, IUGG, has kindly supplied these tables. The Meteorological Office, De Bilt, Holland, collects the data and compiles C and selected days. The Chairman of the Committee computes the planetary index. Current tables are also published quarterly in the Journal of Geophysical Research along with data on sudden commencements (sc) and solar flare effects (sfe).

### SUDDEN IONOSPHERE DISTURBANCES

Table 86 shows that no sudden ionosphere disturbances were observed during the month of July 1953 at Washington, D. C.

## TABLES OF IONOSPHERIC DATA

Table 1								July 1953	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00	(270)	2.8				2.6	3.0		
01	(280)	2.6				2.1	3.0		
02	(280)	2.8				1.8	3.0		
03	(280)	2.2				2.5	(3.1)		
04	(280)	2.0				2.4	3.0		
05	260	2.6	—	—		3.0	3.2		
06	(300)	3.3	220	3.0	120	2.0	3.7	3.3	
07	—	< 3.6	210	3.4	110	2.4	3.7	3	
08	—	< 3.8	210	3.8	110	2.6	4.4	3	
09	G	< 4.1	200	4.0	100	2.9	5.2	6	
10	440	(4.4)	200	4.0	100	3.0	4.6	(2.8)	
11	G	< 4.2	200	4.1	100	3.0	5.2	6	
12	G	< 4.3	200	4.2	100	3.2	4.8	3	
13	520	(4.6)	200	4.2	100	3.2	4.4	6	
14	G	(4.6)	200	4.1	100	3.2	4.1	3	
15	430	4.7	210	4.0	100	3.1	4.8	2.8	
16	360	4.8	210	3.9	110	2.9	4.2	3.0	
17	350	4.8	220	3.7	110	2.6	3.7	3.0	
18	300	4.8	220	3.4	110	2.2	4.2	3.1	
19	250	4.9	220	—	—	—	3.2	3.2	
20	240	5.0					3.2	3.1	
21	250	4.6					2.7	3.0	
22	250	3.8					2.9	3.0	
23	260	3.3					2.5	3.0	

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 3

Table 3								June 1953	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00	280	3.6				3.6	3.0		
01	300	3.9				4.2	3.0		
02	300	3.8	270	—		5.0	3.0		
03	320	3.8	240	—		4.8	3.0		
04	360	3.9	220	3.1		4.0	3.0		
05	370	4.0	230	3.3	—	—	2.8		
06	380	4.1	210	3.5	—	—	2.9		
07	390	4.3	200	3.7	—	—	2.8		
08	410	4.3	200	3.7	—	—	2.8		
09	420	4.4	200	3.9	—	—	2.8		
10	440	4.4	200	3.9	—	—	2.7		
11	420	4.4	210	3.9	—	—	2.8		
12	420	4.5	200	4.0	—	—	2.8		
13	470	4.4	200	3.9	—	—	2.7		
14	440	4.4	200	4.0	—	—	2.6		
15	420	4.3	200	3.8	—	—	2.8		
16	290	4.4	210	3.8	—	—	2.9		
17	360	4.4	220	3.7	—	—	3.0		
18	230	4.4	220	3.5	—	—	3.0		
19	300	4.4	230	3.3	—	—	3.1		
20	270	4.4	240	—	—	—	3.2		
21	260	4.2	—	—	—	—	3.2		
22	260	4.0	—	—	—	—	3.2		
23	260	3.8	—	—	—	—	3.1		

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 5

Table 5								June 1953	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00	300	(3.5)				5.2	(2.9)		
01	300	(3.4)				4.7	(2.9)		
02	(300)	(3.4)				4.7	(3.0)		
03	(310)	(3.4)				4.9	(3.2)		
04	—	(3.6)	—	—	—	4.8	(3.0)		
05	(280)	(3.9)	220	—	—	4.0	(3.2)		
06	380	(4.2)	240	3.6	100	2.5	4.9	3.1	
07	420	4.4	210	3.8	100	2.7	4.1	3.1	
08	390	4.4	200	4.0	100	2.8	3.4	3.0	
09	420	4.5	200	4.0	100	3.0	2.8	2.8	
10	400	4.6	200	4.1	100	3.0	2.9	2.8	
11	420	4.6	200	4.1	100	3.0	2.8	2.8	
12	460	4.5	200	4.2	100	3.1	2.7	2.7	
13	430	4.7	200	4.2	100	3.1	2.7	2.7	
14	420	4.8	200	4.1	100	3.0	2.8	2.7	
15	400	4.7	200	4.1	100	2.9	2.8	2.8	
16	390	(4.7)	210	4.0	100	2.8	3.2	2.8	
17	370	(4.6)	240	3.9	100	(2.8)	4.0	(2.9)	
18	350	(4.4)	240	(3.7)	100	2.4	4.5	3.0	
19	(340)	(4.2)	240	(3.4)	110	2.0	5.4	(2.9)	
20	(300)	(4.0)	260	—	—	4.8	(3.0)		
21	290	(4.0)	—	—	—	6.6	(3.1)		
22	(280)	(3.5)	—	—	—	5.4	(3.0)		
23	280	(3.7)	—	—	—	7.0	(3.1)		

Time: 45.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Time: 15.0°E. Sweep: 0.6 Mc to 25.0 Mc in 5 minutes, automatic operation.

Table 2

Table 2								June 1953	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00	(325)	4.1				—	—	4.1	(2.9)
01	310	4.2				—	—	4.1	3.0
02	310	4.2	250	—	—	100	—	3.9	3.0
03	330	4.1	240	3.2	100	1.8	3.2	3.0	
04	345	4.2	70	3.4	100	2.0	3.2	3.0	
05	390	4.2	210	3.5	100	2.2	3.2	3.0	
06	400	4.4	215	7.6	100	2.4	3.0	2.8	
07	395	4.5	210	3.8	100	2.4	3.0	2.9	
08	380	4.7	210	3.9	100	2.6	3.2	3.0	
09	380	4.8	205	4.0	100	2.7	3.2	3.0	
10	395	4.8	210	4.0	100	2.3	3.0	3.0	
11	390	4.7	210	4.1	100	2.8	3.2	3.0	
12	390	4.7	210	4.1	100	2.8	3.2	3.0	
13	410	4.6	200	4.1	100	2.8	3.1	3.0	
14	430	4.6	210	4.0	100	2.8	3.1	2.8	
15	390	4.5	205	4.0	100	2.8	3.0	3.0	
16	385	4.5	215	3.9	100	2.6	3.0	3.0	
17	350	4.5	220	3.7	100	2.6	3.0	2.8	
18	335	4.4	230	3.6	105	2.3	3.8	3.2	
19	310	4.3	240	3.5	110	2.1	4.1	3.2	
20	(315)	4.2	240	—	—	110	1.8	4.0	3.1
21	—	4.0	245	—	—	110	—	3.6	3.1
22	—	4.2	—	—	—	—	—	3.9	(3.1)
23	—	4.0	—	—	—	—	4.1	—	(3.0)

Time: 15.0°E.

Sweep: 0.6 Mc to 25.0 Mc in 5 minutes, automatic operation.

Table 4

Table 4								June 1953	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00	280	3.4				—	—	2.2	3.0
01	270	3.0				—	—	3.2	3.0
02	290	3.0				—	—	1.8	3.0
03	330	3.4	260	2.5	130	1.4	2.6	2.9	
04	400	3.7	240	2.9	110	1.7	3.0	2.8	
05	400	3.9	220	3.3	100	2.1	3.4	2.8	
06	420	4.2	210	3.5	100	2.3	3.0	2.8	
07	420	4.3	210	3.7	100	2.6	3.0	2.8	
08	420	4.5	210	3.8	100	2.8	3.2	2.7	
09	430	4.5	210	3.9	100	2.9	3.0	2.8	
10	460	4.5	210	4.0	100	2.9	3.2	2.7	
11	440	4.6	210	4.0	100	3.0	3.2	2.8	
12	480	4.5	200	4.2	100	3.0	3.2	2.6	
13	530	4.5	210	4.1	100	3.0	3.2	2.4	
14	500	4.5	210	4.0	100	3.0	3.2	2.6	
15	460	4.4	210	4.0	100	2.8	3.2	2.7	
16	450	4.3	200	3.9	100	2.8	3.2	2.7	
17	400	4.4	210	3.8	100	2.6	3.2	2.8	
18	360	4.4	220	3.6	110	2.4	3.2	3.0	
19	320	4.5	230	3.4	110	2.1	3.4	3.0	
20	290	4.4	240	3.0	120	1.7	3.2	3.1	
21	260	4.4	240	—	—	130	—	3.4	
22	250	4.6	—	—	—	—	1.7	—	
23	250	4.4	—	—	—	—	—	3.3	

Time: 15.0°E.

Sweep: 0.6 Mc to 14.0 Mc in 8 minutes, automatic operation.

Uppsala, Sweden ( $59.8^{\circ}\text{N}$ ,  $17.6^{\circ}\text{E}$ )

Table 7

June 1953

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	255	3.8						3.0
01	260	3.4						3.0
02	270	3.2						3.0
03	270	3.4	240	2.5	---	E	3.0	3.0
04	350	3.7	230	3.0	130	1.6	3.6	3.0
05	375	4.1	225	3.4	115	2.0	4.3	3.0
06	375	4.4	220	3.6	110	2.2	3.8	3.0
07	400	4.4	215	3.8	110	2.5	4.4	2.9
08	415	4.6	210	4.0	105	2.7	5.1	2.9
09	395	4.8	205	4.0	105	2.8	4.6	3.0
10	370	5.0	205	4.1	105	2.9	4.6	3.0
11	385	5.1	200	4.2	105	2.9	5.1	3.0
12	385	4.9	210	4.2	105	3.0	4.6	3.0
13	395	4.8	210	4.2	105	2.9	4.0	3.0
14	395	4.7	210	4.1	105	2.8	4.7	2.9
15	415	4.6	210	4.1	105	2.8	4.2	2.9
16	380	4.7	215	4.0	105	2.7	3.8	3.0
17	365	4.8	215	3.8	110	2.4	3.9	3.0
18	315	4.8	225	3.6	110	2.2	4.1	3.1
19	280	4.9	235	3.2	120	1.9	4.2	3.2
20	265	4.9	240	2.7	125	1.5	3.4	3.2
21	255	4.8				E		3.1
22	250	4.8						3.1
23	250	4.8						3.1

Time:  $16.0^{\circ}\text{E}$ .

Sweep: 1.4 Mc to 17.0 in 6 minutes, automatic operation.

Table 9

Graz, Austria ( $47.1^{\circ}\text{N}$ ,  $15.5^{\circ}\text{E}$ )

June 1953

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	270	4.2						
01	280	3.9						
02	280	3.5						
03	280	3.3						
04	280	3.3						
05	250	4.0	(245)	3.3				
06	300	4.5	220	3.5			4.1	
07	310	5.0	205	3.9	---	2.7	4.6	
08	300	5.0	200	4.0	---		4.8	
09	300	5.1	200	4.1	---	3.0	5.0	
10	300	5.4	190	4.2	---		5.0	
11	300	5.2	200	4.4	---		5.0	
12	305	5.2	200	4.3	---	3.4	4.7	
13	330	5.1	200	4.3	---	3.4	4.0	
14	300	5.2	195	4.2	---	3.4	4.2	
15	340	5.0	200	4.1	---	3.2	4.9	
16	330	5.1	200	4.0	---	3.1	4.0	
17	300	5.1	200	3.8	---	2.8	4.9	
18	290	5.4	230	3.5			4.0	
19	260	5.9					4.0	
20	240	6.1					4.0	
21	245	5.9					5.0	
22	240	5.1					4.4	
23	250	4.3					3.8	

Time:  $16.0^{\circ}\text{E}$ .

Sweep: 2.5 Mc to 12.0 Mc in 2 minutes.

Table 11

White Sands, New Mexico ( $32.3^{\circ}\text{N}$ ,  $106.5^{\circ}\text{W}$ )

June 1953

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	280	3.4					3.4	3.0
01	280	3.4					2.6	3.0
02	260	3.4					2.4	3.0
03	270	3.3					2.4	3.0
04	270	3.1					2.8	3.0
05	250	3.3					2.7	3.2
06	280	4.1	220	3.1	110	1.9	3.6	3.2
07	340	4.5	210	3.7	100	2.5	4.1	3.0
08	320	5.4	200	4.0	100	2.8	4.4	3.0
09	360	5.3	200	4.2	100	3.0	4.7	3.0
10	400	5.5	190	4.3	100	3.2	5.2	2.9
11	410	5.4	200	4.4	100	3.2	4.8	2.8
12	380	5.4	200	4.4	110	3.2	4.4	2.8
13	330	5.6	190	4.3	110	3.2	2.8	
14	360	5.7	200	4.3	110	3.2	4.2	2.9
15	350	5.6	200	4.2	110	3.0	4.2	3.0
16	330	5.6	210	4.0	110	2.9	4.2	3.0
17	310	5.6	220	3.8	110	2.6	3.6	3.0
18	290	5.6	230	3.3	110	2.0	4.3	3.1
19	260	5.6					3.4	3.2
20	230	6.0					3.6	3.2
21	240	4.8					3.3	3.2
22	250	4.0					3.2	3.1
23	260	3.6					3.7	3.1

Time:  $105.0^{\circ}\text{W}$ .

Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 7

June 1953

Adek, Alaska ( $51.8^{\circ}\text{N}$ ,  $176.6^{\circ}\text{W}$ )

Table 8

June 1953

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	270	4.3						2.5
01	280	4.0						3.0
02	290	3.9						2.4
03	300	3.8	---		---	E	2.7	2.9
04	360	3.8	270	2.6	140	1.5	2.3	2.8
05	390	4.2	250	3.2	120	1.9	3.4	2.8
06	400	4.4	240	3.6	110	2.3	6.1	2.8
07	400	4.7	240	3.8	110	2.6	6.9	2.8
08	400	4.8	220	4.0	110	2.8	6.8	2.8
09	440	4.7	210	4.0	110	3.0	6.4	2.7
10	450	4.7	220	4.0	110	3.1	7.5	2.7
11	400	4.9	210	4.1	110	3.1	7.1	2.9
12	450	4.8	220	4.2	110	3.1	7.3	2.7
13	420	4.7	220	4.2	110	3.1	6.4	2.9
14	460	4.4	210	4.1	110	3.0	7.0	2.7
15	430	4.5	220	4.0	110	2.9	7.2	2.8
16	400	4.6	230	3.9	110	2.7	5.6	2.9
17	370	4.7	240	3.8	110	2.5	4.8	3.0
18	350	4.6	240	3.5	120	2.2	4.4	3.0
19	310	5.0	250	---	130	1.8	4.4	3.0
20	280	5.6					3.6	3.0
21	260	6.0					4.0	3.1
22	260	5.6					4.0	3.0
23	270	4.7					3.4	2.9

Time:  $180.0^{\circ}\text{W}$ .

Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 10

San Francisco, California ( $37.4^{\circ}\text{N}$ ,  $122.2^{\circ}\text{W}$ )

June 1953

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	(250)	(3.4)						4.3
01	(270)	(3.5)						4.1
02	(280)	(3.3)						3.8
03	(270)	(3.2)						3.0
04	(280)	(3.2)						3.8
05	(300)	3.2	250	---	---	---		3.2
06	380	(3.9)	230	3.2	110	2.0	4.1	3.1
07	380	4.4	220	(3.6)	110	(2.5)	4.5	3.0
08	350	4.8	(200)	(3.8)	110	(2.8)	5.7	3.1
09	390	5.0	(200)	(4.0)	100	(2.9)	6.9	2.8
10	360	5.1	(200)	(4.2)	100	(3.1)	5.8	3.0
11	400	5.2	(190)	4.2	100	(3.2)	5.6	2.9
12	380	5.1	200	4.2	100	(3.2)	5.7	2.9
13	410	5.1	200	4.2	100	(3.2)	5.0	2.9
14	380	5.3	210	4.1	100	(3.1)	5.4	2.9
15	360	5.4	210	(4.0)	110	(3.0)	4.5	3.0
16	340	5.2	210	(3.9)	110	(2.8)	4.4	3.1
17	320	5.2	210	(3.7)	110	(2.8)	4.8	3.1
18	310	5.0	220	(3.5)	110	(2.1)	4.3	3.1
19	240	5.6					3.1	3.2
20	240	5.5					3.2	3.2
21	(240)	(5.2)					4.8	(3.2)
22	(250)	(4.6)					4.8	(3.2)
23	(260)	(3.8)					4.2	(3.1)

Time:  $120.0^{\circ}\text{W}$ .

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 12

Baton Rouge, Louisiana ( $30.5^{\circ}\text{N}$ ,  $91.2^{\circ}\text{W}$ )

June 1953

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	300	3.3						3.1
01	300	3.3						3.1
02	280	3.2						3.1
03	280	3.0						3.3
04	300	2.8						3.1
05	280	3.0						3.2
06	290	4.1	230	---	120	(2.1)	3.0	3.3
07	340	4.6	220	3.6	110	(2.4)	4.1	3.1
08	330	5.0	210	4.0	110	(2.6)	5.2	3.1
09	370	5.2	200	4.1	110	2.9	6.0	2.9
10	400	5.1	20					

Table 13

Time	June 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	300	4.9			5.0	3.0	
01	270	5.0			4.6	3.1	
02	260	4.5			4.2	3.2	
03	260	4.0			4.0	3.2	
04	240	3.6			3.6	3.2	
05	260	3.4			4.0	3.3	
06	270	4.5	240	—	110	1.9	3.9
07	280	5.4	220	—	110	2.4	5.0
08	290	5.4	220	4.2	110	2.7	5.8
09	340	6.2	210	4.3	110	2.8	6.8
10	400	5.6	210	4.4	110	3.1	5.4
11	390	6.2	220	4.4	110	3.2	7.0
12	370	6.6	230	4.5	110	3.2	6.6
13	380	7.3	240	4.4	110	3.2	6.0
14	360	7.9	220	4.3	110	3.1	5.3
15	330	8.6	230	4.2	110	3.0	6.0
16	320	8.8	230	4.0	110	2.8	5.0
17	290	9.3	230	3.8	110	2.4	5.2
18	260	8.3					5.2
19	250	6.8					4.6
20	260	5.8					3.9
21	280	5.4					4.3
22	300	4.8					3.0
23	310	4.8					2.8

Time: 127.5°E.

Sweep: 1.0 Mc to 25.0 Mc in 16 seconds.

Table 15

Time	June 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	270	4.4				2.2	3.1
01	260	4.4				2.5	3.2
02	250	4.4				2.5	3.2
03	240	3.8				2.2	3.3
04	250	3.4				2.4	3.2
05	250	3.2					3.2
06	240	3.5	220	—	100	—	2.9
07	280	4.5	210	3.5	100	2.1	3.6
08	280	5.4	200	3.9	90	2.6	3.8
09	320	5.4	190	4.1	90	3.0	4.4
10	360	5.6	200	4.2	90	3.2	4.8
11	350	5.9	200	4.3	90	3.3	3.0
12	360	6.4	200	4.4	90	3.4	4.4
13	340	7.4	200	4.4	90	3.4	2.9
14	320	7.6	200	4.3	100	3.3	3.0
15	300	7.8	210	4.2	100	3.2	3.0
16	300	8.4	210	4.0	100	3.0	4.8
17	280	8.2	210	3.9	100	2.6	4.8
18	250	8.2	220	3.3	100	—	4.2
19	220	6.9					4.6
20	220	6.0					3.3
21	240	5.2					3.2
22	250	4.7					2.5
23	260	4.4					2.7

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 17

Time	June 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	270	4.9					2.9
01	260	4.2					2.8
02	260	4.1					2.9
03	280	3.6					2.9
04	270	3.3					2.9
05	260	3.3				2.4	3.0
06	260	3.6				3.9	3.0
07	260	4.6	230	3.5	120	(2.2)	4.1
08	320	5.1	210	4.0	110	2.7	4.6
09	440	5.3	220	4.2	110	3.0	4.4
10	450	5.6	220	4.2	110	3.2	4.2
11	460	6.8	220	4.3	110	3.3	4.8
12	420	7.8	220	4.3	110	3.4	2.5
13	400	8.7	220	4.3	110	3.4	4.5
14	380	9.2	220	4.3	110	3.3	4.6
15	360	9.8	220	4.2	110	3.1	4.4
16	330	10.1	220	4.0	110	2.8	4.7
17	300	9.8	230	3.8	120	(2.5)	3.8
18	270	9.1	240	(3.2)	(130)	(1.9)	3.0
19	250	8.2					3.3
20	250	7.0					3.0
21	270	6.3					2.6
22	270	5.6					2.3
23	270	5.2					2.0

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 14

Time	June 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	290	5.2					2.5
01	280	5.4					2.6
02	260	5.0					2.7
03	260	4.7					2.2
04	250	4.4					3.1
05	260	3.7					2.0
06	260	3.9	250	—	130	1.6	2.4
07	300	4.9	220	3.6	110	2.2	4.4
08	340	5.2	210	4.0	110	2.7	5.0
09	430	5.4	210	4.2	110	3.0	5.4
10	450	5.9	200	4.3	110	3.2	5.7
11	450	6.6	200	4.4	110	3.3	6.2
12	410	7.6	200	4.4	110	3.4	4.8
13	380	8.5	200	4.3	110	3.4	5.0
14	350	9.0	210	4.3	110	3.3	4.3
15	340	9.4	220	4.2	110	(3.2)	4.6
16	320	9.8	220	4.0	110	3.0	4.2
17	290	9.6	230	3.9	110	2.6	5.4
18	270	10.0	230	(3.5)	110	2.0	4.1
19	250	9.0	—	—	—	—	4.4
20	240	7.4	—	—	—	—	4.0
21	250	6.6	—	—	—	—	4.0
22	260	6.0	—	—	—	—	3.8
23	280	5.7	—	—	—	—	2.6

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 15

Time	June 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	270	4.4				2.2	3.1
01	260	4.4				2.5	3.2
02	250	4.4				2.5	3.2
03	240	3.8				2.2	3.3
04	250	3.4				2.4	3.2
05	250	3.2					3.2
06	240	3.5	220	—	100	—	2.9
07	280	4.5	210	3.5	100	2.1	3.6
08	280	5.4	200	3.9	90	2.6	3.4
09	320	5.4	190	4.1	90	3.0	4.4
10	360	5.6	200	4.2	90	3.2	3.0
11	350	5.9	200	4.3	90	3.3	4.8
12	360	6.4	200	4.2	90	3.3	7.6
13	420	7.2	200	4.3	110	3.3	6.9
14	420	7.5	200	4.2	110	3.2	7.0
15	390	7.8	210	4.1	110	(3.1)	7.1
16	360	8.0	220	4.0	110	2.9	6.9
17	340	8.1	230	3.8	120	2.6	4.9
18	280	8.5	230	—	—	—	4.5
19	250	8.2	—	—	—	—	4.2
20	250	6.9	—	—	—	—	3.6
21	270	5.6	—	—	—	—	3.0
22	200	4.4	—	—	—	—	2.5
23	330	3.9	—	—	—	—	2.6

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 16

Time	June 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	340	(3.3)					2.9
01	(330)	5.0					2.8
02	340	2.4					2.9
03	340	(2.4)					2.9
04	290	—					2.4
05	250	2.3					3.4
06	250	3.7	230	—	120	—	2.0
07	270	6.2	220	3.7	(110)	—	2.3
08	270	5.7	210	4.1	110	2.9	7.0
09	330	5.0	210	4.2	110	3.1	6.8
10	400	6.1	220	4.2	110	3.1	2.8
11	420	6.4	210	4.3	110	3.3	7.6
12	420	7.2	200	4.3	110	3.3	6.9
13	390	4.5	215	3.9	105	2.8	3.0
14	385	4.5	210	4.0	105	2.9	3.0
15	350	4.9	205	4.0	105	3.0	3.1
16	360	4.9	210	4.1	105	3.1	3.1
17	360	4.4	210	4.1	105	3.1	3.0
18	400	(4.4)	210	4.0	105	3.1	2.9
19	360	4.3	210	3.9	108	2.9	3.0
20	350	4.2	—	—	—	—	2.8
21	250	4.0	—	—	—	—	3.1
22	320	4.5	230	3.8	110	2.5	3.2
23	295	4.5	240	3.5	110	2.2	2.2
19	280	4.3	240	3.2	—	2.0	2.0
20	250	4.2	—	—	—	—	2.2
21	250	4.0	—	—	—		

Table 19  
De Bilt, Holland (52.1°N, 5.2°E)

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	May 1953
00	270	3.5							3.0
01	280	3.1							3.0
02	280	3.0							3.0
03	280	2.9							3.0
04	260	3.2	—	—	—	E	2.2	3.1	
05	250	3.7	215	3.3	110	2.0	2.6	3.3	
06	310	<4.2	210	3.5	105	2.2	2.7	3.1	
07	325	4.8	210	3.8	100	2.5	3.6	3.2	
08	355	4.7	205	3.9	100	2.7	3.6	3.1	
09	330	5.0	200	4.0	100	2.9	4.2	3.1	
10	365	5.1	200	4.2	100	3.0	4.5	3.1	
11	355	5.1	200	4.2	100	3.0	4.4	3.1	
12	360	5.1	200	4.2	100	3.1	4.1	3.0	
13	330	5.0	200	4.2	100	3.1	3.6	3.1	
14	370	5.0	200	4.2	100	3.0	3.6	3.0	
15	350	5.0	200	4.0	100	2.9	3.2	3.0	
16	320	5.2	210	3.9	100	2.7	3.2	3.1	
17	300	5.2	225	3.6	105	2.3	3.2	3.1	
18	280	5.5	225	3.3	110	2.0	3.1	3.2	
19	240	5.7	—	—	—	E	2.6	3.3	
20	220	5.6						3.2	
21	220	4.9						3.2	
22	230	4.0						3.1	
23	265	3.8						3.0	

Time: 0.0°.

Sweep: 1.4 Mc to 11.2 Mc in 6 minutes, automatic operation.

Table 21

Time	Baton Rouge, Louisiana (30.5°N, 91.2°W)								May 1953
Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	
00	300	3.1					2.7	3.0	
01	300	3.1					2.4	3.0	
02	290	3.1					2.2	3.1	
03	270	3.0					2.0	3.1	
04	280	3.0					3.1		
05	260	3.0					2.4	3.2	
06	260	4.0	240	—	120	(1.9)	3.0	3.4	
07	320	4.7	220	3.6	110	2.3	3.9	3.2	
08	340	4.9	210	3.6	110	2.7	4.0	3.0	
09	340	5.2	200	4.0	110	2.9	4.8	3.1	
10	360	5.5	210	4.2	110	3.0	4.8	3.0	
11	380	5.8	200	4.2	110	3.2	4.4	2.9	
12	340	6.0	210	4.2	110	3.2	4.6	3.0	
13	340	6.3	220	4.2	110	3.2	4.7	3.0	
14	330	6.6	220	4.1	110	3.2	4.5	3.0	
15	330	6.0	220	4.0	110	3.0	4.2	3.1	
16	310	5.8	230	3.8	110	2.8	4.1	3.1	
17	300	5.8	230	3.6	110	2.4	4.1	3.2	
18	270	6.1	240	—	110	—	4.1	3.3	
19	240	5.6					3.6	3.4	
20	240	5.3					3.8	3.4	
21	250	4.1					3.0	3.3	
22	260	3.4					3.2	3.1	
23	300	3.2					3.0		

Time: 90.0°W.

Sweep: 1.0 Mc to 26.0 Mc in 30 seconds.

Table 23

Time	Baguio, P.I. (16.4°N, 120.6°E)								May 1953
Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	
00	290	5.0					2.9	2.9	
01	250	4.8					4.1	3.3	
02	230	4.4					3.0	3.3	
03	240	3.0					3.0	3.2	
04	250	3.0					3.4	3.2	
05	(250)	2.2					4.1	3.2	
06	240	4.9					4.2	3.4	
07	220	5.9	—	—	110	2.4	5.5	3.2	
08	(300)	6.5	220	—	100	2.7	5.6	3.0	
09	350	7.0	200	(4.2)	110	(3.0)	6.4	2.7	
10	400	7.7	200	4.2	110	(3.1)	5.7	2.5	
11	400	8.3	220	4.3	110	(3.2)	6.6	2.4	
12	400	8.6	200	4.3	110	3.3	6.0	2.4	
13	380	8.6	190	4.2	110	(3.4)	4.4	2.4	
14	360	8.8	200	4.2	110	3.2	4.5	2.5	
15	340	9.0	210	4.0	100	3.1	4.6	2.6	
16	310	9.3	210	—	100	(2.7)	3.8	2.3	
17	260	9.5	230	—	110	2.3	3.7	3.0	
18	250	9.8					4.0	3.1	
19	230	8.8					3.2	3.1	
20	260	7.1					2.8	3.0	
21	290	6.1					2.6	2.6	
22	300	5.3					2.5	2.5	
23	320	4.8					2.2	2.7	

Time: 120.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 19Table 20

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	May 1953
00	250	3.6							3.3
01	290	3.4							3.1
02	290	3.2							3.2
03	285	3.0							3.2
04	280	3.2							3.2
05	250	3.3							3.4
06	230	4.0	210	3.0	100	2.0	—	—	3.5
07	290	4.6	200	3.6	100	2.3	—	—	3.5
08	300	5.0	200	3.8	100	2.6	4.1	3.4	
09	300	5.0	200	3.9	100	2.8	4.0	3.4	
10	310	5.0	200	4.0	100	3.0	4.5	3.4	
11	305	5.3	200	4.1	100	3.0	4.0	3.3	
12	325	5.0	200	4.1	100	3.0	3.0	3.3	
13	365	5.0	200	4.1	100	3.0	3.0	3.1	
14	325	5.2	200	4.1	100	3.0	3.0	3.2	
15	320	5.2	200	4.0	100	3.0	3.0	3.4	
16	310	5.2	200	4.0	100	2.9	4.0	3.3	
17	300	5.4	200	3.8	100	2.6	—	—	
18	300	5.7	200	3.5	100	2.3	—	—	
19	250	5.8	230	3.0	100	1.8	2.9	2.5	
20	230	6.5							3.6
21	210	6.0							3.5
22	215	5.0							3.5
23	250	4.0							3.4

Table 20

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	May 1953
00	250	3.6							3.3
01	290	3.4							3.1
02	290	3.2							3.2
03	285	3.0							3.2
04	280	3.2							3.2
05	250	3.3							3.4
06	230	4.0	210	3.0	100	2.0	—	—	3.5
07	290	4.6	200	3.6	100	2.3	—	—	3.5
08	300	5.0	200	3.8	100	2.6	4.1	3.4	
09	300	5.0	200	3.9	100	2.8	4.0	3.4	
10	310	5.0	200	4.0	100	3.0	4.5	3.4	
11	305	5.3	200	4.1	100	3.0	4.0	3.3	
12	325	5.0	200	4.1	100	3.0	3.0	3.3	
13	365	5.0	200	4.1	100	3.0	3.0	3.1	
14	325	5.2	200	4.1	100	3.0	3.0	3.2	
15	320	5.2	200	4.0	100	3.0	3.0	3.2	
16	310	5.2	200	4.0	100	2.9	4.0	3.2	
17	300	5.4	200	3.8	100	2.6	—	—	
18	300	5.7	200	3.5	100	2.3	—	—	
19	250	6.2							
20	215	5.6							
21	205	5.6							
22	215	4.0							
23	250	4.0							

Table 20

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	May 1953
00	250	3.6							3.3
01	240	5.6							3.2
02	240	4.4							3.4
03	240	3.7							3.6
04	270	3.5							3.4
05	260	3.5							3.2
06	230	5.2	240	3.9	110	2.0	—	—	3.5
07	270	5.7	240	3.9	110	(2.4)	5.2	3.4	
08	280	6.0	230						

Table 25  
Huancayo, Peru ( $12.0^{\circ}\text{S}$ ,  $75.3^{\circ}\text{W}$ )

Time	$\text{h}'\text{F}2$	$\text{foF}2$	$\text{h}'\text{Fl}$	$\text{foFl}$	$\text{h}'\text{E}$	$\text{foE}$	$\text{fEs}$	(M3000)F2
00	230	4.8						3.3
01	230	4.5						3.3
02	240	3.9						3.4
03	240	3.2						3.3
04	250	2.4						3.3
05	270	2.0						3.2
06	280	2.6				E		3.0
07	(260)	5.3	230	---	120	2.1	5.8	3.3
08	(300)	6.7	220	---	110	2.5	9.4	3.0
09	320	7.3	210	4.1	110	---	11.5	2.7
10	350	6.8	200	4.2	110	---	11.8	2.6
11	370	6.6	200	4.3	110	---	12.0	2.6
12	380	6.4	200	4.3	110	---	12.0	2.6
13	370	6.6	190	4.2	110	---	12.0	2.6
14	360	6.6	190	4.2	110	---	11.6	2.6
15	320	6.8	200	4.1	110	---	10.6	2.7
16	(290)	7.0	210	---	110	---	9.2	2.7
17	250	7.2	240	---	120	2.0	5.7	2.9
18	260	7.1				---	4.7	2.9
19	280	6.5				---		2.9
20	270	6.1				---		2.9
21	250	6.2				---		3.1
22	220	6.0				---		3.3
23	230	5.0				---		3.3

Time:  $75.0^{\circ}\text{W}$ .

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 27

Time	$\text{h}'\text{F}2$	$\text{foF}2$	$\text{h}'\text{Fl}$	$\text{foFl}$	$\text{h}'\text{E}$	$\text{foE}$	$\text{fEs}$	(M3000)F2
00	260	3.1			---			3.0
01	260	3.0			---			3.0
02	260	3.2			---	1.6		3.0
03	260	3.3	---		130	1.6		2.9
04	260	3.4	---		130	1.5		3.0
05	250	3.3	240	---	120	1.7		3.0
06	260	3.5	240	3.1	120	1.8		3.0
07	400	3.4	240	3.0	110	2.0		3.0
08	0	3.6	230	3.2	110	2.2		2.6
09	0	<3.7	230	3.4	110	2.3		2.5
10	0	<3.7	220	3.4	110	2.4	G	
11	0	<3.6	220	3.4	110	2.5	G	
12	0	<3.6	230	3.5	110	2.6	G	
13	0	<3.7	210	3.6	110	2.5	G	
14	0	3.7	220	3.5	110	2.6	G	
15	0	<3.6	220	3.4	110	2.3	G	
16	420	4.0	220	3.3	110	2.3		2.8
17	370	3.9	230	3.2	110	2.1		2.9
18	320	3.8	230	3.0	110	1.9		2.9
19	270	3.9	250	3.0	120	1.8		3.0
20	250	3.8	240	---	120	1.6		3.0
21	250	3.8			120	1.5		3.0
22	250	3.5			140	1.5		3.0
23	260	3.6			---			2.9

Time:  $90.0^{\circ}\text{W}$ .

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 29

Time	$\text{h}'\text{F}2$	$\text{foF}2$	$\text{h}'\text{Fl}$	$\text{foFl}$	$\text{h}'\text{E}$	$\text{foE}$	$\text{fEs}$	(M3000)F2
00	320	2.9			120	2.2	4.0	2.9
01	320	3.0			110	2.5	4.9	2.8
02	340	2.9			110	2.8	3.5	(2.9)
03	---	<2.9			110	3.3	---	
04	(380)	(3.4)	---		110	3.2	---	(2.9)
05	(350)	<3.8	---		110	3.6	---	(2.9)
06	(320)	<3.9	---		100	3.8	---	(2.9)
07	380	<3.9	270	3.8	110	3.2	2.9	
08	460	4.0	280	3.8	110	3.0	2.7	
09	440	4.2	250	3.9	110	3.0	2.3	
10	450	4.4	230	4.0	110	3.0	2.8	
11	450	4.4	230	4.0	110	3.0	2.8	
12	430	4.4	230	4.0	110	3.0	2.6	
13	410	4.6	230	3.9	110	3.0	2.8	
14	440	4.6	250	3.9	110	3.0	2.8	
15	420	4.6	290	3.8	110	2.9	2.8	
16	400	4.4	280	3.6	110	2.9	2.8	
17	330	4.2	280	3.2	110	2.9	2.8	
18	300	4.1	---		110	2.9	2.9	
19	300	3.9			110	2.3	6.2	2.9
20	300	3.6			110	2.2	6.0	2.9
21	300	3.5			---		6.0	2.9
22	300	3.3			110	2.6	6.0	2.9
23	300	3.0			110	3.8	5.2	3.0

Time:  $75.0^{\circ}\text{W}$ .

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 26

Watheroo, W. Australia ( $30.2^{\circ}\text{S}$ ,  $115.9^{\circ}\text{E}$ )

May 1953

Time	$\text{h}'\text{F}2$	$\text{foF}2$	$\text{h}'\text{Fl}$	$\text{foFl}$	$\text{h}'\text{E}$	$\text{foE}$	$\text{fEs}$	(M3000)F2
00	250	3.4						2.0
01	250	3.4						3.1
02	240	3.6						3.2
03	240	3.5						3.2
04	230	3.6						3.4
05	210	3.4						3.4
06	220	2.9						3.3
07	220	3.8						3.5
08	230	5.2			200	2.9		3.6
09	240	5.7			200	3.7		3.5
10	250	5.9			200	4.1		3.4
11	270	6.1			200	4.2		3.3
12	270	6.4			200	4.3		3.3
13	270	6.0			200	4.2		3.3
14	260	6.4			200	4.1		3.3
15	260	6.5			210	3.8		3.4
16	250	6.5			220	4.1		3.4
17	230	6.2			220	3.4		3.5
18	210	5.3			220	2.3		3.5
19	210	4.0			220	1.5		3.5
20	210	3.9			210	3.0		3.2
21	210	3.8			210	2.9		3.1
22	250	3.0			250	3.0		3.0
23	250	3.2			250	3.2		3.1

Time:  $120.0^{\circ}\text{E}$ .

Sweep: 1.0 Mc to 16.0 Mc in 2 minutes.

Table 28

Baker Lake, Canada ( $64.3^{\circ}\text{N}$ ,  $96.0^{\circ}\text{W}$ )

April 1953

Time	$\text{h}'\text{F}2$	$\text{foF}2$	$\text{h}'\text{Fl}$	$\text{foFl}$	$\text{h}'\text{E}$	$\text{foE}$	$\text{fEs}$	(M3000)F2
00	230	3.1						3.0
01	230	3.7						3.0
02	230	2.6						3.0
03	240	2.4						3.0
04	240	2.5						3.0
05	250	2.8						3.0
06	230	3.1	200	2.8	100	1.9	3.7	3.0
07	240	3.4	200	3.0	100	2.3	5.5	3.0
08	280	3.8	200	3.4	100	2.4	4.7	2.9
09	340	4.0	200	3.6	100	2.8	5.0	2.8
10	360	4.1	220	3.7	100	3.0	4.4	2.9
11	390	4.0	220	3.7	100	3.1	4.3	2.8
12	420	4.2	220	3.7	100	3.0	4.0	2.8
13	390	4.4	200	3.8	100	3.0	4.0	2.8
14	400	4.4	200	3.8	105	2.6	3.2	2.8
15	305	5.4	215	4.0	105	2.9	3.0	3.2
16	300	5.4	215	3.8	105	2.6	3.2	3.3
17	280	5.3	225	3.6	110	2.3	3.0	3.3
18	260	5.4	230	---	120	1.8	2.6	3.3
19	250	5.3	240	---	120	1.8	2.6	3.3
20	240	5.4	240	---	120	1.8	2.6	3.3
21	240	4.6	240	---	120	1.8	2.6	3.2
22	260	3.8	240	---	120	1.8	2.6	3.2
23	270	3.4	240	---	120	1.9	3.0	3.0

Time:  $90.0^{\circ}\text{W}$ .

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 30

Lindau/Harz, Germany ( $61.6^{\circ}\text{N}$ ,  $10.1^{\circ}\text{E}$ )

April 1953

Time	$\text{h}'\text{F}2$	$\text{foF}2$	$\text{h}'\text{Fl}$	$\text{foFl}$	$\text{h}'\text{E}$	$\text{foE}$	$\text{fEs}$	(M3000)F2
00	290	3.1						3.0
01	280	3.0						3.0
02	270	2.9						3.0
03	275	2.7						3.0
04	270	2.6						3.0
05	260	2.6						3.2
06	250	3.3	225	---	115	2.0	2.6	3.4
07	280	4.0	220	3.2	115	2.0	2.6	3.4
08	320	4.4	220	3.6</td				

Time	April 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	300	2.4					2.8
01	310	2.1					2.9
02	310	1.8					2.9
03	300	1.9					(2.9)
04	320	1.6					3.0
05	250	2.7	—	—	120	1.8	1.4
06	240	3.4	240	3.2	120	2.1	3.3
07	G	>3.9	220	3.6	110	2.4	3.0
08	420	4.1	210	3.8	110	2.8	2.9
09	500	4.3	210	4.0	110	2.9	2.6
10	410	4.5	200	4.0	110	3.0	2.9
11	400	4.6	200	4.1	110	3.1	2.9
12	370	5.0	210	4.2	110	3.1	3.0
13	350	5.0	210	4.1	110	3.0	2.0
14	340	5.0	210	4.0	110	3.0	2.2
15	350	5.0	220	3.9	110	2.8	3.1
16	310	5.1	220	3.6	110	2.5	3.2
17	290	5.1	240	3.1	120	2.1	3.2
18	260	6.2	250	—	140	1.8	1.5
19	250	5.2					3.2
20	250	4.3					3.1
21	250	3.7					3.0
22	270	3.0					3.0
23	310	2.5					2.9

Time: 60.0°W.

Sweep: 0.8 Mc to 10.0 Mc in 18 seconds.

Time	April 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	200	4.0					2.4
01	300	4.0					2.8
02	280	3.9					2.8
03	250	3.7					2.2
04	250	3.5					3.0
05	260	3.6	—	—	—	—	2.1
06	250	4.8	—	—	130	1.9	3.4
07	250	5.5	250	3.6	110	2.5	2.8
08	280	5.9	240	4.0	110	2.8	3.3
09	300	6.4	240	4.3	110	3.0	3.5
10	300	6.5	240	4.4	110	3.1	3.1
11	310	6.9	240	4.5	110	3.2	4.2
12	320	6.8	230	4.5	110	3.2	4.1
13	310	7.2	220	4.4	110	3.2	3.8
14	300	7.4	240	4.3	110	3.0	3.1
15	290	7.0	240	4.1	110	3.0	3.2
16	230	6.8	240	3.7	110	2.6	3.5
17	260	6.3	250	3.4	120	2.2	3.3
18	250	6.1	—	—	—	—	3.1
19	250	5.9					3.2
20	250	5.3					3.0
21	270	4.6					2.8
22	200	4.4					2.8
23	300	4.2					2.8

Time: 135.0°E.

Sweep: 0.85 Mc to 22.0 Mc in 2 minutes.

Time	April 1953*						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	260	3.9					3.2
01	250	4.0					3.2
02	240	4.1					3.3
03	220	3.6					2.6
04	230	3.3					3.5
05	250	2.9					3.3
06	220	4.8	—	—	—	—	3.5
07	210	5.7	—	—	110	2.3	3.7
08	220	6.1	—	—	100	2.7	4.4
09	230	6.4	—	—	100	3.0	5.8
10	250	6.9	—	—	100	3.2	6.5
11	270	7.0	200	4.9	—	—	5.2
12	260	8.7	210	4.8	—	—	5.7
13	270	8.7	200	4.5	100	3.3	6.2
14	260	9.1	200	4.5	100	3.4	5.8
15	250	9.5	220	4.4	100	3.2	5.8
16	240	9.8	200	4.1	100	3.0	4.8
17	230	9.1	220	—	100	2.7	4.4
18	220	8.1	—	—	100	2.1	5.1
19	210	7.0					4.2
20	210	6.0					4.2
21	(240)	(4.9)					4.2
22	(260)	(4.2)					4.5
23	260	4.0					3.2

Time: 135.0°E.

Sweep: 1.0 Mc to 20.0 Mc in 15 minutes, manual operation.

\*Observations taken April 17, 13th hour, through April 30, only.

Time	April 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	310	(3.8)					(2.8)
01	320	3.7					2.8
02	300	(4.0)					(2.8)
03	300	3.6					2.9
04	290	3.6					3.0
05	300	4.2					3.1
06	280	4.6	270	3.2	120	2.0	3.2
07	290	5.4	250	3.6	120	2.4	3.1
08	320	5.9	240	3.8	120	2.6	3.0
09	320	6.0	250	3.9	110	3.0	3.0
10	310	6.2	240	4.2	110	3.0	3.0
11	350	6.1	220	4.2	120	3.0	3.0
12	330	6.1	250	4.2	120	3.0	3.0
13	330	6.2	230	4.2	120	3.0	3.0
14	320	6.3	260	4.0	120	3.0	3.0
15	300	6.2	260	3.9	120	2.8	3.0
16	300	6.0	260	3.6	120	2.5	3.0
17	300	5.7	260	3.3	120	2.1	3.1
18	280	5.7					3.0
19	270	5.7					3.0
20	300	4.3					3.0
21	290	4.4					2.9
22	300	4.2					2.8
23	300	(4.6)					(2.9)

Time: 135.0°E.

Sweep: 1.0 Mc to 15.5 Mc in 2 minutes.

Time	April 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	300	4.0					2.3
01	300	4.0					2.2
02	280	4.1					2.2
03	250	3.9					2.2
04	260	3.2					2.3
05	260	3.5					2.2
06	240	5.0	—	—	140	2.0	2.8
07	250	5.6	240	3.8	120	2.5	3.4
08	270	6.2	240	4.1	110	2.8	4.4
09	300	6.6	230	4.4	110	3.0	4.5
10	310	6.7	220	4.4	110	3.2	4.8
11	300	7.8	230	4.5	110	3.2	5.0
12	320	7.9	230	4.6	110	3.2	5.0
13	300	8.1	240	4.5	110	3.2	4.9
14	300	8.0	240	4.4	110	3.2	4.7
15	280	8.0	240	4.2	110	3.0	4.3
16	270	7.8	240	3.9	120	2.7	3.7
17	260	7.2	250	3.5	120	2.2	4.0
18	250	6.7	—	—	—	—	3.5
19	240	6.4					3.2
20	240	5.2					3.1
21	270	4.3					2.6
22	300	4.4					3.0
23	300	4.0					2.6

Time: 135.0°E.

Sweep: 1.0 Mc to 17.2 Mc in 2 minutes.

Time	April 1953						
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs
00	250	3.6					2.3
01	260	3.6					3.0
02	250	3.8					3.1
03	240	3.7					3.2
04	240	3.6					3.2
05	250	3.2					2.6
06	240	2.8					3.1
07	230	4.5					3.5
08	240	5.7	220	3.2			2.7
09	260	6.3	220	4.0			3.0
10	260	6.6	220	4.2			3.4
11	260	6.8	200	4.4			3.5
12	280	7.0	220	4.4			3.7
13	270	7.4	200	4.5			3.3
14	270	7.6	210	4.4			3.6
15	260	7.4	220	4.2			3.6
16	250	6.7	220	3.8			3.3
17	230	6.0					2.2
18	220	5.2					2.7
19	220	3.9					2.6
20	240	3.3					2.0
21	250	3.4					2.4
22	260	3.4					2.0
23	260	3.5					2.7

Time: 120.0°E.

Sweep: 1.0 Mc to 16.0 Mc in 2 minutes.

Table 37

Wakkanai, Japan (45.4°N, 141.7°E)								March 1953	
Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	
00	300	3.4						2.8	
01	300	3.2						3.0	
02	200	3.2						2.9	
03	280	3.2						3.0	
04	280	3.1						2.9	
05	280	3.0						2.9	
06	260	3.9		---	E			3.1	
07	260	4.8	260	3.2	120	1.8		3.2	
08	280	6.4	230	3.8	120	2.6		3.2	
09	300	6.0	240	3.9	120	2.7		3.2	
10	290	6.0	230	4.0	110	2.7		3.2	
11	300	6.5	230	3.9	110	2.8		3.1	
12	300	7.0	240	3.9	120	2.9		3.1	
13	290	7.0	240	4.0	120	2.8		3.1	
14	290	6.7	250	3.9	110	2.8		3.2	
15	280	6.2	240	3.7	120	2.6		3.2	
16	260	5.8	260	3.4	120	2.2		3.2	
17	250	5.5	---	---	130	1.6		3.2	
18	250	4.7						3.1	
19	260	3.9						3.0	
20	260	3.2						3.0	
21	300	3.3						2.9	
22	300	3.3						3.0	
23	300	3.4						2.9	

Time: 135.0°E.

Sweep: 1.0 Mc to 15.6 Mc in 2 minutes.

Table 39

Tokyo, Japan (35.7°N, 139.5°E)								March 1953	
Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	
00	280	3.6						2.1	2.9
01	270	3.6						2.1	2.9
02	260	3.5						2.3	3.0
03	250	3.5						2.3	3.1
04	240	3.0						2.3	3.1
05	250	3.0						2.0	3.0
06	230	4.1						3.3	
07	240	5.3	240	---	120	1.8	2.3	3.3	
08	250	5.9	230	3.7	110	2.5		3.4	
09	270	6.3	220	4.1	110	2.8		3.3	
10	280	6.9	220	4.3	110	3.0		3.2	
11	280	7.4	220	4.4	110	3.1		3.1	
12	280	8.4	230	4.4	110	3.2	4.0	3.2	
13	280	8.2	230	4.3	110	3.1		3.2	
14	270	7.4	230	4.2	110	3.0		3.2	
15	270	6.8	230	4.0	110	2.8		3.3	
16	250	6.5	240	3.6	120	2.5	3.1	3.3	
17	240	6.4	240	2.6	130	1.9	2.6	3.3	
18	230	6.0						2.6	3.4
19	230	4.5						2.6	3.2
20	260	3.8						2.4	3.0
21	280	3.7						2.2	2.9
22	300	3.6						2.0	2.8
23	300	3.6						2.2	2.8

Time: 135.0°E.

Sweep: 1.0 Mc to 17.2 Mc in 2 minutes.

Table 41

Rarotonga I. (21.3°S, 159.8°W)								February 1953	
Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	
00	290	5.9						3.0	2.9
01	260	5.7						3.1	
02	250	4.7						2.9	
03	280	3.8						2.9	
04	300	3.9						2.8	
05	<300	3.8						2.9	
06	<270	3.8						2.6	
07	250	6.1	---	---	110	2.1	3.4	3.2	
08	280	7.4	240	4.2	110	2.7	4.0	3.2	
09	300	7.7	220	4.4	110	3.0	4.2	3.1	
10	300	8.8	210	4.5	110	3.2	4.4	3.1	
11	320	8.8	210	4.6	110	3.4	4.5	3.0	
12	300	9.2	200	4.6	110	3.4	4.6	3.0	
13	300	9.4	200	4.6	110	3.4	4.6	3.1	
14	290	9.4	200	4.6	110	3.3	4.5	3.1	
15	300	8.4	200	4.6	110	3.2	4.4	3.1	
16	300	7.9	200	4.5	110	3.1	4.5	3.1	
17	300	7.7	200	4.5	110	2.9	4.4	3.0	
18	280	7.5	---	---				3.8	
19	260	7.5	---	---				3.0	
20	260	6.5						3.9	
21	260	6.4						3.6	
22	290	6.0						2.9	
23	290	5.7						2.9	

Time: 157.5°W.

Sweep: 2.0 Mc to 16.0 Mc, manual operation.

