PART A

IONOSPHERIC DATA

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U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

CRPL-F153
PART A

NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

Issued
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CONTENTS

SYMBOLS, TERMINOLOGY, CONVENTIONS

Beginning with data reported for January 1952, and continuing through December 1956, 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 1957, the symbols used are given in NBS Report 5033, "Summary of Changes in Ionospheric Vertical Soundings, Observing and Scaling Procedures - Effective 1 January 1957," which draws upon the First Report of the Special Committee on World-Wide Ionospheric Soundings (URSI/AGI), Brussels, Sept. 2, 1956. A list of these symbols is 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 above.

a. For all ionospheric characteristics:

Values missing because of A, C, F, H, L, N, R or S are omitted from the median count.

b. For critical frequencies and virtual heights:

Values of foF2 (and foE near sunrise and sunset) missing because of E are counted as equal to or less than the lower limit of the recorder. Values of h'F (and h'E near sunrise and sunset) missing for this reason are counted usually as equal to or greater than the median. Other characteristics missing because of E are omitted from the median count.

Values missing because of G are counted:

1. For foF2, as equal to or less than foF1.
2. For h'F2, as equal to or greater than the median.

The symbol W is included in the median count only when it replaces a height characteristic; the descriptive symbol D, only when it replaces a frequency characteristic.

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

c. For MUF factor (M-factors):

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

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

d. For sporadic E (Es):

Values of fEs missing because of 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.

At night B for fEs is counted on the low side when there is a numerical value of foF2; otherwise it is omitted from the median count.

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

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

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

2. For the F2 layer, h'F or foEs, if the count is from five to nine, the median is considered doubtful. The E and F1 layers are so regular in their characteristics that, as long as the count is at least five, the median is not considered doubtful. A count of at least 5 is considered sufficient for an h'Es median.

3. For all layers, if more than half of the data used to compute the medians 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 values, may at times give an erroneous conception of typical ionospheric characteristics at the station. Some of the errors are due to:

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

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

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

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

Ordinarily, a blank space in the fEs or foEs column of a table is the result of the fact that a majority of the readings for the month are below the lower limit of the recorder or less than the corresponding values of foE. Blank spaces at the beginning and end of columns of h'F2 or h'F1, foF1, h'E, and foE are usually the result of diurnal variation in these characteristics. Complete absence of medians of h'F1 and foF1 is usually the result of seasonal effects.

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

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

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

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

d. The tables may contain median values of either foEs or fEs. The graph of median Es corresponds to the table. Percentage curves of fEs are estimated from values of foEs when necessary.

PREDICTED AND OBSERVED SUNSPOT NUMBERS

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

Month	Predicted Sunspot Number										
	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947
December		150	42	11	15	33	53	86	108	114	126
November		147	35	10	16	38	52	87	112	115	124
October	150*	135	31	10	17	43	52	90	114	116	119
September	150*	119	30	8	18	46	54	91	115	117	121
August	150*	105	27	8	18	49	57	96	111	123	122
July	150*	95	22	8	20	51	60	101	108	125	116
June	150*	89	18	9	21	52	63	103	108	129	112
May	150*	77	16	10	22	52	68	102	108	130	109
April	150*	68	13	10	24	52	74	101	109	133	107
March	150*	60	14	11	27	52	78	103	111	133	105
February	150*	53	14	12	29	51	82	103	113	133	90
January	150*	48	12	14	30	53	85	105	112	130	88

*This number is believed representative of solar activity at a maximum portion of the current sunspot cycle.

The latest available information follows concerning the corresponding observed Zürich numbers (some of which may be subject to minor change) beginning with the minimum of April 1954.

Observed Sunspot Number

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1954				3	4	4	5	7	8	8	9	12
1955	14	16	19	23	29	35	40	46	55	64	73	81
1956	89	98	109	119	127	137	145	148	149	154		

WORLD-WIDE SOURCES OF IONOSPHERIC DATA

The ionospheric data given here in tables 1 to 72 and figures 1 to 144 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
- Decepcion I.