Table 38

Akita, Japan (39.7°N, 140.1°E)								March 1953	
Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	
00	290	3.6						2.2	3.0
01	280	3.6						2.2	3.0
02	270	3.6						2.2	3.1
03	250	3.5						2.2	3.1
04	250	3.3						2.2	3.1
05	260	3.2						2.2	3.1
06	230	4.1						1.8	2.6
07	240	5.2	240	3.2	120	1.9		1.8	2.6
08	250	5.7	230	3.5	110	2.5	3.0		3.4
09	270	6.0	230	4.0	110	3.8	3.6		3.3
10	280	6.9	220	4.2	110	2.9	3.6		2.3
11	280	7.4	230	4.3	110	3.0	3.7		2.2
12	280	7.6	230	4.3	110	3.1	3.5		2.2
13	280	7.5	230	4.3	110	3.1	3.5		3.2
14	270	7.0	230	4.1	110	3.0	3.2		3.2
15	270	7.0	230	4.1	110	3.0	3.2		3.3
16	250	6.0	240	3.9	120	3.0	3.2		3.2
17	250	5.7	240	3.9	120	3.0	3.2		3.0
18	250	5.7	240	3.9	120	3.0	3.2		3.0
19	240	5.7	240	3.9	120	3.0	3.2		3.0
20	260	6.6	230	3.9	120	3.0	3.2		3.0
21	260	6.4	230	3.9	120	3.0	3.2		3.0
22	290	6.0	230	3.9	120	3.0	3.2		2.9
23	290	5.7	230	3.9	120	3.0	3.2		2.9

Time: 135.0°E.

Sweep: 1.0 Mc to 22.0 Mc in 6 minutes, automatic operation.

Table 40

Yamagawa, Japan (31.2°N, 130.6°E)								March 1953	
Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	
00	290	3.2						2.9	
01	270	3.3						3.1	
02	270	3.3						3.1	
03	260	3.4						3.3	
04	220	3.4						3.2	
05	250	2.7						3.1	
06	260	2.8						2.5	
07	220	4.4						3.4	
08	240	6.4						3.2	
09	260	6.2						3.2	
10	280	6.6						2.9	
11	290	7.0						2.9	
12	310	7.8	210	4.5	100	3.3	4.0		2.9
13	310	8.7	210	4.5	100	3.4	4.0		3.0
14	300	9.4	210	4.6	100	3.4	4.0		3.0
15	290	9.3	210	4.4	110	3.2	4.0		3.1
16	280	8.9	220	4.2	120	3.1	3.8		3.2
17	270	9.0	230	4.2	110	2.9	3.8		3.3
18	250	8.2	250	4.2	110	2.9	3.6		3.4
19	240	7.2							3.4
20	260	6.6							3.2
21	280	5.8							3.0
22	300	5.7							2.9
23	300	5.8							2.9

Time: 135.0°E.

Sweep: 1.0 Mc to 26.0 Mc in 30 seconds.

Table 42

Buenoe Aires, Argentina (34.5°S, 58.5°W)								February 1953	
Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2	
00	270	5.4						2.9	</

Table 43

Christchurch, New Zealand ( $43.6^{\circ}\text{S}$ , $172.7^{\circ}\text{E}$ ) February 1953						
Time	h'F2	foF2	h'Fl	foFl	h'E	foE
						(M3000)F2
00	270	4.4			3.5	3.0
01	270	4.0			2.2	3.0
02	260	3.7			2.5	3.0
03	260	3.2			2.7	3.1
04	270	2.6			—	3.1
05	270	2.8			1.1	3.0
06	250	3.9	240	(3.3)	1.8	3.4
07	270	4.7	230	3.6	2.3	3.3
08	300	5.0	230	4.0	2.7	3.3
09	220	5.4	220	4.2	2.8	4.1
10	310	5.6	220	4.3	3.0	4.4
11	320	5.8	200	4.3	3.2	4.5
12	320	6.1	210	4.4	3.3	4.2
13	300	5.9	220	4.4	3.3	3.8
14	320	5.9	230	4.3	3.2	3.2
15	320	5.8	220	4.2	3.1	4.0
16	310	5.6	220	4.1	2.8	3.2
17	280	5.5	230	3.8	2.5	3.8
18	270	5.4	240	3.3	2.0	3.1
19	260	5.7			1.3	3.1
20	250	6.0			3.0	3.0
21	260	5.8			3.4	3.0
22	260	5.2			3.5	3.1
23	270	4.7			4.0	2.9

Time:  $172.5^{\circ}\text{E}$ .

Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 45\*

Inverness, Scotland ( $57.4^{\circ}\text{N}$ , $4.2^{\circ}\text{W}$ ) January 1953						
Time	h'F2	foF2	h'Fl	foFl	h'E	foE
						(M3000)F2
00	320	(1.8)				(2.6)
01	305	(1.6)			2.1	
02	310	(1.5)			2.3	(2.8)
03	315	1.5			1.4	(2.6)
04	305	1.4			2.4	(2.9)
05	285	(1.6)			2.3	(2.9)
06	285	1.8				(3.0)
07	(310)	< 1.6			2.2	
08	255	2.3			2.1	(3.0)
09	225	4.3		(145)	(1.7)	2.5
10	225	5.2		(140)	1.9	2.4
11	235	5.9	(225)	(3.0)	2.1	2.3
12	235	6.3	(220)	(3.0)	2.2	2.3
13	235	6.2	(225)	(3.0)	2.2	2.4
14	235	5.9	(230)	(2.9)	2.1	2.2
15	225	5.6		(160)	1.9	2.0
16	220	4.9		(165)	(1.7)	2.4
17	225	4.2				3.3
18	255	2.8				3.3
19	305	2.1				(3.1)
20	(320)	(1.8)				(3.0)
21	325	(1.7)				(3.0)
22	345	(1.6)				
23	330	(1.6)				(2.8)

Time:  $0.0^{\circ}$ .

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

\*Average values except foF2 and fEs, which are median values.

Table 47\*

Khartoum, Sudan ( $15.6^{\circ}\text{N}$ , $32.6^{\circ}\text{E}$ ) January 1953						
Time	h'F2	foF2	h'Fl	foFl	h'E	foE
						(M3000)F2
00	275	4.2				3.0
01	250	4.2				3.3
02	230	3.5			(0.9)†	3.3
03	220	2.1			(0.9)†	1.6
04	260	1.3			(1.0)†	1.8
05	270	1.2			(1.0)†	2.6
06	260	2.6			(1.8)	1.7
07	240	(6.2)	220		2.1	3.2
08	290	7.8	230	4.3	2.6	4.3
09	290	8.8	220	4.4	120	3.1
10	310	9.1	220	4.4	120	3.3
11	340	8.9	220	4.6	120	3.4
12	320	9.1	210	4.6	120	3.4
13	310	9.4	230	4.6	120	3.4
14	290	9.2	220	4.5	120	3.2
15	280	9.4	230	4.4	120	3.0
16	260	8.8	230	4.0	120	2.6
17	250	8.2			1.9	5.4
18	240	8.0			3.1	3.3
19	250	7.0			3.1	3.2
20	250	6.3			2.6	3.2
21	250	6.0				2.9
22	250	5.7			2.6	3.1
23	280	4.7			1.6	2.9

Time:  $30.0^{\circ}\text{E}$ .

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

\*Average values except foF2 and fEs, which are median values.

†One or two observations only.

Table 44

Deception I. ( $63.0^{\circ}\text{S}$ ,  $60.7^{\circ}\text{W}$ )

February 1953

Time	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	280	6.3						3.0
01	280	6.2						3.0
02	270	5.8						3.1
03	280	5.5						3.0
04	280	5.4						3.0
05	250	5.5						3.2
06	260	5.0						2.5
07	260	5.0						3.0
08	260	4.8						4.0
09								
10	(270)	5.3						5.5
11	(280)	5.8						4.8
12								
13	260	5.7						4.5
14	300	5.3						4.5
15	280	5.5						4.0
16	280	5.4						(3.4)
17								
18	260	5.5						3.5
19	270	5.8						3.4
20	260	6.0						3.2
21	260	6.0						(3.2)
22	280	6.0						3.1
23	280	6.3						3.0

Time:  $60.0^{\circ}\text{W}$ .

Sweep: 1.5 Mc to 16.0 Mc in 15 minutes, manual operation.

Table 48\*

Singapore, British Malaya ( $1.3^{\circ}\text{N}$ , $103.8^{\circ}\text{E}$ ) January 1953							
Time	h'F2	foF2	h'Fl	foFl	h'E	foE	
						(M3000)F2	
00	245	3.6					2.8
01	265	3.3					1.6
02	280	2.9					2.6
03	280	2.4					2.9
04	275	2.2					1.9
05	270	1.9					1.9
06	290	2.6					3.4
07	245	5.4			(125)	2.0	3.1
08	330	6.3	225		(120)	2.7	4.7
09	325	7.1	215		4.4	3.1	6.4
10	420	7.6	205		4.5	3.3	5.6
11	440	8.0	200		4.6	110	3.4
12	425	7.8	205		4.6	110	3.5
13	415	8.0	200		4.6	110	3.5
14	385	8.4	200		4.6	110	3.4
15	375	8.4	210		4.5	110	3.2
16	360	8.4	225		4.3	115	2.9
17	305	8.4	245		120	2.4	3.6
18	285	8.0					2.5
19	290	7.8					3.0
20	290	8.8					2.8
21	270	6.4					2.7
22	240	6.0					2.9
23	235	4.3					3.2

Time:  $105.0^{\circ}\text{E}$ .

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

\*Average values except foF2 and fEs, which are median values.

Table 49

Time	January 1953							
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	270	6.4					3.8	3.0
01	250	5.9					3.8	3.0
02	<290	5.0					3.5	2.9
03	280	4.5					3.0	2.9
04	300	4.4					3.0	2.9
05	290	4.4					3.0	2.9
06	260	4.2					3.2	3.0
07	250	6.0	250	3.9	110	2.5	4.2	3.0
08	320	6.9	220	4.3	110	3.0	4.4	3.0
09	330	8.0	220	4.5	110	3.2	4.6	3.0
10	340	9.1	220	4.7	110	3.3	4.8	3.9
11	350	10.5	220	4.8	110	3.4	4.8	2.8
12	310	11.4	200	4.7	110	3.5	5.0	3.0
13	300	12.0	210	4.6	110	3.5	4.5	3.0
14	300	10.3	210	4.6	110	3.4	4.7	3.1
15	300	8.7	220	4.5	110	3.3	4.4	3.0
16	310	7.6	220	4.3	110	3.1	4.2	3.1
17	300	7.0	250	4.3	110	2.9	4.5	3.1
18	260	6.9	230	3.5	120	2.3	4.0	3.0
19	290	6.3					4.4	2.8
20	310	5.6					4.2	2.8
21	310	6.7					3.8	2.8
22	300	6.5					3.7	2.8
23	300	6.5					3.5	2.9

Time: 157.5°W.

Sweep: 2.0 Mc to 16.0 Mc, manual operation.

Table 51

Time	January 1953							
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	170	4.8					2.8	2.9
01	260	4.4					2.6	3.0
02	260	3.7					3.2	3.0
03	270	2.8					3.3	3.0
04	280	2.6					2.8	3.0
05	270	3.8	280	---		1.6	3.2	
06	330	4.4	240	3.6		2.2	3.8	3.1
07	330	5.1	240	3.9		2.6	4.2	3.0
08	330	5.3	220	4.1		2.8	5.4	3.0
09	330	5.6	220	4.3		3.1	4.4	3.0
10	330	5.8	220	4.4		3.2	4.3	3.0
11	340	6.0	210	4.5		3.3	5.7	3.1
12	350	5.9	200	4.4		3.3	4.2	2.9
13	350	5.8	220	4.4		3.3	4.3	3.0
14	360	5.7	220	4.4		3.5	4.2	3.0
15	340	5.7	220	4.3		3.2	5.9	3.0
16	330	5.7	220	4.2		2.9	5.2	3.0
17	320	5.7	220	3.9		2.7	4.3	3.0
18	300	5.5	240	3.4		2.3	4.0	3.0
19	270	5.7	270	2.7		1.8	3.0	
20	260	6.2				1.4	4.0	2.9
21	270	6.5					4.0	2.9
22	270	6.0					3.2	2.9
23	270	5.5					3.3	2.9

Time: 172.5°E.

Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

\*From 1000, January 11, to 2300, January 11, observations were taken at Godley Head (43.6°S, 172.8°E).

Table 52

Time	December 1952							
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	290	5.6					2.9	2.7
01	290	5.3					3.1	
02	280	6.2					2.6	2.8
03	300	6.1					2.7	
04	280	6.1	260	145	110	1.6	2.7	
05	305	6.5	250	(3.5)	130	2.1	2.6	2.7
06	310	6.2	250	3.8	120	2.5	3.1	2.7
07	370	6.1	240	4.1	110	2.8	5.0	2.7
08	350	6.4	250	4.3	110	3.0	5.3	2.8
09	360	6.2	230	4.3	105	3.1	5.9	2.7
10	370	6.3	230	4.5	105	3.2	5.5	2.8
11	370	6.9	230	4.5	105	3.3	4.8	2.8
12	365	6.6	235	4.5	105	3.4	5.9	2.8
13	350	6.7	235	4.5	105	3.4	5.6	2.8
14	335	6.6	240	4.5	105	3.3	4.8	2.9
15	340	6.2	230	4.3	105	3.1	4.8	2.9
16	315	6.2	250	4.2	115	2.9	5.0	3.0
17	300	6.1	240	4.0	115	2.7	4.6	3.0
18	305	5.9	240	3.7	120	2.3	3.9	2.9
19	270	6.0	250		130	1.9	4.2	2.9
20	280	6.2					3.8	2.8
21	295	6.6					3.1	2.8
22	300	6.7					3.0	2.6
23	300	6.8					2.5	2.6

Time: 60.0°W.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

\*Average values except foF2 and fEs, which are median values.

Table 50

Time	January 1953							
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	290	5.5					3.2	2.9
01	290	5.2					3.4	3.0
02	290	5.0					4.0	3.1
03	260	4.4					2.5	3.0
04	280	4.0					3.0	3.0
05	260	4.2					2.2	3.1
06	280	5.0	240	---	120	2.1	3.7	3.3
07	300	5.4	230	4.2	110	2.2	4.1	2.9
08	350	5.8	210	4.3	110	3.0	4.3	2.7
09	400	6.7	200	4.4	110	3.2	4.4	2.6
10	400	8.1	200	4.5	100	3.3	4.8	2.7
11	370	8.4	200	4.5	100	3.3	4.6	2.8
12	350	9.2	200	4.6	100	3.4	4.6	2.9
13	320	9.4	200	(4.5)	110	3.4	4.6	2.9
14	300	9.7	200	4.6	100	3.3	4.3	3.0
15	290	9.9	200	4.3	100	3.2	4.0	3.2
16	280	8.8	210	4.2	110	3.1	4.1	3.2
17	280	6.9	220	---	110	3.0	4.1	3.3
18	270	6.5	230	---	---	---	3.5	3.1
19	260	6.4	230	---	---	---	3.1	2.9
20	250	6.0	230	---	---	---	2.9	2.8
21	250	5.6	230	---	---	---	2.8	2.8
22	250	5.7	230	---	---	---	3.1	2.8
23	250	5.9	230	---	---	---	3.1	2.9

Time: 60.0°W.

Sweep: 1.0 Mc to 18.0 Mc in 30 seconds.

Table 52

Time	December 1952							
	h'F2	foF2	h'Fl	foFl	h'E	foE	fEs	(M3000)F2
00	270	8.2						
01	275	8.2						
02	275	8.1						
03	285	8.1						
04	295	(7.3)	(230)	(3.0)				
05	(295)	7.5	(225)	(3.6)				
06	(305)	6.8	(220)	(3.7)	(110)	(2.4)		
07	(300)	6.2			(3.8)	(100)	(2.7)	
08	325	5.7			(4.1)	(105)	(2.8)	4.6
09	315	5.9			(4.2)	(105)	(3.0)	3.6
10		(5.9)						
11	320	5.2			(4.3)	(105)	(3.1)	4.7
12	350	5.4			(4.2)	(105)	(3.1)	5.3
13		(5.6)						
14		(5.3)						
15	(340)	(5.3)						
16	(310)	5.3						
17	(325)	(5.4)						
18	(295)	5.8	(215)	(3.7)				
19	(285)	(6.0)	(230)	(3.6)				
20	280	6.1	(235)	(3.3)				
21	(265)	6.0	(245)					
22	(275)	(6.8)						
23	270	7.0						

Time: 60.0°W.

Sweep: 1.1 Mc to 16.0 Mc, manual operation.

\*Average values except foF2 and fEs, which are median values.

Table 55\*

Ibadan, Nigeria ( $7.4^{\circ}\text{N}$ , $4.0^{\circ}\text{E}$ )							November 1952	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	245	(7.6)						
01	250	(7.2)						
02	250	—						
03	240	5.2						
04	225	4.4						
05	225	3.1						
06	250	5.3						
07	240	7.5	(235)		120	1.8	2.4	
08	(250)	8.4	220		110	2.7		
09	(320)	7.9	205	(4.5)	110	3.4	5.1	
10	330	7.8	205	4.5	110	3.4	5.2	
11	335	7.8	205	4.6	110	3.5	5.2	
12	340	8.0	200	4.6	105	3.5	5.5	
13	335	8.1	200	(4.6)	105	3.4	5.6	
14	(320)	8.3	210	(4.5)	105	3.3	5.4	
15	(300)	8.5	215		110	3.0	5.0	
16	(220)	8.7	(230)		110	(2.6)	4.9	
17	260	8.6			115	1.8		
18	225	8.3				2.2		
19	310	>8.0						
20	280	8.6						
21	250	8.9						
22	235	7.7						
23	245	(7.5)						

Time:  $0.0^{\circ}$ .

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

\*Average values except foF2 and fEs, which are median values.

Table 56\*

Tananarive, Madagascar ( $18.8^{\circ}\text{S}$ , $47.8^{\circ}\text{E}$ )							October 1952	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	5.2						3.1
01	230	4.8						3.3
02	240	3.6						3.0
03	255	3.0						3.0
04	260	2.8						3.0
05	270	2.8						3.0
06	240	4.9						3.4
07	260	5.2	238		140	1.9	1.9	3.3
08	285	7.0	225	4.4	115	2.9	3.0	3.2
09	290	7.4	220	4.6	113	3.2	3.2	3.1
10	310	7.6	220	4.7	117	3.4	3.2	3.0
11	310	8.0	215	4.7	117	3.4	3.2	3.0
12	305	9.0	210	4.7	119	3.5	3.2	3.0
13	300	9.0	220	4.7	115	3.4	3.1	3.0
14	300	8.6	230	4.6	115	3.3	3.2	3.0
15	300	8.6	230	4.5	113	3.1	3.1	3.0
16	280	8.5	235	4.2	120	2.8	3.1	3.1
17	260	8.6	240	—	123	2.3	5.1	3.1
18	230	8.4	—	—	—	—	2.5	3.2
19	235	7.6	—	—	—	—	2.4	3.1
20	240	7.0	—	—	—	—	2.2	3.1
21	245	5.8	—	—	—	—	—	3.1
22	255	5.2	—	—	—	—	—	3.0
23	270	5.2	—	—	—	—	—	2.9

Time: Local.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Table 57

Lulea, Sweden ( $65.6^{\circ}\text{N}$ , $22.1^{\circ}\text{E}$ )							September 1952	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	345	(2.6)				2.6		
01								
02	340	(2.4)				1.9		
03								
04	(310)	2.3						
05								
06	295	3.8	245	—	E			
07								
08	315	4.5	230	3.8	120	2.5		
09								
10	300	5.2	215	3.9	120	2.7		
11								
12	300	5.5	210	4.0	110	2.7		
13								
14	290	5.5	230	—	115	2.6		
15								
16	265	4.9	245	—	125	2.2		
17								
18	260	4.1	—	—	E			
19								
20	285	(3.0)	—	—	E	2.6		
21								
22	330	(2.5)	—	—	—	—		
23								

Time:  $15.0^{\circ}\text{E}$ .

Sweep: 1.5 Mc to 10.0 Mc in 6 minutes, automatic operation.

Table 58\*

Ibadan, Nigeria ( $7.4^{\circ}\text{N}$ , $4.0^{\circ}\text{E}$ )							September 1952	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	270	—						
01	(260)	(6.8)						2.0
02	(365)	>5.6						1.7
03	(250)	(4.0)						1.8
04	(240)	(2.3)						
05	(235)	(3.3)						1.8
06	(235)	(6.4)						
07	(240)	(7.8)	(225)		(121)	(2.0)	(2.3)	
08	(9.2)	(215)			(115)	(2.8)	4.2	
09	9.2	210			(110)	(3.1)	(5.6)	
10	(340)	8.4	(200)	(4.8)	(107)	(3.4)	10.2	
11	(345)	8.1	200	(4.5)	(107)	(3.5)	11.0	
12	(340)	8.6	200	(4.8)	(100)	(3.6)	12.0	
13	(330)	8.8	200	(4.8)	(106)	(3.6)	10.6	
14	(315)	9.1	(200)	(4.6)	(107)	(3.4)	11.3	
15	(300)	9.6	(200)	(4.2)	(110)	(3.1)	7.2	
16	(260)	(9.7)	(205)		(110)	(2.6)	5.3	
17	(260)	9.8	(250)	—	122	(1.9)	3.6	
18	280	10.0	—	—	—	—	2.2	
19	305	9.2	—	—	—	—	—	
20	300	—	—	—	—	—	—	
21	265	—	—	—	—	—	—	
22	255	—	—	—	—	—	—	
23	265	—	—	—	—	—	—	

Time:  $0.0^{\circ}$ .

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

\*Average values except foF2 and fEs, which are median values.

†Indicates less than 5 values.

Table 59

Ibadan, Nigeria ( $7.4^{\circ}\text{N}$ , $4.0^{\circ}\text{E}$ )							August 1952	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	285	>5.0						
01	270	(4.3)						
02	260	(4.2)						
03	255	(3.8)						
04	(245)	(3.2)						
05	250	(1.8)						
06	250	5.1						
07	260	7.1	235		115	2.7		
08	310	8.2	215		110	3.1	4.8	
09	335	8.7	210	4.5	105	3.5	5.0	
10	365	8.3	205	4.6	105	3.7	5.0	
11	380	7.8	200	4.7	110	3.8	5.0	
12	375	7.6	200	4.7	108	3.8	5.4	
13	370	7.9	200	4.6	105	3.6	5.2	
14	365	8.2	200	4.5	110	3.5	5.2	
15	345	8.2	200	4.3	110	3.2	4.6	
16	265	8.5	200		110	2.7		
17	260	9.0	235		115	2.3		
18	270	9.2	—		130	1.6		
19	295	—	—	—	—	—	—	
20	300	—	—	—	—	—	—	
21	295	—	—	—	—	—	—	
22	265	—	—	—	—	—	—	
23	290	—	—	—	—	—	—	

Time:  $0.0^{\circ}$ .

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

\*Average values except foF2 and fEs, which are median values.

TABLE 6!  
Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.  
**IONOSPHERIC DATA**  
Observed at **Washington, D.C.**  
Lat. **38.7°N**, Long. **77.1°W**

Form adopted June 1946

**National Bureau of Standards**

(Institution)

**E.J.W.**Scaled by: **MCC.****MCC.****E.J.W.**Calculated by: **MCC.****MCC.****E.J.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	75°W Mean Time							
1	[210] <sup>s</sup>	[280] <sup>s</sup>	[280] <sup>s</sup>	[290] <sup>s</sup>	[290] <sup>s</sup>	[240] <sup>s</sup>	[240] <sup>s</sup>	[240]	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G			
2	[240] <sup>s</sup>	[260] <sup>s</sup>	[280] <sup>s</sup>	[280] <sup>s</sup>	S	[260] <sup>s</sup>	[310] <sup>s</sup>	G	G	G	G	G	G	G	G	G	A	G	A	G	A	G	G	G	G	G	G	G	G			
3	270	250	[490] <sup>s</sup>	[480] <sup>s</sup>	[280] <sup>s</sup>	[290] <sup>s</sup>	[280] <sup>s</sup>	G	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
4	270	A	S	[270] <sup>s</sup>	A	[240] <sup>a</sup>	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
5	270	[270] <sup>s</sup>	[320] <sup>s</sup>	[300] <sup>s</sup>	[290] <sup>s</sup>	280	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
6	[270] <sup>s</sup>	230	270	260	[250] <sup>s</sup>	[240]	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	
7	[270] <sup>s</sup>	260	240	[280] <sup>s</sup>	[260] <sup>s</sup>	[410] <sup>s</sup>	[440]	G	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
8	[280] <sup>s</sup>	[290] <sup>s</sup>	[280] <sup>s</sup>	[280] <sup>s</sup>	[300] <sup>s</sup>	[320] <sup>s</sup>	[250]	300	G	370	350	360	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
9	A	[490] <sup>s</sup>	S	A	S	240	250	400	G	360	380	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	
10	270	290	280	[260] <sup>s</sup>	270	[260]	300	420	370	480	320	A	G	400	490	420	350	370	330	420	370	330	300	270	240	240	240	240	240			
11	A	[280] <sup>s</sup>	A	A	[250] <sup>a</sup>	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
12	[270] <sup>s</sup>	[260] <sup>s</sup>	250	[260] <sup>s</sup>	[260] <sup>s</sup>	[250]	[230] <sup>a</sup>	G	G	440	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
13	240	[280] <sup>a</sup>	[340] <sup>s</sup>	[320] <sup>s</sup>	[290] <sup>s</sup>	[240] <sup>s</sup>	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
14	[270] <sup>a</sup>	270	280	250	[290] <sup>s</sup>	[250]	230	350	330	370	370	350	360	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370		
15	250	[280] <sup>s</sup>	250	250	[270] <sup>s</sup>	[280]	280	320	420	380	410	430	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380		
16	[280] <sup>s</sup>																															
17	270	260	250	[250] <sup>s</sup>	[250]	230	230	230	230	230	230	330	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360		
18	250	250	260	[250] <sup>s</sup>	[270] <sup>s</sup>	[230]	G	G	G	G	G	450	310	400	350	350	390	450	430	390	350	350	350	350	350	350	350	350	350	350	350	
19	[280] <sup>a</sup>																															
20	[280] <sup>a</sup>	[270] <sup>a</sup>	260	240	280	280	270	210	G	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
21	[270] <sup>a</sup>	280	280	[280] <sup>a</sup>	[270] <sup>s</sup>	250	G	[270] <sup>a</sup>	A	C	320	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360		
22	260	[240] <sup>a</sup>	[300] <sup>a</sup>	280	280	230	[260] <sup>a</sup>	[240] <sup>a</sup>	G	G	330 <sup>h</sup>	[330] <sup>a</sup>	440	400	400	[400] <sup>s</sup>	390	410	350	350	350	350	350	350	350	350	350	350	350	350	350	350
23	280	280	270	240	250	[280] <sup>s</sup>	[280]	210	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
24	[290] <sup>s</sup>	[300] <sup>s</sup>	[300] <sup>s</sup>	A	A	[210] <sup>s</sup>	[250]	G	G	330	370	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
25	[310] <sup>a</sup>	[290] <sup>a</sup>	[290] <sup>a</sup>	S	S	220	220	[380] <sup>s</sup>	[490] <sup>s</sup>	500	[380] <sup>s</sup>	360	520	390	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
26	[250] <sup>s</sup>	[290] <sup>s</sup>	[310] <sup>s</sup>	[270]	[300] <sup>s</sup>	[320] <sup>s</sup>	230	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
27	[300] <sup>s</sup>	[300] <sup>s</sup>	[310] <sup>s</sup>	E	F	S	230	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
28	[330] <sup>s</sup>	[300] <sup>s</sup>	S	E	E	E	[270] <sup>s</sup>	250	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
29	280	[280] <sup>s</sup>	270	[310] <sup>s</sup>	S	S	S	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
30	[280] <sup>s</sup>	[280] <sup>s</sup>	[280] <sup>s</sup>	[280] <sup>s</sup>	S	A	A	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
31	[300] <sup>a</sup>	270	250	[300] <sup>s</sup>	[300] <sup>s</sup>	[300] <sup>s</sup>	[300] <sup>s</sup>	430	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
Median	[270]	[280]	[280]	[280]	260	[300]	G	G	440	G	G	520	G	G	430	360	350	300	250	240	240	240	240	240	240	240	240	240	240	240	240	
Count	27	29	28	25	25	27	28	25	26	28	26	28	26	28	26	27	29	26	27	29	30	30	30	30	30	30	30	30	30	30	30	30

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual □ Automatic □

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

**foF2**      MC      JULY      1953  
(Characteristic)      (Unit)      (Month)

**IONOSPHERIC DATA**

Observed at      Washington, D.C.  
Lat 38.7°N, Long 77.1°W

Day	JULY												AUGUST													
	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	3.1 F	2.9 F	2.9 F	(2.6) P	2.6	<3.0 G	<3.3 G	<3.6 G	<3.8 G	4.2	<4.1 G	<4.2 G	<4.1 G	<4.2 G	4.3	(4.2) S	4.6	4.6	4.6	4.6	4.7	4.7	4.2 J	3.9		
2	3.3	3.4 S	(2.7) S	(2.2) S	(2.0) S	2.6 S	-3.6 S	<3.4 G	<3.7 G	<3.9 G	(4.2) H	<4.1 G	<4.1 G	<4.1 G	4.7	5.0 H	4.7	4.5	4.5	4.5	4.5	4.5	4.0 S	3.3 J		
3	3.0	2.8	2.3	(1.9) S	(1.6) S	2.4	<2.9 G	3.7	A	A	(4.4) P	<4.0 G	<4.1 G	<4.0 G	4.3	4.6	[5.0] A	5.2	4.4	4.2	3.9	(3.4) S				
4	2.8	2.5	2.3	1.9	[2.2] A	2.5	3.3	A	A	4.7	<4.0 G	<4.0 G	<4.2 G	4.5	<4.0 G	4.8	5.2	4.8	4.4	4.6	4.9	4.3	3.1	2.8 F		
5	2.6	2.2	2.1	1.9	(1.7) S	(2.3) S	<3.0 G	<3.4 G	<3.7 G	<3.9 G	<4.0 G	<4.1 G	<4.2 G	<4.2 G	4.5	<4.0 G	4.8	5.2	4.8	4.4	4.6	4.9	4.3	3.1		
6	3.2 J	(2.8) S	(2.1) S	(2.2) S	(2.0) S	2.7	<3.1 G	<3.5 G	<3.8 G	<4.2 G	<4.2 G	<4.1 G	<4.1 G	<4.1 G	4.5	4.8	5.2	5.2	5.4 S	4.8 S	[4.8] S	3.5 F				
7	(3.4) S	2.9 S	2.9	2.5	2.1	2.6	3.3	3.7	<3.9 G	A	(4.3) A	<4.1 G	A	[4.7] A	[4.8] A	A	A	4.7	4.7	4.7	4.7	4.8	4.9	4.1	(3.0) S	
8	2.1 J	1.8	1.6	1.6	1.7	2.6	3.6	<3.5 G	4.3	4.7	4.6	A	A	<4.2 G	<4.1 G	5.1	5.2	[5.4] A	5.6	[5.4] A	5.6	S A	A	A		
9	(2.4) A	(2.1) S	1.8	2.0	1.7	2.9	3.6	4.0 S	<3.8 G	<4.0 G	4.8	4.7	<4.2 G	<4.2 G	A	4.5	5.1	5.0	5.0	5.8	5.8	4.7	3.7	(3.1) A		
10	2.7	2.5	2.7	2.1	2.0	2.7	3.3	4.0	4.3	4.7	4	<4.3 G	<4.3 G	<4.3 G	4.8	4.7	4.7	4.5	5.2	5.5	4.2	3.7	3.2 J			
11	A	A	2.7	2.4	[2.4] A	2.9	4.2	A	[4.8] A	4.8	5.3	5.0	(5.2) S	5.4	5.2 G	5.0	[4.8] A	4.7	4.8	5.4	5.8	5.0	3.9	3.6		
12	3.2	3.2	(2.6) S	2.4 F	2.3 S	3.0	<3.4 G	<3.6 G	4.4	A	A	A	A	<5.0 G	4.9	[5.6] S	6.4	7.0	5.8	5.8	5.2	4.6 S	3.8			
13	2.8	[2.1] A	2.0	(1.9) A	1.9 F	2.4	<3.3 G	[<3.5] G	<3.8 G	<4.2 G	4.5 H	4.3 H	4.0	4.0	4.0	4.0	4.0	4.0	(4.1) S	(3.2) S						
14	[2.6] A	2.4 F	2.2 F	1.9 F	(1.8) F	2.6 S	3.4 S	4.2	4.7	4.7	5.0	(5.2) A	5.2	5.0	(4.6) A	5.1	5.4	5.1	5.5	5.4	5.4	4.8	4.5			
15	3.8	3.2	3.0	2.5	2.1	2.6	3.3	4.2	4.1	4.5	4.8	4.8	[4.9] A	5.0	4.7	4.8	4.7	4.9	4.8	4.9	5.0	4.3	[3.2] A	[2.8] A		
16	2.8	2.7	2.5	2.3	2.1 F	2.6	A	A	A	A	A	A	A	[5.0] A	4.9	4.9	5.2	5.1 H	5.0	5.4	5.7	4.8				
17	2.9	3.0	2.7 F	2.4	2.3	2.9	3.8	4.5	5.6	5.4 F	5.2	5.2	5.2	4.7	4.9	(4.1) H	5.0	5.0	5.2	4.8	4.1	3.8				
18	(3.5) S	3.4	2.9	2.4	2.3	2.8	<3.6 G	<3.7 G	4.3	5.0	4.9	5.2	5.0	4.8	4.9	4.9	4.8	4.7	5.2	5.3	4.7	4.0	3.8			
19	[3.4] A	3.1	2.8	1.5 J	2.3	2.7	3.5	<3.6 G	5.4	5.2	5.2	5.0	4.8	5.0	<4.2 G	4.9	5.0	5.6	5.8	5.6	4.8	[4.8] A	A	A		
20	(3.8) A	[3.4] A	3.1	(2.9) S	2.3	2.6	3.6	<3.7 G	A	4.9	4.9	A	A	<4.3 G	4.7	4.7	4.7	4.9	4.9	5.4	(4.2) S	3.6	3.3			
21	[3.0] A	(2.7) S	2.4 F	[2.3] A	2.0 F	2.5	<3.3 G	4.4 J	A	C	(5.0) A	5.1	[5.0] A	5.0 J	[5.0] A	5.0	4.9	5.2 H	5.8	A	A	5.3	[4.7] A	4.1		
22	3.7 F	3.2 F	2.5 F	(2.4) S	[2.2] S	(2.0) S	(2.9) A	3.7 J	<3.9 G	<4.0 G	(5.3) H	4.9	5.0	[5.0] C	4.9	4.8	5.0	5.2	[6.0] A	6.8	6.8	5.8	4.8	(4.2) S		
23	3.5	2.5	2.9	2.5	2.4	2.3	3.1	<3.4 G	<3.5 G	<3.7 G	<3.9 G	4.3	<4.0 G	<4.0 G	4.5	4.8	4.9	5.6	6.4	6.4	5.6	4.2	3.1			
24	2.8 F	1.9 F	1.7 S	A	2.2	2.9	[3.2] G	4.2	<4.6 G	[4.6] A	(4.5) H	(4.5) A	(4.6) P	4.7	4.6	4.7	4.9	4.9	4.7	4.7	4.7	3.7	3.3 S	3.1		
25	2.5	2.5	(2.4) S	F	2.0 F	2.5	<3.3 G	4.4 J	(4.0) H	4.2	(4.5) A	4.7	4.6	4.9	[5.0] A	5.1	4.8	4.9	4.9	4.9	4.9	4.9	4.5	4.1		
26	3.6 F	3.2	2.2 F	(2.9) S	2.4	2.7	(2.7) S	3.2 G	<3.5 G	<3.6 G	3.8 S	[3.8] G	4.0 G	[4.0] G	4.0 G	4.0 G	4.2 G	4.5	3.5							
27	2.5	2.5	2.2 S	1.9 S	1.9 S	2.1 F	2.9 F	<3.1 G	<3.5 G	<3.6 G	<3.7 G	3.9 G	<4.0 G	<4.0 G	4.5	4.8	4.9	3.9 G	4.2	3.9 G	3.7	3.2	2.6 S	2.4 S		
28	(3.5) F	(2.6) F	F	1.0 E	1.0 E	(2.1) S	2.7 F	<3.3 G	<3.5 G	<3.5 G	<3.7 G	3.8 G	<4.0 G	<4.0 G	4.0 G	4.0 G	4.0 G	[4.4] A	4.3	4.4	4.3	3.8	3.2	2.7 S	(2.5) S	
29	2.7 J	(2.2) F	2.2 F	(1.7) S	S	2.8 G	<3.1 G	<3.5 G	<3.8 G	<3.9 G	<3.9 G	4.0 G	<4.0 G	<4.0 G	4.1	4.1	4.2	3.8	3.6	3.1 J	3.1	2.9 S				
30	2.4 S	(2.3) S	2.0	[1.8] S	A	A	(2.8) J	<3.2 G	<3.6 G	<3.7 G	<3.8 G	<3.9 G	<4.0 G	<4.0 G	<4.0 G	4.4	4.3	4.0	4.3	4.1	4.2	3.0	2.6	2.5		
31	2.7	2.6	2.2 S	1.9 J	1.7 S	2.0	(3.1) S	<3.4 G	<3.6 G	<3.9 G	<4.0 G	4.4	<4.0 G	<4.0 G	4.4	4.4	4.4	4.5	4.3	3.9	3.2 J	2.9	2.8			
Median	2.8	2.6	2.4	2.2	2.0	2.6	3.3	<3.6	<3.8	<4.1	<4.4	<4.2	<4.3	<4.6	(4.6)	4.7	4.8	4.8	4.8	4.9	4.9	5.0	4.6	3.8	3.3	
Count	30	30	30	30	28	29	30	28	26	26	29	26	29	29	30	29	30	30	29	30	30	30	29	29		

Sweep 1 Q Mc to 25.0 Mc in 0.25 min

Automatic □

National Bureau of Standards

(Institution)

E.J.W.

MCC.      MCC.

Calculated by:

MCC.      MCC.

Calculated by:

E.J.W.

Calculated by:

TABLE 63  
IONOSPHERIC DATA $f_{0F2}$ , Mc (Characteristic)

Mc (Month)

JULY 1953

Observed at Washington, D.C.

Lat. 38°7'N, Long. 77°10'W

Day	75°W										Mean Time															
	00 30	01 30	02 30	03 30	04 30	05 30	06 30	07 30	08 30	09 30	10 30	11 30	12 30	13 30	14 30	15 30	16 30	17 30	18 30	19 30	20 30	21 30	22 30	23 30		
1	2.9	$\frac{1}{4}$	(3.0) <sup>2</sup>	(2.8) <sup>2</sup>	(2.6) <sup>2</sup>	(2.4) <sup>2</sup>	(2.2) <sup>2</sup>	(2.0) <sup>2</sup>	(1.8) <sup>2</sup>	(1.6) <sup>2</sup>	(1.4) <sup>2</sup>	(1.2) <sup>2</sup>	(1.0) <sup>2</sup>	(0.8) <sup>2</sup>	(0.6) <sup>2</sup>	(0.4) <sup>2</sup>	(0.2) <sup>2</sup>	(0.0) <sup>2</sup>	(-0.2) <sup>2</sup>	(-0.4) <sup>2</sup>	(-0.6) <sup>2</sup>	(-0.8) <sup>2</sup>	(-1.0) <sup>2</sup>	(-1.2) <sup>2</sup>		
2	3.2	$\frac{3}{4}$	2.3	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(1.9) <sup>2</sup>	(1.8) <sup>2</sup>	(1.7) <sup>2</sup>	(1.6) <sup>2</sup>	(1.5) <sup>2</sup>	(1.4) <sup>2</sup>	(1.3) <sup>2</sup>	(1.2) <sup>2</sup>	(1.1) <sup>2</sup>	(1.0) <sup>2</sup>	(0.9) <sup>2</sup>	(0.8) <sup>2</sup>	(0.7) <sup>2</sup>	(0.6) <sup>2</sup>	(0.5) <sup>2</sup>	(0.4) <sup>2</sup>	(0.3) <sup>2</sup>	(0.2) <sup>2</sup>	(0.1) <sup>2</sup>		
3	3.1	$\frac{2.5}{4}$	2.1	(1.8) <sup>2</sup>	(1.9) <sup>2</sup>	(2.0) <sup>2</sup>	(2.1) <sup>2</sup>	(2.2) <sup>2</sup>	(2.3) <sup>2</sup>	(2.4) <sup>2</sup>	(2.5) <sup>2</sup>	(2.6) <sup>2</sup>	(2.7) <sup>2</sup>	(2.8) <sup>2</sup>	(2.9) <sup>2</sup>	(3.0) <sup>2</sup>	(3.1) <sup>2</sup>	(3.2) <sup>2</sup>	(3.3) <sup>2</sup>	(3.4) <sup>2</sup>	(3.5) <sup>2</sup>	(3.6) <sup>2</sup>	(3.7) <sup>2</sup>	(3.8) <sup>2</sup>		
4	2.3	$\frac{3}{4}$	2.3	2.4	A	A	3.0	<3.3	C	<3.7	G	<3.5	G	<3.3	G	<3.1	G	<2.9	G	<2.7	G	<2.5	G	<2.3	G	
5	2.3	$\frac{1}{2}$	(2.2) <sup>2</sup>	(2.0) <sup>2</sup>	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(2.1) <sup>2</sup>	(2.2) <sup>2</sup>	(2.3) <sup>2</sup>	(2.4) <sup>2</sup>	(2.5) <sup>2</sup>	(2.6) <sup>2</sup>	(2.7) <sup>2</sup>	(2.8) <sup>2</sup>	(2.9) <sup>2</sup>	(3.0) <sup>2</sup>	(3.1) <sup>2</sup>	(3.2) <sup>2</sup>	(3.3) <sup>2</sup>	(3.4) <sup>2</sup>	(3.5) <sup>2</sup>	(3.6) <sup>2</sup>	(3.7) <sup>2</sup>	(3.8) <sup>2</sup>		
6	3.1	$\frac{2.5}{3}$	2.2	F	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(2.1) <sup>2</sup>	(2.2) <sup>2</sup>	(2.3) <sup>2</sup>	(2.4) <sup>2</sup>	(2.5) <sup>2</sup>	(2.6) <sup>2</sup>	(2.7) <sup>2</sup>	(2.8) <sup>2</sup>	(2.9) <sup>2</sup>	(3.0) <sup>2</sup>	(3.1) <sup>2</sup>	(3.2) <sup>2</sup>	(3.3) <sup>2</sup>	(3.4) <sup>2</sup>	(3.5) <sup>2</sup>	(3.6) <sup>2</sup>	(3.7) <sup>2</sup>	(3.8) <sup>2</sup>		
7	3.2	$\frac{1}{4}$	(2.8) <sup>2</sup>	(2.7) <sup>2</sup>	(2.6) <sup>2</sup>	(2.5) <sup>2</sup>	(2.4) <sup>2</sup>	(2.3) <sup>2</sup>	(2.2) <sup>2</sup>	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(1.9) <sup>2</sup>	(1.8) <sup>2</sup>	(1.7) <sup>2</sup>	(1.6) <sup>2</sup>	(1.5) <sup>2</sup>	(1.4) <sup>2</sup>	(1.3) <sup>2</sup>	(1.2) <sup>2</sup>	(1.1) <sup>2</sup>	(1.0) <sup>2</sup>	(0.9) <sup>2</sup>	(0.8) <sup>2</sup>	(0.7) <sup>2</sup>		
8	1.8	1.7	1.6	3	2.1	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	
9	(2.2) <sup>2</sup>	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(1.9) <sup>2</sup>	(1.8) <sup>2</sup>	(1.7) <sup>2</sup>	(1.6) <sup>2</sup>	(1.5) <sup>2</sup>	(1.4) <sup>2</sup>	(1.3) <sup>2</sup>	(1.2) <sup>2</sup>	(1.1) <sup>2</sup>	(1.0) <sup>2</sup>	(0.9) <sup>2</sup>	(0.8) <sup>2</sup>	(0.7) <sup>2</sup>	(0.6) <sup>2</sup>	(0.5) <sup>2</sup>	(0.4) <sup>2</sup>	(0.3) <sup>2</sup>	(0.2) <sup>2</sup>	(0.1) <sup>2</sup>	(0.0) <sup>2</sup>			
10	2.6	2.4	2.2	2.0	F	2.1	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.0	3.1	
11	(2.8) <sup>2</sup>	(2.6) <sup>2</sup>	(2.4) <sup>2</sup>	(2.2) <sup>2</sup>	(2.0) <sup>2</sup>	(1.8) <sup>2</sup>	(1.6) <sup>2</sup>	(1.4) <sup>2</sup>	(1.2) <sup>2</sup>	(1.0) <sup>2</sup>	(0.8) <sup>2</sup>	(0.6) <sup>2</sup>	(0.4) <sup>2</sup>	(0.2) <sup>2</sup>	(0.0) <sup>2</sup>	(-0.2) <sup>2</sup>	(-0.4) <sup>2</sup>	(-0.6) <sup>2</sup>	(-0.8) <sup>2</sup>	(-1.0) <sup>2</sup>	(-1.2) <sup>2</sup>	(-1.4) <sup>2</sup>	(-1.6) <sup>2</sup>	(-1.8) <sup>2</sup>		
12	3.2	3.1	2.5	F	2.7	2.8	2.9	2.4	3.3	3.6	3.9	3.6	3.3	3.0	2.7	2.4	2.1	A	A	A	A	A	A	A	A	
13	2.2	1.9	1.5	(1.8) <sup>2</sup>	(1.7) <sup>2</sup>	(1.6) <sup>2</sup>	(1.5) <sup>2</sup>	(1.4) <sup>2</sup>	(1.3) <sup>2</sup>	(1.2) <sup>2</sup>	(1.1) <sup>2</sup>	(1.0) <sup>2</sup>	(0.9) <sup>2</sup>	(0.8) <sup>2</sup>	(0.7) <sup>2</sup>	(0.6) <sup>2</sup>	(0.5) <sup>2</sup>	(0.4) <sup>2</sup>	(0.3) <sup>2</sup>	(0.2) <sup>2</sup>	(0.1) <sup>2</sup>	(0.0) <sup>2</sup>	(-0.1) <sup>2</sup>			
14	2.5	$\frac{1}{2}$	2.2	2.0	F	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(2.1) <sup>2</sup>	(2.2) <sup>2</sup>	(2.3) <sup>2</sup>	(2.4) <sup>2</sup>	(2.5) <sup>2</sup>	(2.6) <sup>2</sup>	(2.7) <sup>2</sup>	(2.8) <sup>2</sup>	(2.9) <sup>2</sup>	(3.0) <sup>2</sup>	(3.1) <sup>2</sup>	(3.2) <sup>2</sup>	(3.3) <sup>2</sup>	(3.4) <sup>2</sup>	(3.5) <sup>2</sup>	(3.6) <sup>2</sup>	(3.7) <sup>2</sup>		
15	3.3	3.1	2.1	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.0	3.1	
16	2.8	2.5	2.4	2.1	2.1	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.0	
17	3.0	2.8	2.6	2.4	2.2	2.3	2.5	2.3	2.5	2.7	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.0	3.1	3.2	3.3	
18	(3.3) <sup>2</sup>	3.0	2.8	(2.6) <sup>2</sup>	(2.5) <sup>2</sup>	(2.4) <sup>2</sup>	(2.3) <sup>2</sup>	(2.2) <sup>2</sup>	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(1.9) <sup>2</sup>	(1.8) <sup>2</sup>	(1.7) <sup>2</sup>	(1.6) <sup>2</sup>	(1.5) <sup>2</sup>	(1.4) <sup>2</sup>	(1.3) <sup>2</sup>	(1.2) <sup>2</sup>	(1.1) <sup>2</sup>	(1.0) <sup>2</sup>	(0.9) <sup>2</sup>	(0.8) <sup>2</sup>	(0.7) <sup>2</sup>	(0.6) <sup>2</sup>		
19	(2.2) <sup>2</sup>	3.0	2.6	(2.6) <sup>2</sup>	(2.4) <sup>2</sup>	(2.2) <sup>2</sup>	(2.0) <sup>2</sup>	(1.8) <sup>2</sup>	(1.6) <sup>2</sup>	(1.4) <sup>2</sup>	(1.2) <sup>2</sup>	(1.0) <sup>2</sup>	(0.8) <sup>2</sup>	(0.6) <sup>2</sup>	(0.4) <sup>2</sup>	(0.2) <sup>2</sup>	(0.0) <sup>2</sup>	(-0.2) <sup>2</sup>	(-0.4) <sup>2</sup>	(-0.6) <sup>2</sup>	(-0.8) <sup>2</sup>	(-1.0) <sup>2</sup>	(-1.2) <sup>2</sup>	(-1.4) <sup>2</sup>		
20	A	(3.2) <sup>2</sup>	3.1	(2.4) <sup>2</sup>	(2.5) <sup>2</sup>	(2.6) <sup>2</sup>	(2.7) <sup>2</sup>	(2.8) <sup>2</sup>	(2.9) <sup>2</sup>	(3.0) <sup>2</sup>	(3.1) <sup>2</sup>	(3.2) <sup>2</sup>	(3.3) <sup>2</sup>	(3.4) <sup>2</sup>	(3.5) <sup>2</sup>	(3.6) <sup>2</sup>	(3.7) <sup>2</sup>	(3.8) <sup>2</sup>	(3.9) <sup>2</sup>	(3.0) <sup>2</sup>	(3.1) <sup>2</sup>	(3.2) <sup>2</sup>	(3.3) <sup>2</sup>	(3.4) <sup>2</sup>		
21	2.8	F	2.7	(2.6) <sup>2</sup>	(2.5) <sup>2</sup>	(2.4) <sup>2</sup>	(2.3) <sup>2</sup>	(2.2) <sup>2</sup>	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(1.9) <sup>2</sup>	(1.8) <sup>2</sup>	(1.7) <sup>2</sup>	(1.6) <sup>2</sup>	(1.5) <sup>2</sup>	(1.4) <sup>2</sup>	(1.3) <sup>2</sup>	(1.2) <sup>2</sup>	(1.1) <sup>2</sup>	(1.0) <sup>2</sup>	(0.9) <sup>2</sup>	(0.8) <sup>2</sup>	(0.7) <sup>2</sup>	(0.6) <sup>2</sup>		
22	3.5	3.1	2.5	3.1	2.4	3.0	2.9	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	
23	3.1	2.5	2.1	2.1	2.4	2.4	2.3	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	
24	2.3	F	2.0	A	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
25	(2.5) <sup>2</sup>	(2.4) <sup>2</sup>	(2.4) <sup>2</sup>	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(1.9) <sup>2</sup>	(1.8) <sup>2</sup>	(1.7) <sup>2</sup>	(1.6) <sup>2</sup>	(1.5) <sup>2</sup>	(1.4) <sup>2</sup>	(1.3) <sup>2</sup>	(1.2) <sup>2</sup>	(1.1) <sup>2</sup>	(1.0) <sup>2</sup>	(0.9) <sup>2</sup>	(0.8) <sup>2</sup>	(0.7) <sup>2</sup>	(0.6) <sup>2</sup>	(0.5) <sup>2</sup>	(0.4) <sup>2</sup>	(0.3) <sup>2</sup>	(0.2) <sup>2</sup>	(0.1) <sup>2</sup>		
26	3.5	$\frac{1}{2}$	(3.1) <sup>2</sup>	2.8	(2.7) <sup>2</sup>	(2.6) <sup>2</sup>	(2.5) <sup>2</sup>	(2.4) <sup>2</sup>	(2.3) <sup>2</sup>	(2.2) <sup>2</sup>	(2.1) <sup>2</sup>	(2.0) <sup>2</sup>	(1.9) <sup>2</sup>	(1.8) <sup>2</sup>	(1.7) <sup>2</sup>	(1.6) <sup>2</sup>	(1.5) <sup>2</sup>	(1.4) <sup>2</sup>	(1.3) <sup>2</sup>	(1.2) <sup>2</sup>	(1.1) <sup>2</sup>	(1.0) <sup>2</sup>	(0.9) <sup>2</sup>	(0.8) <sup>2</sup>		
27	2.4	$\frac{1}{2}$	2.1	1.8	1.5	1.0	E	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>											
28	(2.5) <sup>2</sup>	(2.0) <sup>2</sup>	(2.0) <sup>2</sup>	(2.0) <sup>2</sup>	(2.0) <sup>2</sup>	(2.0) <sup>2</sup>	(2.0) <sup>2</sup>	(2.0) <sup>2</sup>	(2.0) <sup>2</sup>																	
29	2.5	2.0	2.0	2.3	(1.8) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>	(1.0) <sup>2</sup>												
30	2.4	2.2	2.2	(1.7) <sup>2</sup>	A	A	A	2.6	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	
31	2.6	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
Median	2.8	2.5	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
Count	30	31	29	28	28	30	29	27	26	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27

Calculated by: MCC. (Institution) E.J.W.

Sweep 1.0 Mc 1a 25 Qnc in. 0.25 min

Manual □ Automatic □

**TABLE 64**  
**IONOSPHERIC DATA**

**h'F1**,    **Km**    **JULY**, 1953  
 (Characteristic)    (Unit)    (Month)

Observed at **Washington, D.C.**

Lat **38.7°N**, Long **77.1°W**

Swept I.O. Mc to 25.0 Mc in 0.25 min

Manual □ Automatic ■

Mean Time

75°W

Day	National Bureau of Standards																								
	Scaled by:      MCC. (Institution)				Calculated by:      MCC.      E.J.W.				MCC.      E.J.W.				MCC.      E.J.W.				MCC.      E.J.W.				MCC.      E.J.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									220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	
2									240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	
3									210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	
4									Q	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
5									230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	
6									220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	
7									240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	
8									220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	
9									(200) <sup>A</sup>																
10									200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
11									230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	
12									A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
13									200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
14									Q	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
15									230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	
16									220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	
17									A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
18									200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
19									210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	
20									Q	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
21									230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	
22									A	(200) <sup>A</sup>															
23									Q	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	
24									Q	(230) <sup>A</sup>															
25									Q	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	
26									Q	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	
27									Q	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	
28									Q	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	
29									Q	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	
30									Q	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	
31									Q	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	
										Median	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
										Count	15	23	25	23	21	22	24	25	23	22	23	22	21	22	23

Form adopted June 1946

TABLE 65  
Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

**f<sub>0</sub>F1 . . . Mc**  
(Characteristic)  
**Observed at Washington, D.C.**

**JULY, 1953**  
(Month)

**Lat 38.7°N, Long. 77.1°W**

Day	75° W												75° W												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
	McC.												McC.												
	National Bureau of Standards												Calculated by McC.												
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2																									
3																									
4																									
5																									
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29																									
30																									
31																									
Median																									
Count																									

Manual  Automatic

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

$\text{h}^{\circ}\text{E}$ , Km  
(Characteristic), (Unit)  
Observed at Washington, D.C.  
Lat  $38.7^{\circ}\text{N}$ , Long  $77.1^{\circ}\text{W}$

JULY, 1953  
(Month)  
75° W Mean Time

Doy	75° W Mean Time										75° W Mean Time												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
1																							
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3																							
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31																							
Median Count	16	26	28	29	31	29	29	29	29	27	28	30	29	29	29	28	28	28	28	28	28	28	28
Sweep 10 Mc to 25.0 Mc in 25 min																							

Manual  Automatic

National Bureau of Standards  
McC. (Institution) E.J.W.  
Calculated by: McC. E.J.W.

Scaled by:

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

**TABLE 67**  
**IONOSPHERIC DATA**

foE — Mc  
(Characteristic)  
Observed on Washington, D.C.

July  
(Month)

1953

Lat. 38°7'N, Long. 77°1'W

7.5°W Mean Time

7.5°W

Mean Time

7.5°W

Mean Time

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	Calculated by:			
																									M.C.C.	E.J.W.		
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2																												
3																												
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Median	20	24	26	29	30	32	34	36	37	38	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Count	14	13	24	24	42	42	15	12	16	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

Sweep 10 Mc to 25 Mc in 0.5 min  
Manual □ Automatic □

TABLE 68  
Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.  
IONOSPHERIC DATA

**E<sub>s</sub>**, Mc.Km  
(Characteristic)  
(Unit)  
Observed at  
**Washington, D.C.**

**July**, 1953

(Month)

**Lot 38 7°N, Long 77.1°W**

**75°W**

Mean Time

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

National Bureau of Standards  
(Institution)  
McC. C., E. J. W.

Calculated by

McC. C., E. J. W.

Doy	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	E	E	E	E	E	E	G	G	G	G	3 5/10	3 6/10	3 6/10	4 3/10	4 3/10	4 3/10	4 3/10	4 3/10	4 3/10	G	G	G	E	E	5 7/20		
2	(28) <sup>s</sup> (2.0)	E	E	E	E	E	E	E	2 0/10	3 5/9	3 6/2	3 6/2	3 2/2	3 2/2	4 2/10	4 2/10	4 2/10	4 2/10	5 2/10	6 2/10	G	G	E	E	E	2 6/10	
3	2 1/10	E	E	E	E	E	E	E	4 4/10	3 6/10	8 4/10	8 8/10	G	7 0/10	7 0/10	3 7/10	3 7/10	5 2/10	6 4/20	10 0/10	10 0/10	7 0/20	3 0/30	3 0/30	6 7/10	7 4/20	E
4	2 4/10	3 8/20	5 5/10	3 4/10	3 8/10	4 0/10	3 9/10	3 9/10	4 8/10	5 2/10	4 5 5/10	4 5 5/10	G	4 3/10	4 3/10	4 3/10	4 3/10	4 3/10	4 3/10	G	G	G	3 0/20	E	2 7/10	3 8/10	
5	3 1/10	E	E	E	E	E	E	E	1 4/5	3 0/10	2 0/10	3 0/10	G	3 8/20	3 8/20	3 9/10	4 5/10	4 5/10	4 5/10	G	5 4/20	7 0/20	G	2 9/30	E	E	E
6	E	E	E	E	E	E	E	E	7 8/10	0/10	(3 5) 5/20	G	3 7/10	3 9/10	4 5/30	3 6/30	3 9/10	3 9/10	G	5 7/20	G	5 8/10	G	4 6/20	3 1/20	E	E
7	2 3/20	E	E	E	E	E	E	E	1 1/0	1 1/0	1 1/0	1 1/0	G	4 3/10	9/10	1 1/0	1 5/0	1 2/10	1 2/10	G	7 4/10	1 6/0	1 6/0	1 6/0	1 6/0	1 6/0	E
8	E	E	E	E	E	E	E	E	1 1/0	1 1/0	1 1/0	1 1/0	G	6 4/20	6 6/10	6 6/10	6 6/10	6 6/10	6 6/10	G	4 3/20	6 0/10	6 0/10	6 0/10	6 0/10	6 0/10	E
9	3 8/1/2	4 8/0	4 4/0	3 3/0	2 4/0	2 4/0	1 5/10	3 2/0	3 2/0	3 2/0	7 0/20	6 2/20	G	6 4/10	6 4/10	6 5/10	6 5/10	6 5/10	6 5/10	G	3 0/20	4 2/20	G	3 1/20	3 1/20	E	E
10	3 3/1/0	E	E	E	E	E	E	E	1 8/20	1 8/20	4 4/10	7 0/10	G	3 5/10	4 3/10	4 7/20	6 8/10	6 8/10	6 8/10	G	7 4/10	3 5/20	3 5/20	4 8/20	4 8/20	4 8/20	E
11	8 4/1/8	6 6/1/0	6 4/1/0	4 8/1/0	6 1/0	6 1/0	6 1/0	6 1/0	6 1/0	6 1/0	6 1/0	6 1/0	G	2 1/0	5 8/100	6 7/100	4 9/30	5 4/00	5 5/100	5 7/100	G	6 8/20	5 0/20	4 0/10	6 8/10	3 7/20	E
12	2 5/20	2 2/0	3 1/0	2 9/10	2 9/10	2 9/10	2 9/10	2 9/10	2 9/10	2 9/10	2 9/10	2 9/10	G	1 6/10	1 6/10	1 6/10	1 6/10	1 6/10	1 6/10	M	4 9/20	4 9/20	4 9/20	5 8/10	3 7/1/0	E	
13	2 1/2/0	7 6/4	7 0/10	7 0/10	7 0/10	7 0/10	7 0/10	7 0/10	7 0/10	7 0/10	7 0/10	7 0/10	G	4 7/10	4 7/10	4 7/10	4 7/10	4 7/10	4 7/10	G	6 6/30	4 4/30	4 4/30	4 3/30	3 1/20	3 1/20	E
14	6 9/1/0	3 9/1/0	E	E	E	E	E	E	4 0/10	4 0/10	4 0/10	4 0/10	G	4 8/20	5 2/20	4 8/20	5 2/20	4 6/20	4 6/20	G	5 5/20	3 3/20	3 3/20	3 0/10	3 0/10	3 0/10	E
15	E	E	E	E	E	E	E	E	4 4/10	3 6/10	4 3/10	4 3/10	G	4 4/10	4 7/10	4 7/10	4 7/10	4 7/10	4 7/10	G	7 2/10	6 0/10	6 0/10	6 0/10	6 0/10	6 0/10	E
16	2 9/1/0	2 4/1/0	4 8/1/0	4 0/10	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	G	1 6/10	1 6/10	1 6/10	1 6/10	1 6/10	1 6/10	G	6 7/20	6 7/20	6 7/20	6 7/20	6 7/20	6 7/20	E
17	4 8/1/0	2 9/1/4	3 2/1/0	3 1/1/0	3 1/1/0	3 1/1/0	3 1/1/0	3 1/1/0	3 1/1/0	3 1/1/0	3 1/1/0	3 1/1/0	G	4 3/10	4 3/10	4 3/10	4 3/10	4 3/10	4 3/10	G	3 5/10	3 7/10	3 7/10	3 7/10	3 7/10	3 7/10	E
18	2 3/0	2 5/1/0	2 6/1/0	3 0/1/0	3 0/1/0	3 0/1/0	3 0/1/0	3 0/1/0	3 0/1/0	3 0/1/0	3 0/1/0	3 0/1/0	G	4 3/10	5 2/10	5 2/10	5 2/10	5 2/10	5 2/10	G	4 8/20	7 0/20	7 0/20	7 0/20	7 0/20	7 0/20	E
19	5 0/1/0	4 2/1/0	6 1/0	4 4/10	4 5/100	4 5/100	4 5/100	4 5/100	4 5/100	4 5/100	4 5/100	4 5/100	G	1 6/10	1 6/10	1 6/10	1 6/10	1 6/10	1 6/10	G	4 6/10	5 5/20	5 5/20	5 5/20	5 5/20	5 5/20	E
20	4 8/0	4 6/1/0	3 4/1/0	3 6/1/0	3 6/1/0	3 6/1/0	3 6/1/0	3 6/1/0	3 6/1/0	3 6/1/0	3 6/1/0	3 6/1/0	G	1 6/10	1 6/10	1 6/10	1 6/10	1 6/10	1 6/10	G	5 8/100	5 8/100	5 8/100	5 8/100	5 8/100	5 8/100	E
21	7 6/1/0	9 2/1/0	4 4/0	4 0/10	3 1/0	2 6/100	2 4/10	2 4/10	2 4/10	2 4/10	2 4/10	2 4/10	G	1 1/0	1 1/0	1 1/0	1 1/0	1 1/0	1 1/0	G	5 0/100	5 0/100	5 0/100	5 0/100	5 0/100	5 0/100	E
22	4 2/1/0	6 3/1/0	4 0/10	4 0/10	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	3 9/1/0	G	1 0/10	1 0/10	1 0/10	1 0/10	1 0/10	1 0/10	G	3 5/10	3 5/10	3 5/10	3 5/10	3 5/10	3 5/10	E
23	E	2 1/1/0	2 2/1/00	E	E	E	E	E	E	E	E	E	G	3 7/20	4 0/10	4 3/10	3 3/10	3 3/10	3 3/10	G	3 7/10	3 1/10	3 1/10	3 1/10	3 1/10	3 1/10	E
24	E	E	E	E	E	E	E	E	4 3/10	3 1/10	5 1/10	5 1/10	G	1 0/10	1 0/10	1 0/10	1 0/10	1 0/10	1 0/10	G	5 4/100	5 8/100	5 8/100	5 8/100	5 8/100	5 8/100	E
25	4 0/0	3 5/1/00	1 8/1/00	2 7/1/00	E	E	E	E	2 0/10	2 5/20	3 2/20	3 5/20	G	1 1/0	1 1/0	1 1/0	1 1/0	1 1/0	1 1/0	G	3 2/10	3 2/10	3 2/10	3 2/10	3 2/10	3 2/10	E
26	E	E	E	E	E	E	E	E	4 2/1/0	1/10	G	G	G	7 0/10	4 4/10	5 2/100	5 2/100	5 2/100	5 2/100	G	3 4/20	3 1/20	3 1/20	3 1/20	3 1/20	3 1/20	E
27	E	E	E	E	E	E	E	E	1/9	1/30	G	G	G	4 2/10	3 8/1/0	3 0/1/0	3 5/1/0	3 5/1/0	3 5/1/0	G	7 6/20	3 7/10	3 7/10	3 7/10	3 7/10	3 7/10	E
28	E	E	E	E	E	E	E	E	2 4/1/0	2 0/10	G	G	G	4 0/10	4 5/100	3 3/10	3 1/10	3 1/10	3 1/10	G	7 4/100	6 0/100	6 0/100	6 0/100	6 0/100	6 0/100	E
29	2 6/1/0	E	E	E	E	E	E	E	10/0	2 2/10	3 5/20	4 4/10	G	3 8/1/0	4 3/1/0	6 0/100	5 2/100	5 2/100	5 2/100	G	2 5/20	2 5/20	2 5/20	2 5/20	2 5/20	2 5/20	E
30	E	E	E	E	E	E	E	E	3 0/1/0	3 3/1/0	2 0/1/00	2 0/1/00	G	G	G	4 3/1/0	4 2/1/0	4 2/1/0	4 2/1/0	G	5 6/100	7 0/100	7 0/100	7 0/100	7 0/100	7 0/100	E
31	4 1/1/0	3 2/1/0	E	E	E	E	E	E	2 9/1/0	3 0/1/0	3 0/1/0	3 0/1/0	G	G	G	4 2/1/0	4 2/1/0	4 2/1/0	4 2/1/0	G	3 2/100	6 0/100	6 0/100	6 0/100	6 0/100	6 0/100	E
Median	2 6	2 1	1 8	2 5	2 4	3 0	3 7	3 7	4 4	5 2	4 6	5 2	4 8	4 4	4 2	4 2	3 7	4 2	3 7	4 2	3 7	3 7	3 7	2 3			
Count	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31			

Sweep 10, Mc. 2.20-Min. 0.25-min

Automatic

**TABLE 69**  
**IONOSPHERIC DATA**

(M1500)F2, (Unit) July, 1953  
 (Characteristic) (Month) Observed at Washington, D.C.

Lat. 38.7°N Long 77.10°W

7.5°W Mean Time

National Bureau of Standards  
 Institution MCC, E J W

Scaled by:

Calculated by: MCC, E J 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	(2.0)J	(2.0)F	(2.0)J	(2.0)P	(2.1)J	(2.1)F	(2.2)S	G	G	G	G	G	G	G	G	1.9	(1.8) <sup>3</sup>	(1.8)	2.1	2.1	2.1	(2.1)J	1.9	
2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	S	S	S	G	G	G	G	G	1.7 <sup>4</sup>	1.7	1.7	1.7	1.7	1.7	(2.1)J	1.7	
3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	S	S	S	G	G	G	G	G	1.9 <sup>P</sup>	1.9	1.9	1.9	1.9	1.9	(2.0)S	1.9	
4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	A	A	A	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)F	1.8	
5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	S	S	S	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)S	1.8	
6	(2.1)S	(2.1)J	(2.0)S	(2.0)J	(2.0)S	(2.0)J	(2.0)S	G	G	G	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)S	1.8	
7	(2.0)S	(2.0)T	(2.0)S	(2.0)T	(2.0)S	(2.0)T	(2.0)S	G	G	G	G	G	G	G	G	1.9 <sup>A</sup>	1.9 <sup>A</sup>	1.9 <sup>A</sup>	1.9 <sup>A</sup>	1.9 <sup>A</sup>	1.9 <sup>A</sup>	(2.0)S	1.9 <sup>A</sup>	
8	(2.1)S	(2.1)T	(2.0)S	(2.0)T	(2.0)S	(2.0)T	(2.0)S	G	G	G	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	(2.0)S	1.9	
9	(2.1)A	(2.1)S	(2.0)A	(2.0)J	(2.0)S	(2.0)J	(2.0)S	G	G	G	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)S	1.8	
10	2.0	2.0	2.0	2.0	2.0	2.0	2.0	S	S	S	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)S	1.8	
11	A	A	A	A	A	A	A	A	A	A	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	(2.0)A	1.9	
12	2.0	2.0	2.0	2.0	2.0	2.0	2.0	S	S	S	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	(2.0)S	1.9	
13	2.2	A	2.1	2.1	2.1	2.1	2.1	A	A	A	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.1)A	1.8	
14	A	2.0	F	(2.0)F	(2.1)F	(2.1)J	(2.1)F	(2.1)J	(2.1)S	(2.1)J	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	(2.1)S	1.9	
15	2.0	1.9	2.0	2.0	2.0	2.0	2.0	S	S	S	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	(2.1)S	1.9	
16	2.0	2.0	2.0	2.0	2.0	2.0	2.0	J	J	J	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)J	1.8	
17	2.0	2.1	2.1	2.1	2.1	2.1	2.1	S	S	S	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	(2.1)S	1.9	
18	(2.0)S	(2.0)J	(2.0)S	(2.0)J	(2.0)S	(2.0)J	(2.0)S	G	G	G	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	(2.0)S	1.9	
19	A	2.1	2.0	(2.0)J	(2.1)J	(2.1)A	(2.1)J	(2.1)A	S	S	S	G	G	G	G	2.1	2.1	2.1	2.1	2.1	2.1	(2.0)A	2.1	
20	(2.1)A	A	2.0	(2.0)S	(2.0)J	(2.0)S	(2.0)J	S	S	S	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)S	1.8	
21	A	(2.0)S	2.1	F	A	2.2	F	S	S	S	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	A	2.1	
22	A	F	2.0	F	(2.0)S	(2.0)J	(2.0)S	S	S	S	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)S	1.8	
23	1.9	2.0	2.0	2.0	2.0	2.0	2.0	S	S	S	G	G	G	G	G	1.6	1.6	1.6	1.6	1.6	1.6	1.9	1.6	
24	1.9	(1.9)J	(1.9)F	(1.9)J	(1.9)A	(1.9)J	(1.9)A	A	A	A	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)J	1.9	
25	2.1	2.2	(2.2)S	(2.2)J	(2.2)S	(2.2)J	(2.2)S	S	S	S	G	G	G	G	G	1.7	1.7	1.7	1.7	1.7	1.7	(2.0)J	1.7	
26	2.0	2.0	2.1	2.1	2.1	2.1	2.1	S	S	S	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	(2.0)S	1.9	
27	1.9	(1.9)J	(1.9)S	E	E	E	E	S	S	S	G	G	G	G	G	1.6	1.6	1.6	1.6	1.6	1.6	(2.0)J	1.6	
28	(1.8)J	(1.9)F	(1.9)J	(1.9)F	(1.9)E	(1.9)J	(1.9)F	E	E	E	G	G	G	G	G	1.9	1.9	1.9	1.9	1.9	1.9	(2.0)J	1.9	
29	(2.0)S	(1.7)F	(2.0)S	(2.0)J	(2.0)S	(2.0)J	(2.0)S	J	J	J	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)S	1.8	
30	2.0	2.1	(1.9)F	2.1	S	A	(2.3)J	G	G	G	G	G	G	G	G	2.0	2.0	2.0	2.0	2.0	2.0	(1.9)J	1.9	
31	2.0	2.1	(2.0)S	(2.0)J	(2.0)S	(2.0)J	(2.0)S	J	J	J	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	(2.0)S	1.8	
Median	2.0	2.0	2.0	2.0	2.0	2.0	2.0	S	S	S	G	G	G	G	G	1.8	1.8	1.8	1.8	1.8	1.8	2.0	1.8	
Count	27	28	30	30	30	30	30	w6	w1	w9	30	w8	w5	w8	w5	27	w8	w6	w4	w6	w4	w7	w8	

Sweep 10 Mc to 25.0 Mc in 0.25 min  
 Manual  Automatic

TABLE 70  
Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.  
IONOSPHERIC DATA

(M3000)F2, July, 1953  
(Characteristic) (Unit)  
Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°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

	National Bureau of Standards (Institution) MC C., E. J. W.																							
	Scaled by: Calculated by: MC C., E. J. 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	(3.0)F	(3.0)F	(3.0)F	(3.0)P	(3.4)F	3.3	G	G	G	G	G	G	G	G	G	G	2.9	(2.7)S	3.0	3.2	3.1	3.1	2.9	
2	3.0	3.0	5	(3.0)F	(3.1)F	(3.2)F	S	3.3	S	G	G	G	G	A	2.6	3.1	3.1	3.2	3.0	3.1	3.1	3.1	3.1	
3	3.0	3.2	3.0	(3.1)F	(3.1)F	(2.8)F	S	3.2	G	3.1	A	(2.9)P	G	G	2.6	2.7	A	3.1	3.1	3.1	3.1	3.2	2.9	
4	3	1	3.2	3	2	4	3.2	3.3	A	A	3.0	G	G	2.4	G	2.7	2.9	3.0	3.0	3.0	3.2	3.0	F	
5	3	1	2.9	(2.7)F	2.8	(3.0)F	(3.2)F	S	G	G	G	G	G	G	G	A	2.6	3.2	3.1	3.1	3.0	3.0	3.0	
6	(3.1)F	(3.3)F	(3.0)F	3	1	5	(3.1)F	3.3	G	G	G	G	G	G	G	2.7	3.3	3.1	3.1	3.2	3.3	3.5	(3.2)F	
7	(3.0)F	(3.2)F	3.2	(3.3)F	3.0	3.4	3.4	3.4	2.8	G	A	(2.8)A	G	A	A	A	A	A	A	3.1	3.1	3.1	3.3	(3.2)F
8	(3.1)F	3.0	3.0	(2.9)F	2.9	3.3	3.3	G	3.2	A	A	G	G	G	G	3.0	A	3.1	4	(3.5)F	5	A	A	
9	(3.1)F	(3.3)F	3.0	3.3	3.2	3.2	3.2	G	G	G	3.1	G	G	G	A	2.6	3.1	3.0	3.0	3.0	3.0	3.0	A	
10	2.9	2.9	3.0	3.0	3.0	3.1	3.0	3.2	A	G	3.0	2.8	3.0	2.7	3.2	A	G	2.9	3.1	3.1	3.1	3.1	(3.0)F	
11	A	3	1	3	1	A	3.4	3.4	A	A	3.2	3.4	2.9	(3.0)F	3.2	(3.2)A	3.1	A	2.9	2.9	3.0	3.1	3.1	3.0
12	3.0	3.0	(3.3)F	3	1	F	(3.2)F	3.4	G	G	A	2.8	2.8	A	2.7	M	2.9	3.1	3.2	3.1	3.0	3.0	(3.1)F	
13	3.2	A	2.8	(2.9)F	(3.0)F	3.3	G	G	G	G	G	G	G	G	G	(2.7)F	2.9H	3.1H	3.0	3.0	(3.1)F	(2.9)F	(3.1)F	
14	A	F	3.0	(3.2)F	(3.2)F	(3.1)F	(2.9)F	(3.3)F	3.2	3.1	3.0	3.0	(3.0)A	3.1	3.0	(2.7)A	3.0	3.0	3.1	3.0	3.2	3.0	3.0	3.0
15	3.0	2.9	3.0	3.0	3.0	3.0	3.1	3.2	3.2	3.4	A	A	A	A	A	3.0	2.6	2.9	2.8	3.0	3.0	3.1	3.0	
16	3.0	3.0	3.0	2.9	(3.0)F	3.2	A	A	A	A	A	A	A	A	A	2.8	3.2	3.1H	3.1	3.1	3.2	3.1	3.1	
17	3.0	3.1	2.9	F	3	1	3	4	3.4	3.1	3.4	(3.1)F	3.1	3.0	2.8	2.9	(3.1)H	3.0	3.0	3.2	3.2	3.1	3.1	3.0
18	(3.0)F	3.2	3.0	2.9	3	1	3.3	G	G	2.7	3	1	2.9	3.0	2.9	2.8	2.8	2.9	3.0	3.0	3.2	3.1	3.0	
19	A	3	1	3.0	(3.1)F	3.1	3.2	3.3	G	3.1	3.1	3.1	3.1	3.1	3.1	3.1	2.6	3.0	3.0	3.1	3.1	3.3	3.2	A
20	(3.1)A	A	3.0	(3.4)F	3.0	3.3	3.3	3.1	2.8	3.0	2.9	2.8	3.0	2.8	3.0	A	3.0	2.6	2.9	3.0	3.1	3.1	3.2	A
21	A	(3.0)F	3	1	F	A	3.2F	3.4	G	A	C	(3.5)F	A	(3.2)F	G	2.7	2.9	3.0	2.9	A	3.1	3.1	3.4	
22	3.0	F	3.1	3.0	F	(3.1)A	5	(3.2)A	(3.4)F	G	G	(3.2)H	(3.1)A	2.7	2.9	C	2.9	2.9	3.0	3.0	3.3	3.0	3.4	S
23	2.9	3.0	3.0	3.1	3.0	3.1	3.0	3.1	3.4	G	G	G	G	G	2.3	G	2.4	2.7	2.6	2.8	2.8	2.9	3.0	
24	2.8F	(2.9)F	(2.7)F	A	A	3.2	3.4	G	3.0	G	A	(2.6)H	(2.7)A	(2.7)P	2.8	2.7	3	3.2	3.2	3.3	3.2	3.2	3.2	
25	3	1	3.2	(3.2)F	(3.3)F	5	3.4	3.5	(3.0)F	(3.4)F	G	G	3.1	2.6	A	(3.0)F	3	2	3.2	3.2	3.0	3.0	3.0	
26	3	1	F	2	9	(2.9)F	3	1	S	(3.0)F	(3.4)F	G	G	G	G	G	G	(2.8)F	3	0	3.2	2.9	3.1	
27	2	9	(2.8)F	(2.9)F	E	E	(3.1)F	3	5	G	G	G	G	G	G	G	G	2.9	2.8	3.0	(3.1)F	(3.0)F	(3.0)F	
28	(2.7)F	(2.8)F	F	S	E	E	(3.3)F	5	5	(2.8)F	(2.9)H	2.6	(3.0)A	2.7	2.6	G	G	G	2.8	3.0	3.2	2.9	(2.8)F	
29	(3.0)F	(2.6)F	(3.0)F	P	(3.0)F	S	S	S	G	G	G	G	G	G	G	G	G	G	2.7	3.1	3.3	3.0	(3.0)F	
30	3	1	(2.9)F	3	1	S	A	A	(3.4)F	G	G	G	G	G	G	G	3.0	2.9	2.8	3.2	3.1	2.9	(2.8)F	
31	3	0	3	1	(3.2)F	(2.9)F	5	3	(2.7)F	(2.7)F	3	G	G	G	G	G	G	G	A	3.3	3.2	3.1	2.9	
Median	3	0	3	0	(3.1)	3	0	3	2	3	G	G	G	G	G	G	G	2.8	3.0	3.0	3.1	3.0	3.0	
Count	27	28	30	26	21	29	30	28	25	26	28	26	27	26	25	30	26	24	30	29	29	27	28	

Sweep LO Mc 10 25.0 Mc in 0.25 min  
Manual  Automatic

TABLE 71  
IONOSPHERIC DATA  
Lat 38.7°N, Long 77.1°W  
July 1953  
(Month)

(M3000) El. - (Unit)  
Characteristic Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°W

Day	75° W												Mean Time													
	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	3.7	3.9	4.0	4.0 <sup>h</sup>	4.0	3.9 <sup>h</sup>	3.9	3.8	3.7	3.6	L		
2													H	3.7	3.9	3.8 <sup>h</sup>	4.0	4.0 <sup>h</sup>	4.0	A	A	A	3.9	3.7	L	
3													3.7 <sup>h</sup>	3.7	A	A	3.8	3.9	4.1	(3.9) <sup>h</sup>	3.9	3.7	A	L		
4													Q	A	A	A	(3.9) <sup>h</sup>	(3.9) <sup>h</sup>	3.9	3.8	3.9	3.8 <sup>h</sup>	3.6 <sup>h</sup>	3.9 <sup>h</sup>	L	
5													3.6	3.7	(3.8) <sup>h</sup>	3.8 <sup>h</sup>	(4.2) <sup>s</sup>	3.9	4.0 <sup>h</sup>	(3.8) <sup>h</sup>	(2.0) <sup>h</sup>	3.9	A	3.6 <sup>h</sup>	3.4	L
6													3.8	3.8	4.0	4.0 <sup>h</sup>	4.0	A <sup>h</sup>	3.9	4.0	A	A	A	3.8	L	
7													L	(3.7) <sup>P</sup>	3.8 <sup>h</sup>	A	A	3.9	A	A	A	A	A	A	A	
8													3.8	3.9	3.7	4.0	A	4.2	A	(3.9) <sup>h</sup>	3.9	3.9	A	A	A	
9													L	3.6	3.7 <sup>h</sup>	3.9	4.0	A	4.2	4.1	4.1	4.0	3.9	3.8 <sup>h</sup>	3.6	L
10													L	3.9 <sup>h</sup>	4.0	4.0	A <sup>h</sup>	A	4.1	4.0	3.8	3.9	3.9	3.8 <sup>h</sup>	3.6	L
11													A	A	A	A	A	A	A	A	A	A	A	A		
12													3.5	3.6 <sup>h</sup>	A	A	A	A	A	A	A	A	A	A	A	
13													3.5	A	3.9	3.8	3.8	4.0	A	A	4.0 <sup>h</sup>	3.9	4.0	3.8	3.6	L
14													Q	A	3.8	3.9	4.0	(4.1) <sup>h</sup>	4.1	3.8	3.9	3.7	3.6	3.5	3.5	L
15													3.7	3.6	3.9	3.8	3.9	4.0	A	A	3.8	3.7	3.7	3.6	L	
16													A	A	A	A	A	A	4.0	A	4.0	A	4	A		
17													4.0	Q	A	A	A	4.0	41 <sup>h</sup>	41	39	40	(3.7) <sup>h</sup>	3.6	3.7	3.5
18													35	3.8	3.6	3.8	4.0	3.7	3.9	3.8	3.7	3.6	3.5	3.5	L	
19													A	4.1	3.8	A <sup>s</sup>	A	4.1	3.8 <sup>h</sup>	3.9	3.7	3.8 <sup>h</sup>	3.6	3.9	A	
20													Q	3.7	A	A	S	A	4.0 <sup>h</sup>	3.8	4.0 <sup>h</sup>	A	A	A	A	
21													3.5	3.7 <sup>h</sup>	A	C	3.7	A	A	3.7	3.6	3.7	4.0 <sup>h</sup>	3.7	A	
22													A	3.6	(3.7) <sup>h</sup>	3.7	A	41 <sup>h</sup>	41	39	40	(3.7) <sup>h</sup>	3.6	3.7	A	
23													Q	3.5 <sup>h</sup>	3.8 <sup>h</sup>	3.9	3.9 <sup>h</sup>	3.8	4.0	3.9	3.8	3.8	3.7	3.3	L	
24													Q	3.8	3.5	3.5	A	4.0	3.7	3.9 <sup>h</sup>	(4.1) <sup>h</sup>	(4.1) <sup>h</sup>	3.9	3.9	A	
25													Q	(3.8) <sup>h</sup>	3.9	3.9	(4.1) <sup>h</sup>	4.0	41 <sup>h</sup>	3.9	A	A	3.7	3.8	A	
26													Q	3.8 <sup>h</sup>	4.1	4.0	3.8	A	3.7 <sup>h</sup>	A	3.9 <sup>h</sup>	3.9	3.8	3.6	3.5	
27													Q	3.9	3.9	4.0 <sup>h</sup>	3.9 <sup>h</sup>	4.1	4.0	41 <sup>h</sup>	4.0	3.9 <sup>h</sup>	3.9	3.7	3.7	L
28													Q	3.7	3.8	3.9	4.0	4.0	3.4	3.8 <sup>h</sup>	4.0	3.9 <sup>h</sup>	3.9	3.7	3.7	A
29													3.5	3.8	3.7	3.8	A	3.9	3.7	3.9	3.8 <sup>h</sup>	3.8	3.7 <sup>h</sup>	3.6	L	
30													Q	3.9	3.7	3.9	4.0	41 <sup>h</sup>	4.1	3.8	A	A	A	3.6	3.6	L
31													3.5	3.6	3.8	3.8	3.8	4.1	4.0	3.9	3.7 <sup>h</sup>	3.7 <sup>h</sup>	A	A	A	
Median Count	-	36	37	3.8	3.9	4.0	4.0	4.0	4.0	4.0	4.0	4.0	21	22	22	22	22	23	23	23	23	23	23	23	—	
	1	13	25	23	21	19	24	23	24	23	24	23	21	21	22	22	22	23	23	23	23	23	23	23	17	

Sweep 1.0 Mc to 25.0 Mc in 0.25 min  
Manual  Automatic



Table 73

Ionospheric Storminess at Washington, D. C.July 1953

Day	Ionospheric character*		Principal storms Beginning GCT      End GCT		Geomagnetic character** 00-12 GCT      12-24 GCT	
	00-12 GCT	12-24 GCT	-----	0200	5	4
1	2	3			4	
2	2	3			4	
3	1	3			3	
4	2	3			3	
5	2	3			3	
6	1	2			3	
7	1	2			3	
8	3	3			3	
9	3	3			3	
10	2	2			3	
11	2	2			2	
12	1	1			2	
13	2	3			1	
14	1	2			4	
15	1	2			2	
16	2	1			4	
17	1	1			2	
18	1	1			2	
19	2	1			2	
20	1	1			3	
21	2	2			2	
22	2	1			1	
23	1	3			4	
24	2	1			3	
25	2	1			2	
26	2	3			4	
27	3	3			5	
28	3	3			5	
29	2	3			4	
30	2	3			4	
31	1	3			3	

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

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

-----Dashes indicate continuing storm.

Table 74a

Radio Propagation Quality Figures  
(Including Comparisons with Short-Term and Advance Forecasts)

June 1953

Day	North Atlantic 6-hourly quality figures				Short-term forecasts issued about one hour in advance of:				Whole day quality index	Advance forecasts (J-reports) for whole day; issued in advance by:			Geomag- netic K <sub>Ch</sub>	
	00 to 06	06 to 12	12 to 18	18 to 24	00	06	12	18		1-4 days	4-7 days	8-25 days	Half day	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	7	6	7	6	6	5	6	6	7	6	6	X	2	2
2	6	(4)	6	5	6	(4)	(4)	5	5	(4)	(4)	X	(4)	(4)
3	(4)	(4)	6	6	(3)	(3)	(4)	5	5	(3)	(4)	X	(5)	3
4	5	5	6	6	(4)	(4)	6	5	6	(3)	(4)	X	(4)	3
5	6	5	6	6	5	(4)	5	5	6	(4)	(4)	X	3	3
6	6	5	7	7	(4)	(3)	6	5	6	5	5		3	3
7	5	6	7	7	5	5	6	5	6	6	6		3	2
8	7	6	7	7	5	5	6	6	7	6	6		2	2
9	8	6	7	7	6	5	6	6	7	6	6		1	2
10	7	6	7	7	6	6	6	7	7	6	6		3	3
11	7	6	7	7	6	5	6	6	7	5	5		2	2
12	7	6	7	7	5	5	5	6	7	(3)	(3)	X	2	(4)
13	6	5	6	6	(4)	(4)	5	6	6	(4)	(3)	X	3	3
14	6	5	7	7	5	5	6	7	6	(4)	(4)	X	3	3
15	7	7	7	7	6	5	6	7	7	(4)	(4)	X	1	2
16	7	7	7	7	7	6	6	7	7	(4)	(4)	X	1	2
17	7	6	6	7	7	6	6	6	7	7	6		2	3
18	7	6	7	7	6	6	6	6	7	7	6		2	2
19	7	7	7	7	7	6	7	7	7	7	6		2	2
20	7	7	7	7	7	6	7	7	7	7	7		2	(4)
21	7	7	7	7	5	6	7	7	7	7	6		3	3
22	7	7	7	6	5	5	6	7	7	6	6		3	3
23	7	6	7	7	6	6	6	7	7	5	5		1	2
24	7	6	7	7	7	7	7	7	7	7	5		2	2
25	7	6	7	7	7	6	7	7	7	7	6		2	2
26	7	7	7	7	7	7	7	7	7	7	7		0	2
27	7	7	7	7	7	7	7	7	7	7	7		1	2
28	7	7	7	7	7	7	7	7	7	6	6		2	2
29	7	6	6	6	7	7	5	6	7	(4)	(4)	X	3	(5)
30	5	(4)	5	6	5	(3)	(4)	5	5	(4)	(4)	X	(5)	3
<b>Score:</b>														
Quiet periods														
P		13	9	10	17					10	4			
S		9	15	17	11					9	15			
U		5	3	1	2					3	3			
F		2	0	2	0					8	8			
Disturbed periods														
P		0	1	0	0					0	0			
S		1	2	0	0					0	0			
U		0	0	0	0					0	0			
F		0	0	0	0					0	0			

## Scales:

- Q-scale of Radio Propagation Quality  
 (1) - useless  
 (2) - very poor  
 (3) - poor  
 (4) - poor to fair  
 5 - fair  
 6 - fair to good  
 7 - good  
 8 - very good  
 9 - excellent

K-scale of Geomagnetic Activity  
 0 to 9, 9 representing the greatest disturbance; K<sub>Ch</sub> ≥ 4 indicates significant disturbance, enclosed in ( ) for emphasis

## Scoring: (beginning October 1952)

- P - Perfect: forecast quality equal to observed  
 S - Satisfactory: (beginning October 1952)  
     forecast quality one grade different  
     from observed  
 U - Unsatisfactory: forecast quality two or more  
     grades different from observed when both  
     forecast and observed were ≥ 5, or both ≤ 5  
 F - Failure: other times when forecast quality  
     two or more grades different from observed

## Symbols:

- X - Probable disturbed day

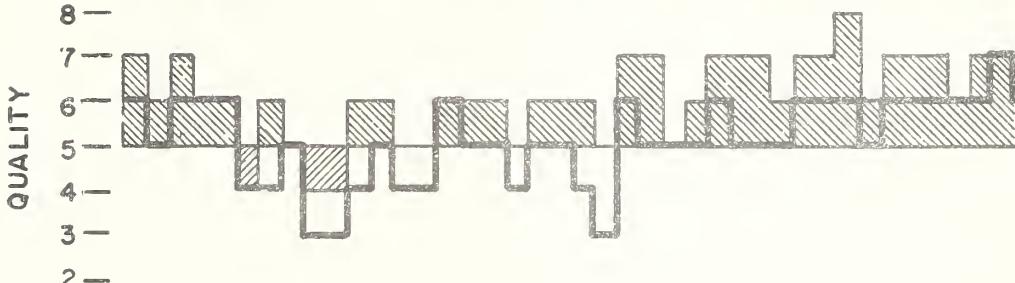
Note: All times are UT (Universal Time or CCT)

## Short-Term Forecasts--June 1953

observed disturbance    observed quiet    — forecasts

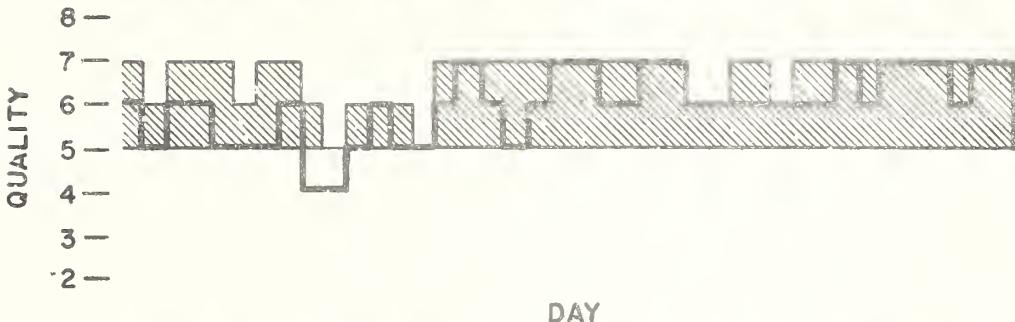
DAY

● 1 ● 2 ● 3 ● 4 ● 5 ● 6 ● 7 ● 8 ● 9 ● 10 ●



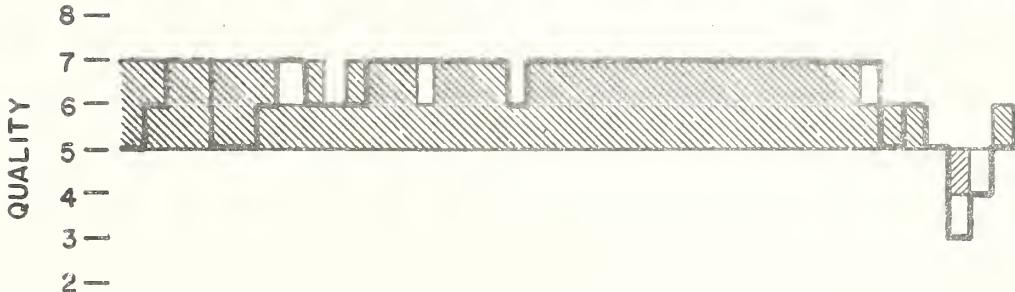
DAY

● 11 ● 12 ● 13 ● 14 ● 15 ● 16 ● 17 ● 18 ● 19 ● 20 ●



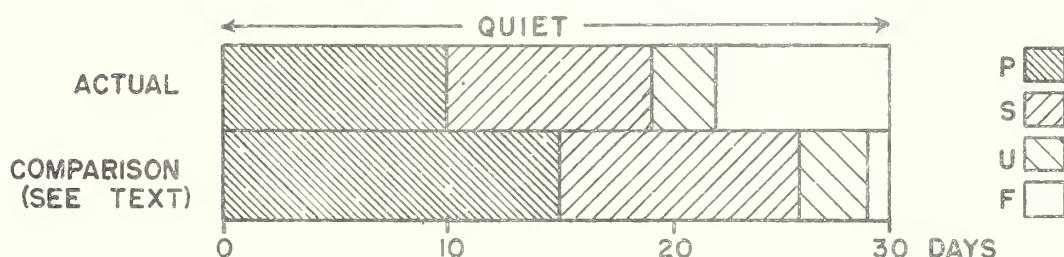
DAY

● 21 ● 22 ● 23 ● 24 ● 25 ● 26 ● 27 ● 28 ● 29 ● 30 ●



DAY

## Outcome of Advance Forecasts (1 to 4 days ahead)--June 1953



Note: Five "failures" resulted because the eighth in a series of recurrent disturbances did not take place June 12-16. Thus June proved to be as undisturbed as a year ago rather than like May 1953.

Table 75a

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

Date GCT	Degrees north of the solar equator														00	Degrees south of the solar equator																				
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1953																																				
July	1.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-		
	2.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	3.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	6.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	7.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	8.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	12.6	-	-	-	-	-	-	3	4	3	2	2	1	3	3	6	6	6	4	3	2	2	2	2	1	1	1	1	-	-	-	-	-	-		
	13.6	-	-	-	-	-	-	-	5	5	2	2	3	4	4	4	5	5	4	4	2	1	2	2	2	1	-	-	-	-	-	-	-	-	-	-
	14.6a	-	-	-	-	-	-	2	2	2	2	2	2	2	2	6	5	3	3	2	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	
	15.7	-	-	-	-	-	-	-	1	2	3	3	3	2	2	3	4	4	3	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-		
	19.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	20.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-			
	21.7a	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	22.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	-	-	-	-	-	-	-			
	23.8	-	-	-	-	-	-	-	-	1	1	2	3	2	2	2	3	4	4	4	4	4	4	4	3	3	2	2	-	-	-	-	-	-		
	24.7a	-	-	-	-	-	-	-	-	-	1	2	2	2	3	4	4	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	25.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	26.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	27.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	28.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	2	2	3	3	3	1	-	-				
	29.6	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Table 76a

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

Date GCT	Degrees north of the solar equator														00	Degrees south of the solar equator																												
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90								
1953																																												
July	1.6a	2	2	2	2	1	1	1	2	2	1	1	1	2	2	2	2	2	2	2	2	4	2	3	3	2	2	2	2	2	2	2	-	-	-	-	-	-						
	2.7a	-	-	-	-	-	-	-	-	-	1	1	2	2	3	4	3	2	2	3	3	4	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	3.6a	2	2	2	-	-	-	-	-	-	1	1	2	3	3	4	5	4	3	3	4	3	3	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	6.7a	2	2	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	3	3	3	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	7.7a	4	3	2	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	3	4	4	3	3	3	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	8.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
	12.6	3	2	2	2	2	1	1	1	2	2	1	3	2	1	1	1	3	5	5	3	4	5	5	7	4	4	3	3	3	3	3	3	3	3	4	4	4						
	13.6	3	3	3	3	-	-	-	-	-	2	4	3	2	3	3	4	3	3	3	3	3	3	3	3	3	3	2	2	3	2	2	2	2	3	3	3	3	3	3				
	14.6a	2	2	1	1	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
	15.7	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	3	3	4	4	4	4	4	4	3	4	3	2	2	1	1	1	1	1	1	2	2	2					
	19.8a	2	2	1	1	1	1	2	2	2	2	1	1	1	1	1	2	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
	20.8a	2	1	-	-	-	-	-	-	-	1	1	1	1	1	1	2	2	2	2	2	2	3	2	3	4	5	4	2	2	2	2	1	1	1	1	1	2	2	2				
	21.7a	2	2	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	3	3	4	3	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2			
	22.8a	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
	23.8	2	1	1	-	-	-	-	-	-	2	2	3	3	3	3	3	3	4	4	4	4	4	3	3	3	2	-	-	-	-	-	-	-	-	-	-	1	1	2	2	2		
	24.7a	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	3	3	5	3	3	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1					
	25.6a	3	3	3	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	4	4	5	4	3	3	3	3	5	4	4	4	2	2	2	2	2	2	2						
	26.7a	2	2	2	1	1	-	-	-	1	1	1	1	2	2	3	4	4	4	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
	27.7	2	3	2	1	1	1	1	1	2	2	2	3	3	3	3	4	4	4	4	4	4	4	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2		
	28.6a	2	2	2	1	1	1	1	1	2	3	3	3	4	5	5	5	4	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2					
	29.6	x	x	x	x	3	3	2	2	2	2	2	4	3	3	3	4	6	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 77a

Coronal observations at Climax, Colorado (6702A), east limb

The 6702A coronal line was not visible on any of the observation dates in July (see Table 75a).

Table 75b

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

Date GCT	Degrees south of the solar equator															0°	Degrees north of the solar equator																			
	90	85	80	75	70	65	50	55	50	45	40	35	30	25	20		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90		
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	4	3	3	-	-	-	-	-	-	-	-	-	-	-	-			
Jul	1.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	4	6	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-		
	2.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	3	3	-	-	-	2	2	2	-	-	-	-	-	-	-	-	
	3.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	6.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	7.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	-	-	-	-	-	1	1	4	4	1	1	1	1	1	1	1	
	13.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	
	21.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-
	22.8a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	-
#	23.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	3	3	3	5	5	5	6	6	6	5	2	2	2	2	-	
	24.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-
	25.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-
	26.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-
	27.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	4	4	3	3	2	2	2	2	2	2	2	2	2	-
	28.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	3	5	3	3	3	4	3	2	3	3	3	1	1	-	-
	29.6	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

# low weight from S90 - S20

Table 76b

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

Date GCT	Degrees south of the solar equator															0°	Degrees north of the solar equator																			
	90	85	80	75	70	65	50	55	50	45	40	35	30	25	20		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90		
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-
Jul	1.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	4	5	2	3	1	1	1	1	1	1	1	1	1	1	1	1	-
	3.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	4	5	2	3	1	1	1	1	1	1	1	1	1	1	1	1	-
	6.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
	7.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-
	8.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12.6	4	3	2	2	2	2	1	1	2	3	3	5	5	4	3	3	4	5	5	4	4	4	3	3	2	2	2	2	1	1	1	1	1		
	13.6	3	3	1	1	1	2	2	2	2	3	4	5	5	5	3	3	4	4	5	4	3	2	2	2	1	1	1	1	1	1	1	1	1		
	14.6a	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	
	15.7	2	2	2	2	2	2	2	2	2	3	2	2	3	5	4	4	4	4	4	4	4	2	2	3	2	1	1	1	1	1	1	1	1		
	19.8a	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
	20.8a	2	2	2	1	1	1	1	1	1	2	2	2	3	2	3	3	4	4	4	4	3	3	3	2	2	2	2	2	1	1	1	1	1		
	21.7a	3	-	-	-	-	-	-	-	-	1	1	1	3	3	2	3	5	5	4	3	3	3	2	1	-	-	-	-	-	-	-	-	-	-	
	22.8a	2	2	2	2	2	1	1	1	1	1	2	2	2	3	2	3	5	3	6	5	5	5	5	3	3	2	1	1	1	1	1	1	1	-	
	23.8	2	3	3	2	1	1	1	1	3	3	4	5	5	3	3	3	6	5	4	4	6	2	1	-	-	-	-	-	-	-	-	-	-		
	24.7a	1	2	2	1	1	1	2	3	3	2	2	2	4	3	3	4	4	3	3	2	2	1	1	1	1	1	1	1	2	2	2	2	-		
	25.6a	2	2	2	2	1	1	1	1	1	1	2	2	2	2	3	3	3	4	3	3	3	4	2	2	2	2	2	2	2	2	2	2	-		
	26.7	2	2	2	2	1	1	1	1	1	2	2	2	2	2	3	3	2	2	2	3	4	4	3	2	2	2	2	2	2	2	2	2	-		
	27.7a	2	1	1	1	1	1	1	2	3	2	2	3	5	3	2	2	2	2	2	2	2	2	2	3	3	1	1	1	1	1	1	1	-		
	28.6	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	3	3	3	2	2	2	2	3	3	2	2	2	1	1	1	1	-		
	29.6	1	1	1	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 77b

Coronal observations at Climax, Colorado (6702A), west limb

The 6702A coronal line was not visible on any of the observation dates in July (see Table 75b).

Table 78a

Table 79a

Coronal observations at Sacramento Peak, New Mexico (6374A), east limb

Date GCT	Degrees north of the solar equator															0°	Degrees south of the solar equator																											
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90								
1953																																												
July	5.5a	-	3	2	2	2	2	3	2	-	2	3	2	2	3	3	3	4	5	5	4	3	4	4	4	5	7	3	2	2	2	2	-	-	-	-	-	-						
	9.7	2	3	3	-	-	-	2	2	2	2	-	-	2	2	3	3	10	5	7	6	5	4	4	5	5	3	3	2	-	-	-	-	-	-	-	-	-	-	-				
	10.7	3	2	2	2	-	-	-	-	2	2	2	2	-	2	3	3	13	3	4	5	6	6	7	8	4	3	2	-	-	-	-	-	-	-	-	-	-	-	-				
	11.7a	-	2	2	2	2	2	2	3	2	3	2	2	2	-	2	-	2	3	2	3	2	3	3	5	3	2	-	2	-	-	-	-	-	-	-	-	-	-	-				
	12.7a	3	3	2	-	2	-	-	x	x	x	x	x	x	2	3	3	3	4	5	x	x	3	4	5	4	3	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-		
	15.7a	3	2	3	3	3	-	-	2	2	3	2	2	2	3	-	2	3	2	2	3	2	3	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	x			
	16.9a	2	2	-	-	-	-	-	-	2	3	2	2	2	3	3	3	2	2	2	3	2	3	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	18.9	4	4	4	3	3	-	-	2	2	2	2	5	4	4	4	3	4	5	5	3	4	4	4	5	4	3	4	2	2	2	-	2	3	2	-	-	-	-	-	-			
	20.7	3	3	3	2	3	2	2	2	3	3	3	4	3	2	3	3	3	3	5	4	6	5	5	6	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-			
	21.6a	3	2	3	3	2	3	2	2	2	3	4	3	2	3	3	4	4	3	3	4	5	6	4	4	3	4	5	3	2	-	-	2	2	2	2	2	2	2	2	2	2		
	23.9a	2	2	2	2	3	2	-	-	-	2	2	3	3	4	4	4	3	2	3	4	4	4	4	5	3	3	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-		
	24.7a	2	2	3	2	2	2	2	-	2	3	3	3	4	4	4	3	2	3	3	3	4	3	2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	26.6a	2	-	3	3	2	2	3	2	-	2	2	-	2	4	4	5	4	3	3	3	2	3	4	4	2	3	3	2	3	2	-	-	2	-	2	-	-	-	-	-	-	-	-
	27.7a	-	-	-	-	-	3	2	-	-	-	2	3	3	2	3	3	2	2	2	3	2	3	2	3	2	2	2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	
	28.6a	-	2	2	-	2	2	3	3	2	2	-	2	2	5	4	5	4	5	3	4	3	4	3	3	2	3	2	2	2	3	2	2	2	2	3	2	2	2	3	2	2		

Table 80a

Coronal observations at Sacramento Peak, New Mexico (6702A), east limb

Table 78b

Coronal observations at Sacramento Peak, New Mexico (5303A), west limb

Date GCT	Degrees south of the solar equator															Degrees north of the solar equator																				
	90	85	80	75	70	65	50	55	50	45	40	35	30	25	20	15	10	5	0°	5	10	15	20	25	30	35	40	45	50	55	60	55	70	75	80	85
1953																																				
July	5.6a	-	-	-	-	-	2	2	2	2	2	2	2	3	3	2	3	3	3	4	2	2	2	3	3	3	2	2	3	3	2	2	2	-	-	
	9.7a	-	-	-	-	-	-	-	2	2	3	3	3	2	2	4	5	4	3	2	2	3	2	3	2	2	2	2	-	-	-	-	-	-		
	10.7	-	-	-	-	-	-	-	3	3	3	2	2	2	2	2	3	3	2	2	2	3	5	8	4	4	4	3	2	2	3	2	2	-	-	
	11.7a	-	-	-	-	-	2	3	4	3	3	2	2	2	2	2	3	3	2	2	-	2	3	6	5	4	3	3	4	2	2	2	-	-		
	12.7a	x	x	x	-	-	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	
	15.7a	-	-	-	-	-	-	-	-	-	2	2	2	2	2	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	16.9a	-	-	-	-	-	-	-	-	-	2	2	2	3	3	2	3	3	4	3	3	2	2	3	3	3	3	2	2	-	-	-	-	-		
	18.9	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	3	3	3	3	3	2	2	2	2	2	2	2	-	-	-	-	-			
	20.7	-	-	-	-	-	-	-	-	-	3	3	2	-	2	2	3	5	2	3	4	3	3	3	2	2	-	-	-	-	-	-	-	-		
	21.6a	-	-	-	-	-	-	-	-	-	3	2	3	3	2	2	-	2	4	5	4	3	2	2	2	3	3	2	-	-	-	-	-	-		
	23.9a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-		
	24.7	-	-	-	-	-	2	3	2	2	2	2	2	-	2	3	3	3	4	3	4	5	11	13	16	11	5	3	2	2	3	3	2	2		
	26.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	4	7	6	6	5	4	3	2	3	3	4	3	2	-	-		
	27.7a	2	-	-	-	-	-	-	-	-	2	2	2	3	3	2	3	3	2	2	3	3	2	3	3	3	3	3	2	2	-	-	-			
	28.6a	3	2	2	2	2	3	2	2	3	3	2	3	3	3	2	2	3	3	3	3	2	4	4	3	2	3	3	3	4	3	2	2			

Table 79b

Coronal observations at Sacramento Peak, New Mexico (6374A), west limb

Date GCT	Degrees south of the solar equator															Degrees north of the solar equator																				
	90	85	80	75	70	65	50	55	50	45	40	35	30	25	20	15	10	5	0°	5	10	15	20	25	30	35	40	45	50	55	60	55	70	75	80	85
1953																																				
July	5.6a	-	-	2	2	2	2	2	-	2	2	2	3	2	3	3	3	4	3	3	3	4	4	2	3	3	3	3	2	3	3	3	2	3	-	-
	9.7a	2	2	2	2	3	-	2	2	2	2	2	3	2	3	3	3	4	3	5	4	2	3	3	3	3	2	3	2	3	2	2	2	2	2	2
	10.7	2	-	2	2	3	2	-	3	2	2	2	3	2	3	4	3	3	3	4	3	3	3	2	3	2	3	2	-	2	3	3	3	2	3	3
	11.7a	2	3	3	-	-	2	2	2	3	2	3	2	3	3	4	4	4	5	5	2	3	3	4	3	3	2	2	2	2	2	2	2	2	2	
	12.7a	x	x	x	-	-	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-
	15.7a	2	2	2	-	2	2	-	-	-	2	3	2	3	3	4	4	4	4	4	4	4	4	4	4	3	4	5	4	3	2	-	2	2	2	
	16.9a	2	-	-	2	-	-	-	-	-	2	2	2	3	2	3	2	2	2	3	2	3	2	3	2	3	2	2	2	2	2	2	2	2	2	
	18.9	2	-	3	3	-	-	2	2	3	3	4	5	6	6	7	7	6	8	9	7	5	4	5	5	6	5	4	3	2	2	3	3	4		
	20.7	2	2	2	-	2	2	-	-	2	2	2	2	2	3	4	5	6	8	7	11	10	8	5	4	3	3	-	-	2	2	2	3	3		
	21.6a	2	2	2	3	3	2	2	-	-	2	2	3	4	4	5	8	7	11	10	8	7	4	2	2	4	3	-	-	2	2	2	3	3		
	23.9a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	
	24.7	2	2	2	2	2	-	-	2	-	-	2	2	3	4	4	5	4	4	4	4	4	2	2	2	-	-	2	3	2	2	2	2	2	2	
	26.6	2	2	2	2	-	-	-	-	-	2	2	3	3	3	3	2	3	2	3	2	3	3	3	2	2	2	2	2	2	2	2	2	2	-	
	27.7a	-	-	3	-	-	-	-	-	2	2	2	3	2	2	2	-	-	-	2	3	3	3	3	2	-	2	2	2	2	2	2	-	-	-	
	28.6a	2	3	2	3	3	2	2	-	-	2	2	2	3	3	2	2	2	3	3	-	-	2	2	3	3	2	2	3	3	2	-	-			

Table 80b

Coronal observations at Sacramento Peak, New Mexico (6702A), west limb

Date GCT	Degrees south of the solar equator															Degrees north of the solar equator																				
	90	85	80	75	70	65	50	55	50	45	40	35	30	25	20	15	10	5	0°	5	10	15	20	25	30	35	40	45	50	55	60	55	70	75	80	85
1953																																				
July	5.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	9.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	11.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	12.7a	x	x	x	-	-	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-
	15.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16.9a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21.6a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23.9a	x	x	x	x	x																														

Table 81Zurich Provisional Relative Sunspot NumbersJuly 19, 5

Date	R <sub>Z</sub> *	Date	R <sub>Z</sub> *
1	0	17	16
2	7	18	21
3	0	19	11
4	0	20	8
5	0	21	14
6	7	22	0
7	7	23	0
8	0	24	0
9	9	25	0
10	20	26	0
11	22	27	0
12	16	28	0
13	23	29	0
14	24	30	0
15	40	31	0
16	19	Mean:	8.5

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

Table 82  
American Relative Sunspot Numbers  
June 1953

Date	$R_{A'}$ *	Date	$R_{A'}$ *
1	14	17	21
2	26	18	18
3	24	19	26
4	35	20	29
5	34	21	18
6	34	22	17
7	32	23	13
8	34	24	12
9	30	25	17
10	28	26	13
11	17	27	5
12	7	28	4
13	3	29	7
14	18	30	6
15	21		
16	25	Mean:	19.6

\*Combination of reports from 28 observers; see page 10.

Table 83

Solar Flares, July 1953

Observatory	Date	Time Observed		Duration	Area (Mill.)	Position		Time of Maximum	Int. Maxi-mum (GCT)	Relative Area of Maximum (Tenths)	Importance	SID Observed
		Begin-ning (GCT)	End-ing (GCT)			Lati-tude (of Visible)	Long-i-tude (Hemisph.)					
1953												
Sac. Peak	July 15	1900	2015	75	135	509	W02	1920	13	2	1	
McMath	15	1923F	1945L	-		508	W02	-			1+	
Sac. Peak	16	2155	2225	30	25	508	W19	2209	8	1	1-	

Sac. Peak. = Sacramento Peak

F Time of first observation  
L Time of last observation

Table 84

## Indices of Geomagnetic Activity for June 1953

Preliminary values of international character-figures, C;  
Geomagnetic planetary three-hour-range indices, Kp;  
Magnetically selected quiet and disturbed days

Table 85. Geomagnetic planetary three-hour-range indices No.

January 1937									February 1937								March 1937								25		
S	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum
1	100+0+0+	1-0+0+0+	3+	303-3-2+	2-1+100+	15+	302-304-	3-2+406-	260																		
2	001+0+20	100+2+40	11-	000+1+1+	10101-40	10-	4+405-3-	3+4-4-20	28+																		
3	3-4-1+20	2-1-001-	13-	6+606-40	305-7-3+	40-	201-0+0+	0+000+00	40																		
4	2+302+20	101+2-1-	140	302+203+	3+2+3+3-	22+	0+1-1+1-	301-0+2-	9-																		
5	0+2-2-0+	0+101+0+	70	3+4-4-2-	2+3-4-40	250	204-406-	5+4+3+4+	33-																		
6	1+2-101-	100+0+1-	70	3-4-204-	3-2+3030	230	4-20101+	1+001-1+	11+																		
7	1+1+2-1+	2-306-4+	20+	2+3-3-2+	2+1+1+20	170	000+0+0+	1-1-100+	4-																		
8	4-1+1-1-	0+0+1e10	90	0+1-2-10	1-101+2+	90	000+1-1-	0000101-	3+																		
9	1+2+3040	302+4-4+	240	3+203-3-	40404+4+	27+	3-30101+	1+1+2-2-	140																		
10	3+3-304-	40305+4+	27+	30303-2+	402+3-30	230	2-1+101+	2-2-1010	11-																		
11	3-303020	202+2040	210	303+3+2-	3-2+3020	21+	101-0+1-	0+101+1+	7-																		
12	2+20202-	3-3+2+2+	19-	201+2+20	20303040	20-	00000+04	0000000+	10																		
13	4-3+3-20	201-2-2-	18-	191+303-	4030304-	22-	001+100+	1-2-2-50	12-																		
14	2-1-2-20	1-0+1-1+	90	3+2+2-1+	0+203+40	18+	50503-30	1+30202-	24-																		
15	0+000+1-	1-0+000+	3-	4-202020	2+20302+	19+	5030405-	6-3+2-14	27-																		
16	1+101010	1-0+0000	5+	4-2+2+30	3-301+20	20+	2+1-100+	1-2-2+20	110																		
17	040+1-20	100+102-	7+	1+202-3-	3+3-2+2+	18+	503-2c20	10102030	17-																		
18	10101-0+	1-1-0+1-	5+	3-2+102-	2+1+4+40	190	1+2-2+1+	1-1+1-2+	12-																		
19	0+00001-	1-1-1-101+	5-	4+304-4-	4+5+4030	31+	2-1-1+1-	0+0+101+	7+																		
20	1-0c000+	2-3-302-	100	2+302030	3-3+3-2-	21-	1+201-1-	1-1-1-2-	8+																		
21	2+202-5-	3+3+4-40	230	1+4-202-	3-2+4-3-	200	031-1-0+	1-2+203-	9+																		
22	2+101+10	1+0+100+	9-	101+3-30	3+3-1+2-	170	503+3-40	4+3+3+40	280																		
23	1-1-1-0+	1-0+1004-	5-	2010100+	101-1-1+	80	3+4-2020	3+2-1+0+	18-																		
24	0c0+1-1-	1000001-	3+	10204-3-	2-101-1+	140	202-2-101+	1+2-3-30	15+																		
25	0+0+1-1-	10000000	30	2+3-3-3-	1+10100+	140	1+0+2+3+	1+1-1010	11+																		
26	0c002-1+	0+0+0+0+	4+	0+202+2+	2+100+0+	110	100+2-2-	2+1+3+40	16-																		
27	0+104-40	402+302+	21-	3-3+1+2+	201+1+1-	150	4+4+3+40	504+4-4-	33-																		
28	3-3+2+2-	3-20303-	210	201c2020	2+20202-	150	5-5-4+30	2+2-2-30	25+																		
29	3+302+2-	2-0+1-10	160				3-3-2-1-	10001-2+	12-																		
30	0+1-2-20	3-4+3-20	16+				203-2-1-	2020401+	16+																		
31	1-0+102-	101-0+00	6-				2+5+7+5+	4-5-5-50	38+																		

April 1937									May 1937								June 1937								25			
S	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	
1	3-1+1+1+	2-1+2+3-	15-	4+5-3030	2+20303-	250	303+3-2+	201+3-1-	180																			
2	304-304+	203+504-	280	2+2+2-0+	102-2-20	130	202-1+20	202+1+20	15-																			
3	4-50404-	4-304-4-	50+	1+2-2+1+	0+303-3-	15+	3+102-1+	10101-10	110																			
4	3-2e2+20	2+102+20	17-	3-301+1+	1-305-3-	21+	1010101+	303-2+2+	15-																			
5	1+201-10	1+2-1-100+	9+	7-6+705+	506-1+1+	350	3-3-243-	303-4+5+	26-																			
6	1+2-1+1+	20100+1-	10-	2-2-0c00	1-C00+0+	5-	5+500-50	5-50303+	370																			
7	1-1-1010	1-2+1+10	10-	1-1+0010	1+1+101-	7+	303+2-2+	5-5-2+5-	19-																			
8	1-100+1-	1-0+001-	4+	1-0c1010	1+1-102+	70	202-2-2-	1+1+203+	150																			
9	1+0+0+00	0+000000	2+	2-202-30	4+503040	25-	3-1+102-	1+1-1-1-	100																			
10	00000+0+	0+0+0+1+	30	3+3+202-	5-1+3-3-	20-	0+403+20	1010102+	150																			
11	4-3+201+	1-202-0+	150	404-202+	203-100+	180	2+2-201+	20101-0+	11+																			
12	0+1-2+20	4+4+5-30	23-	1+3-1+1-	10101010	100	0+0+01-	1-1-2-10	5+																			
13	4-1-3-20	2-1-2+2+2+	17-	0+2-3-1-	1+20102-	11+	103-304+	504-3-2-	240																			
14	0+201+0+	0+0+0101+	7-	1-2-3-2+	3-3+302+	19-	3-304-10	201+2-3-	180																			
15	0+10101-	1+2+201-	90	30302+10	2+2+2+2-	18-	2+2-3+2-	201-1020	15-																			
16	0+0-1-2+	1+101-10	8-	4+202+1+	2+2+2+3-	19+	4-3+201+	203-303-	21-																			
17	1c2-1+10	101+3020	12+	2-1+1+10	102-1+1-	100	40303+30	3020302+	24-																			
18	4030203-	2+2-2-2-	200	0012-10	102-2-2-	10-	3-203026	3-3-2+20	19+																			
19	202+2-2-	20203+4-	19-	102+3+3-	2+1-100+	14+	2-201+10	0+102-1+	10+																			
20	30302+20	201+1+10	160	000+101+	160+1-1-	5-	3+4+4+20	3+305040	29+																			
21	404-3+3-	202-1010	19+	000+1-1-	1+403-2-	11+	4-3+2-1-	0+2-302+	17-																			
22	1-0+2-0+	1+1+1020	9-	000+1-30	2-2-2-1-	10-	3-1+2-4+	403+4-3+	24+																			
23	1+1-100+	1+1+302-	110	10205-10	2-2-201+	13+	2+2-1+10	2+1+1-1-	120																			
24	2-2+203-	405-5+80	31-	100+1-1-	10105-2+	10-	202+3+20	4-404-2+	23+																			
25	704-4-2-	10667+7+	38-	30403-3+	2+3-3+4-	250	303+203-	2+2+2-2+	20-																			
26	6-5-3+2+	20507-8+	380	405-4-2-	2-20302+	230	201+1+1+	0+0+0+0+	70																			
27	7000402+	202-6+70	36+	2+203-30	403+505+	28-	2+3+3-40	4+5+5+5-	320																			
28	700007+	7-7-505+	540	5-5+405-	6-5-6-6-	40+	30303+4-	2+2+2+2-	22-																			
29	2+201-3+	4-4-404-	26+	5+5-4+4+	2-2+304-	29+	3+2+2-2-	202-1-20																				

Table 85 (continued). Geomagnetic planetary three-hour-range indices Kp.

July 1937									August 1937								September 1937																
E	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum						
1	3	0	2	0	2	+2-	3	+1-3-20	18+	2	+	2	0	2	-2	-2+2+50	170	1	+	1	+2	0	2-	3	+2	19-							
2	2	-	2	0	1	-1	1	-20	13-	4	0	6	0	5	-5	-3+30	380	2	+	1	0	1	-	1	-0	0+00	60						
3	1	+2	-3	-1	+	1	-0	0001+	90	2	0	3	0	2	-5	-3+5-	23-	1	0	1	+2	-	1	-0	0+1+	8+							
4	2	-1	0	+1	-	2	-1	-101+	8+	6	+	4	0	4	+3	-	20	260	1	+	3	0	3	-10	2	-1	+2	-1+	140				
5	3	-3	-2	-2	+	3	-3	-2+2+	19+	4	-	1	+	1	-10	102-2+20	14+	4	-3	+3	-2+	20	1	-1	0	10	10	17-					
6	4	-0	+1	03	+	4	-4	-303+	220	2	0	2	0	2	-2	-2+4-	180	1	+	2	-1	01	+	2	+2	-2-	13+						
7	4	-3	+4	02	+	2	0	2	+20	22-	3	0	3	-3	0	2	+1	+2	-1+	18+	2	-2	-20	20	1	+1	+2	-1+	130				
8	1	-1	-1	-1	+	1	+1	+2	-1+	90	1	+	3	-1	1	-10	0	0	+0	0	0+	8-	1	+1	0	1	0	101+	9+				
9	1	0	2	01	+2	+	5	0	3	0	2	0	4	0	0	1	0	10	10-	1	0	2	+1	10	1	-1	+1	-2-	100				
10	5	0	4	03	-1	+	1	-0	0001-	15-	1	-	2	0	1	+1	104	90	1	+2	02	-1	+	102	+4	60	200						
11	1	-1	+1	0	10	0	3	+4	-3+40	18+	1	-1	1	-1	1	-10	0	1	-2	-2+	8+	6	-6	-4	+3	4	3	3	0	2	-1+	28+	
12	4	0	2	02	-1	0	0	0	+1	00+	11-	2	-2	-2	0	1	-1	-2	-1-	90	0	+1	01	-1	+	1	-0	+1	01+	7-			
13	0	+1	00	1	-	2	0	1	-104-	10-	1	+2	-	10	0	0	1	0	1	-1-	7+	2	+2	-3	+3	-	2	+2	0	30	30	19+	
14	2	+3	+4	+4	0	5	0	5	+502+	32-	1	+1	-2	0	0	0	+2	-3-	90	2	0	4	-5	+4	0	2	02	-2	20	204			
15	3	0	3	-3	-2	+	2	0	3	0	2	0	2	0	2	+1	10	210	3	-3	0	-3	1	-1	2	0	1	0	14+				
16	1	+2	-1	-10	2	+3	-2	-1+	13-	0	0	0	1	-10	0	0	0	0	10	4+	1	-2	+3	+20	1	+2	0	3	0	20	17-		
17	2	+2	+3	0	1	-1	0	1	+20	15-	1	-1	4	-1	1	-1	0	100	10	7+	2	+4	0	3	02	-	2	+2	0	30	19+		
18	1	0	1	0	0	+	1	0	+2	3-	10-	1	+1	-1	1	-1	-2	0	4-	7+	3	-3	-1	-1	0	+3	0	3	-3+	160			
19	1	0	1	0	1	0	1	0	+4	6	0	3	0	3	-4	0	0	1	0	22-	9+	4	-3	00	1	-1	2	0	0	1	0	0	11+
20	4	0	5	0	4	-3	+2	+3	26-	1	0	0	1	0	0	0	+1	0	2	-1	26-	6+	0	0	0	0	0	0	1	0	1	5+	
21	3	-2	+3	-3	-	3	-1	+2	+3-	19+	2	-2	-2	1	-1	-0	+2+	10+	4	0	3	01	-0	+	1	-0	+2	-2+	130				
22	4	0	4	+6	-5	0	3	+3	0	45-	34+	1	+6	0	8	-	6	-304	+2+	384	1	+1	-1	3	-	2	02	-1	1	1+	12+		
23	3	0	3	+3	0	3	0	3	-4	+5	-40	280	3	-1	2	-1	1	+1	-10	100	2	+2	-1	+2	0	1	-2	0	30	15-			
24	6	5	+3	-3	-	3	0	3	-404-	33-	1	-0	0	0	0	0	0	+0	1	0	3	4	-3	00	+1	-1	2	0	1	19-			
25	5	-4	+3	-3	-	4	-4	-4	-0	30	29-	0	0	1	1	-0	0	0	0	0	5-	2	02	-1	-1	0	+1	0	1	0	1	7+	
26	3	0	3	0	3	0	2	0	1	-10	18+	2	-2	-2	0	1	+1	-10	202-	13-	1	+1	-3	03	-	2	+2	+1	0	1	0	1	15-
27	1	+1	0	2	-1	1	+	1	+1	1	11-	2	+3	-2	2	-	2	+4	+3	4-	23+	3	01	+3	-2	-	2	-2	0	0	0	15+	
28	2	-1	+2	-1	-	1	-1	-1	-10	10-	9-	3	0	2	0	2	-1	0	10	20-	0	+2	02	-1	+	1	-1	1	0	1	11+		
29	0	+1	0	0	0	+	0	1	0	+2	-2	6+	3	0	4	-2	-2	0	1	-1	10	13+	1	+1	0	1	-1	0	0	0	0	4+	
30	1	0	1	0	2	0	1	0	2	-10	11+	2	5	1	-10	0	0	0	0	0	4+	0	0	0	1	-2	-	4	05	+7	60		
31	0	+0	1	0	1	-	1	0	2	-2	20	9+	1	0	0	1	-1	0	10	0	0	1	-1	0	1	0	0	0	0	0	25-		

October 1937									November 1937								December 1937														
E	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum				
1	5	+4	+5	0	3	-3	+4	30	31+	0	0	0	1	-10	1	+1	0	1	1+	7-	5	0	4	+4	30	3	-2	+3	-0+	25-	
2	3	0	2	0	3	+2	0	2	0	120	3	+3	0	2	-3	1	-1	+2	20	18-	3	0	4	-4	0	3-	2	-1	+1	19-	
3	2	+3	-2	0	4	-4	+4	4	29-	2	0	1	3	-10	0	0	0	1	-0	0+	8+	2	-2	0	3	-1	4	-2	-2	-	14-
4	7	0	7	+8	-4	0	3	-4	30	59+	0	0	0	2	0	1	-10	00	50	2	0	2	-1	+2	1	-1	0	1	-1	90	
5	2	+1	+1	10	3	0	3	-10	20	150	0	0	2	-2	0	1	0	0	4	10	7+	0	0	0	1	-1	0	0	1	0	6+
6	2	0	2	+2	0	3	-2	+1	1	190	0	0	0	1	0	0	0	1	0	5-	2	0	3	0	0	2	+2	-2	-	16-	
7	3	-4	0	4	-3	-	4	0	4	290	1	+2	-2	2	-	1	+3	-30	17+	2	0	3	-3	0	2	-2	0	-	22+		
8	6	-7	5	0	3	-2	+5	-2	32-	5	-3	+2	-2	2	+2	0	3	0	4	250	3	-3	0	2	-2	0	-	30	200	200	
9	0	+1	3	+4	-	6	-6	+4	31+	3	0	3	0	4	-3	0	-30	25	25-	3	-3	1	-1	+1	10	-2	+2	-	15-		
10	5	-5	6	0	6	-	4	0	3	340	1	+1	1	0	1	-10	0	0	10	11-	3	-2	+2	0	2	-2	0	+3	-	19+	
11	3	-3	0	3	4	0	6	0	50	35+	1	0	2	0	2	-4	2	-3	3-	18+	3	0	4	0	4	-30	3	+2	-202-	22+	
12	3	+2	-4	5	0	3	2	-5	5+	30-	3	0	3	-2	0	-3	1	+1	3	-2+	180	3	-2	-1	0	0	0	0	0	0	80
13	4	-3	-3	3	+	3	-3	0	1	0	21-	1	-2	-1	-1	0	+2	0	2	10	110	0	+1	-1	2	0	0	0	0	0	6+
14	1	+5	-4	3	0	2	0	2	-1	19-	2	-2	+1	0	2	0	2	0	1	10	10-	0	+1	-1	0	0	0	0	0	4-	
15	1	0	2	0	4	-4	0	4	-30	250	0	0	0	0	1	-10	0	0	0	2-	2-	0	0	0	2	-2	-	0	0	50	
16	2	-7	+3	0	2	-2	0	2	-202-	15+	0	0	0	0	0	0	0	0	0	0+	0	2	-1	0	0	0	0	0	0	0	4-
17	2	-2	-0	1	1	0	1	0	-102	10-	1	-1	0	2	-1	1	0	2	-2	0	12-	0	0	0	0	1	-1	0	1	-1	5+
18	3	-2	-2	-2	1	0	0	1	-1	12-	3	0	5	-3	-5	-	4	+4	0	4	33-	1	+3	0	3	-3	4	-4	-	26+	
19	1	-1	-1	-2	1	0	1	0	-10	11-	3	-20	4	-5	-	5	-4	3	0	3	28-	4	-3	0	4	-4	0	4	-3	-	29+
20	0	+0	0	0	0	0	0	0	-0	20	2	+3	0	4	-4	0	2	0	2	-2	26-	1	+1	-1	0	0	0	0	0	0	250
21	0	0	+2	0	2	-	0	2	-202	13+	2	+3	0	2	-5	-	3	+203	0	21+	2	+2	0	1	0	0	0	0	0	0	13+
22	1	0	2	0	2	-3	4	-4	-	21+	3	-3	+3	5	-5	0	4	-4	0	30	290	2	+2	4	-3	-	3				

Table 85 (continued). Geomagnetic planetary three-hour-range indices Kp.

January 1938								February 1938								March 1938											
E	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum
1	303-1+2+	1+2-2+3-			17+	202+2-2+	402+3-40		21+	4+4+3+3+	4+4+5+3+								320								
2	202+2-3-	3+3-2+20			190	3+30303+	302+2020		220	3+203-2+	201+1o20								17-								
3	301+2-2-	302+3+10			17+	3+3-3+30	3+403-3-		250	3-30201+	10101010								130								
4	2+3-2+3+	5+4+504+			30-	30202+20	3+4-303-		220	0+1+2010	10203-3+								14-								
5	4-3+304-	1-0+000+			150	303-203-	3-2-200+		170	302+5-3+	5+6-5+4-								53+								
6	0+0+1+20	3-5-302+			17-	2+7-6+40	4-5+5+4+		380	504-403+	2-20303+								260								
7	4-302-2-	304+4+5-			26+	40403+30	504+3-3-		290	3-1+3-20	302+2-10								17-								
8	5-5+4-2+	100104-			22-	20203-3+	3+606+5		310	2-2+2-1+	1-100+20								110								
9	5-3+2+1+	2-10100+			16-	3+6-4+4+	4+5-4-30		33+	1-2-101-	1-0+102+								8+								
10	2-2+1-10	1+00100+			8+	4+606-4-	4+1+1-24		28+	1+100+1-	100+0+0+								5+								
11	1+1-1+10	10201+1-			9+	405+6-4+	20302010		27+	00101+10	0+101+3-								9-								
12	1-103020	1+304-50			20-	1-2-3+30	302-1+3-		17+	3+403030	4-4-1+2-								24-								
13	5+6-5-40	3-303-2-			30-	3+2+304-	3+3-3+3+		250	1020101-	1+1-1-2-								90								
14	1c203+2-	3+2-2-2-			16+	3+40505c	6-6-4+20		350	2+4-3+3+	3-202+2+								220								
15	2c203020	201+303-			180	0+102010	1-1-1-1+		8-	3+3+243-	3+1+2-10								190								
16	1+2-3-2+	3+403+8-			26+	2-1-2+20	101-1-2-		11-	0+0+0+2-	0+10102-								7-								
17	7-6+7-6+	8+8-5-6+			530	1-0c2+2-	2-0+102-		9+	2+202-2-	1+200+1-								120								
18	405-3+30	405+5-50			340	1+302+20	3-201-2-		16-	100+101-	0+0+0+0+								4+								
19	4-3+4-4-	4050402+			30-	2-0+1-04	0+0003+10		5-	00+101-	0+000000								2+								
20	2040404-	40405-4-			300	0+0201-	201-001+		8-	0000+0+	0+0+0+10								3-								
21	3+5-6-5-	50403+50			36-	1-1-1430	0+000000		6c	100+0+1+	3-2-2-4+								13+								
22	6-7+8+8+	7-705+4+			530	00000+1-	1-1-102-		50	4-506050	5+404+5+								39-								
23	3030303+	2+2+3+4+			25-	30303+2+	4-3+3-30		24+	6-505-6-	2+4-6060								390								
24	3+4-3+30	3-3-3-30			24+	20243020	2+1+202+		17+	6+6+605-	3-2-203-								32+								
25	403-2-5-	607+9-8+			43+	2-1-2040	3+4+402-		22-	2+2+3-3+	302+304+								23+								
26	8+6+4+5-	404+4620			380	202c103-	3-203+3-		18+	6+4-1+4-	4-3+303-								28-								
27	2-1+3020	3-4-3+3-			20+	20201+20	3c303-4-		20-	402-2-1-	1-0+2-10								12-								
28	2-202-20	3+1+3030			180	403+3+34	3-2+4+40		27+	2-201-1-	100+0+2-								8+								
29	2-4-2+3+	101-4-5-			210														160								
30	302-1+1+	100+3-3-			140														6+								
31	3-2+3+40	3+4+6060			320														50								

April 1938								May 1938								June 1938											
E	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum
1	10001-20	1+2+2+1+			110	1-1-1010	0+0+2024		8+	20163-1+	2-1-1+2-								12+								
2	0+0+1-10	0+0+2020			70	202+2020	3-1+102-		150	2-1+1+2-	3-304+50								210								
3	2+10102+	3-3-2-20-			16-	2-40303-	203+5+40		240	401+101+	1-0+1c2-								11+								
4	2030203-	30201010			17-	406-4-20	4+70503+		350	202+102-	0+1-0+1-								90								
5	0+101+04	0+00000+			4-	40401020	2-4-04040		25-	3-3-2024	1+1+2-0+								14+								
6	3-3+5+40	2+2-3+40			27-	3-3+303-	303-1+1-		19+	2-1-1+1-	202+2+10								11+								
7	4+5-305+	4-3-2-2-			26-	1-0+1+1+	1030404		8+	101+101-	1+101+4+								120								
8	2020205-	202+2024			17+	102-1+1-	201+1+2-		110	4-5-5-4+	4-4+5-4-								34-								
9	1+102-30	4+2+3+2+			19+	100+0+1-	1+1+2-30		10-	202+301-	202+1+2+								160								
10	2+2-2-30	30301+10			170	3+2+2010	202-101+		15-	1+202+30	304-403-								220								
11	1-2-2034	305-3-4-			22+	3-3-202+	208-9-9-		37-	3+303030	30304-40								260								
12	2-2+3-30	301+4-30			21-	7+7-5+40	4+5-5-7-		45-	4-4-4+404	2+405+5-								33-								
13	2+2-2+4+	5050407-			31+	6+2-1-10	2+10103-		17-	4-505+40	4-4-5-3+								310								
14	6-6+7050	5+4+4+3+			41+	303+3+3+	6-4-4-6-		350	0+1+1+1-	1-0+0+1+								6+								
15	5-4-304-	3+3+2+3-			27+	5+5+303-	303+2-30		27+	2-1-000+	0+0+1010								54								
16	3+709080	8-6-445+			50+	3-4-4-3-	3-3-303+3-		24+	000+2+2+	5-2+2+20								14+								
17	203-3+4-	4-404+40			28-	4-3+303-	202+3+20		22+	202-1+0+	10103+1+								11+								
18	4-304-30	2+3+4-3+			260	2-303-2-	101-101-		12+	1+102+1+	1+10102-								110								
19	4-2+2024	203-302+			20+	1+10101-	1+201+2-		10+	101+1-0+	1+3-1-1-								8+								
20	2+2-1+10	2+2-2-2-			14-	1+1-0+0+	1+1-1-2-		70	101-1-0+	1-1-1-0+								7+								
21	2+20202-	1+202+20			16-	101-2+20	2-1-0+10		110	503-5+4-	3+2-2-2-								210								
22	303+1+2-	3-3+4030			22+	1+1+1+1+	2-3-2-1+		13-	2-3-3-20	101-1-1-								120								
23	4-3-5-50	506-5-5+			37-	10101-0+	0+1-1-1-		5+	000+0000	000+0000								1-								
24	4-3+3-3+	2+202+2-			21+	0+1-1-20	3+5-4-4+		20-	000+1+1+	2-102-1+								9-								
25	3+40303+	3+3-3+30			260	3c3c202-	2-1-2030		18-	2-1c1-1-	201-1-1+								9-								
26	2+102-30	3c201-1+			150	1+2+2-1-	1-100+1-		9-	101+2-1+	1+10101+								100								
27	1+201010	102-1+1+			11-	10201+10	1+2+3-20		14-	1+1+1020	101-101+								10-								
28	101+0+10	1-1+0+0+			60	1+2-5-2-	303c3+3-		220	1-0+0+1-	0+0+2-1+								6-								
29	2020100+	0+0+0+10			7+	30405-40	606-5+40		35-	1+1-2000																	

Table 85 (continued). Geomagnetic planetary three-hour-range indices Kp.

July 1938									August 1938								September 1938										
E	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum
1	2+4+4040	4-30305-			29+	1+1+3+30	3-5-3+5-		24+	1+2-2010	1-1+1+1+			11-													
2	304+4-3-	3-201+1-			20+	4+603020	2+304-5-		29+	1-1-1020	20101-20			100													
3	0+2+201-	101-0+00			7+	40202-0+	003-2+7+		20+	2+2+3-30	2+2+1+20			18+													
4	1+202020	5+506-60			29+	5+5-7-6-	404+4-50		39+	10101+2-	2-3-1+30			14-													
5	4+402020	5-2+3-1+			23+	50504-20	4+4+4+30		31+	3-3-2-2+	4-4-100+			180													
6	3-4-3-3-	3030200+			200	303+3-2+	1+3-3-2+		20+	001-1-20	201-1-20			9-													
7	102-2-0+	1+1+1+2+			11-	1+303-1+	304-2+1+		19-	203-2-2-	1+3+201-			15+													
8	2020202-	201+101-			13-	1-2-2-2-	1+1-202-		11+	2+202-20	20202+10			15+													
9	2-1-2-10	0+2-4+4-			150	1+1-1+C+	2-0+101+		80	001-2+2+	3-3-3-2-			150													
10	5-4-4-3-	305-5+4-			31+	1+3+302+	3-3-202+		20-	2-202+3-	3-2-2-2-			16+													
11	4-3-1+1-	0+0+100+			10+	303+405+	606-404-		350	2030102+	2+2-2+2+			170													
12	101+1010	2+1+1-10			10-	3-303-2+	20203-20		19+	3-303-10	202-2+3-			180													
13	1-1+1+2-	2+204-5-			18-	30302+1-	100+1+1-		12+	2-4+2+20	1020505+			24-													
14	5+4+202+	302+3+2+			250	1-1-0+0+	20101+1+		8-	506+2+20	4-606-6-			37-													
15	2+3+504+	6+6+707-			41+	0+0+0+1-	001-1-0+		3+	6+7-7-7-	7+6+6+4+			51-													
16	50303+50	4+3+503+			32+	0+0+0+0+	0+0+0+0+		3-	4030201+	2-20303+			20+													
17	203-3+10	0+1-1+0+			12-	0+0+1010	2-201010		8+	30402+1+	2+3-1+00			170													
18	001-1-10	1+2-1+2-			8+	2-1-0+0+	1-1-101-		60	202-202-	2-1+Q02-			120													
19	301+2+2+	20101+10			14+	0+1+1-1-	1-1+1+10		7+	1+1-1+1-	0+101+2-			8+													
20	1+2-2+10	10201+20			15-	1-1-1-1-	0+0+1-0+		4+	3-1+2+1+	201+0+0+			12-													
21	2+1+2-2-	2-1+1+1+			15-	0+1-1010	2+2+302-		12+	0+10201+	1+2-3-30			13+													
22	1-2-2-1-	102+101-			10+	1+200+1-	504+4+30		210	2+3+3+4-	3-20100+			19-													
23	102-2-1-	1+202-2+			12+	4-4-4-60	50303-2-		29+	2040302-	1+1+101+			16-													
24	2-1-1010	1+101+2-			10-	1+1-102-	202-4-40		150	0+0+0+10	101-1-2-			60													
25	200+0+0+	0+1-0+00			4+	402+2-1-	101+2+10		14+	0+1-1-1-	101+1+2+			90													
26	000+101-	1+101-0+			5+	10102-10	100+1+1+		9-	3+3-5+5+	5-5-505-			36-													
27	0+1+1+1-	10101-1-			8-	101-102-	1-1-1-10		7+	3-5-4030	30303070			28+													
28	001-1-0+	1-100+0+			40	1-1-1010	1030302+		13-	8-70504-	403+3+20			360													
29	001-1+2+	3-203-3+			150	2+203020	101+4-2+		18-	204-4+40	3+2+2020			24-													
30	4-606-5-	50305-4+			38-	3040202+	2+2-2+10		19-	1+201+4-	5-307-50			28-													
31	3+1+101+	1-0+1-0+			90	203-2-2-	2-0+0+0+		11-																		

October 1938									November 1938								December 1938										
E	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum
1	6-7+5-4+	203-4-40			34+	1+101-2-	301+101-		11-	0+00000+	00001010			3-													
2	4-4-3-3-	3+3+303+			26-	0+1-102-	2+2+1-10		100	101-2-3-	3+3+5-50			22+													
3	4-3+2+20	103+3+40			230	1-1-102-	1-102-1+		9-	504+4-30	3+404+40			32-													
4	2+301+30	4-1+2-1-			170	1+1+1+2-	1+1+2010		11+	404-1+1+	0+102010			15-													
5	000+1010	0+000+0+			3+	10101-10	1020100+		80	1+5-2-30	4-2+1-1-			160													
6	002+3-2+	2+2-200+			14-	2-2-2-20	2-1+2-1+		130	2020202-	101+202-			14-													
7	002+5-5-	7070705+			380	1-102+2-	1-1-2+2-		110	2-1001-	102-201-			9-													
8	6-707-5+	5-404-2+			39+	2-40304-	405-3+5-		290	1-0+0+1-	001-0+00			30													
9	302-4-3+	1+202030			200	50404040	40504+40		34+	10202-2+	2-303-30			17+													
10	3+301+2-	3-2-2+30			190	4+30201+	100+1010		140	2+3-3-34	405+6-4+			30+													
11	303+3-2+	3-202000			180	1-10101-	1+101+10		80	3-3-303-	1+2+2-2-			180													
12	0+1-2-10	1-0+2-2-			80	101-100+	0+00000		3+	2-2+3-24	30201+1+			17-													
13	000+101-	0+1-202-			7-	1+1-1+1-	1-0+000+		5+	2+3-2+2+	202-3+2+			190													
14	101-1-0+	0+00001-			4-	1-0+1-1-	203-3+3+		14-	2+2-2-2+	202+3+2+			180													
15	0+0+1-2-	2-0+1+1+			8+	50201+1-	1-1-1+30		15-	202+3-1+	2-1+101+			13+													
16	20202-30	4-5-2+3+			21-	1+1+202-	201+1-3-		130	101+2030	3-405+5-			250													
17	301-1+3-	20201-00			12+	203-203+	50504-40		28-	505-5-4-	3+4-4-40			33-													
18	0+102-2-	1-1+202+			110	2+2+3-34	301+3-20		20-	5-30404+	506-5-4-			350													
19	3-3+202-	2+2-202-			18+	3-202+3+	2-102-1+		160	3-4-403-	4-4+3+3+			28-													
20	2+404-3-	3-2+3+2-			23-	2-2-3030	302+2-1+		18-	3+3+2+2+	3-303+3+			24-													
21	2-201+3-	3-1+2-2-			150	2-1+3-40	4+40404-		26-	2-20303+	3+10102-			170													
22	0+1-2020	201+3-2-			13-	3-4+4-2+	3-201+20		210	3+405-5-	402+2+20			27+													
23	1+304040	3+3+3-4-			25+	30304-2+	3030203+		23+	3-20101+	200+102-			120													
24	3-3+303+	4+4+305-			29-	203+3+30	3+4-4-30		25+	20102-1-	1-0+1+1+			9-													
25	5+4+405-	5-30405-			35-	3+303-3+	2+3+2-2-		21+	2-001-2-	201-0+0+			7+													
26	3+4-4040	50504050			340	303+4+40	3+3+2+3-		26+	1+1-0+0+	0+0+1-00			40													
27	5-40505-	5-4+4030			34+	3-3-2-2+	20101-1+		14+	0+0+0+0+	0+0+1-2-			4+													
28	40403+3	5-4-4-2-			28+	1-1+2+20	201+1+10		120	201+0+2-	3-201+2-			130													

Table 85 (continued). Geomagnetic planetary three-hour-range indices A<sub>2</sub>.

January 1939								February 1939								March 1939											
E	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum
1	101-1+10	1010001-			7-	201010102-	30304040			20-	3-3-304-	4-4-403+50							280								
2	0+2-1+20	2-1-101-			9+	5-4-3-20	2+3+4040			27-	5+6-4-40	3+1+202+							28-								
3	2-2-1+10	1+0+0+0+			8-	2+3+2+2+	202-3-3+			20-	2+4-3+3+	3+4-3-5-							270								
4	00101010+	001-101+			5+	3-3-2+4-	3-1-1+1+			17+	50504-30	4-3-404+							31+								
5	2-3+2-20	3-2+2+3+			19+	2-20203-	2+20404-			20+	3+202030	2+304-3+							23-								
6	201+102-	2-2+3-3-			15+	30404+5+	5+5+5+50			38-	30303+3+	305+3-3-							24+								
7	2+2-1+3-	2-2-3+2+			16+	5-5-3+5+	403-3020			28-	3+5-1-1+	1+10102+							14-								
8	303+2-2-	1+1+3+2+			18-	20101-1+	2-1+2030			13-	304+4-50	202-302-							22+								
9	2+3-4-30	2-2-2+30			200	202-1-3-	2+2+3+4-			19-	3-4-504-	303-302-							25+								
10	203+202+	30202+26			196	3+3+2020	3+4-303-			23+	3+2+2-1+	30202030							19-								
11	20202-2-	20203-30			170	4+5-3-30	201-100+			19-	102-5+50	2+402030							204								
12	20202010	2+10101+			13-	1-0+1-0+	101-0010			4-	3+302+3-	20303+30							23-								
13	101+0010	2-1+001+			8-	0+001-0+	0+1c2+30			8-	2+1+3-34	2+1-001-							15+								
14	5+3-1+2+	3030104-			20+	2-1+3-2-	202-2+1+			15-	1-1+203+	3-2+1020							15+								
15	10302+2+	2-2-1-1-			15+	3+3+3-2+	3+3+201+			21+	1-3-303+	3-4+3-3-							220								
16	1+001-2-	1020303-			12+	2+404-2+	3+3+2050			240	4+4+4+4=40	4-3-303+3+							30-								
17	4+403-3+	3+1+2+2+			24-	2-303+30	3+4-3+24			24-	4-404-10	202+3010							21-								
18	5-503+10	1c1-0+2+			14+	301+4-2+	20302-3+			20+	2+1+1+20	1-1-000+							9-								
19	1c1+2-14	101-2-3-			11+	3-3+3+2+	302-302-			210	0+1-100+	0+0+2+20							7+								
20	303+302+	0+1+2+2-			17+	20301-1-	1+3-141+			130	404-1+1+	1+2+0+1-							150								
21	2+2-2020	4-3+4-1+			200	1+2+001-	0c000c00			4+	0+3-5-50	3-305-1+							24+								
22	1020201+	2-2-4-40			17+	0c001+2-	1+1c1+1-			7+	304+4040	404+404-							31+								
23	3-3+2+30	30202-10			190	3-201-1c	2+1c203-			14+	4+4-3-4-	3040304+							29-								
24	103+301+	1+0+1-20			130	3-4-203-	3+60707+			35-	2+2+3-20	30202-30							190								
25	2+2+202+	1+001-10			11+	7+6-7-60	6-50404+			45-	2-3-202-	2-1-1000							14+								
26	00000+1-	1-00c00			2-	2-2-101-	1-1+1+3+			110	303-2+2+	2-2-3+34							20+								
27	00000+00	0+0+000			10	1-1-1-1-	2+1+1-1-			8-	4+403-30	1+3-5+50							28+								
28	001-0+1-	10202020			9-	1020202-	204082+3-			18-	4-403+4-	5+6+6+7-							39+								
29	301+0+1-	00000+10			7-						6-6-6060	6-5+6-5+							460								
30	101+2-10	1+1-1-1-			8+						4+404-3+	3+4+5+50							33+								
31	0+3-102+	1+1-0+0+			9+						4+4+2+3+	3030304+							27+								

Table 85 (concluded). Geomagnetic planetary three-hour-range indices Kp.

July 1939									August 1939								September 1939										
E	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum
1	2+203+4-	3-2-2-2+			20-	2+2+1+1-	1-1o1-1o		10o	0+1o1o1-	1-2-0+0o								6-								
2	3-3o3+2o	2+2+2+2+			20+	1-1o1+0+	0o0o0+0o		4-	1o2-2-1o	1+2o2o5-								15+								
3	3+4o4o5o	7-5o6-3o			37-	0o0o0+0+	1-0+0+1-		3-	6o6o5-5-	5o3+3+4o								35o								
4	3+3o2o2+	4+5+6+7-			33+	0+1o0+1o	1-1o1-1o		6o	3-3-1o2-	2-1o1o0o								12-								
5	5+6+6+7-	7-7+6+5-			50-	1-1o1o1o	1-1o1o2-		8o	0o1o1-0+	0+0+1+2+								6+								
6	5-5-3+4-	1o1-1-14			20o	1o1-1-1-	0+1-0+1-		5o	3-2-2+1+	1+1o3-3o								16o								
7	1o0+0+0+	1o0+1o0+			5-	1+1-1-1o	1+1-1-0+		7-	3o3-2+2o	2o1o1o1+								15+								
8	1o0+0o1-	1+2-3o1+			9+	1+1-0o0+	0+1+3-1o		8-	2-2-1o3o	1o1+1+2-								13-								
9	3-1o0+1-	1-1-0+1-			7o	0o0+0+1+	0+0o1-0+		5+	3+4-5+4o	4o3+3+3+								50+								
10	2o1+1o0+	1-1-1-0+			7o	0o1+1+5-	3-3+3+2+		19o	3+4o3+2o	4o3-4-2-								25-								
11	0+1o1-2+	5-3o4-1o			17-	2o1+1+0+	3-3+3o6-		20-	3-2+3-1-	2-1+2-1o								14o								
12	1-1+1+3-	4+5-3o3-			21-	6o3-7+7-	5o4-5-6-		47-	4-5+3+3-	2+1+2o3+								21+								
13	2-2-1o4+	1o1+2o2-			11o	6o3+4-4-	3+4+4-3+		33+	2+1+1-2+	2o1+1o3-								14-								
14	2o3+5o5-	5+4+3-5-			32-	3-4-5+2+	1o1o1-1-		15-	3+3o2-3+	2+3-2-2+								20+								
15	4o5-3-3-	3-2o2o3-			21+	1-1-1-0+	1o3-1+2-		9o	2+1+1o1+	1+1+1+3-								13-								
16	3-3+3+3+	3+5-5+4o			30o	1+3-3+4-	7+8-5-6-		36+	3-1+1o1+	2+2-2o2-								14o								
17	4o3+4+3-	3-3o2+3+			26-	5o5-4-5o	3-3o2-1o		25-	3-5+5o4-	5-6o7o5o								39+								
18	3o3o2+2o	2o3-2+2-			19o	1+1+1-2-	2-2o1+2+		12+	3+3-1+2+	2o2-1-0+								14+								
19	2+2o2+2+	2-2-2+5o			19o	1o2-3-2o	2+5-1+2-		16o	2+4-4+4+	4+5+4+5o								34-								
20	4+6-5o5-	6o5o4o4+			39o	1+2o2o1+	2-1+2+2o		14o	5o5+5o5-	5+4-4-3-								33+								
21	3-2+0+5o	7+4+3o3+			28+	1+1+1o2+	2+1+1+4o		15o	3-3o2+3-	2+2o3-2+								20o								
22	4+5-3o4-	4-3+2+3-			28-	8-0-5-5o	7+7o7+8-		54+	2+3-3-3+	2+3+2o3-								21+								
23	4o2+3-1-	2o2o1+1-			16+	8-7+7-7-	6o4o4o4-		46o	1+0+1+1+	0+1-1o2o								8+								
24	2+1+2+1+	3+2o3-2+			18-	4o2o3+3o	3+2+1+2o		21+	2+3+2+2-	2-0+1+1-								13o								
25	2+4o5-3o	2o2-1+1-			20-	3+3+2o2+	2+1+2-2o		28o	1o1+1+5o	2+3-2+3o								17o								
26	1+6-6-5-	4+4+3+3+			33-	1o1+2-2+	2o1o1+2o		13-	5-5+3o4-	2+2+4o3-								28o								
27	3-3+3o2-	3-3o2o3+			22-	3-2+1+2+	3o2o2o2+		18o	1+1+1-0+	0+1+3o2+								11-								
28	2o2-3+2+	2-2+2o2+			18-	1o1o1+3-	2-1+1o1+		11+	2+1o2-1-	1o1o1o1o								9-								
29	2-2+2o2+	1+3-2-1-			13o	3o2-1-1-	1-0+1o0o		9-	0o0+1o1o	0+1o1-1o								5+								
30	1+3-1+1o	0+1+0+0+			9-	0o1-1o1+	2o3o2+2-		12o	1-1-2-3o	1o1+3+3o								15-								
31	1+2o2+1o	1+1o2-2o			13-	0+0+0o0+	1-2-2-1o		6o																		

October 1939									November 1939								December 1939										
E	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8	Sum
1	3+2o1o1-	2-3-2+2o			16-	2+2-2+3-	2o2o3o1+		17+	2o3o4-2+	2-1o2+2-								18-								
2	1-1o2-1-	1o1+2-2o			10o	1+3-2o2-	2-1o1+1-		12+	2-1-3-1+	1-1+2+3-								14o								
3	3-2o4-4+	5+5-6-6-			34o	2o2-2o2o	2+1+2-2o		15o	1+2-2o1o	0+1-1+3+								12-								
4	7+7+4-3o	4o3-3+2-			33o	3-1+2o2o	1o1-1o1+		12o	3+3o2-0+	1-0o0+1o								9+								
5	3-3-2o4-3-	3+2o4+2o			23-	1+1-1+3o	1+1+2-0+		11o	1o1o1-1-	2+4-3+3+								16o								
6	4+6+5o4-	3o3o4-3-			32-	1-1+1+1+	1+1+2+3-		12+	4-2o2o1+	2o1o5+5+								23-								
7	2o1o1-2-	3-4-5-4-			20o	2+2-2-2-	1-2+2o1+		14-	6-6o5+4o	5o5-4o4o								39-								
8	5+3o2-1-	2-1+3o3-			174	1-1-1o1o	2o0+1+0+		7+	3+3-2-3+	4-5+4o4-								23-								
9	4-3o7-3+	5+3-5o1+			29o	1-2+2o2-	1-1o1-1-		10-	4+2+3+3+	4-3o4-2-								25+								
10	1-1o1+1+	2o1o0+2+			10o	1o2o1-1-	1-1o1+1-		8o	2-2+2o2o	5o2+2o3-								18o								
11	3-3o1+2-	2+1o3+3+			19-	2-2+1-1-	0+1o2o2o+		11o	3o2o3-2o	2-1o1+2-								15+								
12	3o2-1-0+	0+1-0+1-			8-	4-1+1-3-	3o2+2-2o		18o	3-2-1-2-	1o5-2+3-								17-								
13	5o6-6+4o	4-6-8-8o			46o	4o5+5o5+	5+4-6o5-4-		38o	2+3-2o1+	2o2-0o0o								12o								
14	5+6o7-7-	6o6o5o4-			45+	5-4o3o3o	3-3o3-4o		27o	2o0+1+1-	1-1-0+1-								7-								
15	7-8o7-3+	3+5-4o3o			40-	3o2+3-2-	2o3o3-1o		18+	2o3-2+1+	2-3-2o2o								17-								
16	4-4o4o3o	4+6-5o5-			34+	2o1o1+1-	1o2-1+1-		10-	1+2-1-1o	1o3-1+3-								14+								
17	4o5+5-4o	4-5o5o4-			35+	1-0+1+1+	1o1o2o1+		9o	3o1-2-2-	1-1o1o1o								11+								
18	4o4-4o4o	4-4+5-4-			32o	1-1+2o2-	1-1-1-1-		8+	2-1o1-0+	0o0+0o0o								4+								
19	4o5-4o5-	3-3o4-2+			29o	0+0+0+2o	3o3+3o2o		14+	0o1+0+0+	0o0o0o0o								2o								
20	2+2-2+2+	0+1-1-0o			10+	3+3-2o1o	0+0+2-2-		13o	0+0o0+0o	1-1o2o2-								6o								
21	0+2+3o2o	3o2o3+4-			20-	1o1+2o2o	2o1-1-0o		10-	2o5o4+4-	4o5+3o3o								26+								
22	2+1+2o1-	1o1o2+3-			14+	0o0+0+0o	0+0+0o1o		2+	5-4-4-3-	5-4o3+3+								30o								
23	0+2o3o3o	4o4+2+3-			22-	0+1o1+1o	1-0+1-1-		6o	2o4-3o3-	1+2-1+3-								18+								
24	4-2+2o1o	1-1-1-1-			12+	1-1+0+1-	3-2-3-3+		13+	3o3o3o3-	2+2+2+3-								21+								
25	2-2o2o1+	2+1-1-0o			11-	3+5-4o3-	3-3o4o5o		29+	3+3-2o1+	2o1o2-2o								16o								
26	1-1-2o1+	1-1-3o2o			11o	3+4-3+4-	3o2o3+2o		24+	2-3-2o2-	1o0+1o1+								12-								
27	1-1o1-1o	1o2o0+1-			7+	1+3+2o2+	2-1+2o1o		15o	2-3o3-3o	2+3o4-2o								21+								
28	0+1o2+3o	3-1o2o3-			15o	1-3o2-2o	2+1o2-0+		13-	2o2o2o2+	2+2o3o3-																

Table 86

Sudden Ionosphere Disturbances Observed at Washington, D. C.

July 1953

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No sudden ionosphere disturbances were observed during the month  
of July.

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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.

## GRAPHS OF IONOSPHERIC DATA

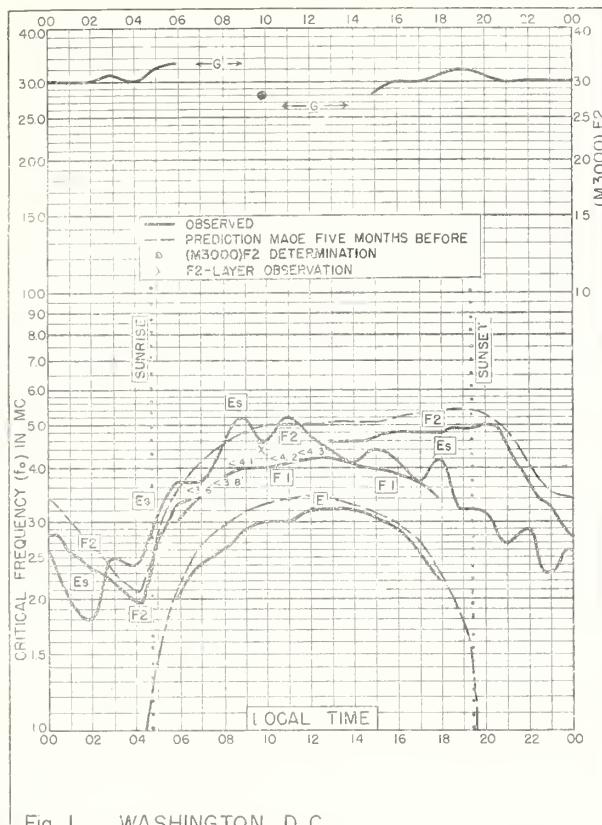


Fig. 1. WASHINGTON, D. C.  
38.7°N, 77.1°W JULY 1953

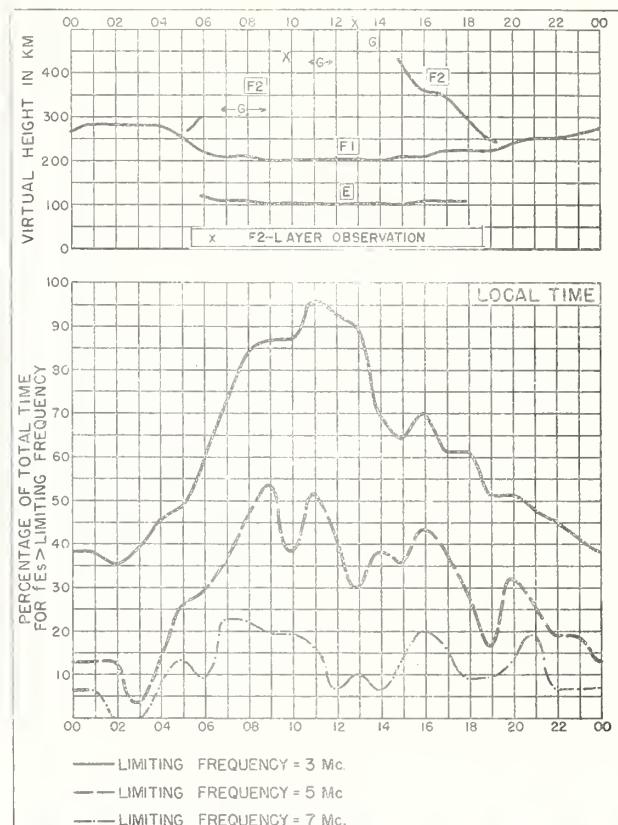


Fig. 2. WASHINGTON, D. C. JULY 1953

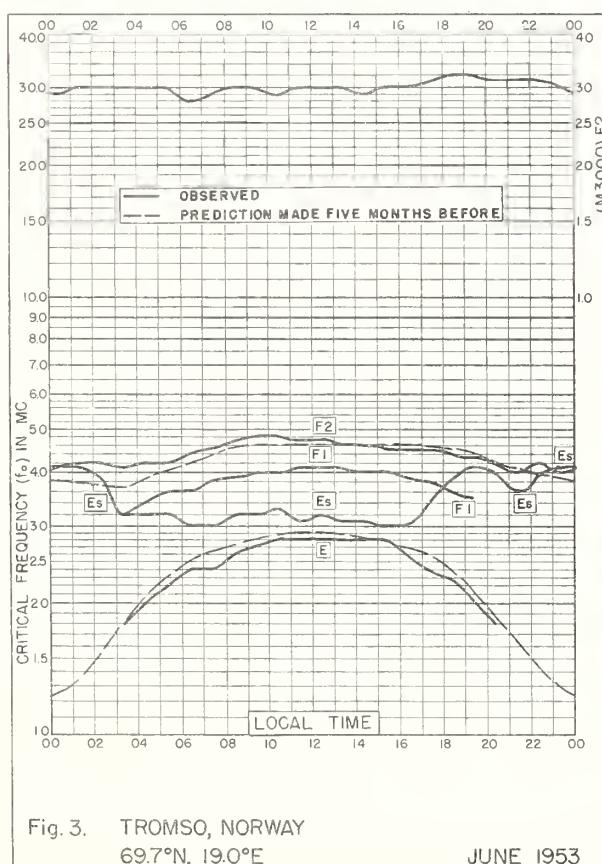


Fig. 3. TROMSO, NORWAY  
69.7°N, 19.0°E JUNE 1953

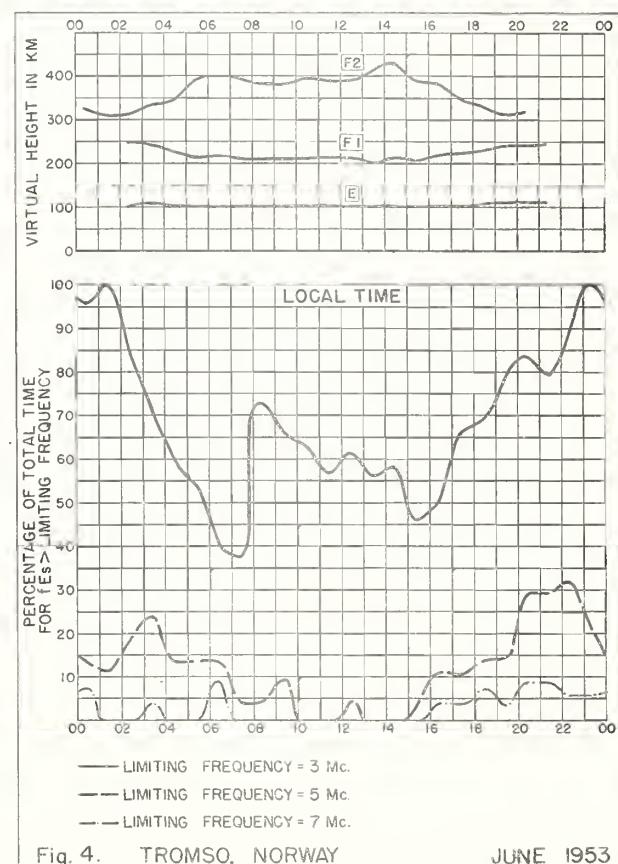
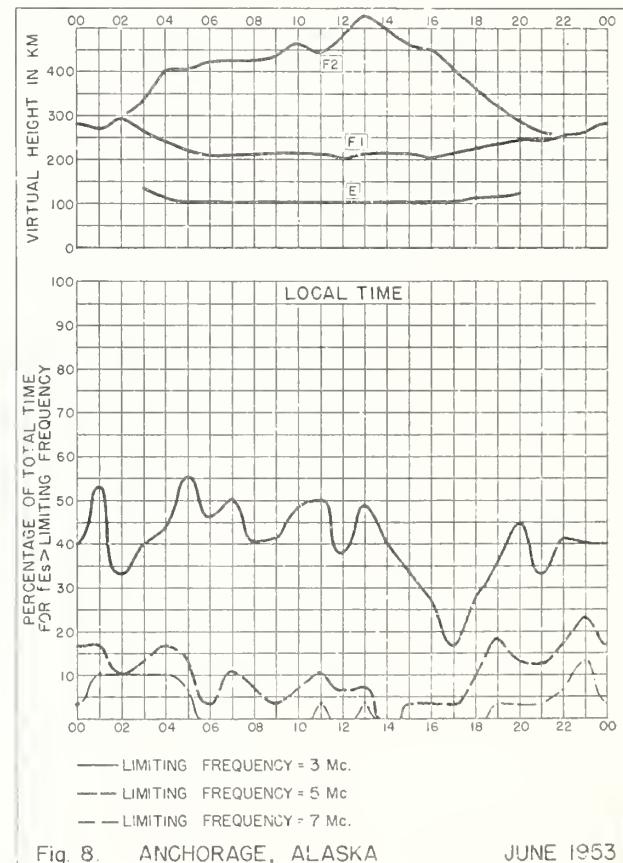
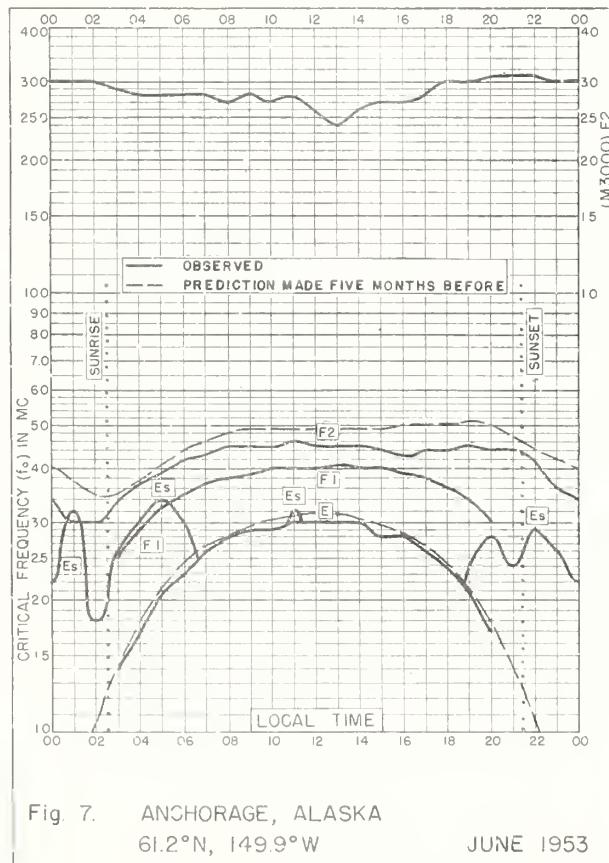
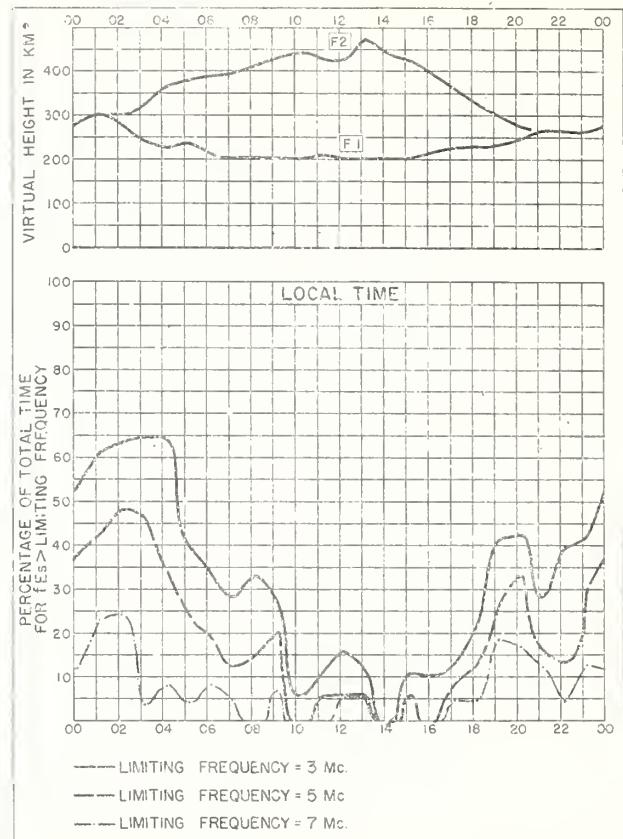
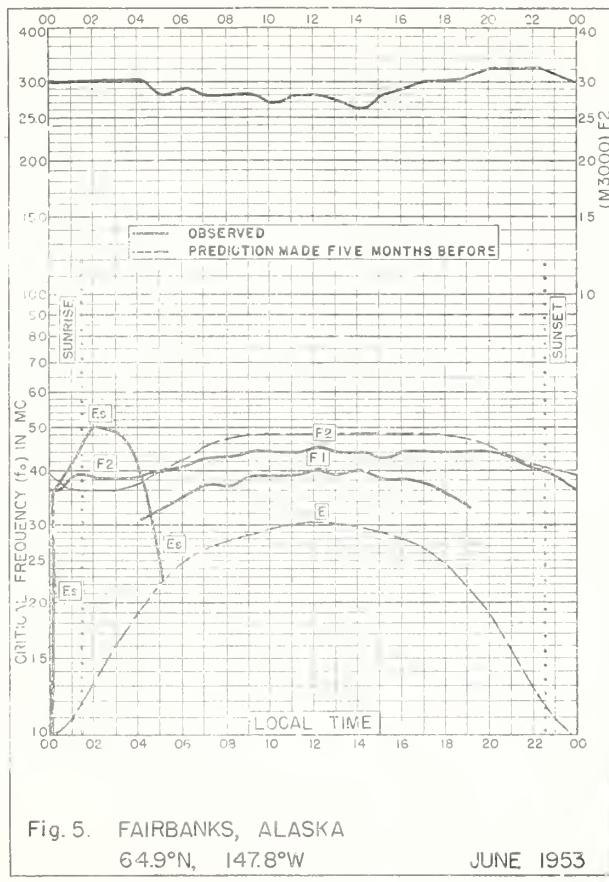
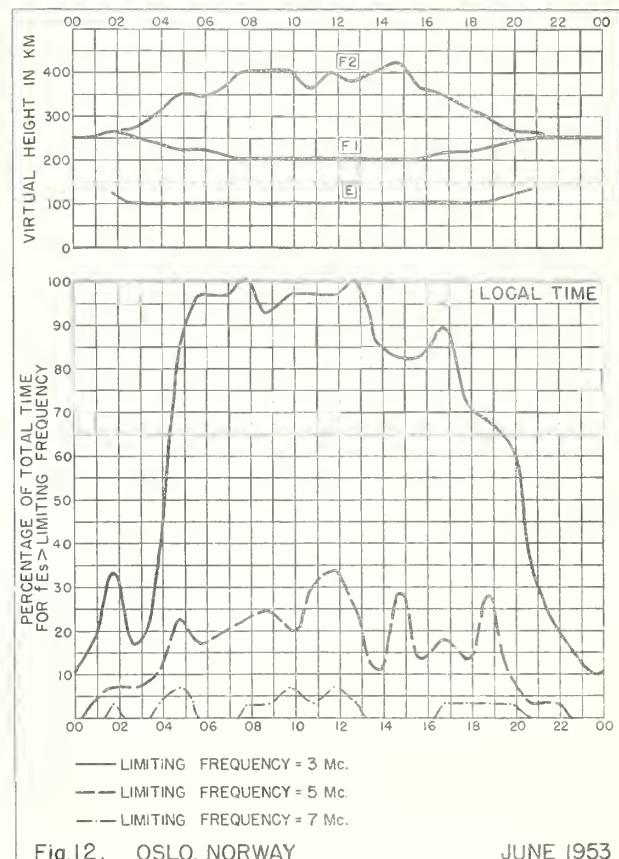
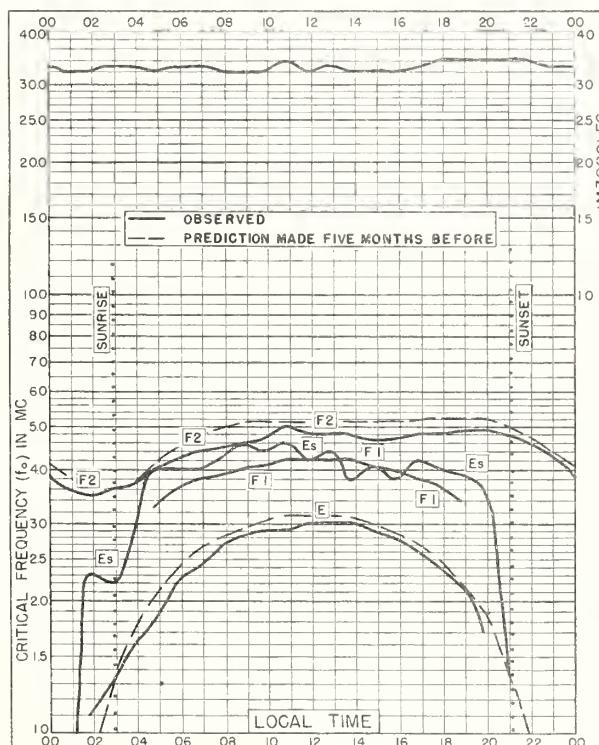
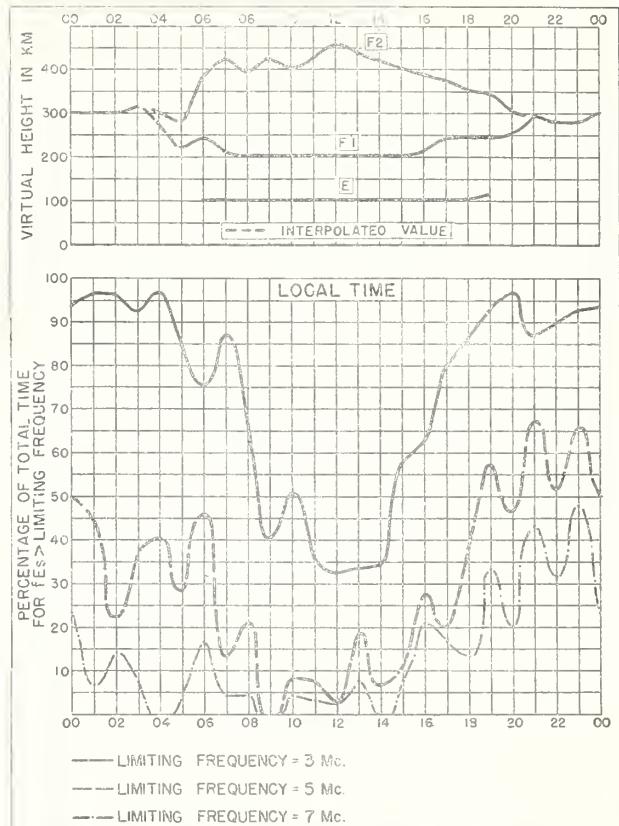
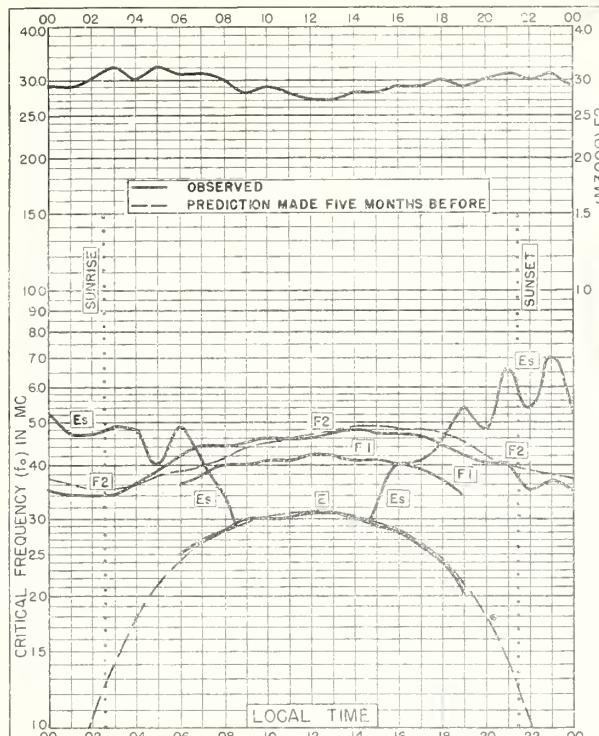
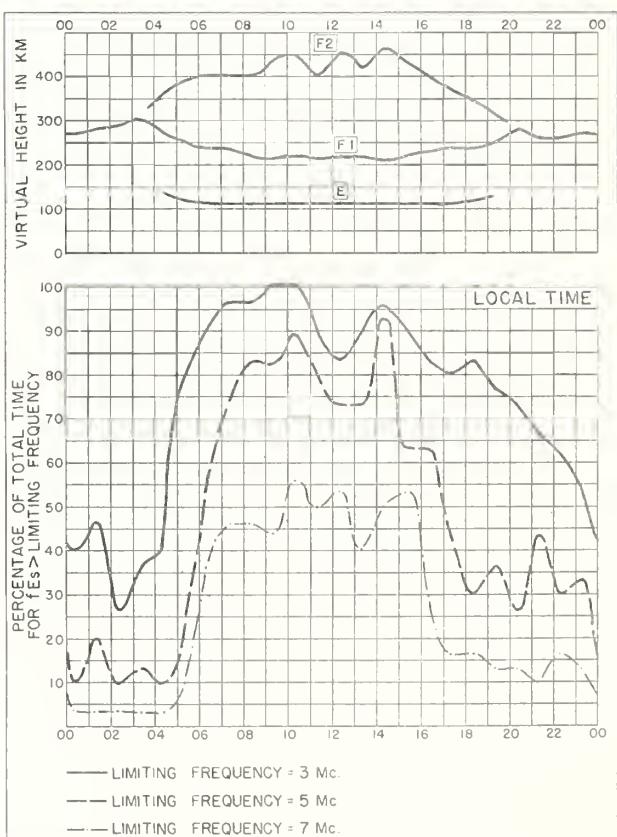
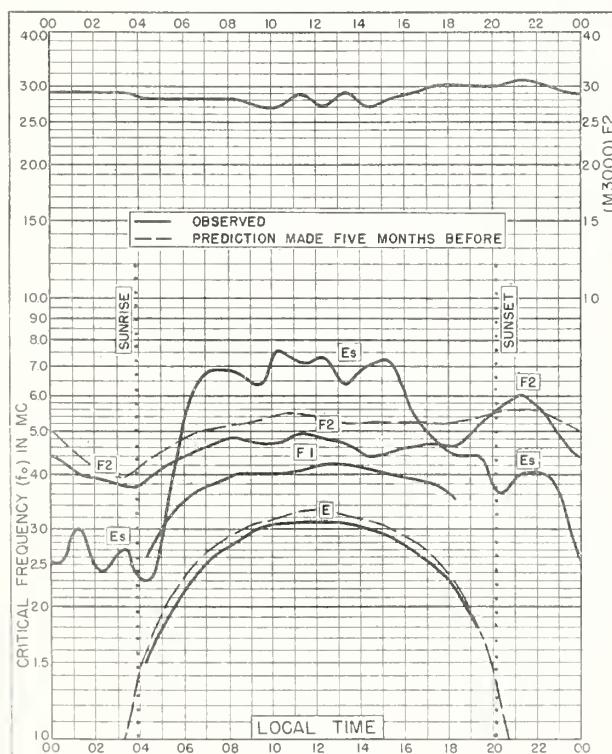
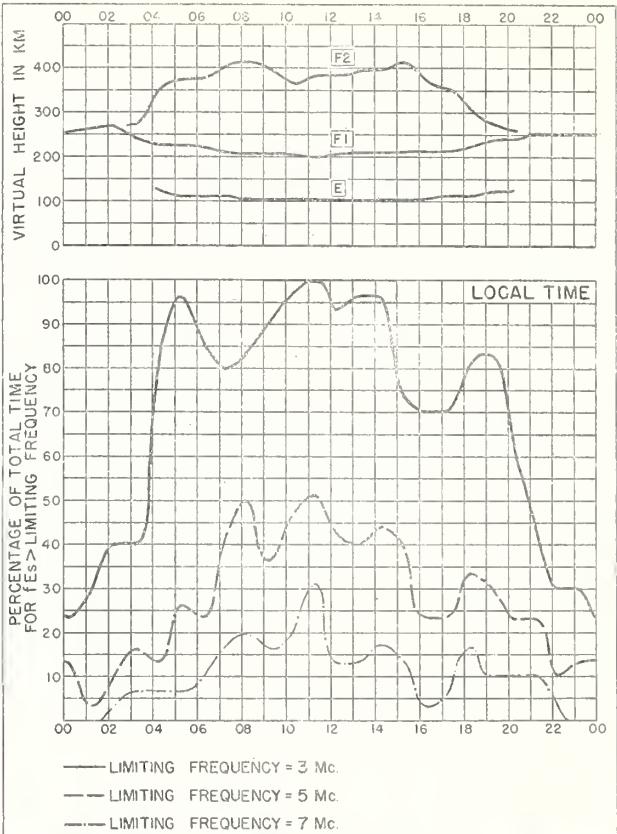
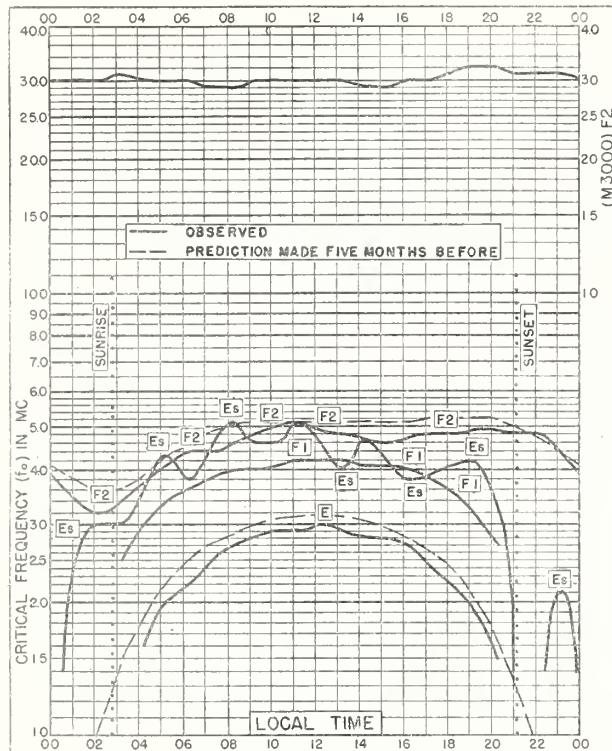


Fig. 4. TROMSO, NORWAY JUNE 1953







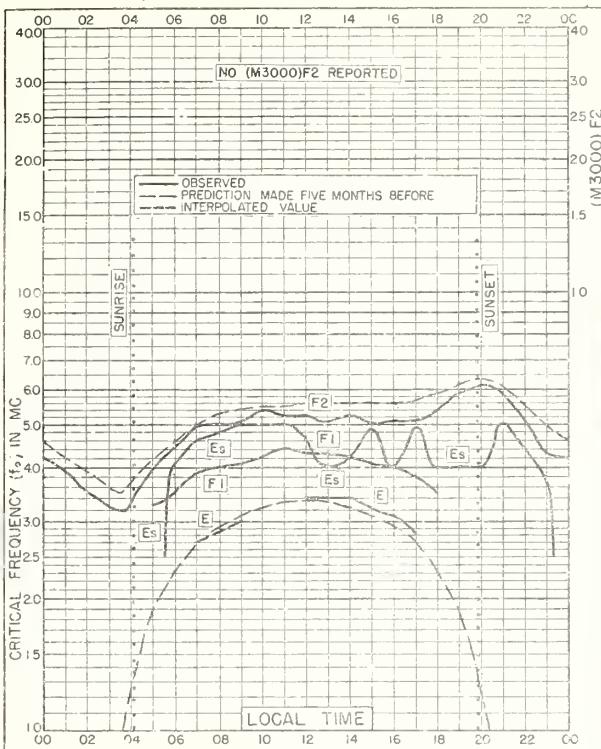


Fig. 17. GRAZ, AUSTRIA  
47.1°N, 15.5°E

JUNE 1953

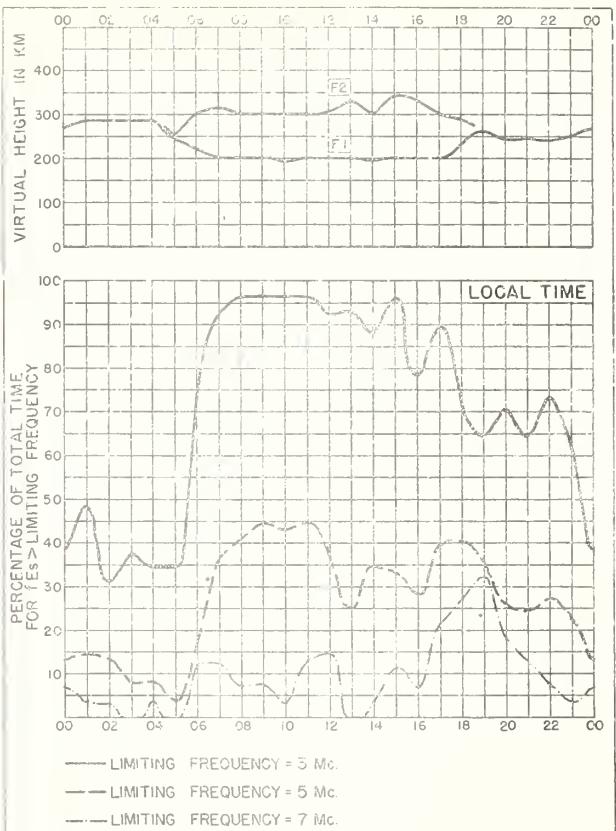


Fig. 18. GRAZ, AUSTRIA

JUNE 1953

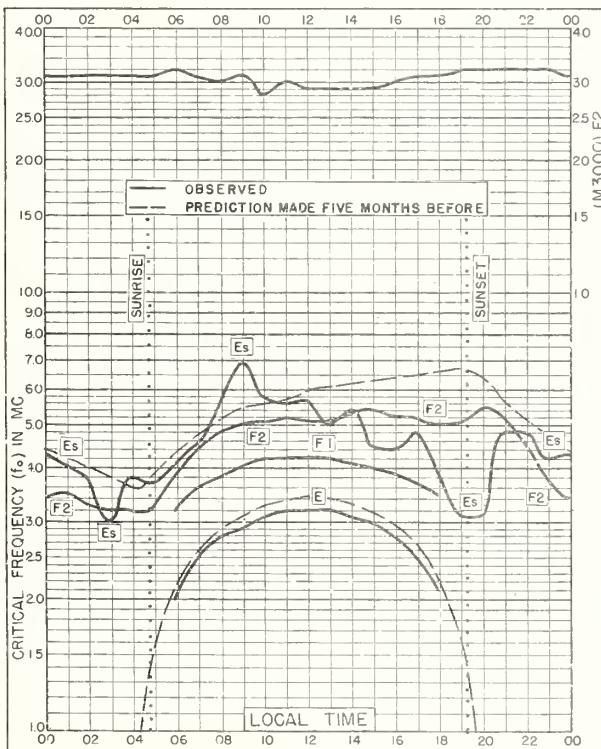


Fig. 19. SAN FRANCISCO, CALIFORNIA  
37.4°N, 122.2°W

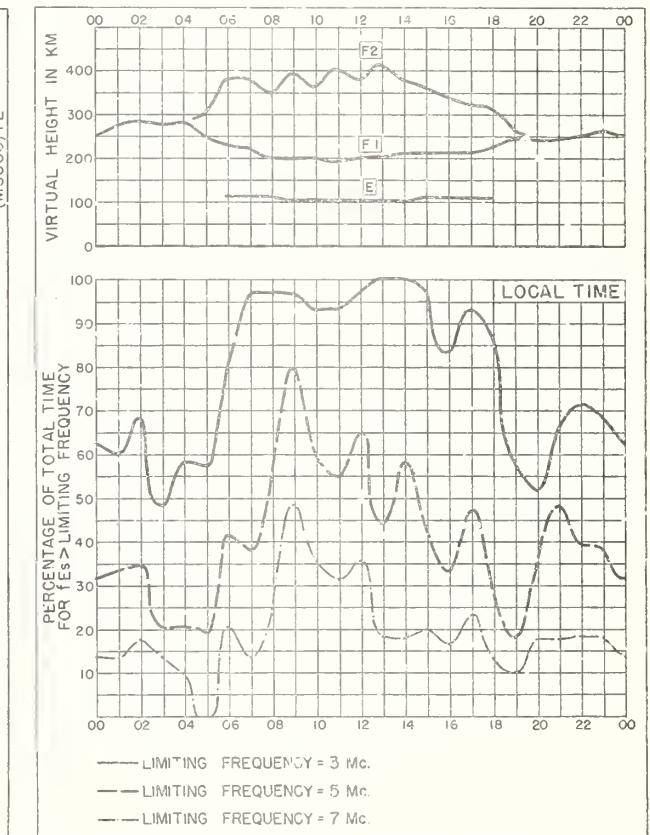


Fig. 20 SAN FRANCISCO, CALIFORNIA JUNE 1953

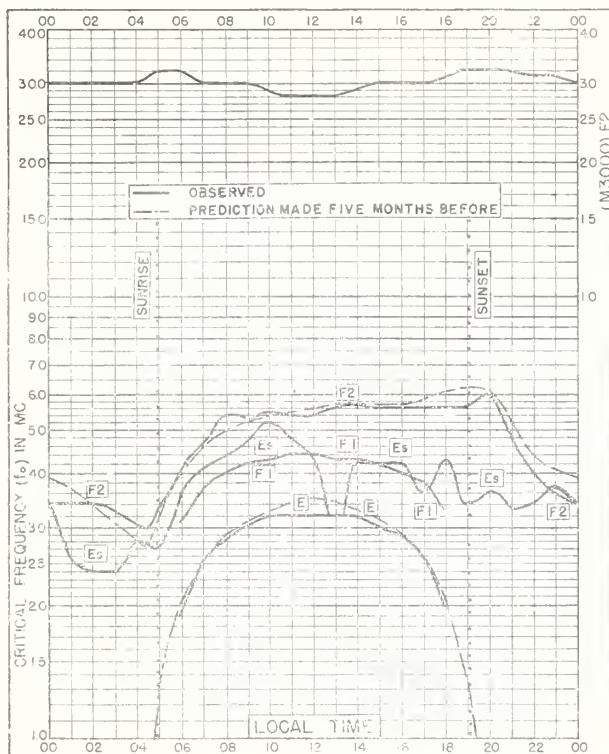


Fig. 21. WHITE SANDS, NEW MEXICO  
32.3°N, 106.5°W JUNE 1953

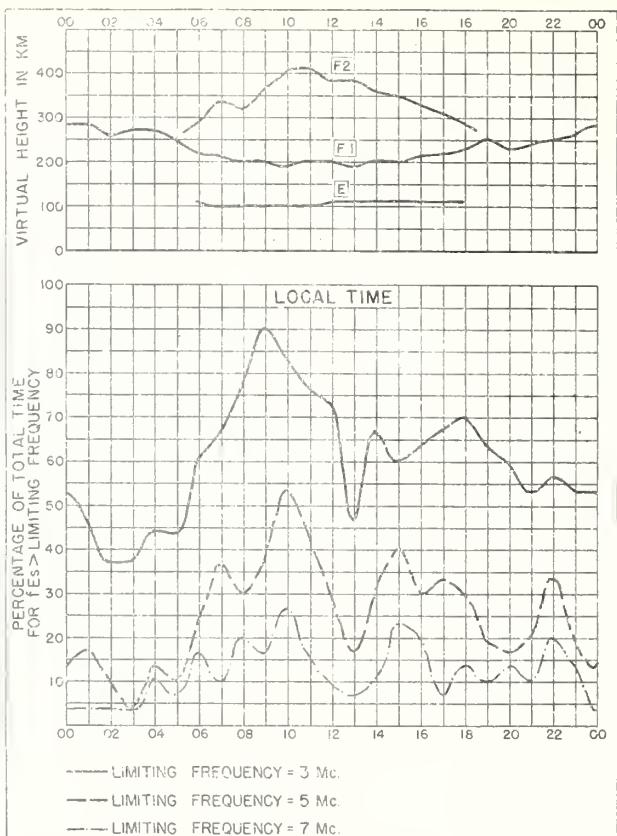


Fig. 22. WHITE SANDS, NEW MEXICO JUNE 1953

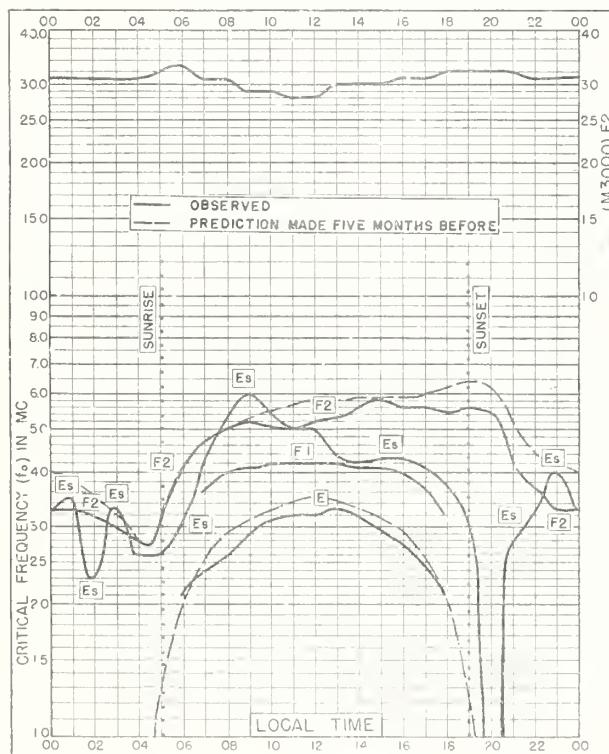


Fig. 23. BATON ROUGE, LOUISIANA  
30.5°N, 91.2°W JUNE 1953

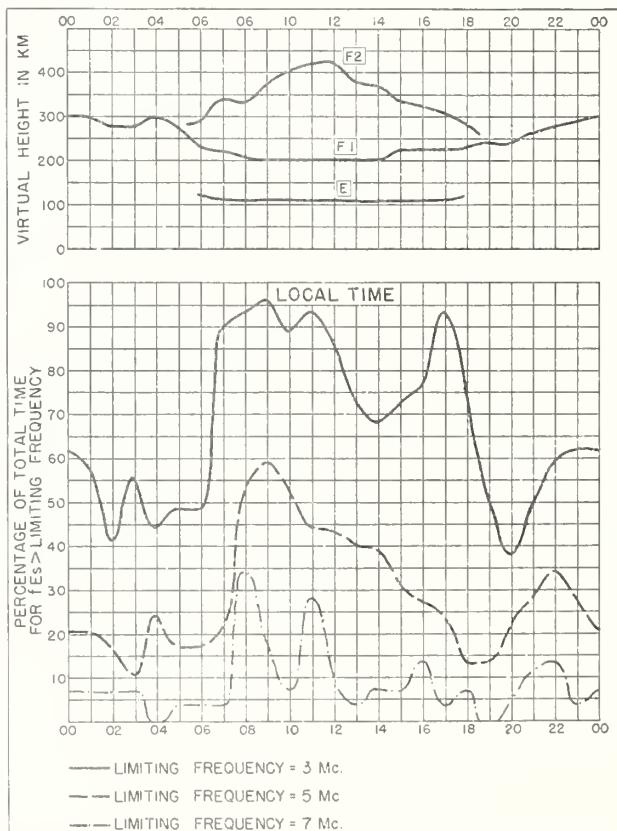


Fig. 24. BATON ROUGE, LOUISIANA JUNE 1953

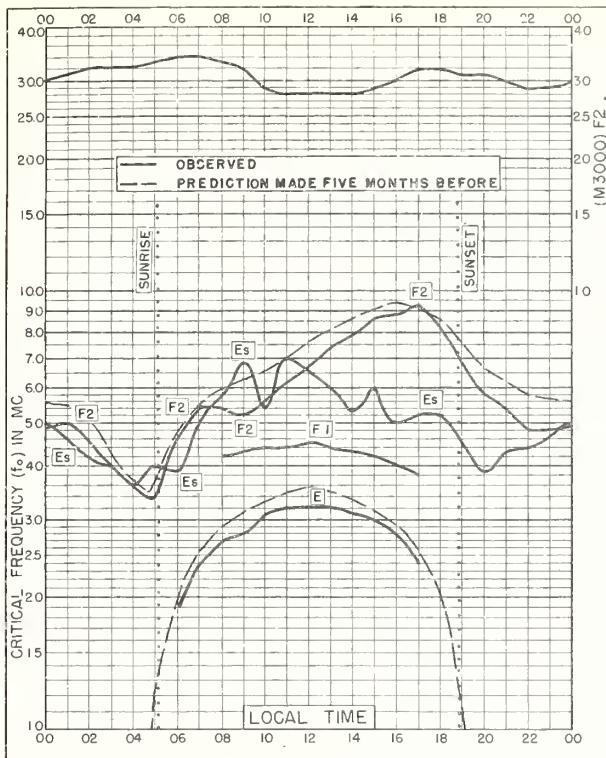


Fig. 25 OKINAWA I.

26.3°N, 127.8°E

JUNE 1953

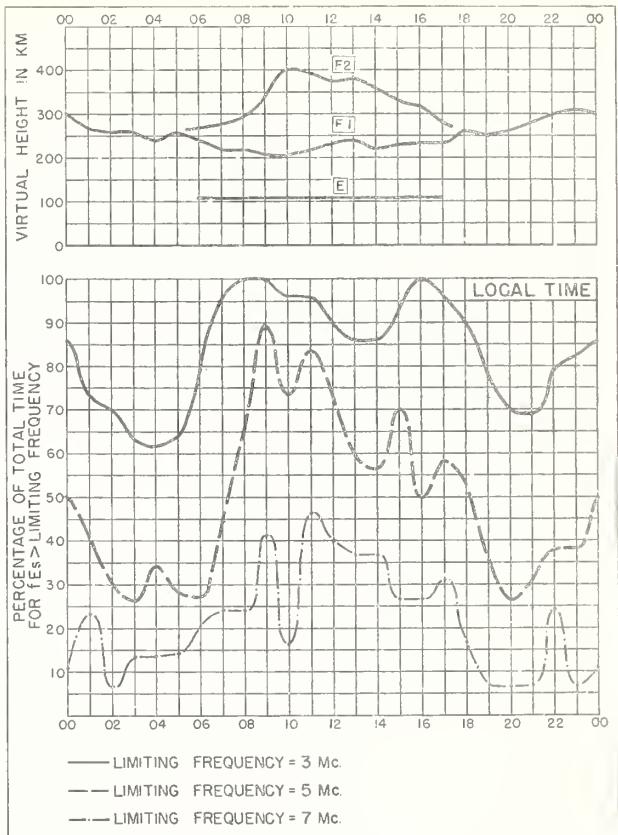


Fig. 26. OKINAWA I.

JUNE 1953

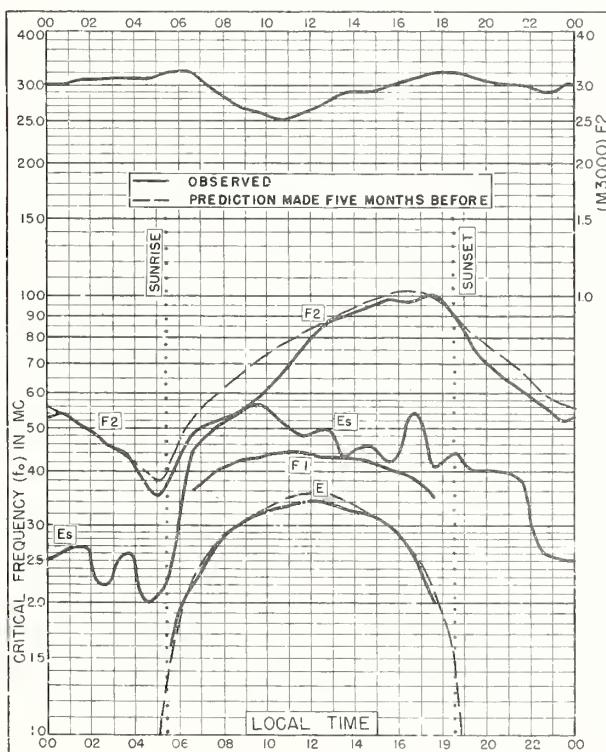


Fig. 27. MAUI, HAWAII

20.8°N, 156.5°W

JUNE 1953

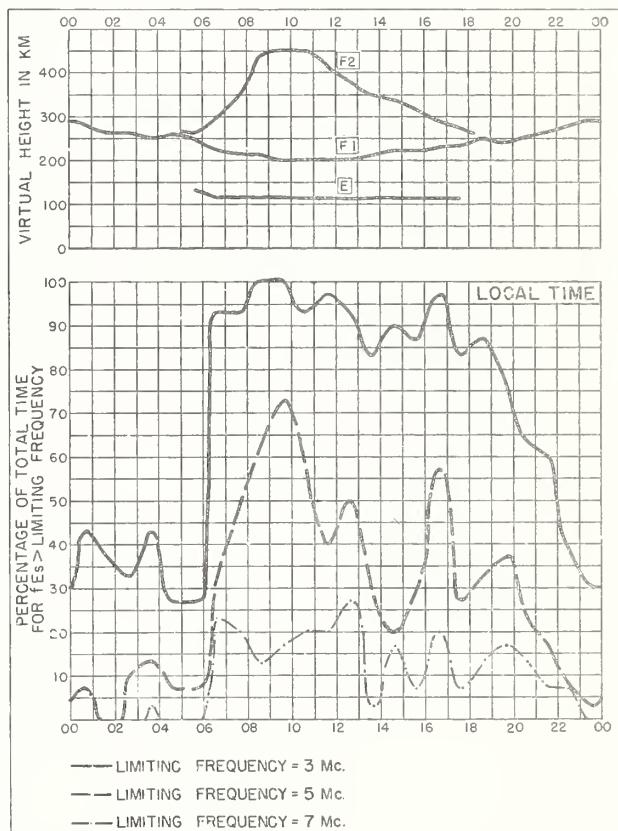


Fig. 28. MAUI, HAWAII

JUNE 1953

NETS 490

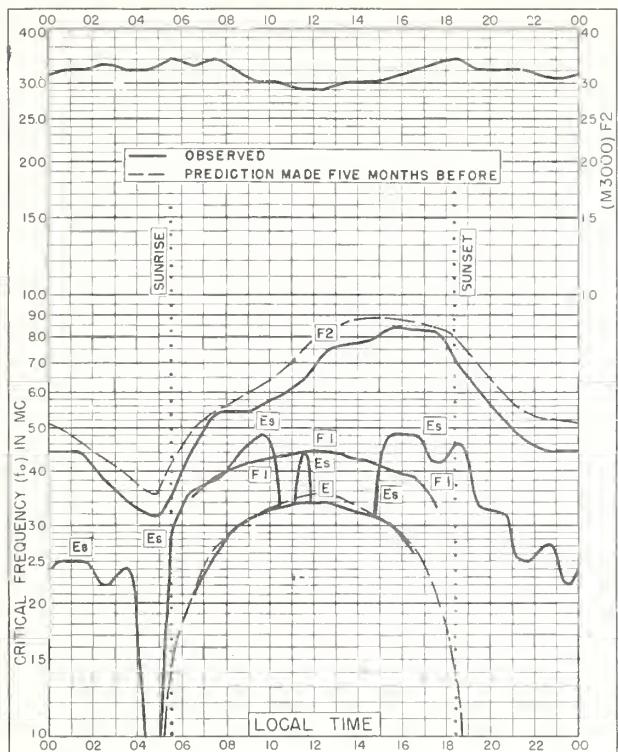


Fig. 29. PUERTO RICO, W. I.  
18.5°N, 67.2°W JUNE 1953

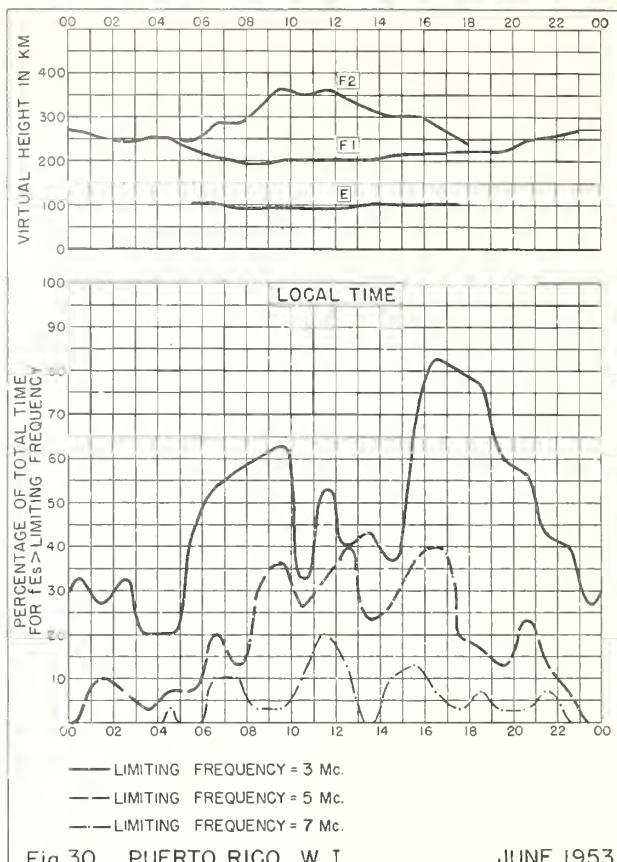


Fig. 30. PUERTO RICO, W. I. JUNE 1953

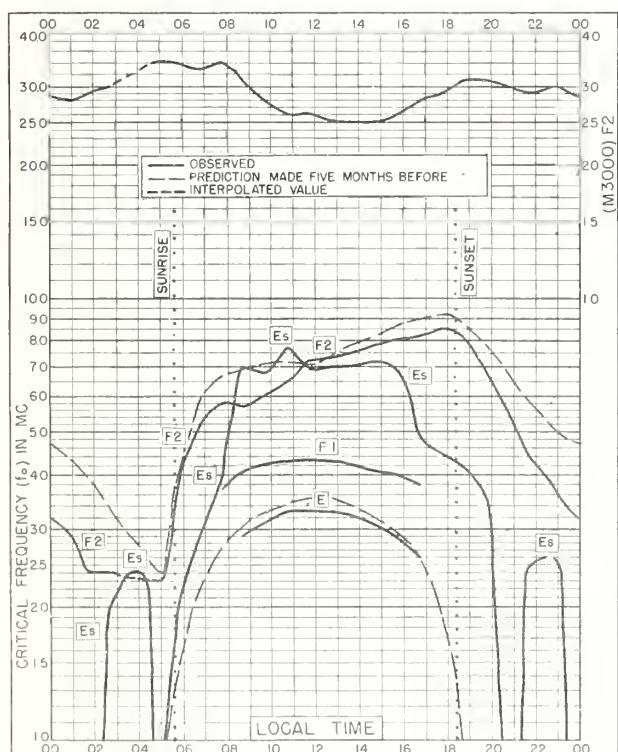


Fig. 31. GUAM I.  
13.6°N, 144.9°E JUNE 1953

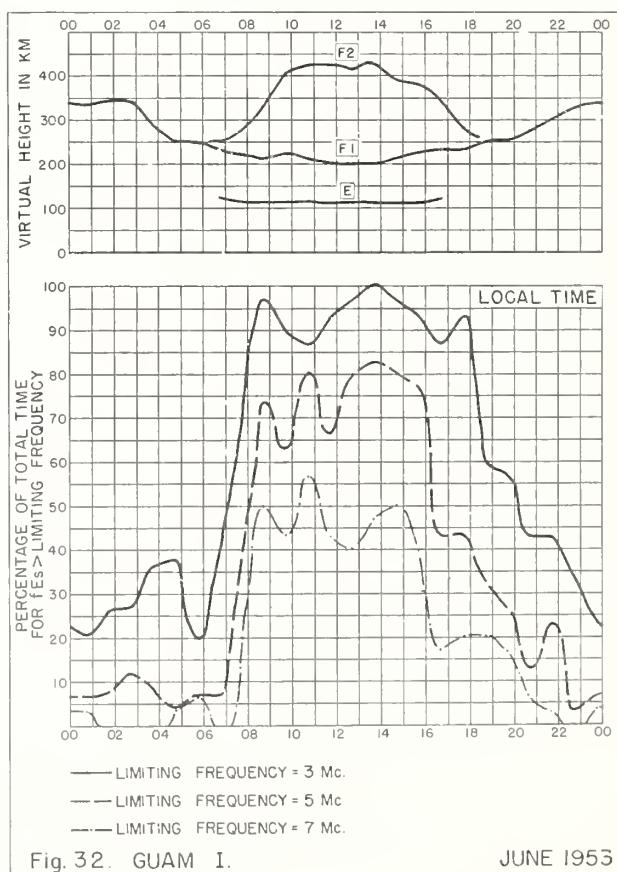


Fig. 32. GUAM I. JUNE 1953

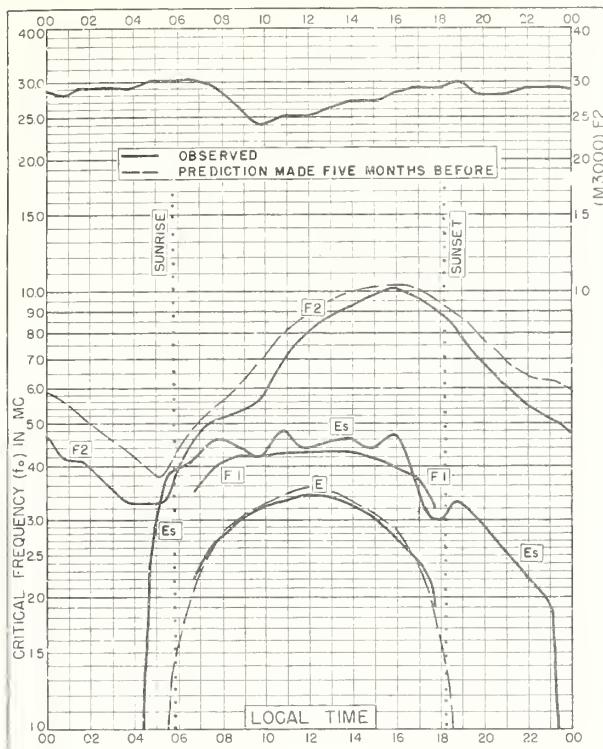


Fig. 33. PANAMA CANAL ZONE  
9.4°N, 79.9°W JUNE 1953

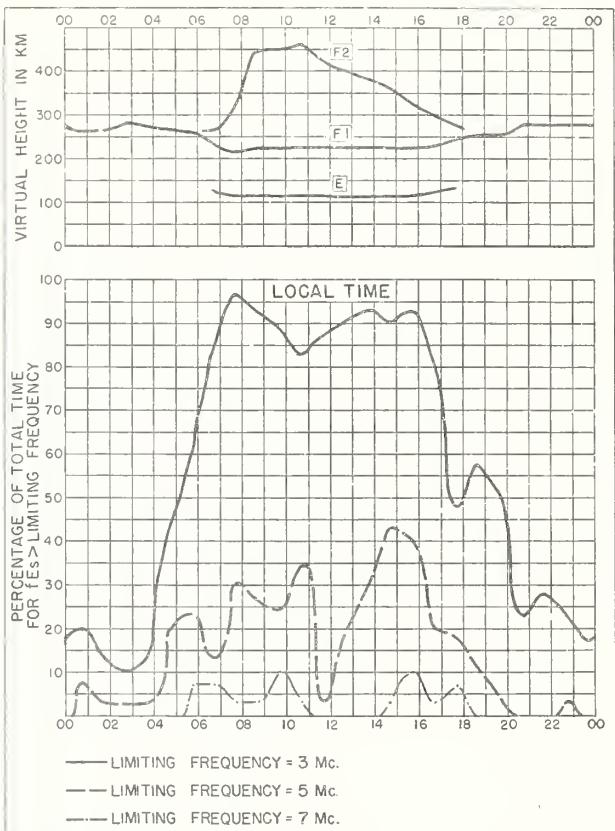


Fig. 34. PANAMA CANAL ZONE JUNE 1953

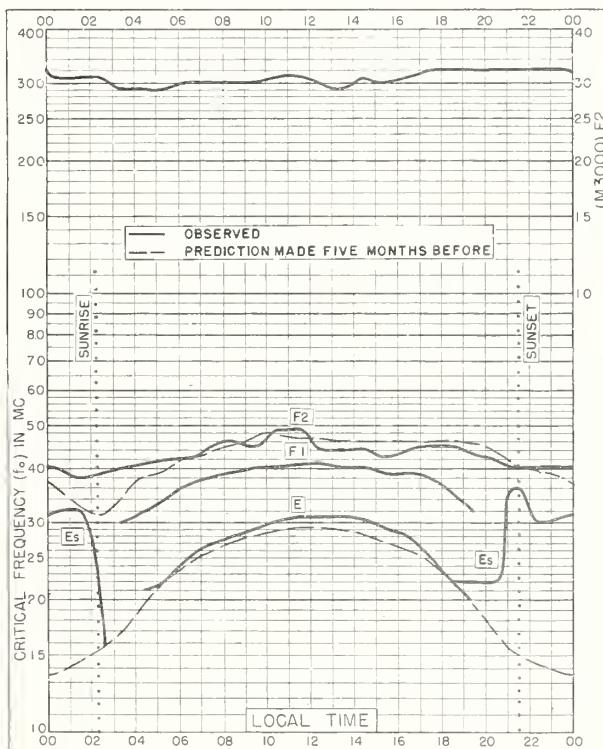


Fig. 35. KIRUNA, SWEDEN  
67.8°N, 20.5°E MAY 1953

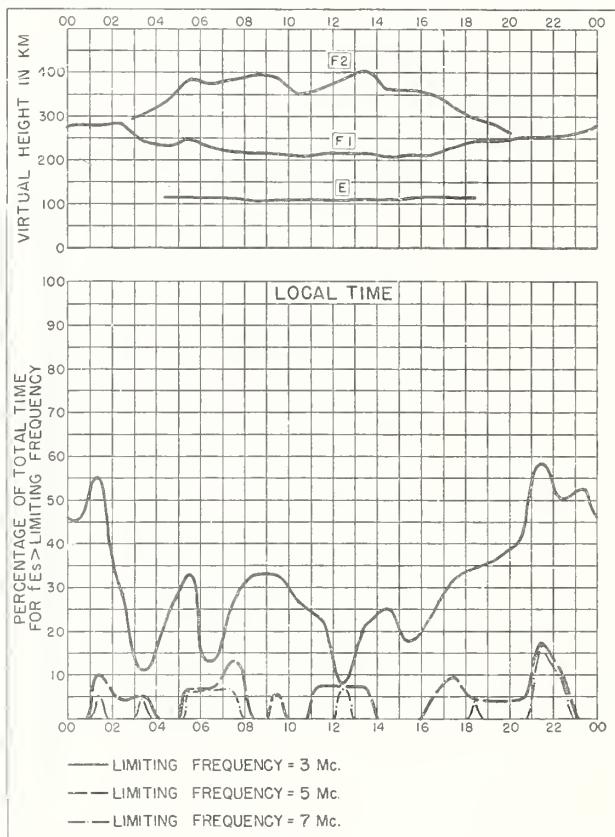
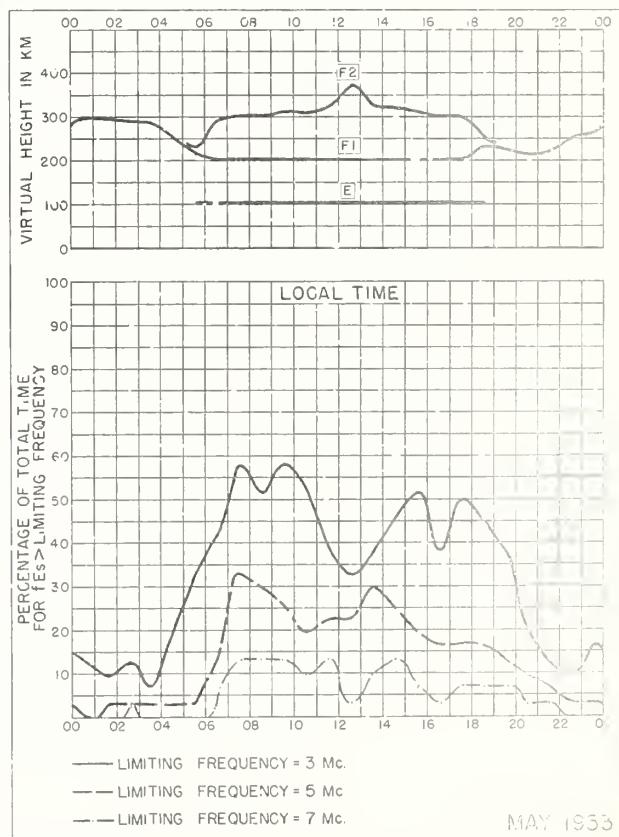
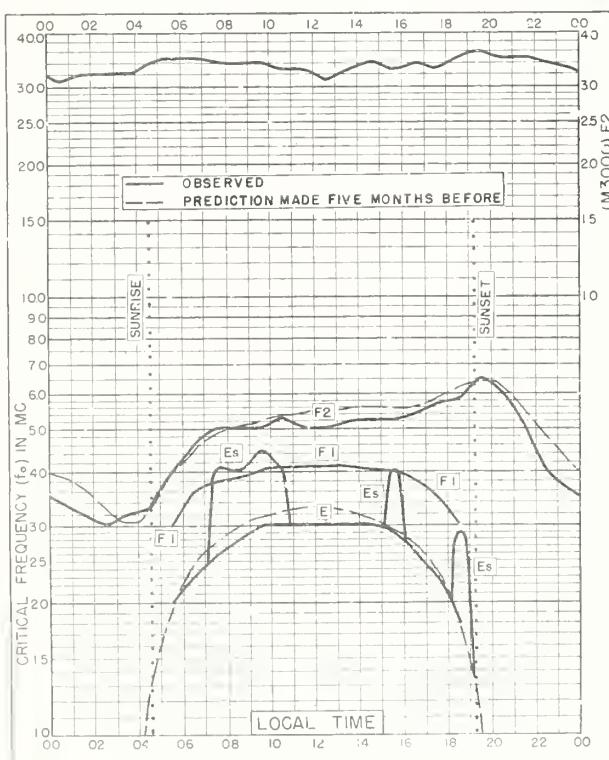
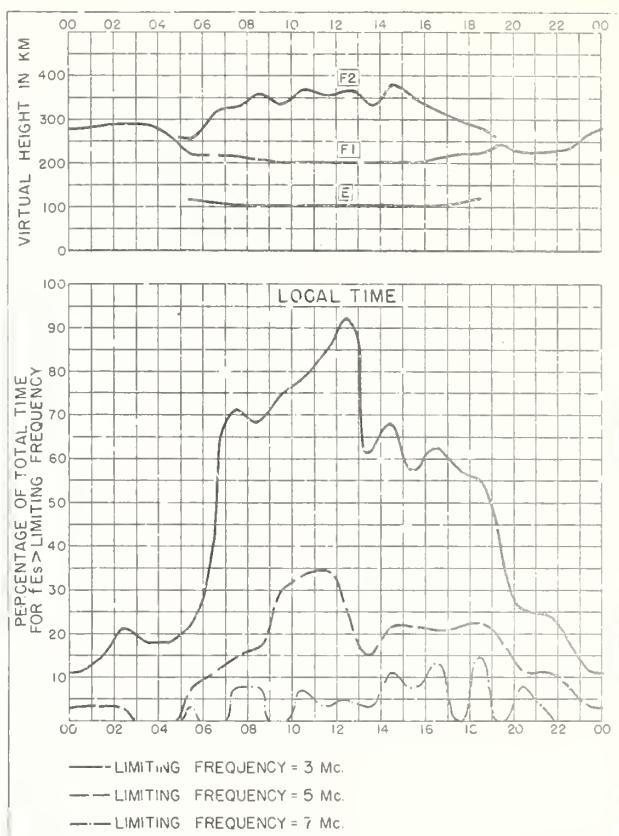
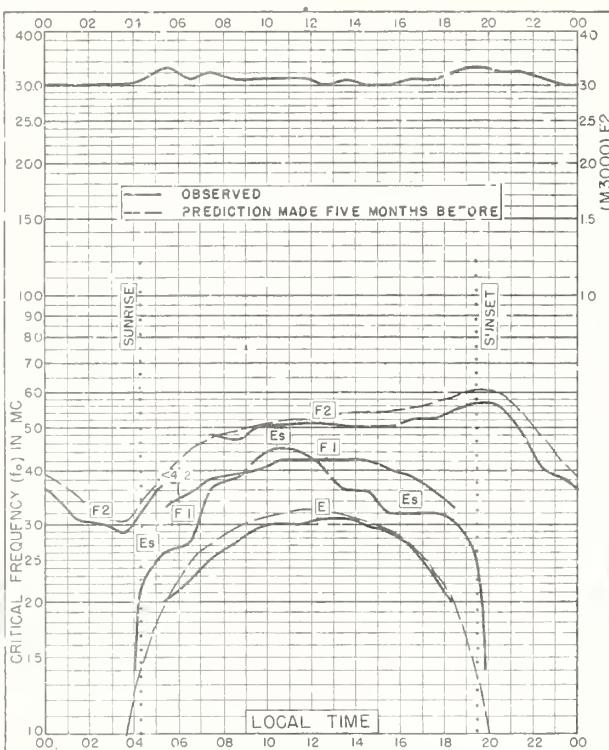


Fig. 36. KIRUNA, SWEDEN MAY 1953



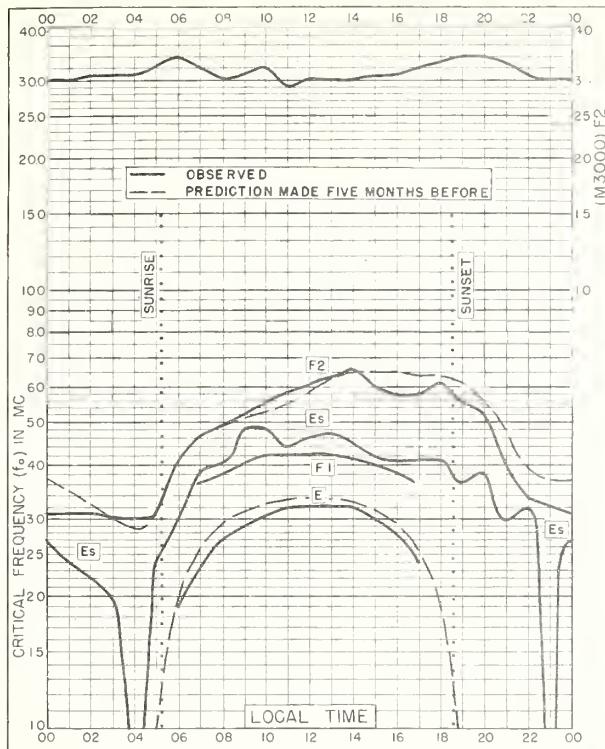


Fig. 41. BATON ROUGE, LOUISIANA  
30.5°N, 91.2°W MAY 1953

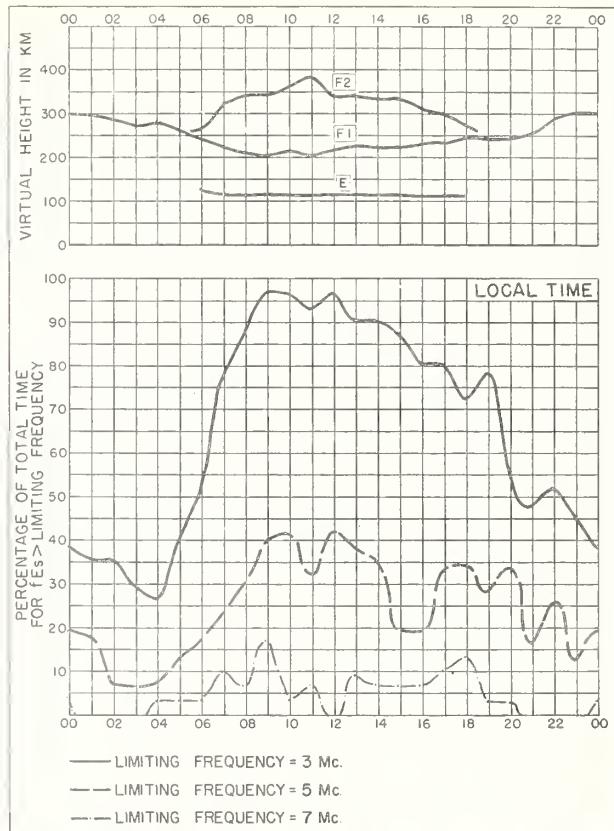


Fig. 42. BATON ROUGE, LOUISIANA MAY 1953

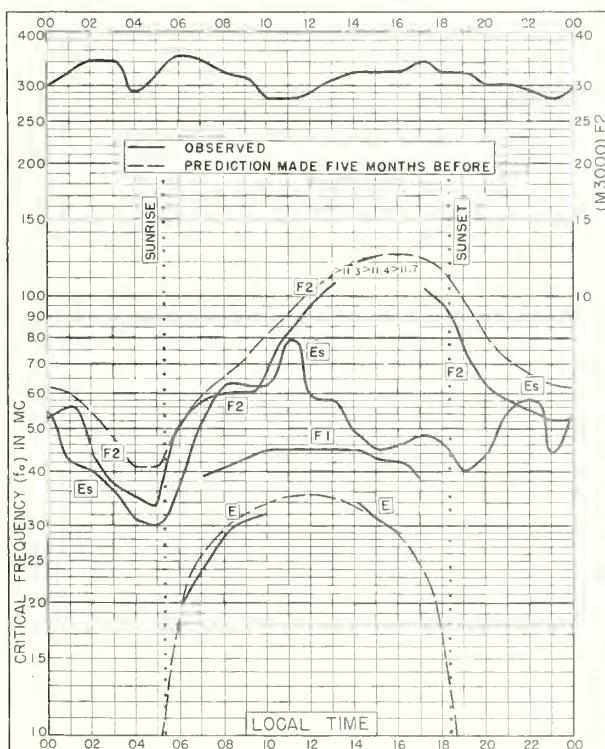


Fig. 43. FORMOSA, CHINA  
25.0°N, 121.5°E MAY 1953

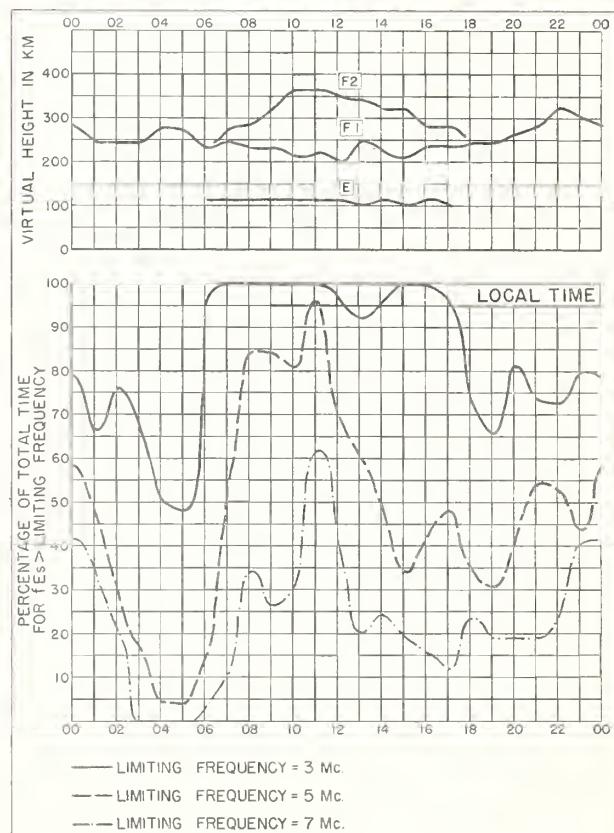


Fig. 44. FORMOSA, CHINA MAY 1953

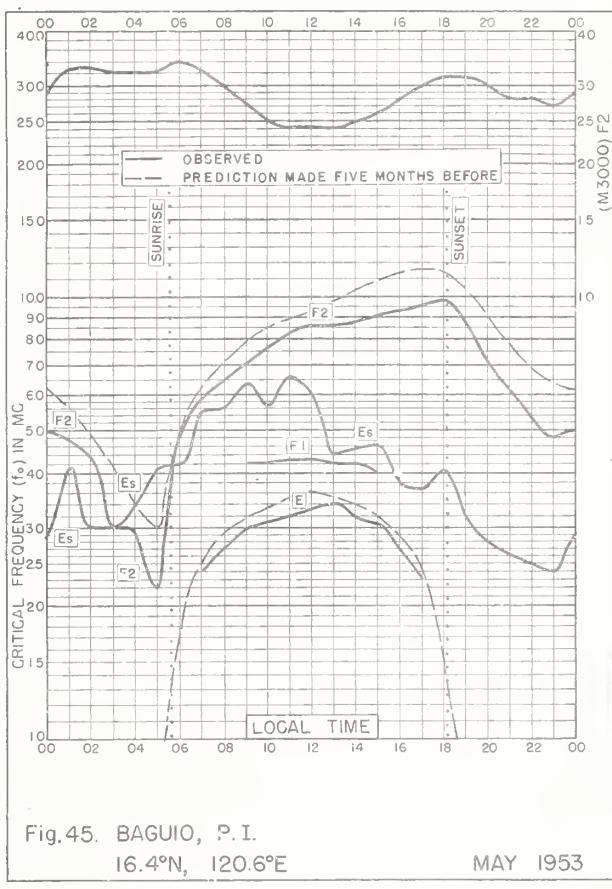


Fig. 45. BAGUIO, P.I.

16.4°N, 120.6°E

MAY 1953

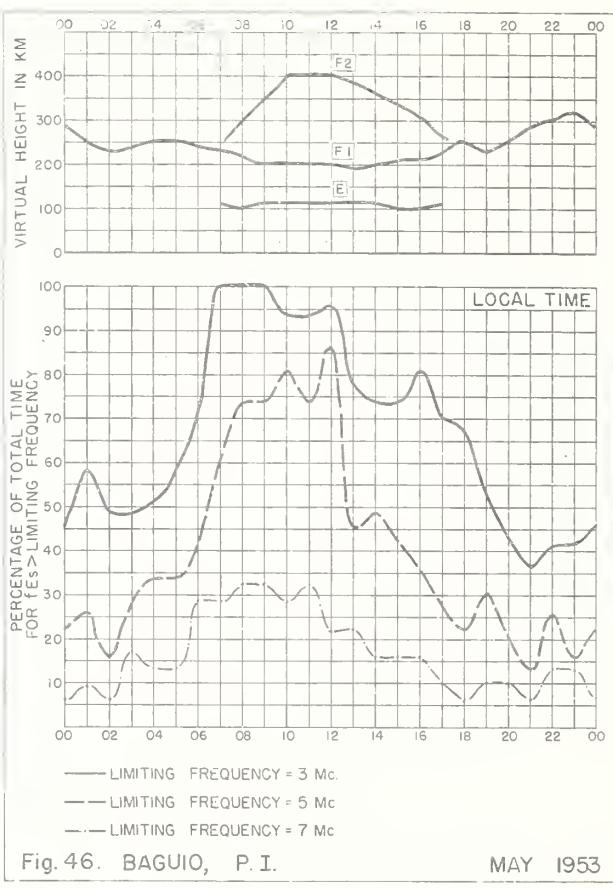


Fig. 46. BAGUIO, P.I.

MAY 1953

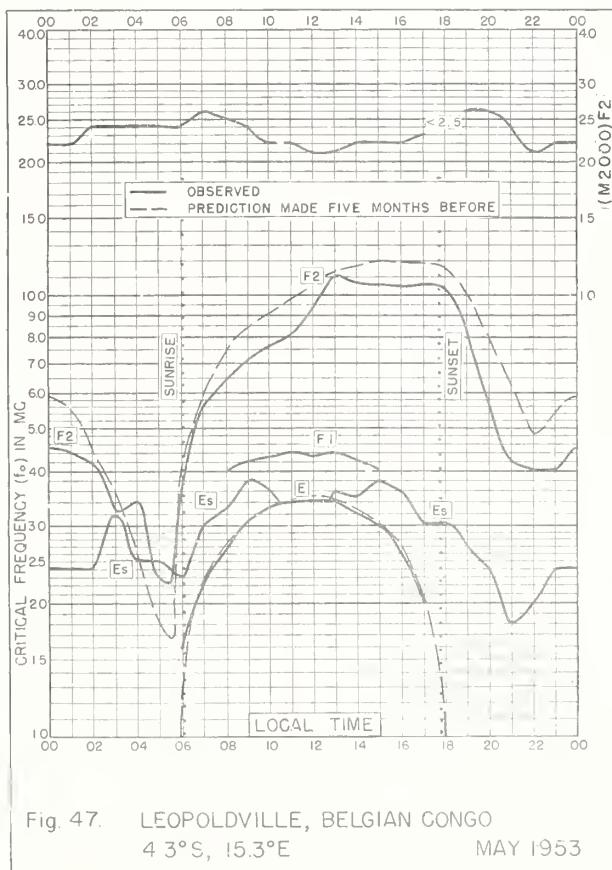


Fig. 47. LEOPOLDVILLE, BELGIAN CONGO

4 3°S, 15.3°E

MAY 1953

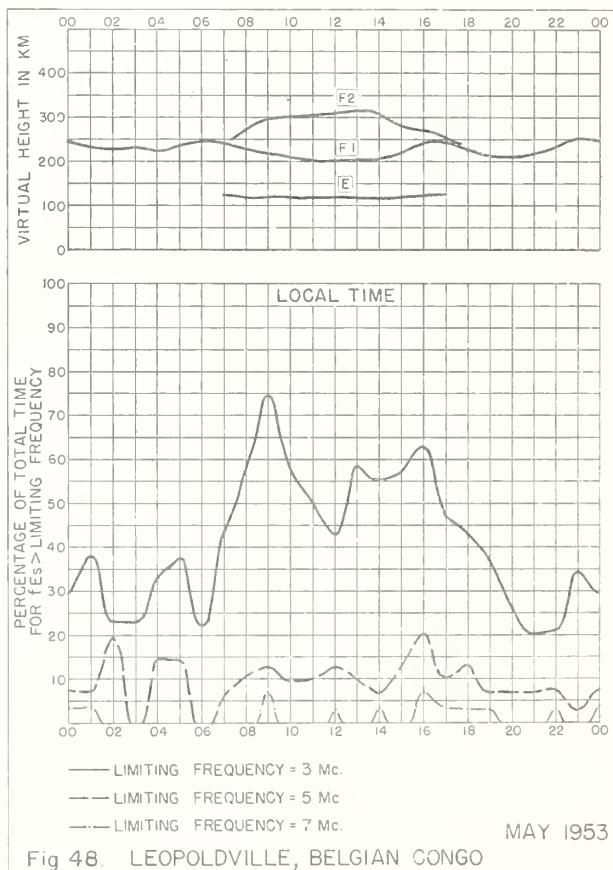
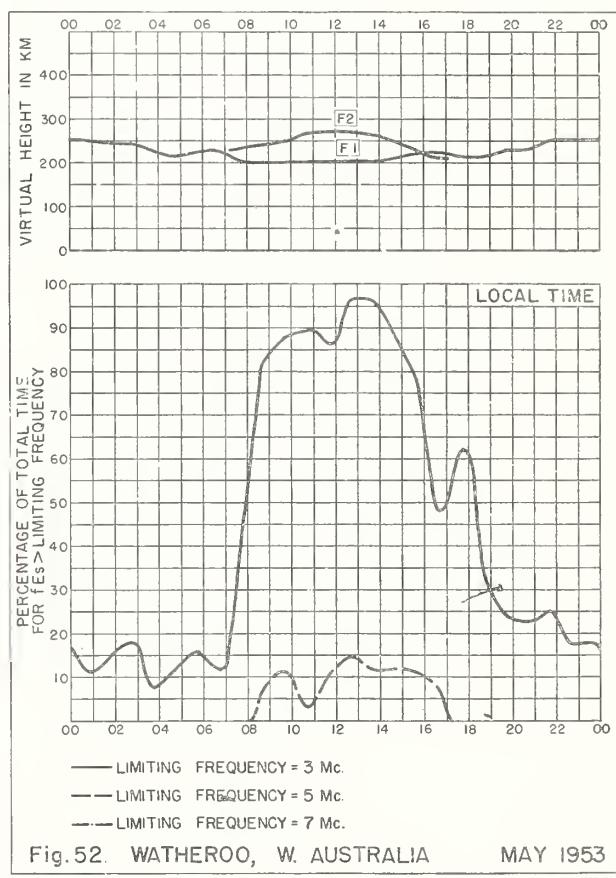
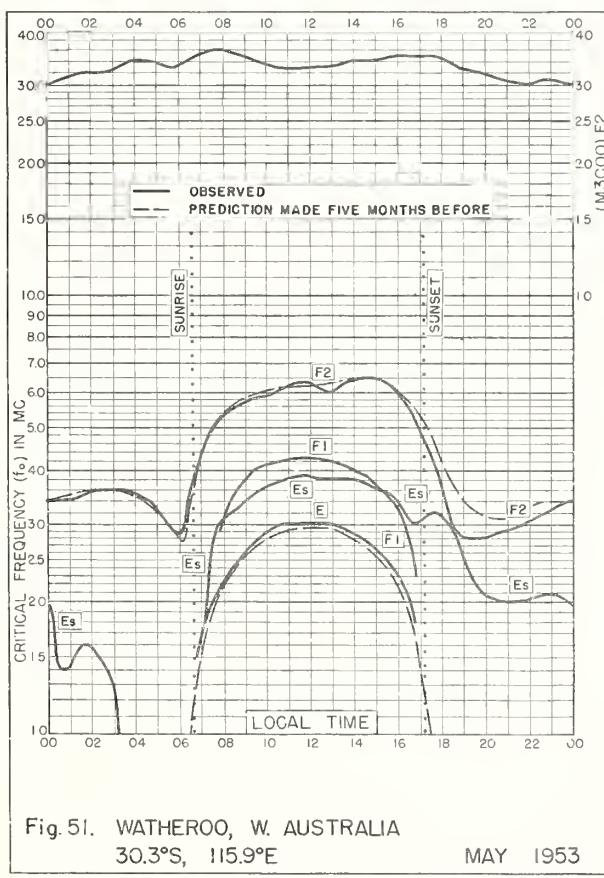
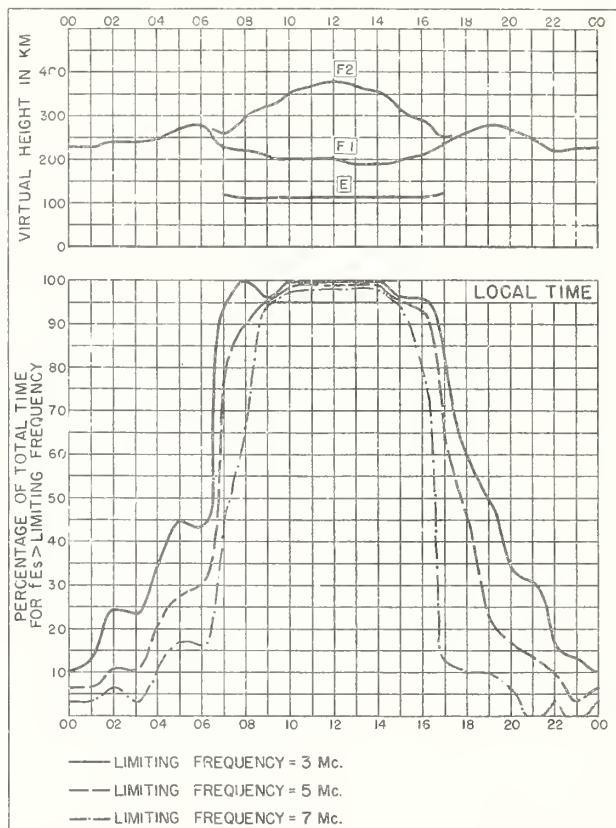
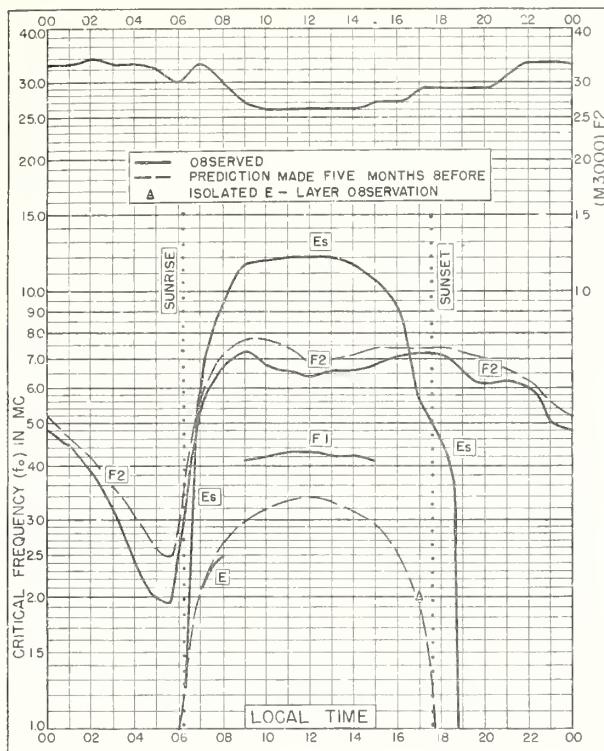
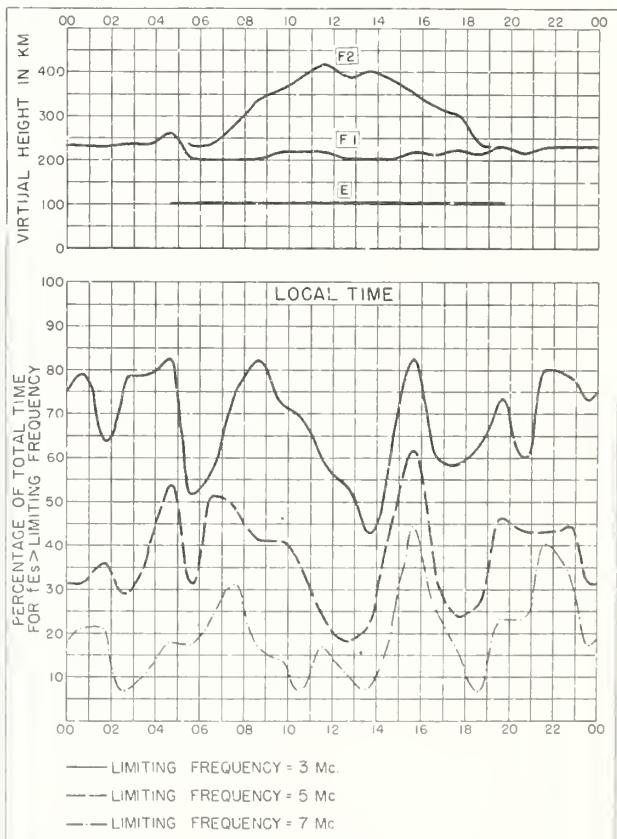
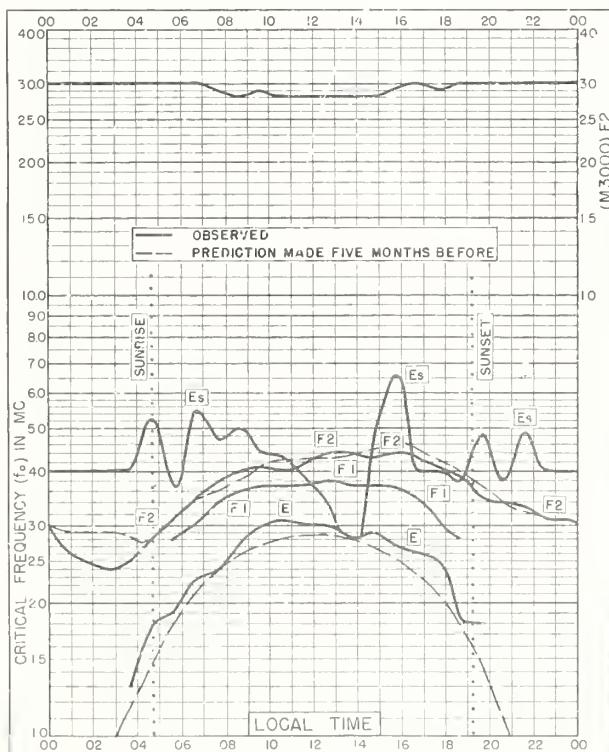
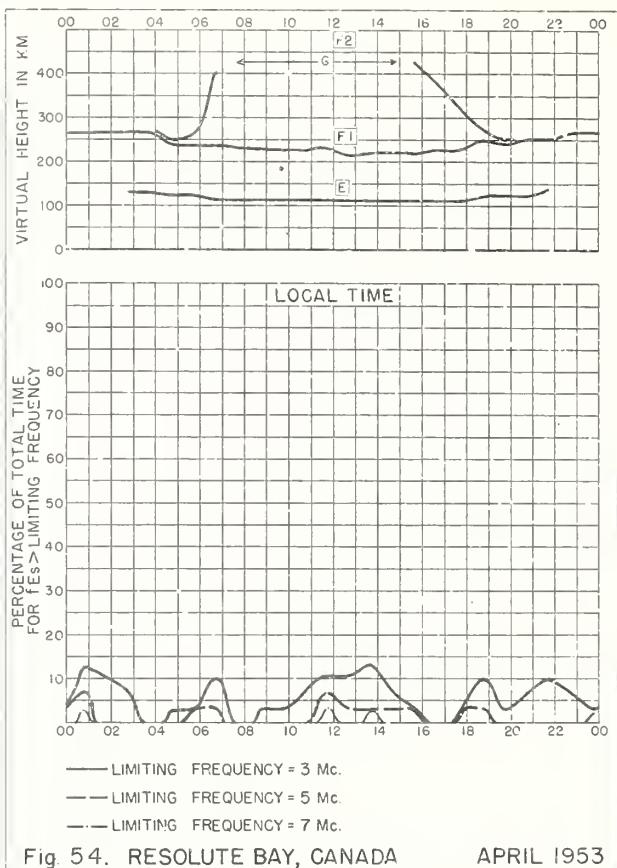
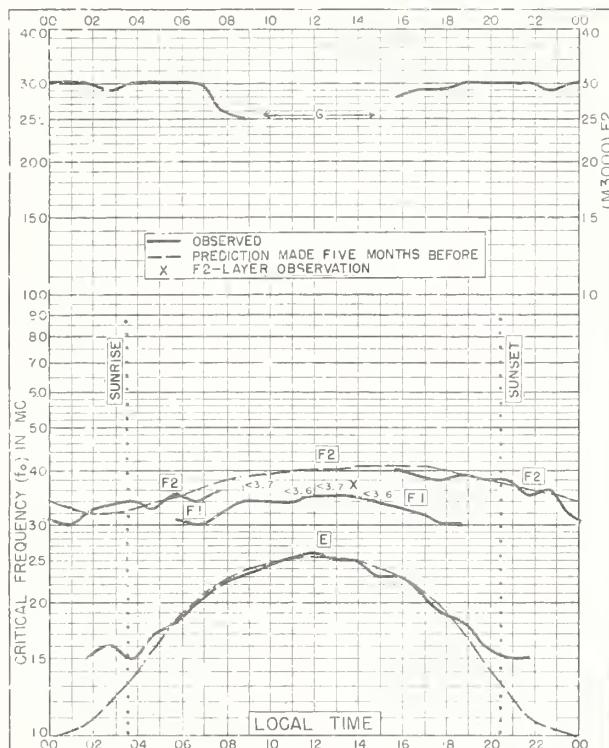


Fig. 48. LEOPOLDVILLE, BELGIAN CONGO

MAY 1953





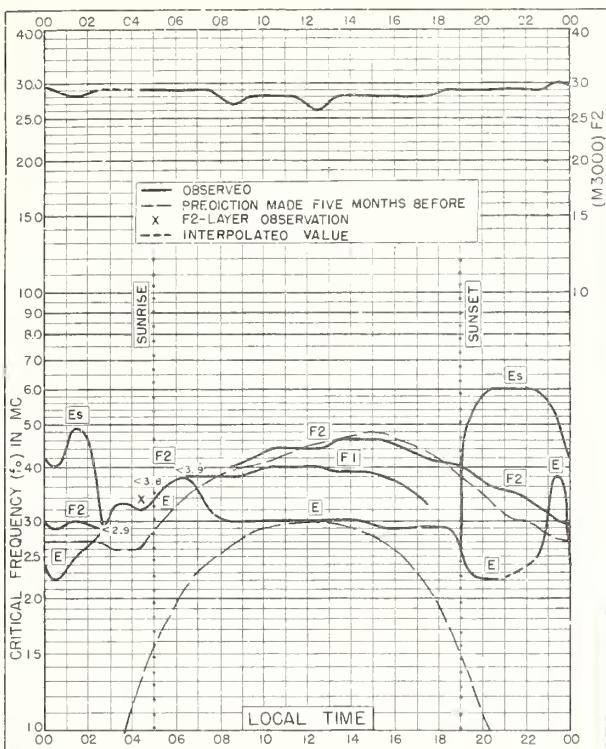


Fig. 57. FORT CHIMO, CANADA  
58.1°N, 68.3°W

APRIL 1953

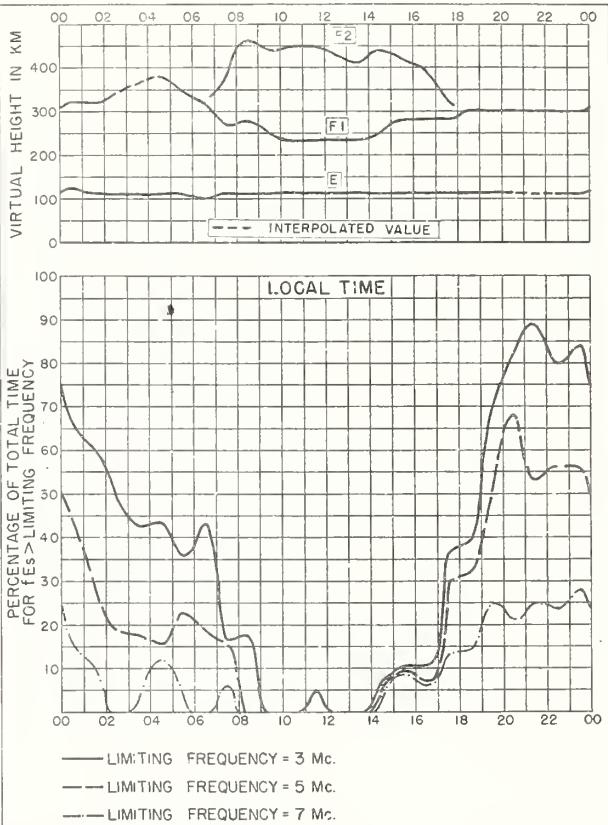


Fig. 58. FORT CHIMO, CANADA

APRIL 1953

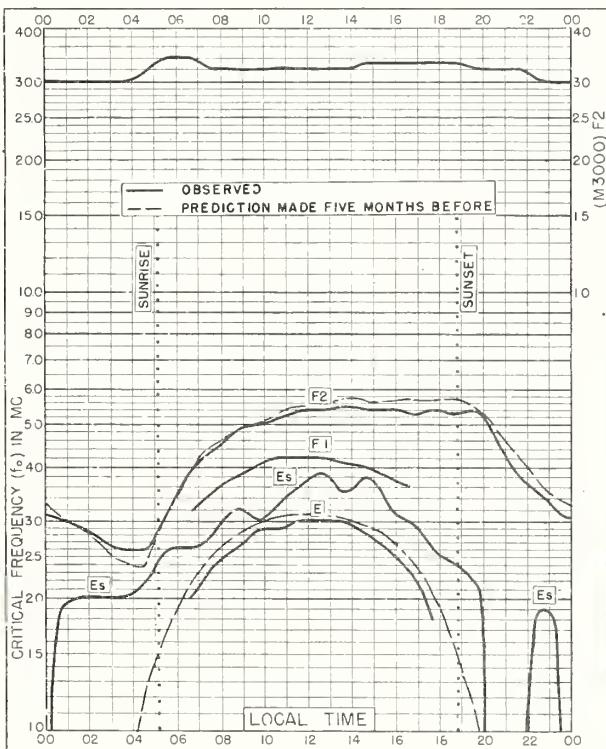


Fig. 59. LINDAU/HARZ, GERMANY  
51.6°N, 10.1°E

APRIL 1953

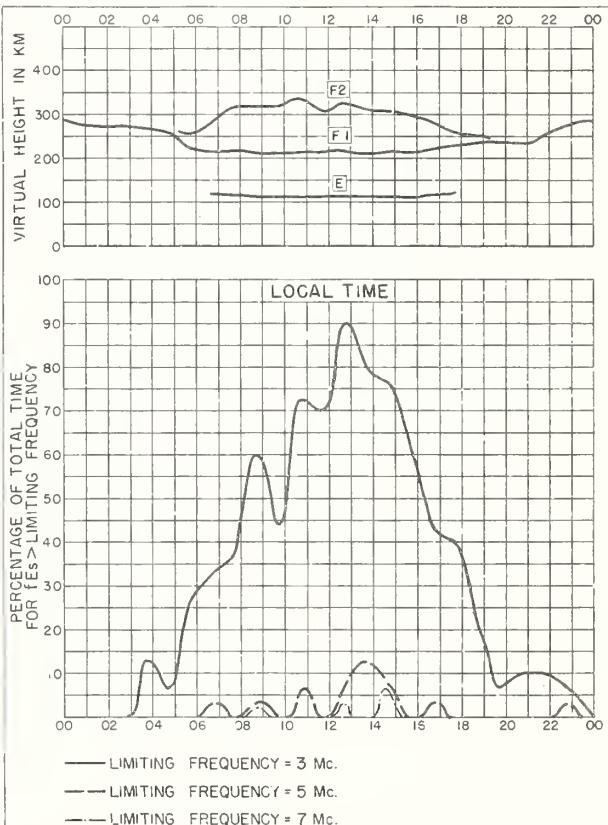


Fig. 60. LINDAU/HARZ, GERMANY

APRIL 1953

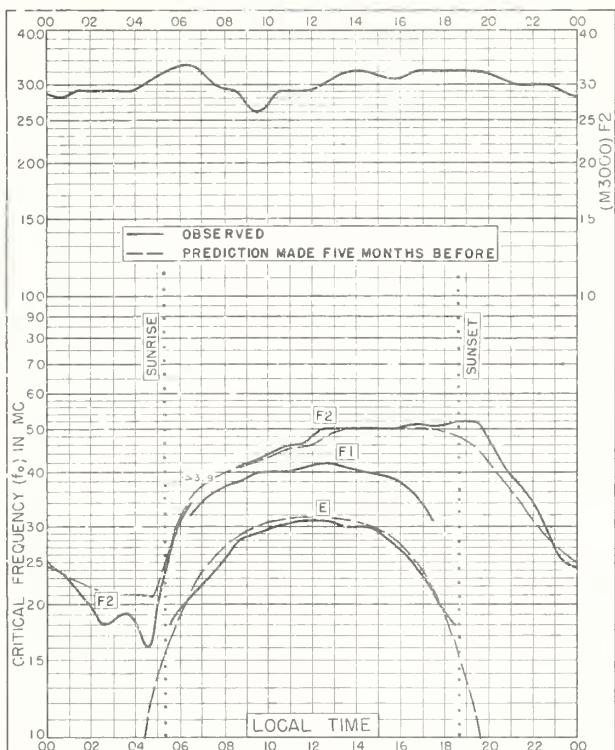


Fig. 61. ST. JOHN'S, NEWFOUNDLAND  
47.6°N, 52.7°W APRIL 1953

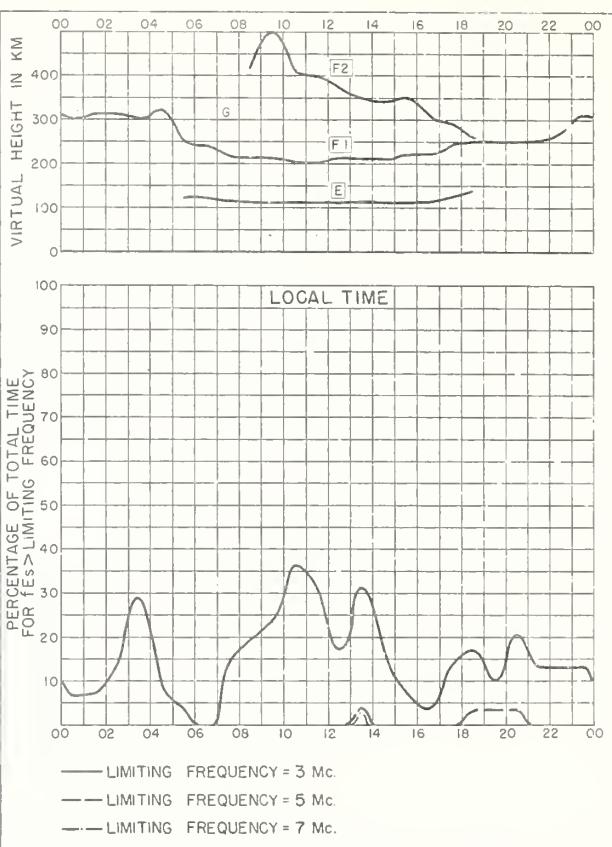


Fig. 62. ST. JOHN'S, NEWFOUNDLAND APRIL 1953

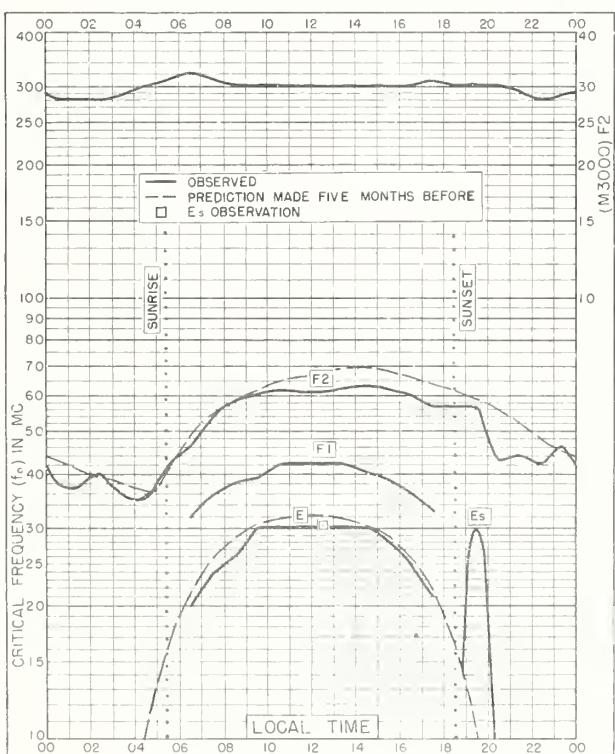


Fig. 63. WAKKANAI, JAPAN  
45.4°N, 141.7°E APRIL 1953

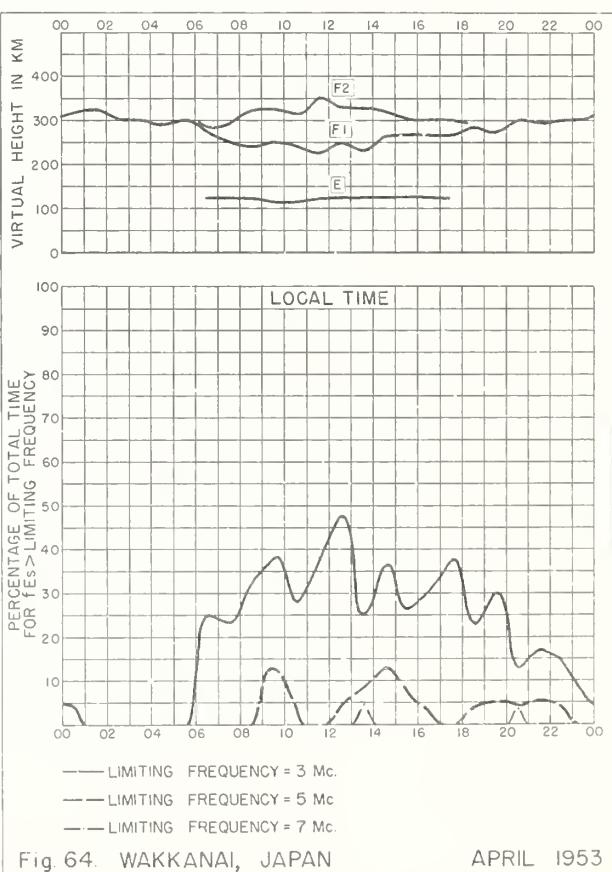
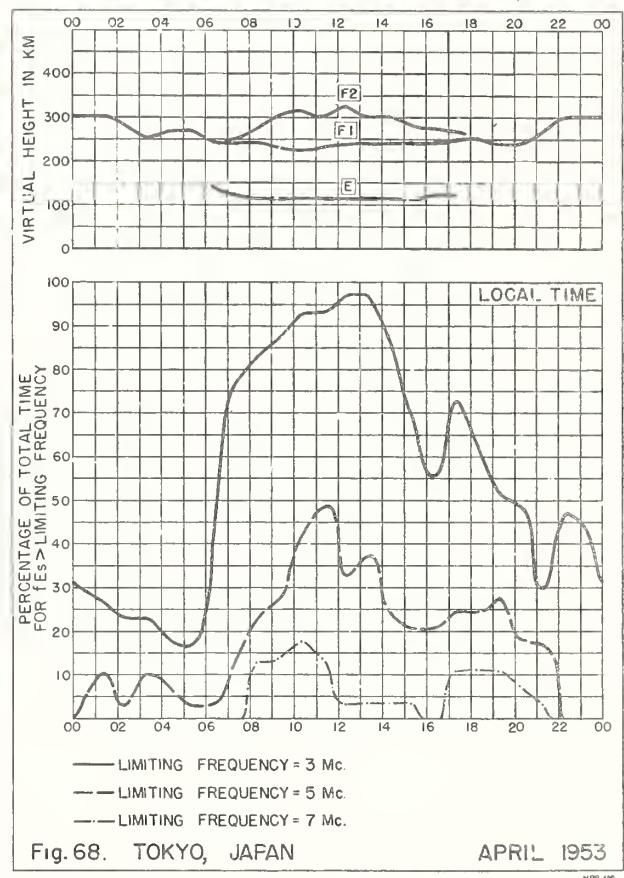
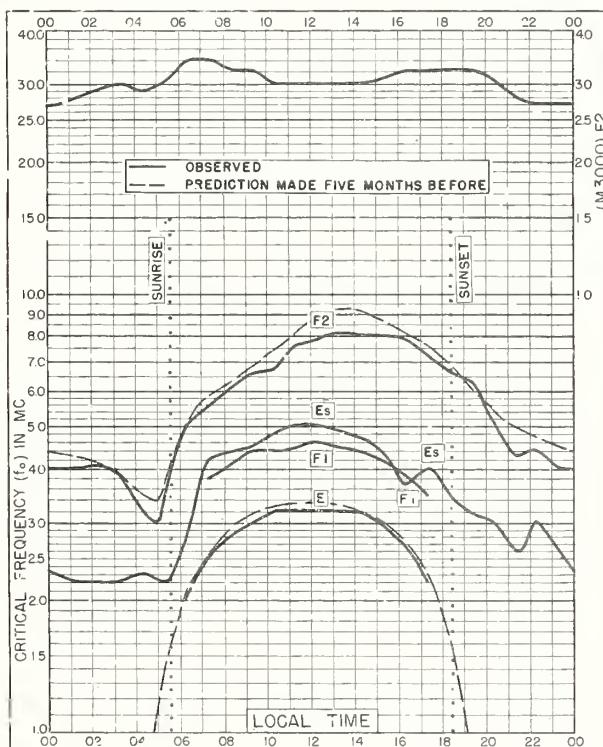
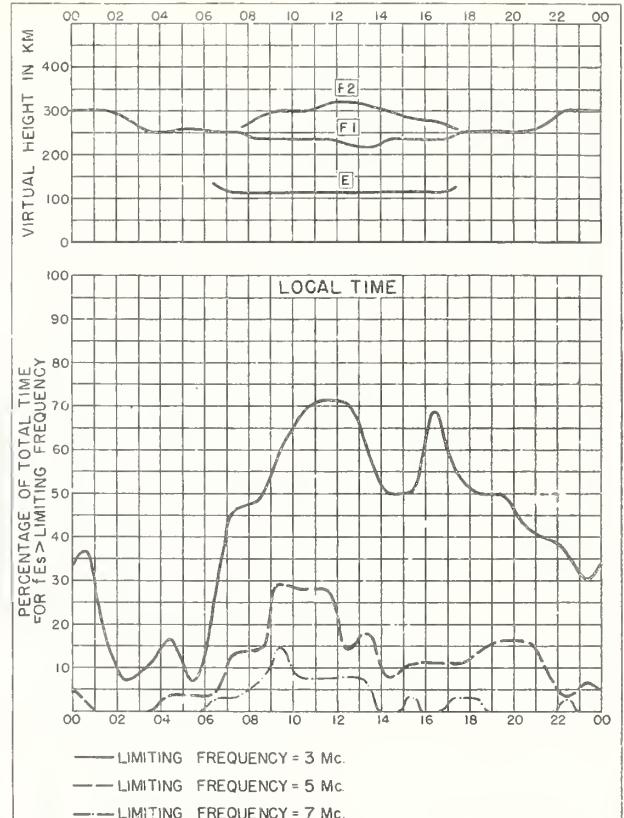
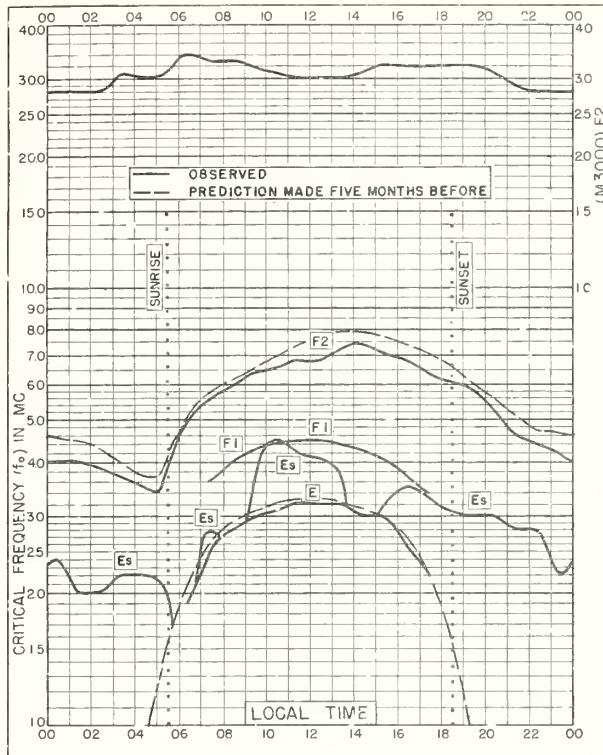
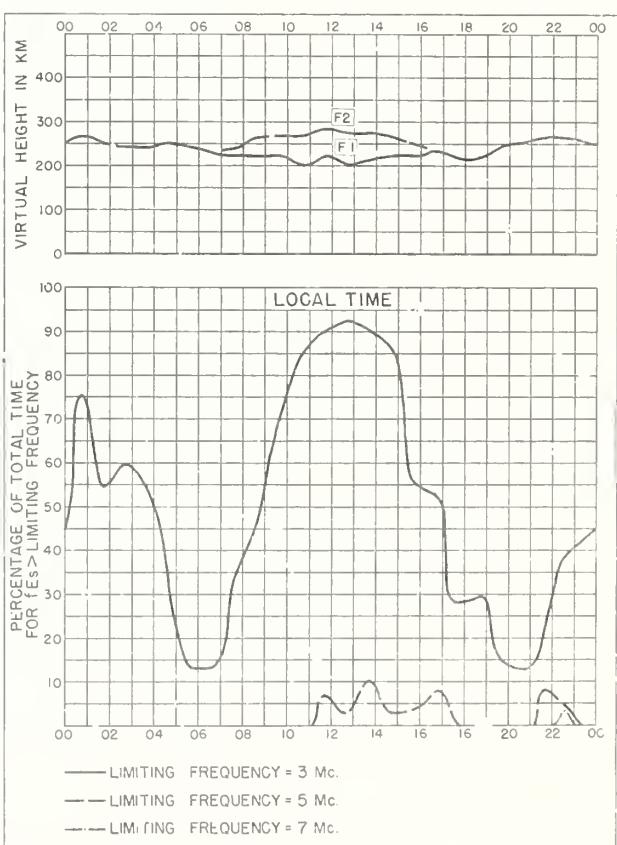
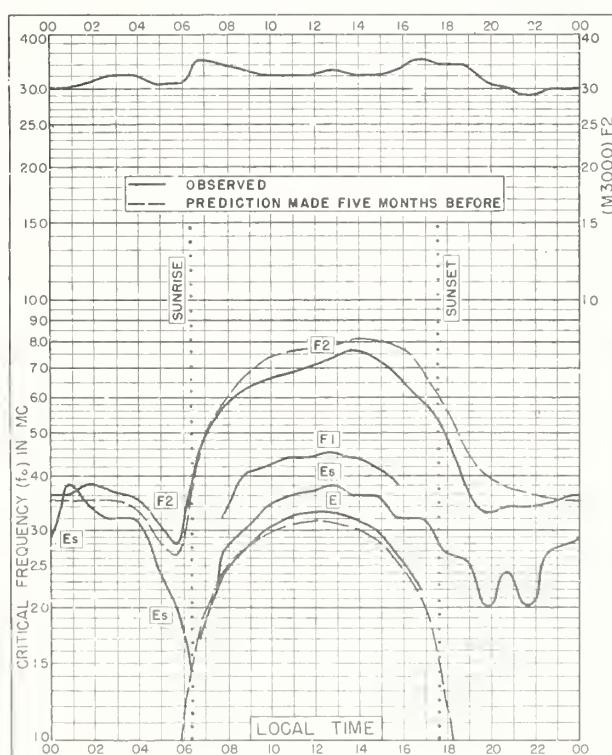
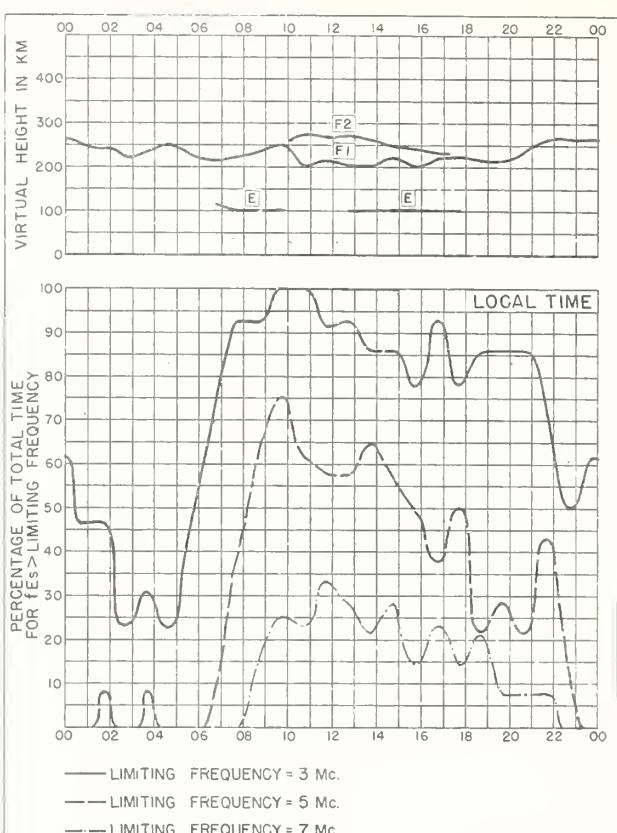
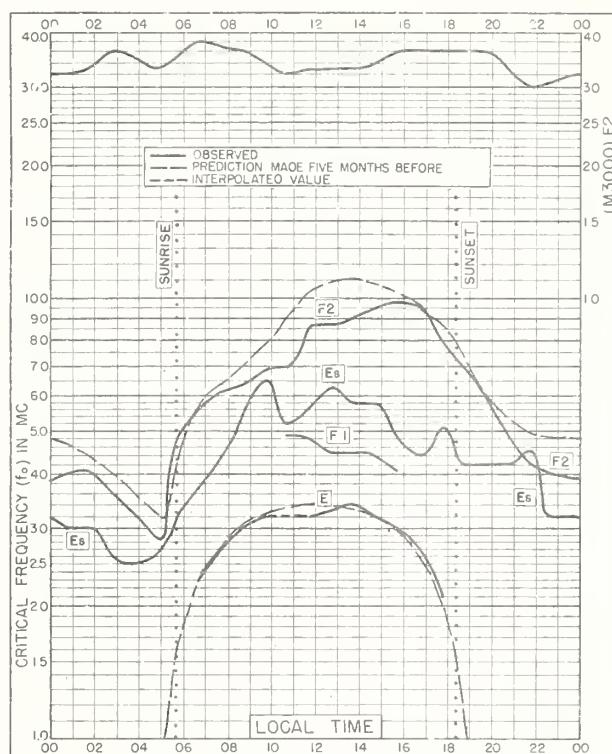


Fig. 64. WAKKANAI, JAPAN APRIL 1953





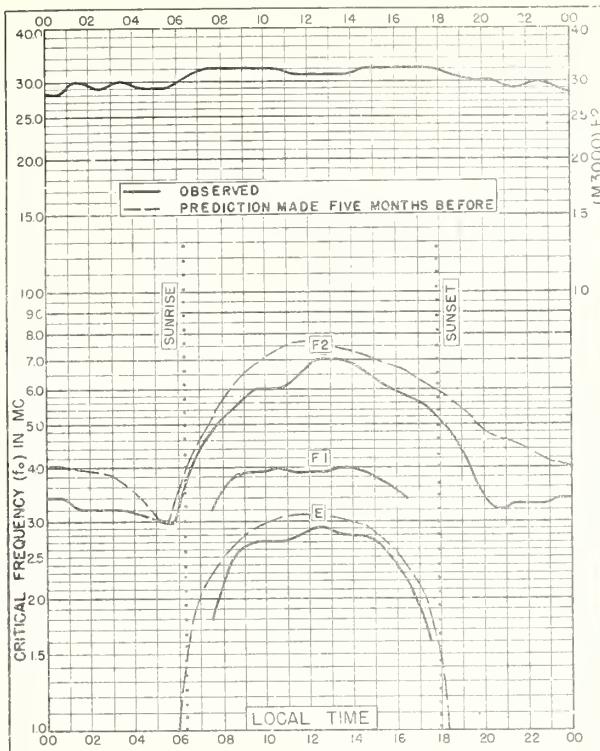


Fig. 73. WAKKANAI, JAPAN  
45.4°N, 141.7°E

MARCH 1953

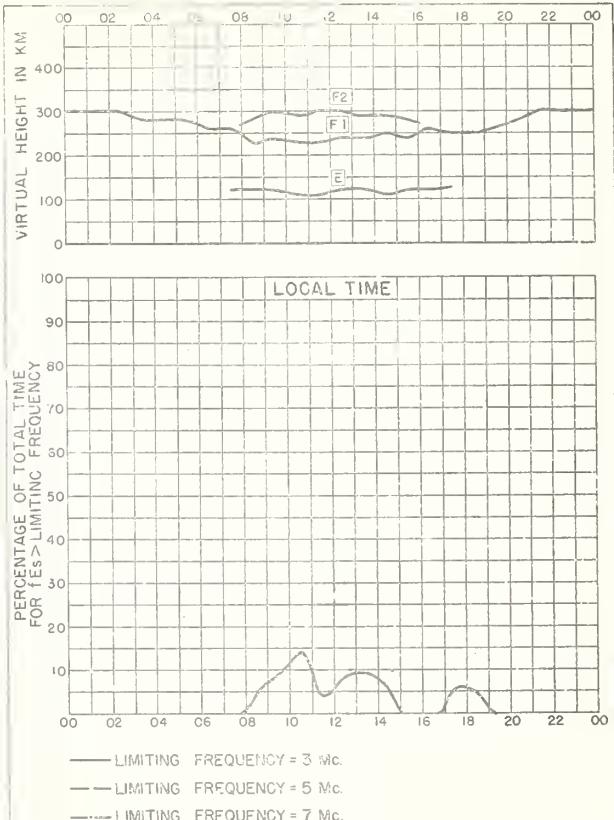


Fig. 74. WAKKANAI, JAPAN

MARCH 1953

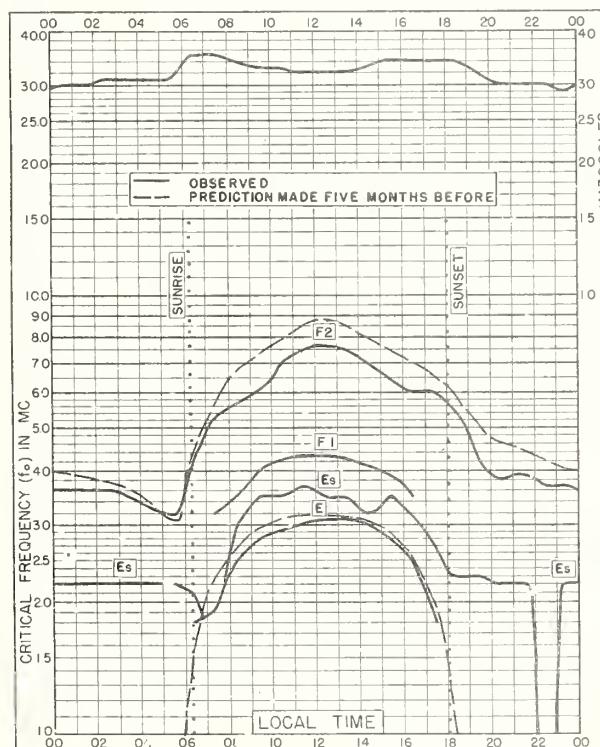


Fig. 75. AKITA, JAPAN  
39.7°N, 140.1°E

MARCH 1953

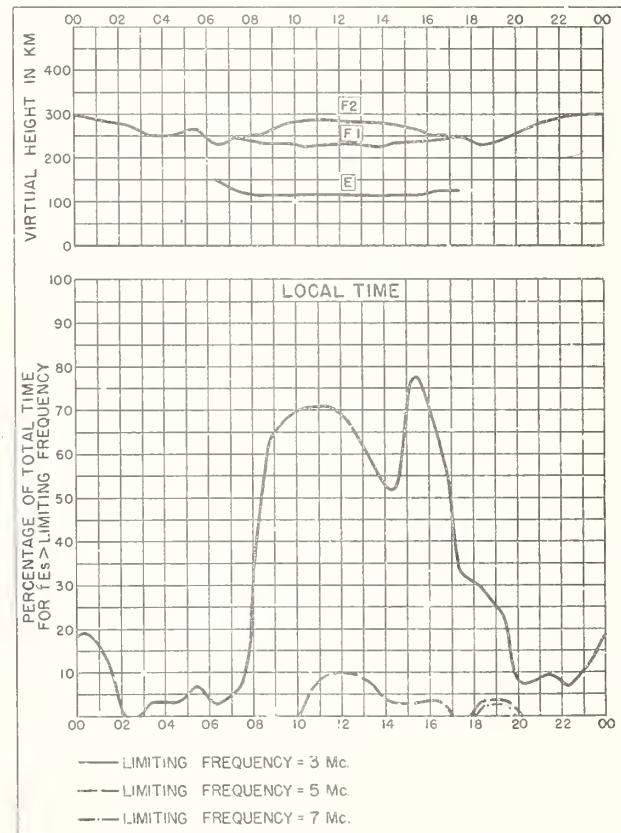


Fig. 76. AKITA, JAPAN

MARCH 1953

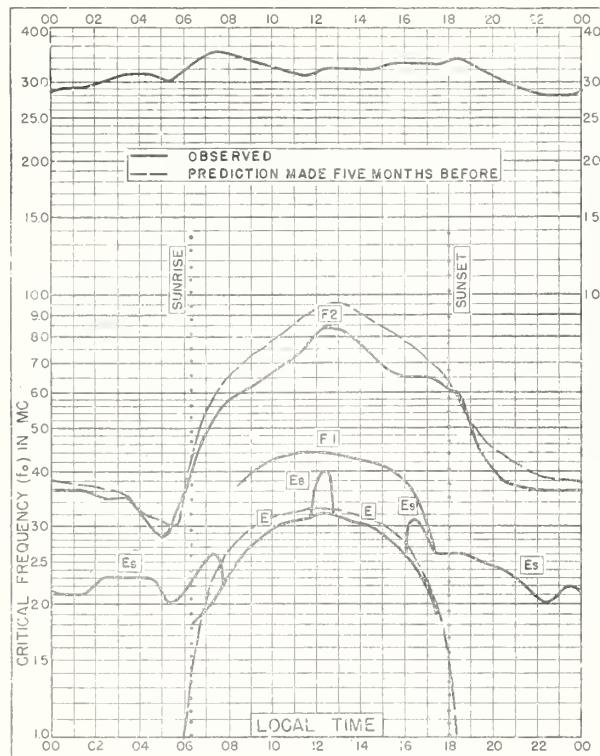


Fig. 77. TOKYO, JAPAN  
35.7° N, 139.5° E

MARCH 1953

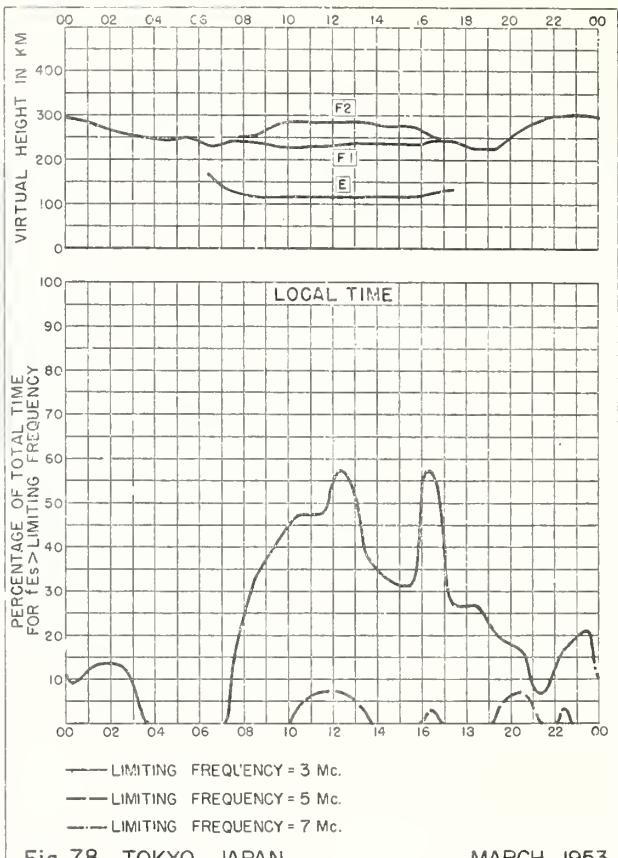


Fig. 78. TOKYO, JAPAN  
MARCH 1953

NBS 480

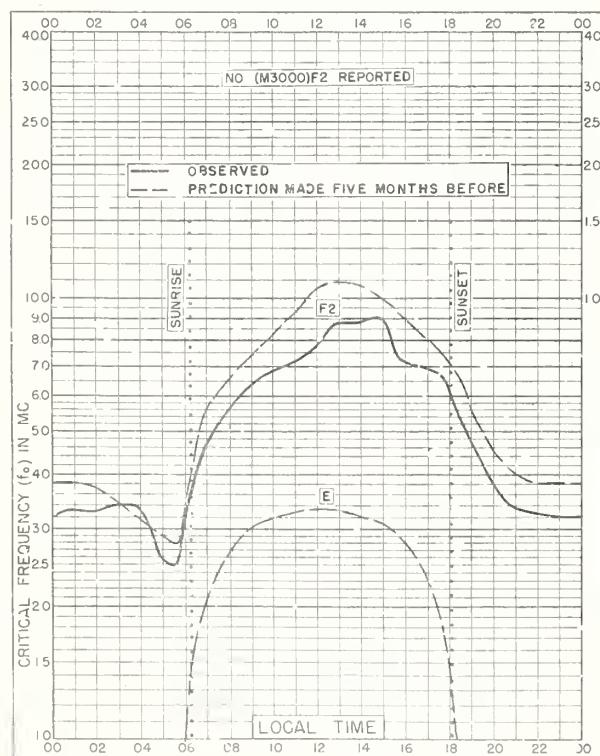


Fig. 79 YAMAGAWA, JAPAN  
31.2° N, 130.6° E

MARCH 1953

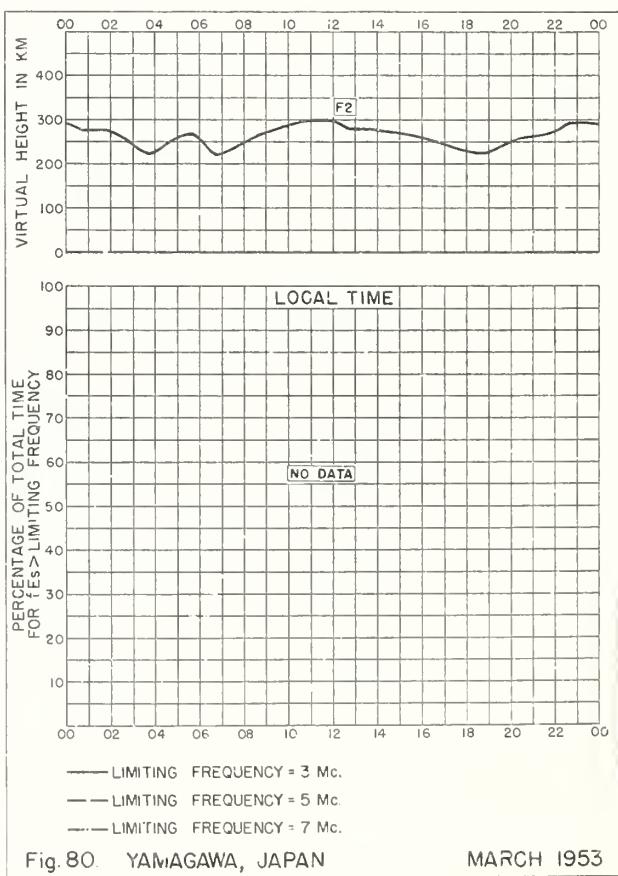


Fig. 80. YAMAGAWA, JAPAN  
MARCH 1953

NBS 480

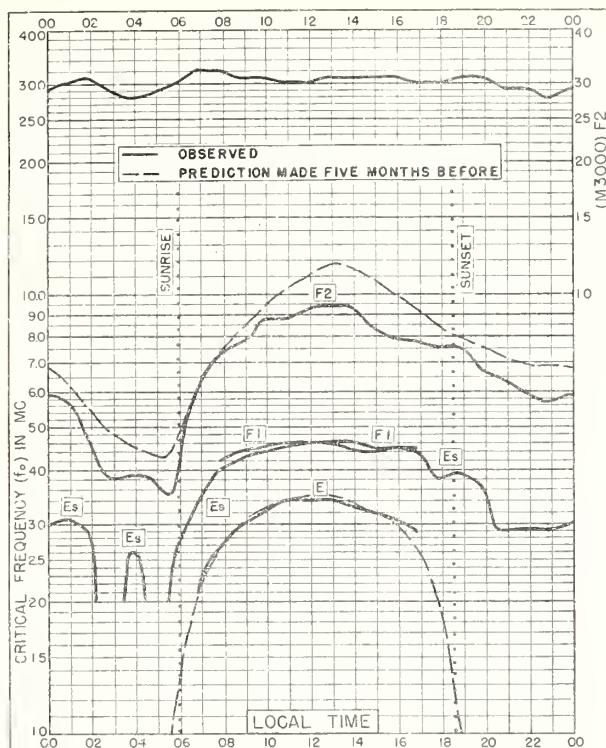


Fig. 81. RAROTONGA I.  
21.3°S, 159.8°W  
FEBRUARY 1953

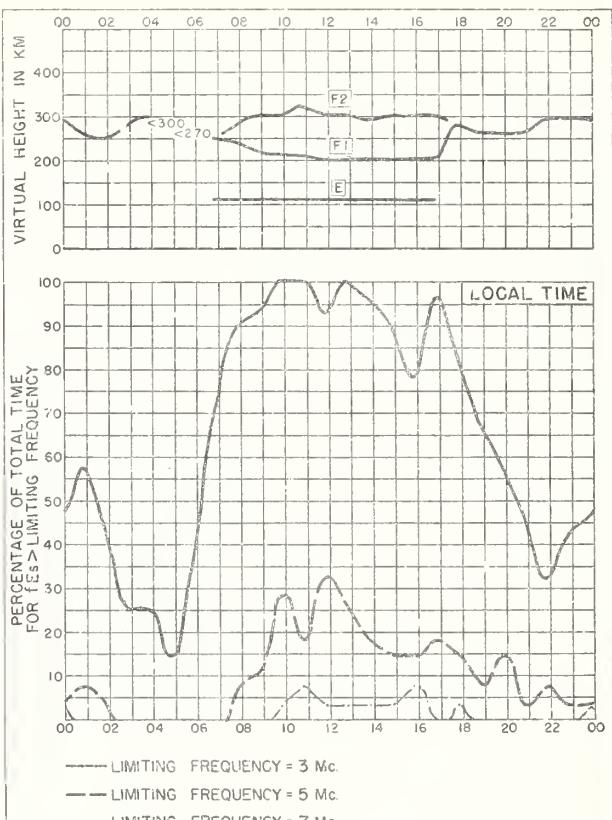


Fig. 82. RAROTONGA I.  
FEBRUARY 1953

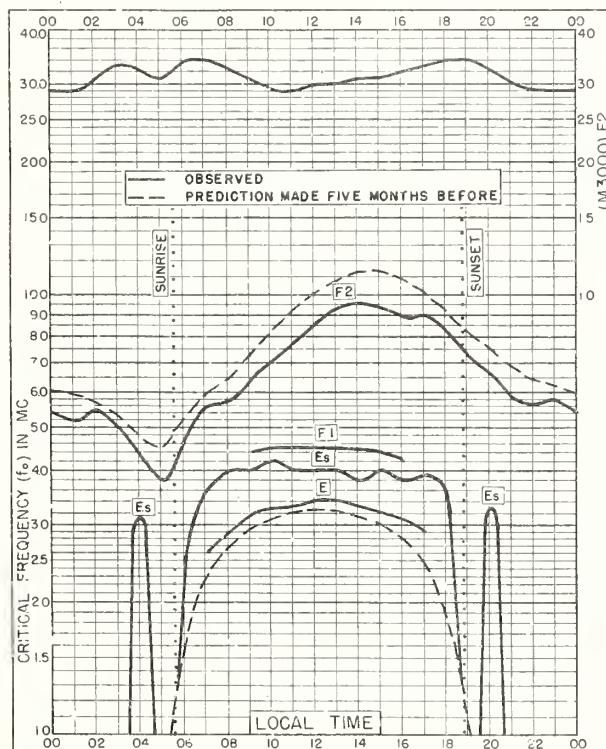


Fig. 83. BUENOS AIRES, ARGENTINA  
34.5°S, 58.5°W  
FEBRUARY 1953

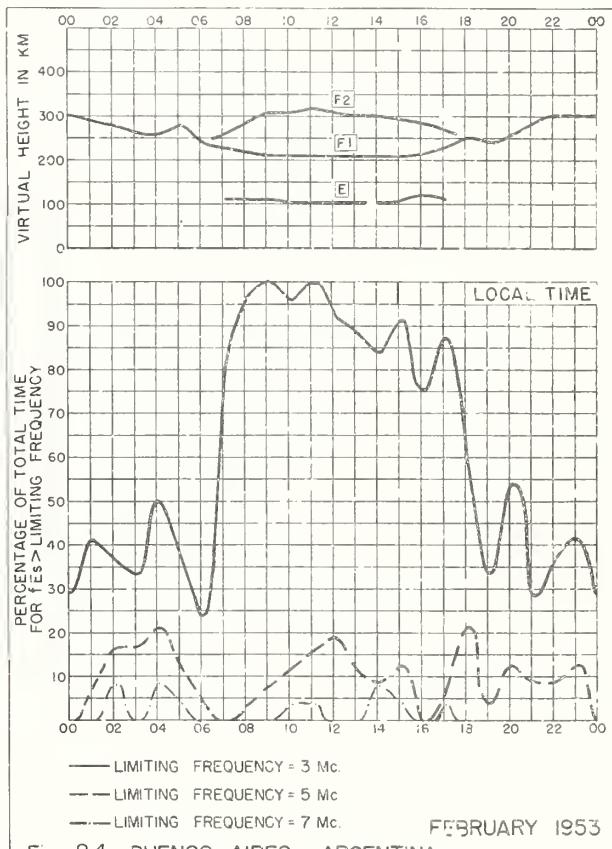
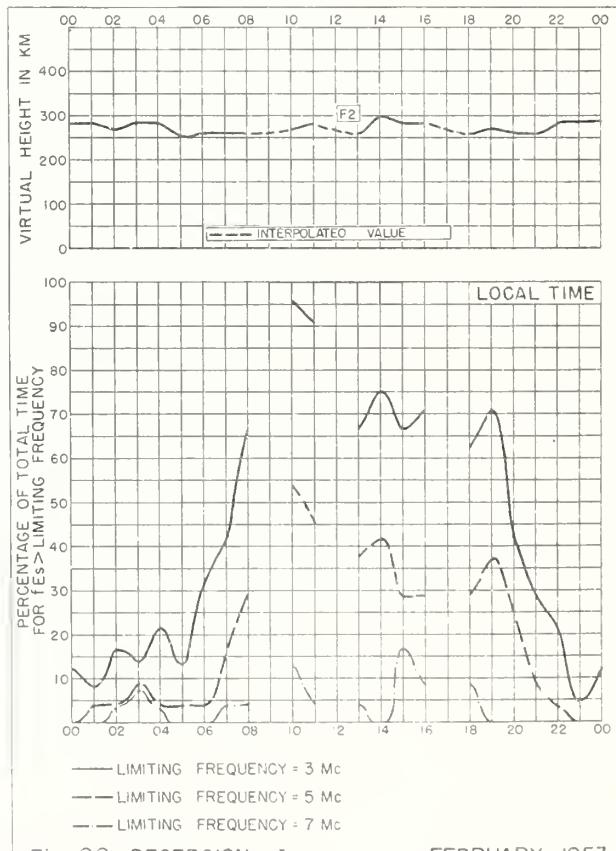
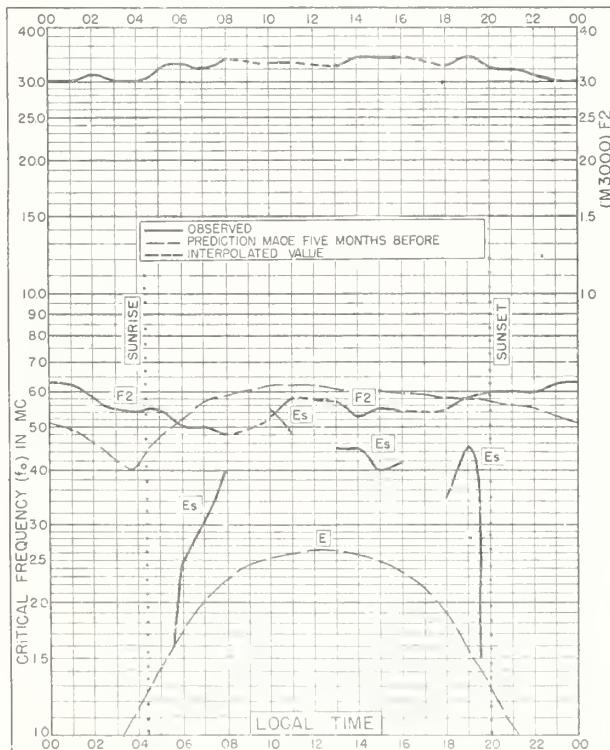
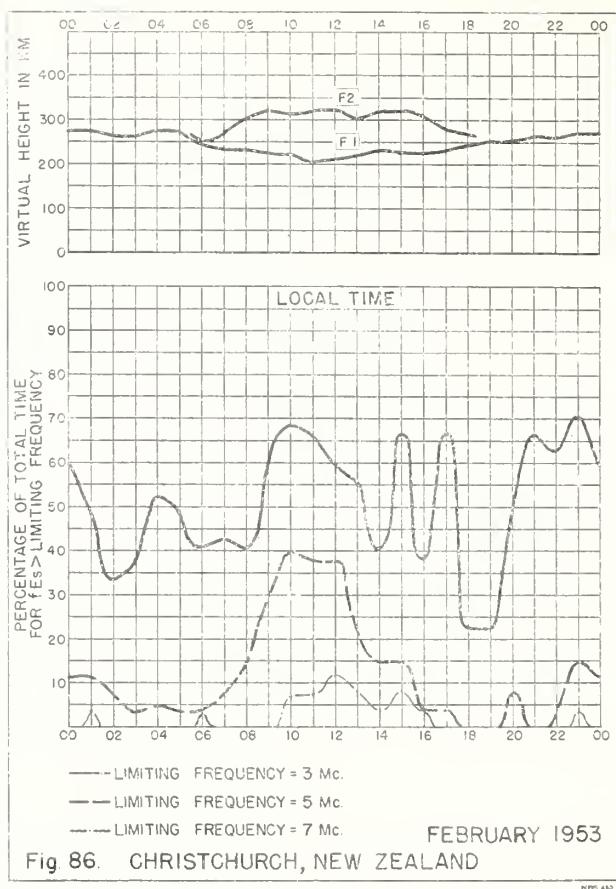
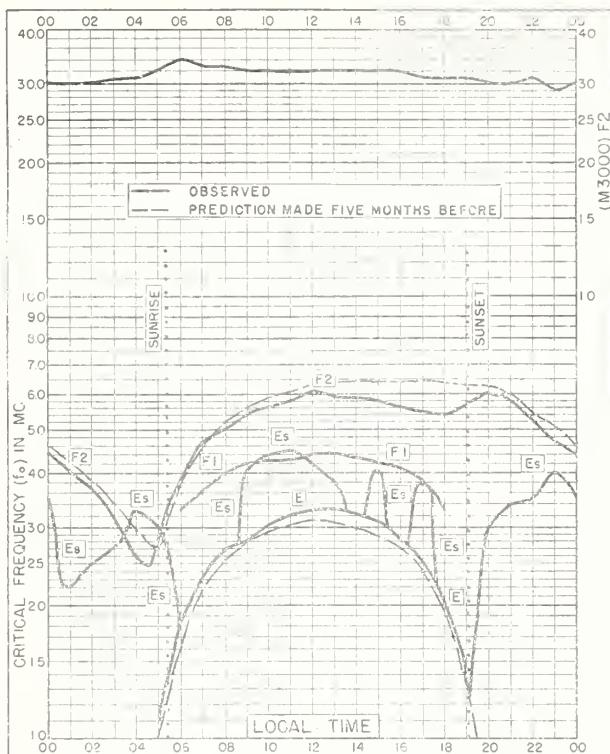


Fig. 84. BUENOS AIRES, ARGENTINA  
FEBRUARY 1953



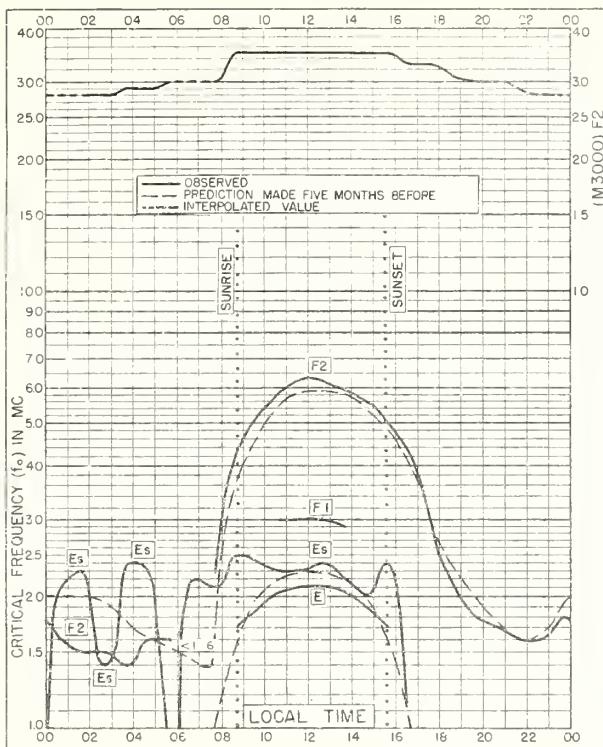


Fig. 89. INVERNESS, SCOTLAND  
57.4°N, 42°W JANUARY 1953

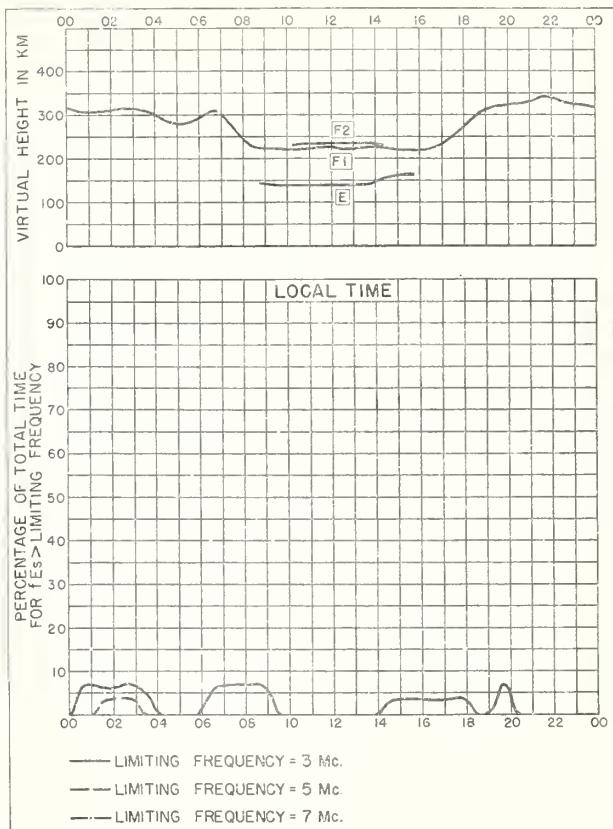


Fig. 90. INVERNESS, SCOTLAND JANUARY 1953

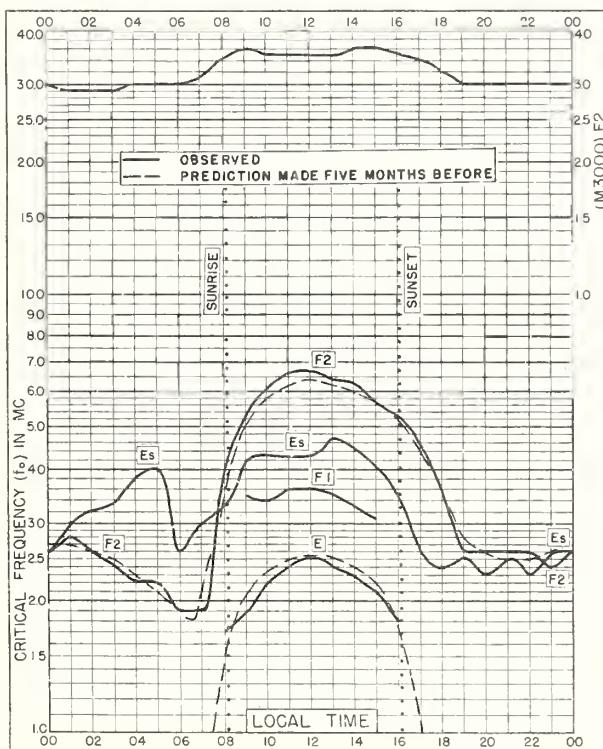


Fig. 91. SLOUGH, ENGLAND  
51.5°N, 0.6°W JANUARY 1953

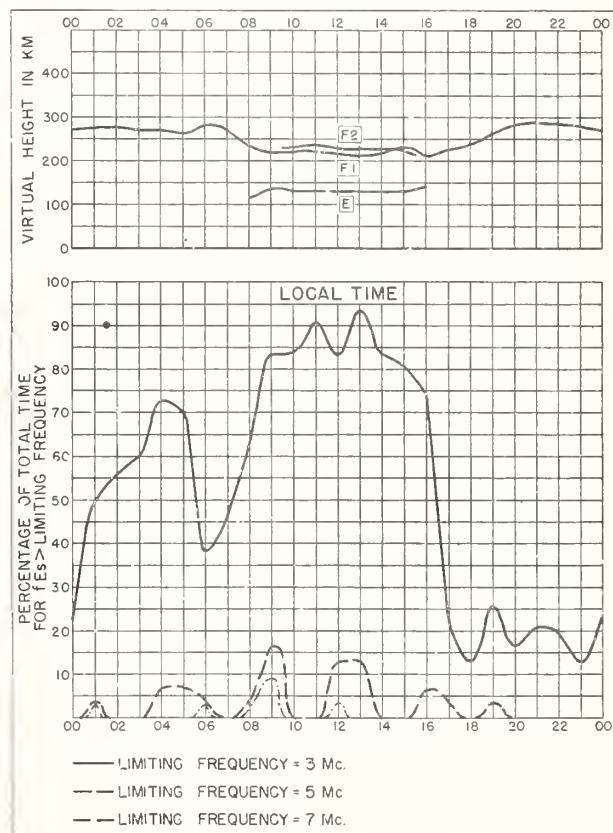


Fig. 92. SLOUGH, ENGLAND JANUARY 1953

NBS 490

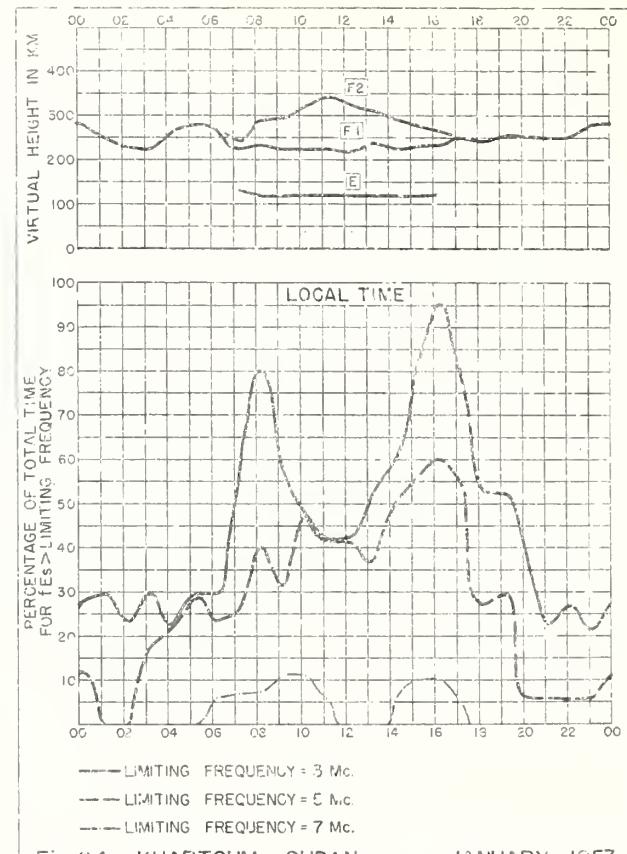
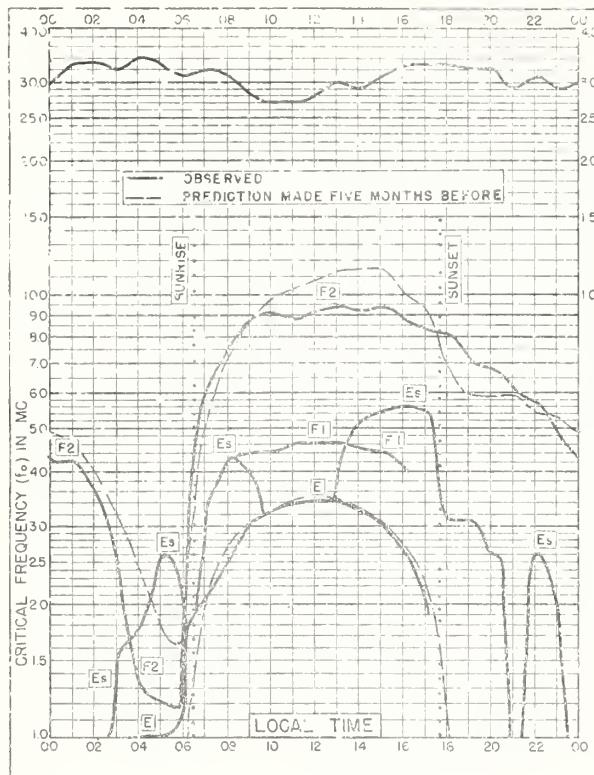


Fig.94. KHARTOUM, SUDAN JANUARY 1953

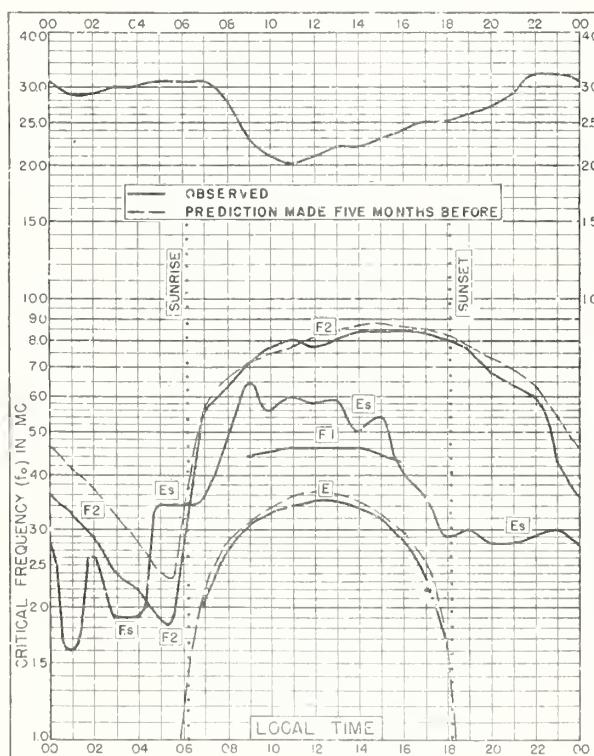
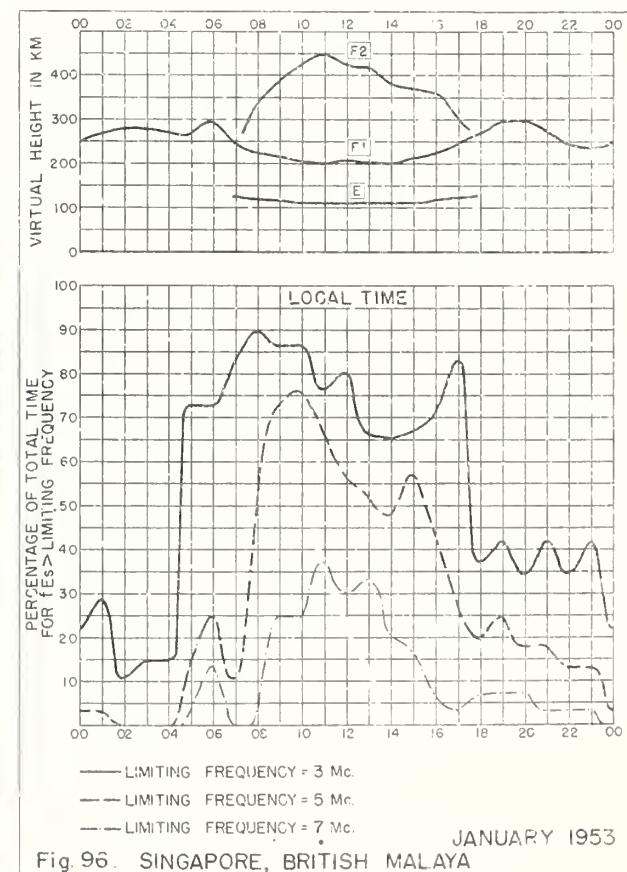
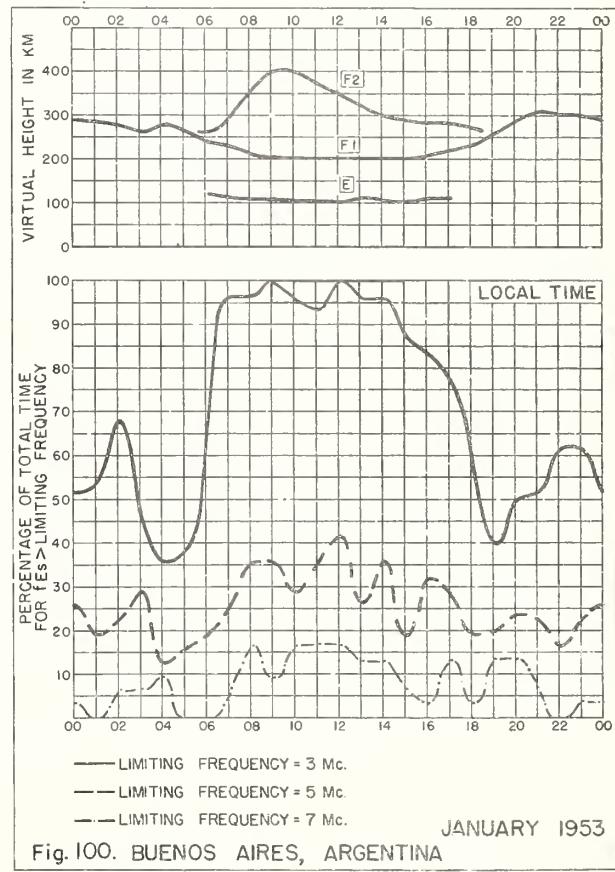
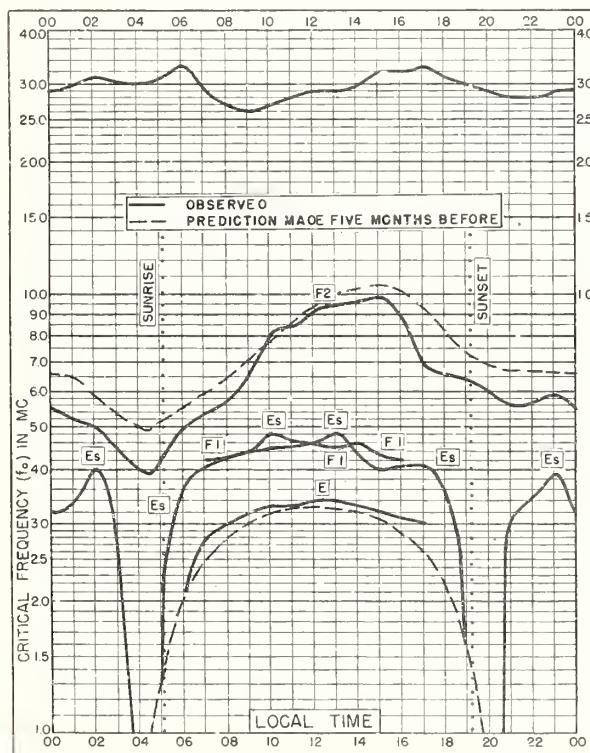
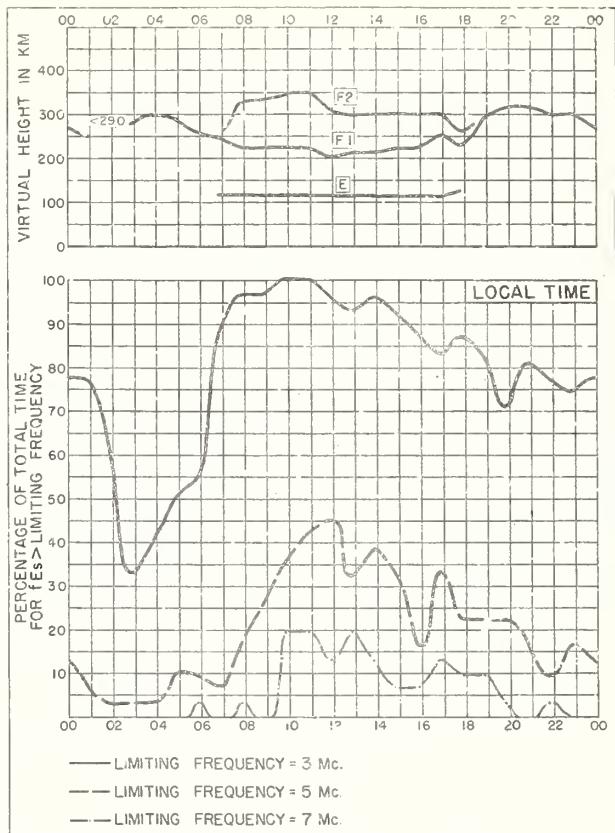
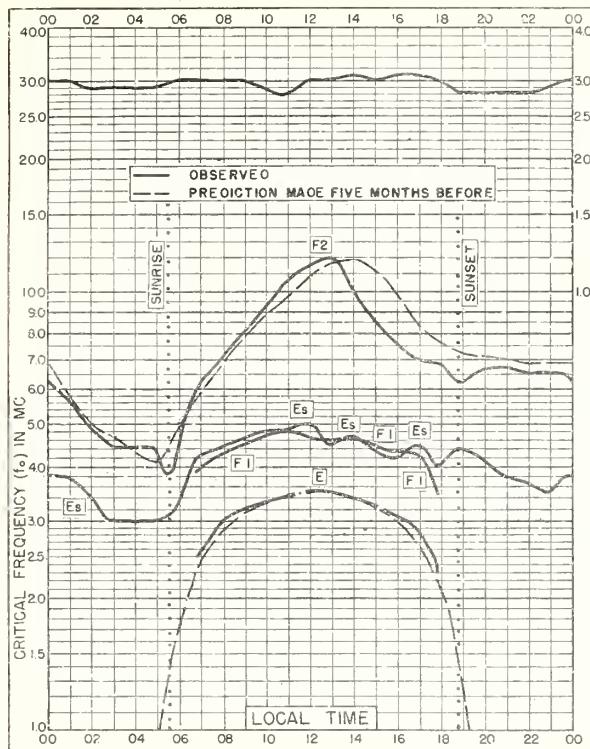


Fig. 95. SINGAPORE, BRITISH MALAYA  
 1.3°N., 103.8°E. JANUARY 1953





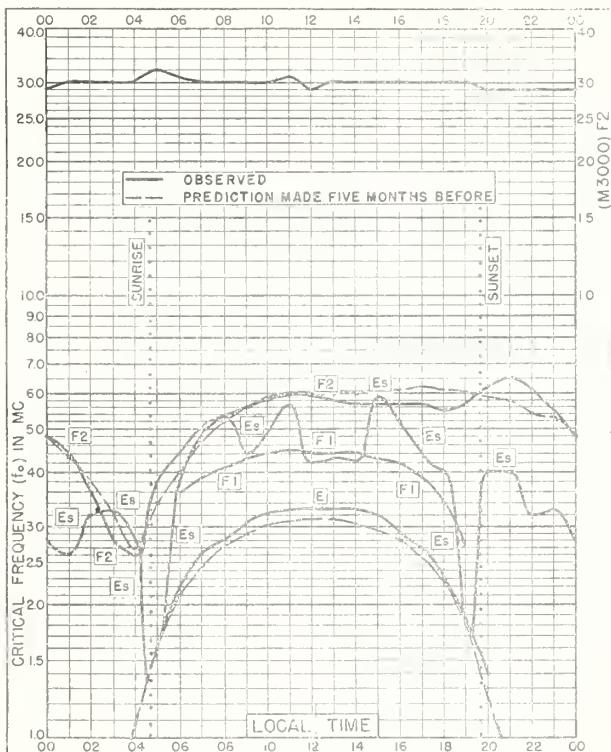
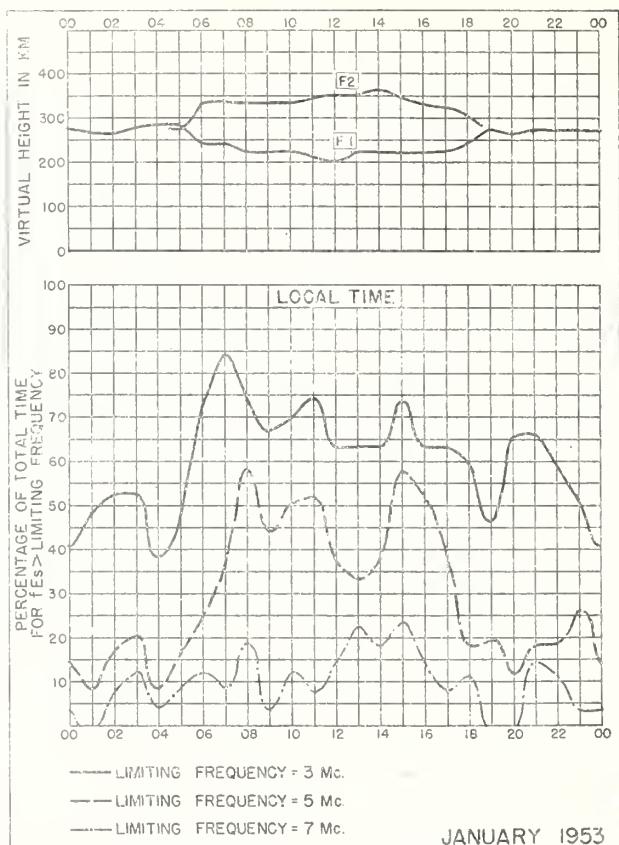


Fig.101. CHRISTCHURCH, NEW ZEALAND  
43.6°S, 172.7°E JANUARY 1953



JANUARY 1953  
Fig.102. CHRISTCHURCH, NEW ZEALAND

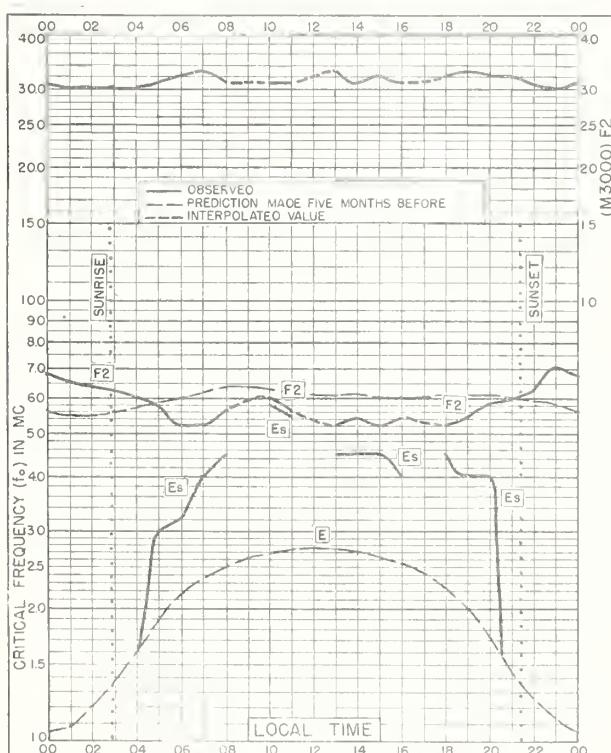
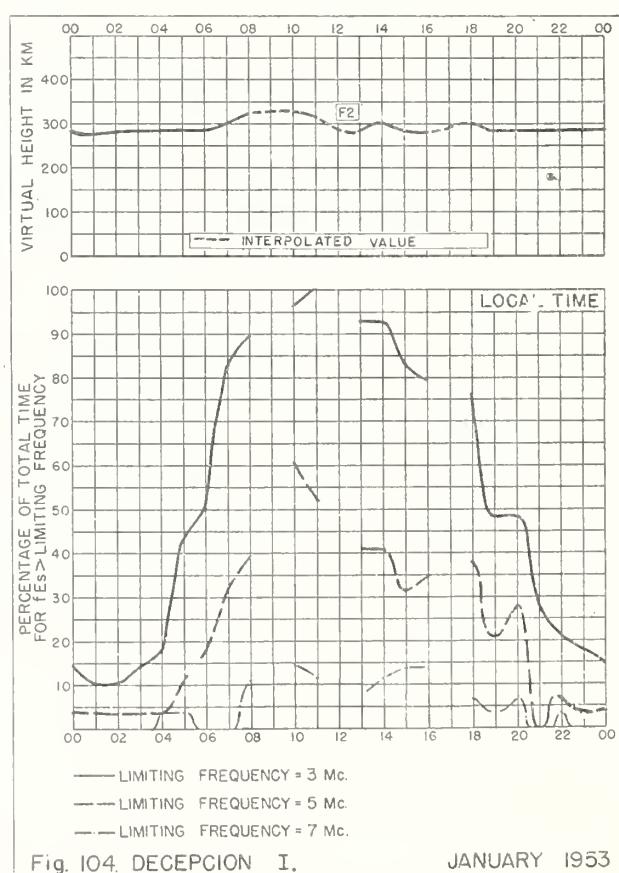
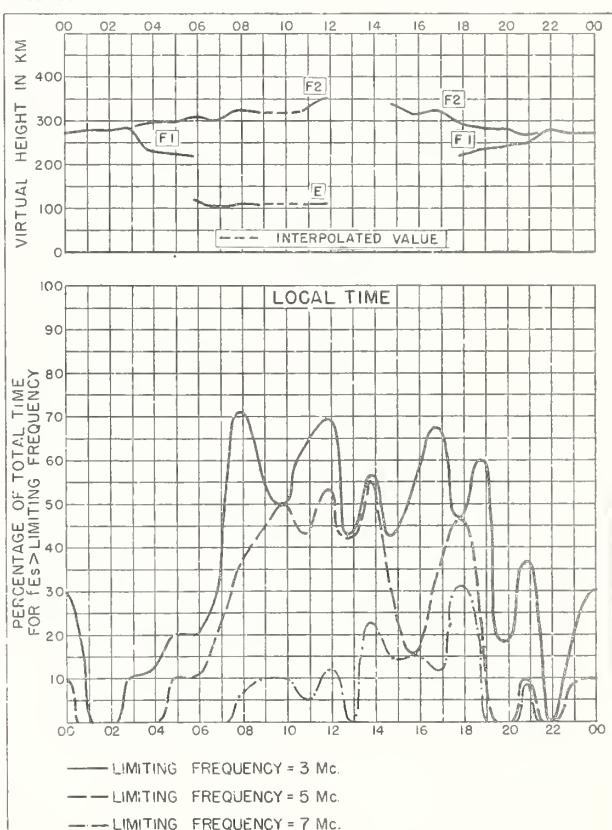
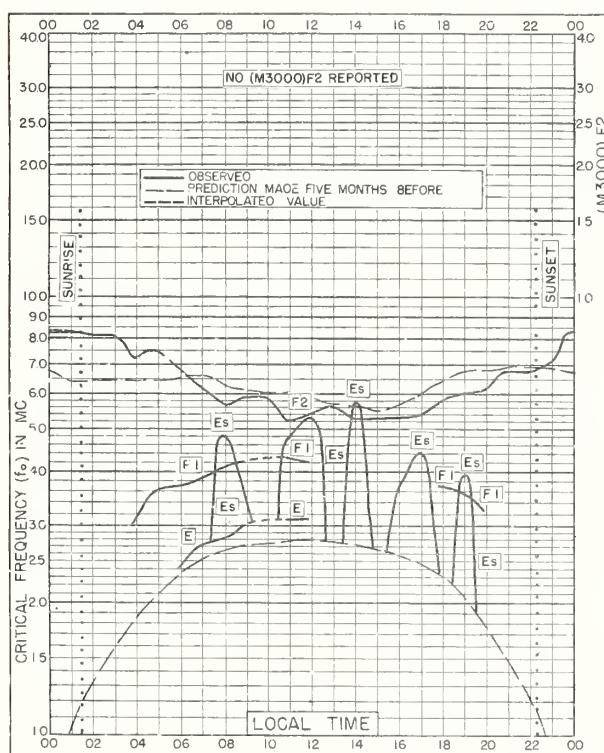
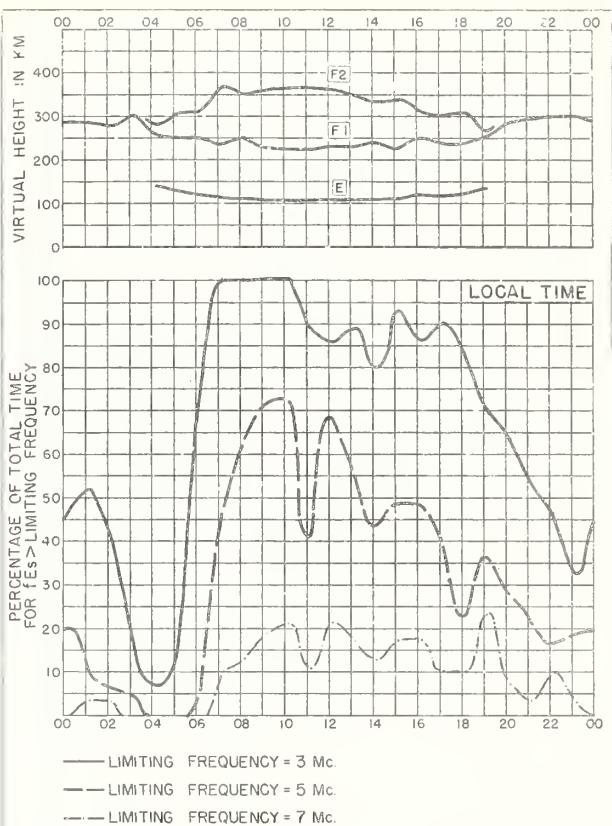
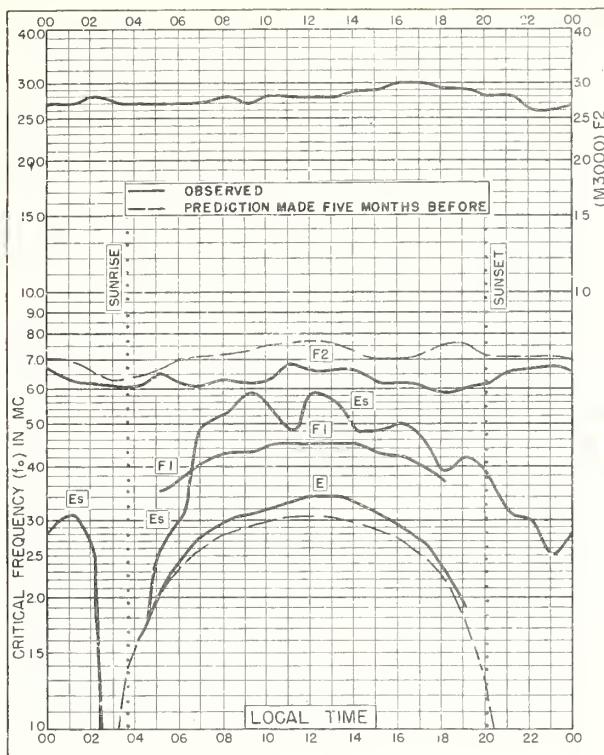
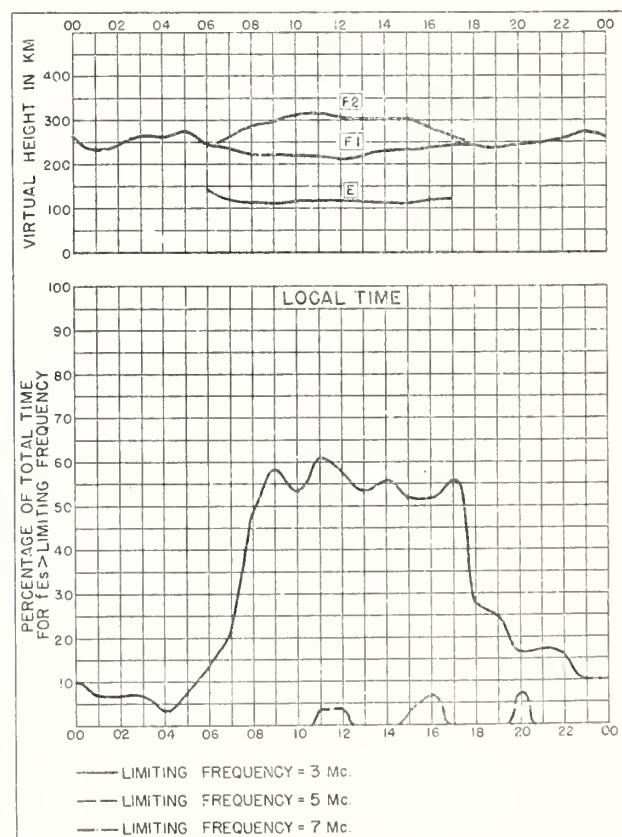
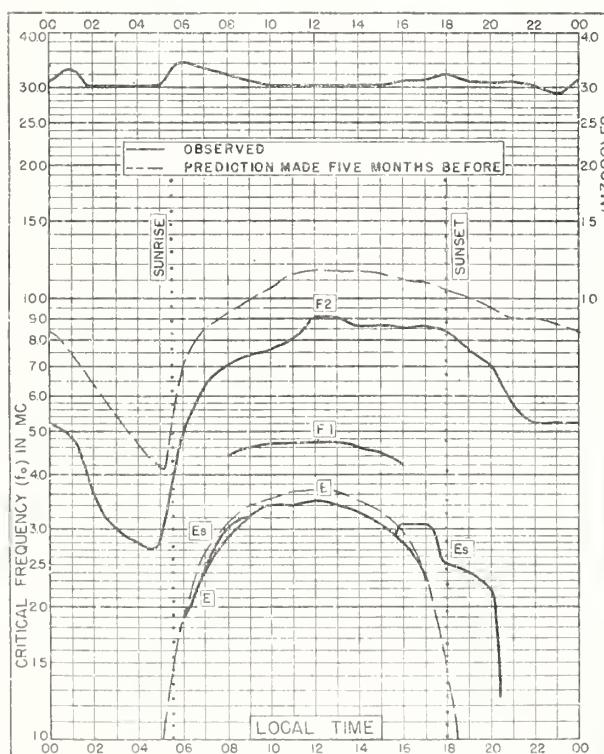
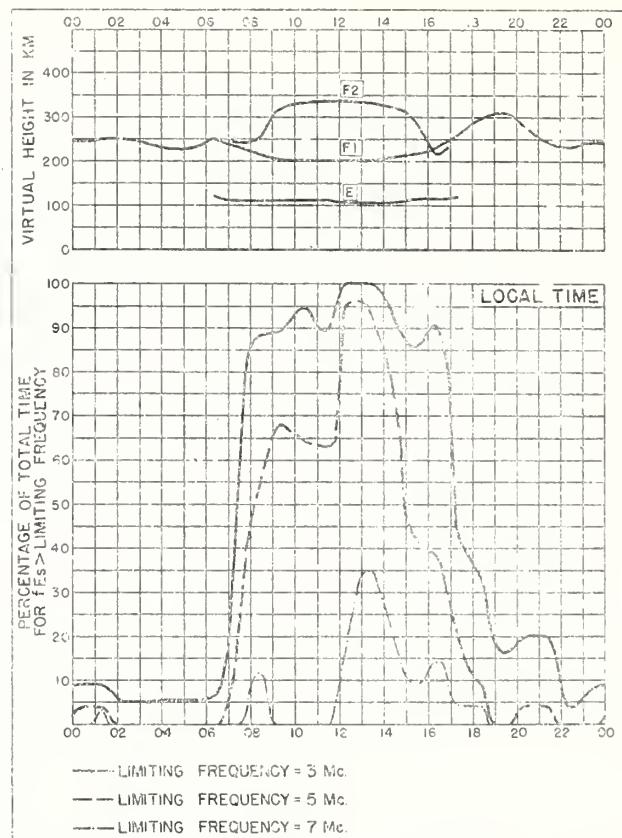
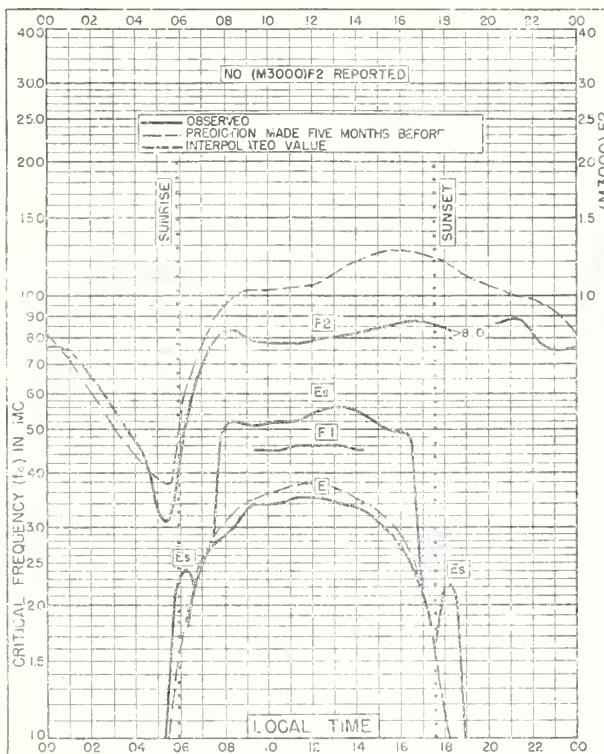


Fig.103. DECEPTION I.  
63.0°S, 60.7°W JANUARY 1953



JANUARY 1953  
Fig.104. DECEPTION I.





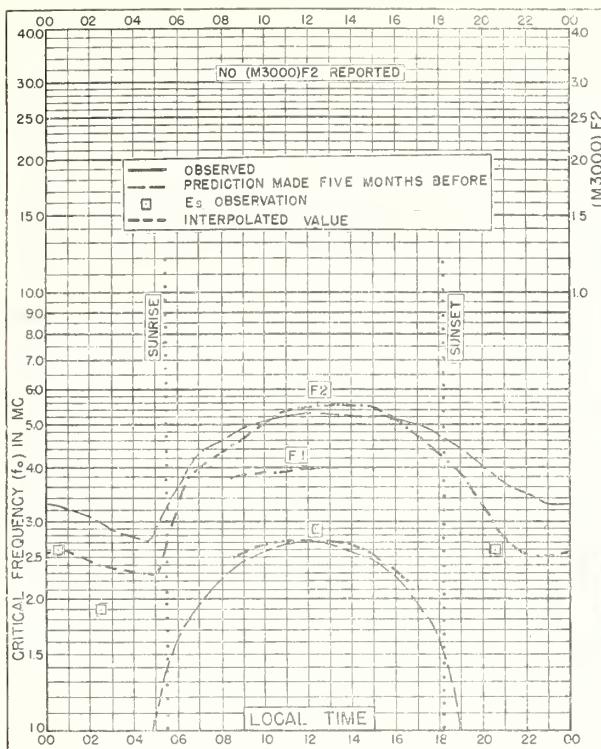


Fig. 113. LULEA, SWEDEN  
65.6°N, 22.1°E SEPTEMBER 1952

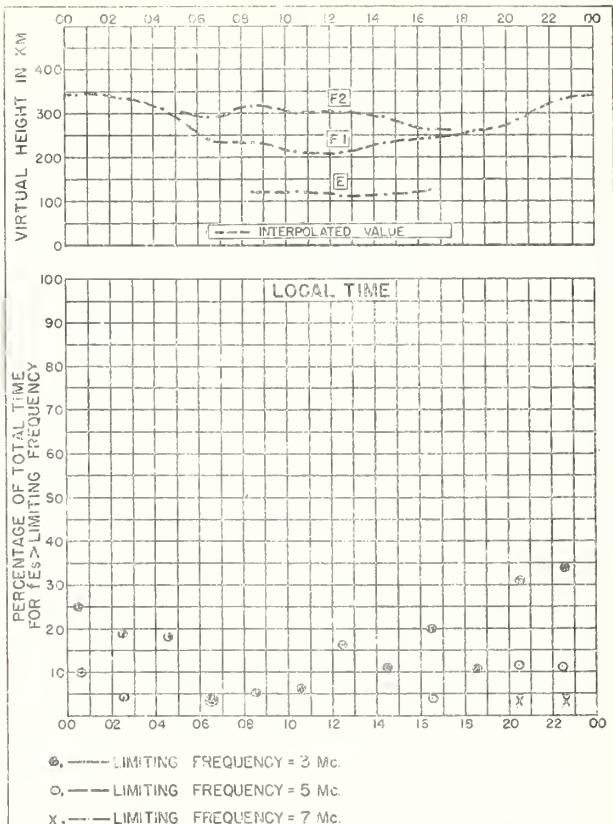


Fig. 114. LULEA, SWEDEN SEPTEMBER 1952

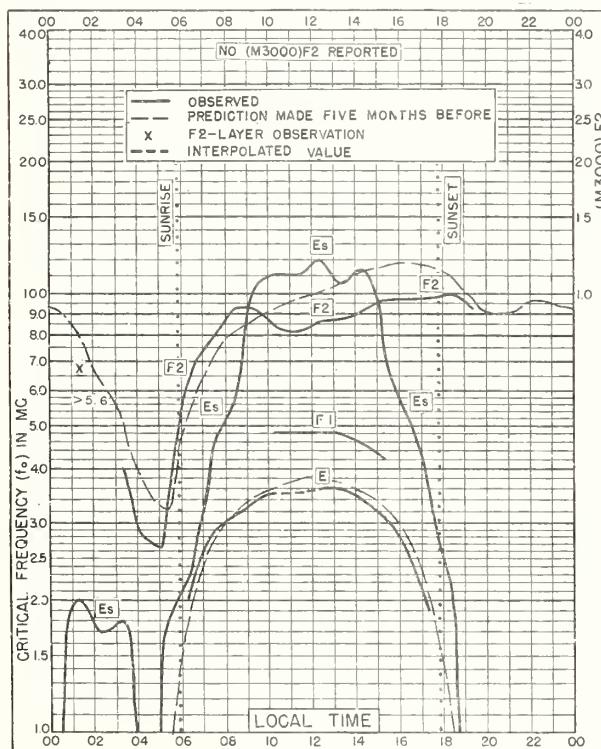


Fig. 115. IBADAN, NIGERIA  
7.4°N, 4.0°E SEPTEMBER 1952

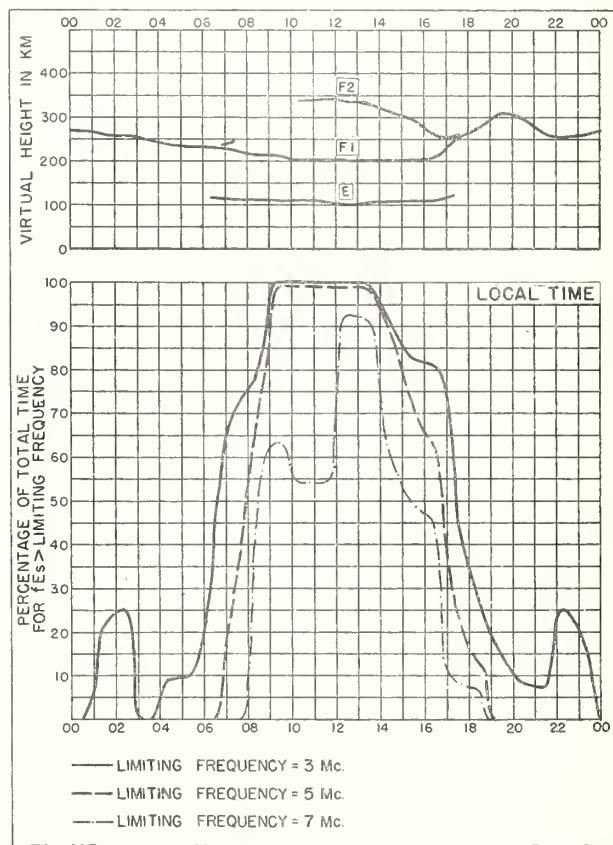


Fig. 116. IBADAN, NIGERIA SEPTEMBER 1952

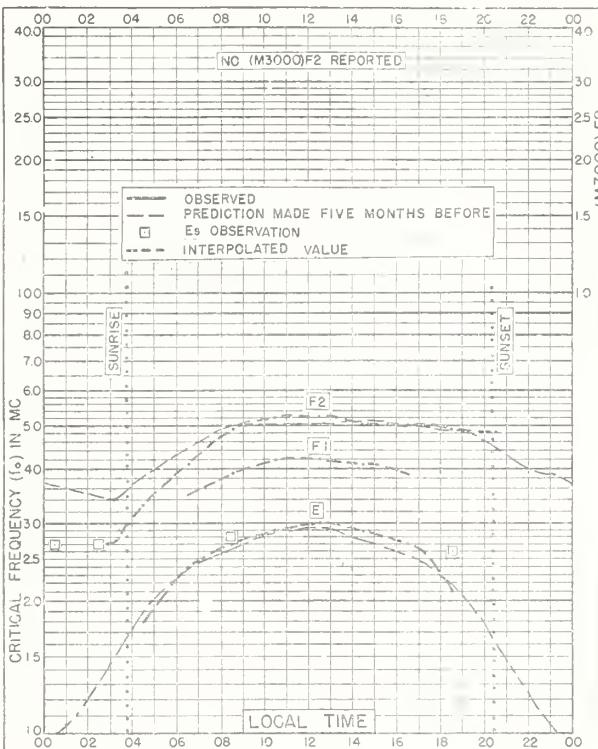


Fig. 117. LULEA, SWEDEN  
 65.6° N, 22.1° E AUGUST 1952

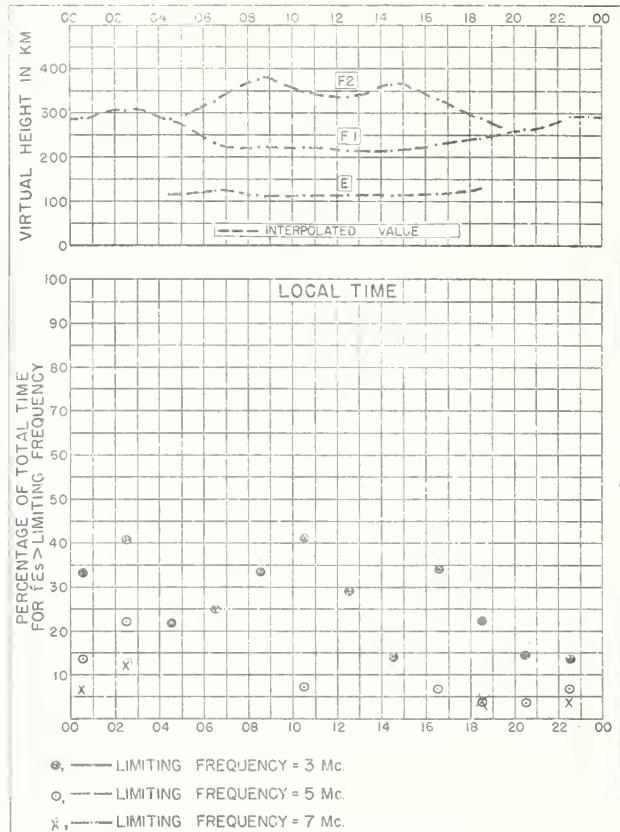


Fig. 118. LULEA, SWEDEN AUGUST 1952

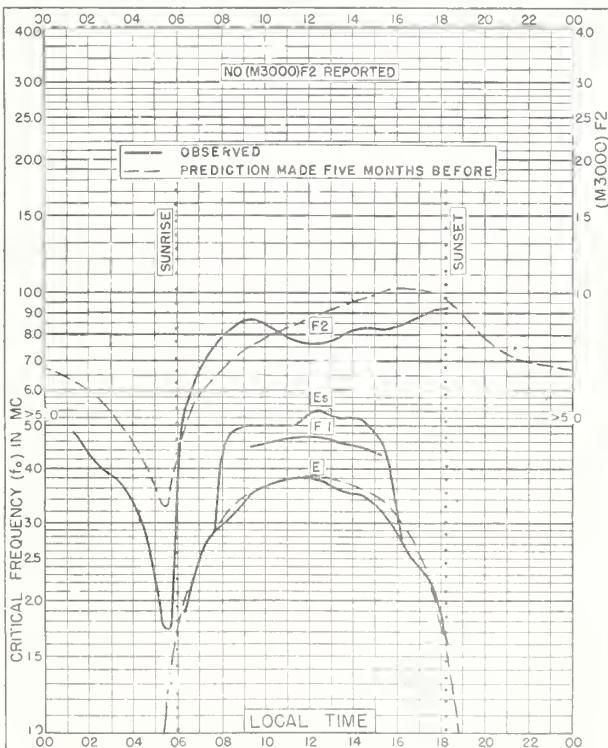
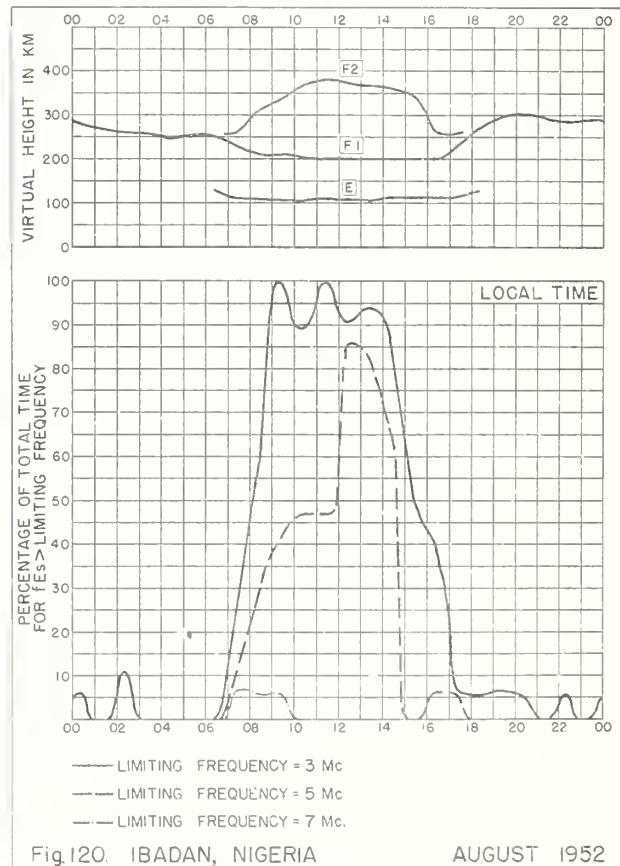


Fig.119. IBADAN, NIGERIA  
 7.4°N, 4.0°E AUGUST 1952



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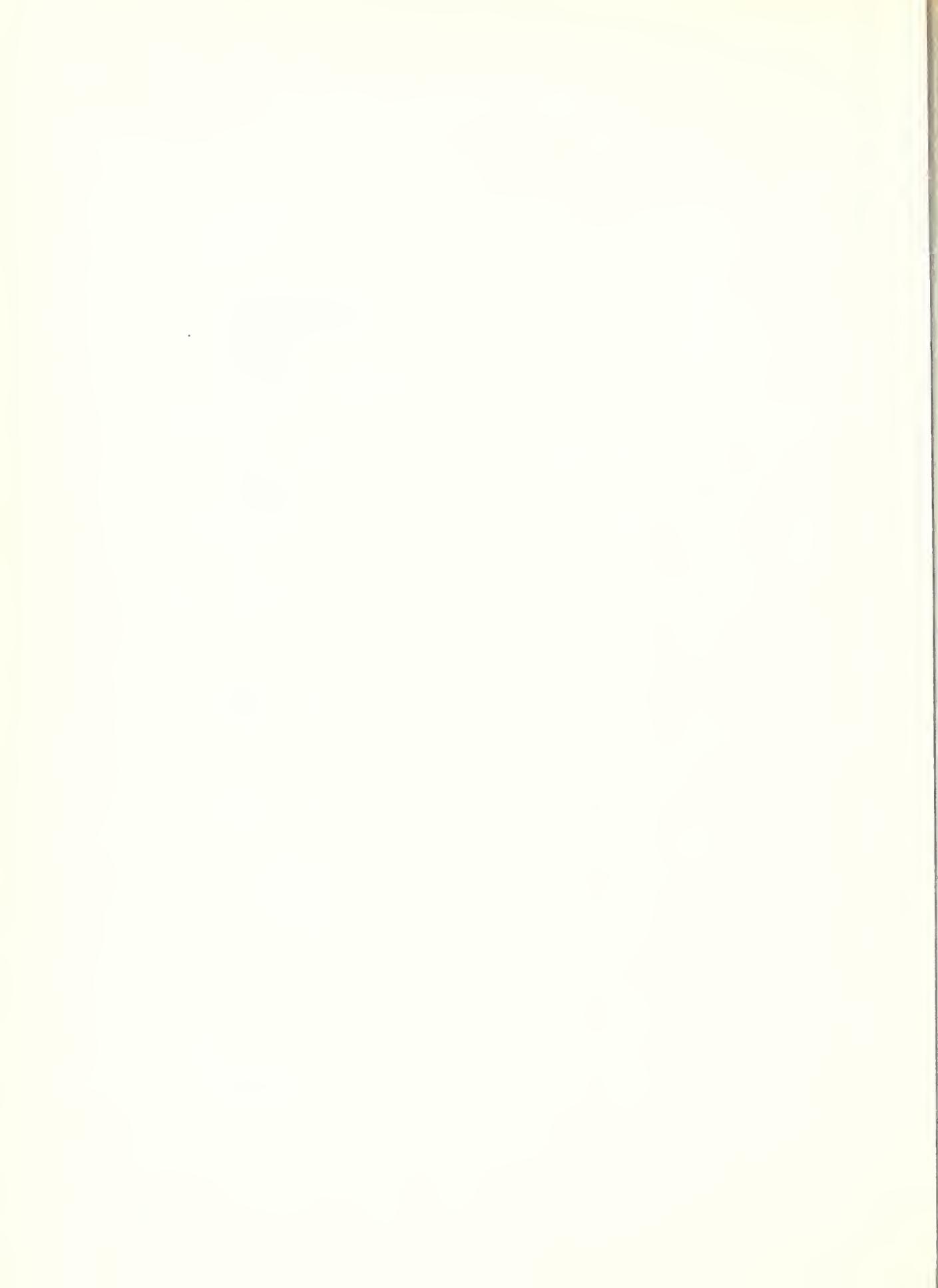
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## CRPL and IRPL Reports

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

### Daily:

Radio disturbance forecasts, 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.

### Semiweekly:

CRPL—J. North Atlantic Radio Propagation Forecast (of days most likely to be disturbed during following month).  
CRPL—Jp. North Pacific 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 ( ) series; Dept. of the Air Force, TO 16-1B-2 series.)  
CRPL—F. Ionospheric Data.  
\*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.  
(G1, G3, available. Others out of print; see second footnote.)  
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 Ionosphere Characteristics.  
R14. A Graphical Method for Calculating Ground Reflection Coefficients.  
\*\*R15. Predicted Limits for F2-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.  
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R27. Relationships Between Radio Propagation Disturbance and Central Meridian Passage of Sunspots  
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\*\*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.)

\*Items bearing this symbol are distributed only by U. S. Navy. They are issued under one cover as the DNC 14 ( ) Series.

\*\*Out of print; information concerning cost of photostat or microfilm copies is available from CRPL upon request.