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

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

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

Defence Research Board, Canada:
- Baker Lake, Canada
- Churchill, Canada
- Ottawa, Canada
- Resolute Bay, Canada
- Winnipeg, Canada

Radio Wave Research Laboratories, National Taiwan University, Taipeh, Formosa, China:
- Formosa, China

Institute for Ionospheric Research, Lindau Uber 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

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

Research Institute of National Defence, Stockholm, Sweden:
Kiruna, Sweden
Upsala, Sweden
Lycksele, 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.
Thule, Greenland
White Sands, New Mexico

National Bureau of Standards (Central Radio Propagation Laboratory):
Fairbanks, Alaska (Geophysical Institute of the University of Alaska)
Huancayo, Peru (Instituto Geofisico de Huancayo)
Narsarssuak, Greenland
Panama Canal Zone
San Francisco, California (Stanford University)
Talara, Peru (Instituto Geofisico de Huancayo)
Washington, D. C.

HOURLY IONOSPHERIC DATA AT WASHINGTON, D. C.

The data given in tables 73 through 84 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.

The interpretation of a cell is as follows: $\begin{matrix} U\ F \\ 32 \end{matrix}$

The U is a qualifying symbol meaning doubtful. Other qualifying symbols are I, interpolated, D, greater than, E, less than, J, ordinary component deduced from extraordinary, and T, value determined by a sequence of observations. Absence of a letter in the upper left position means full weight is given to the observation.

Symbols such as F above are given in the upper right position.

There should be no difficulty in the placing of the decimal point. For the time being, a final zero will be found in each value of foF1. Thus at a later date it will be possible to register more closely scaled values of this characteristic, whenever such are reported.

ERRATA

1. CRPL-F152 (Part A), p. 47, fig. 35: Consult table for middle-of-the-day values of foE and foEs.

2. CRPL-F152 (Part A), p. 64, fig. 103: At 00 hour, reading on both ends of foF2 should be 6.7.

3. Disregard prediction curves for foF2, Sao Paulo, Brazil, which have appeared in CRPL-F (Part A) through CRPL-F150.

EXAMPLES OF IONOSPHERIC VERTICAL SOUNDINGS
PANAMA, C.Z.; JAN. 16, 1957

The following ionograms were obtained at the Panama, C.Z. ionosphere vertical sounding station of the U. S. National Bureau of Standards. They are typical of day and night conditions for January at this geomagnetic latitude (20°N). Ionospheric data are scaled directly from these records onto the f-plot, a graph of frequency characteristics vs. time. The f-plot for the day represented by these soundings is found on the following page.

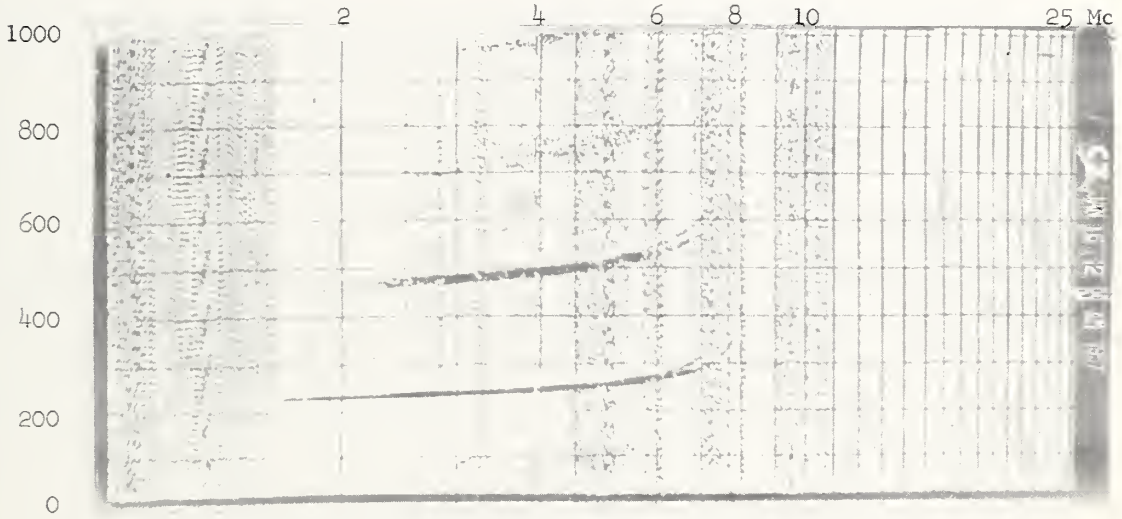


Fig. A. Panama, C.Z., Jan. 16, 1957, 0000 hour, 75°W time.

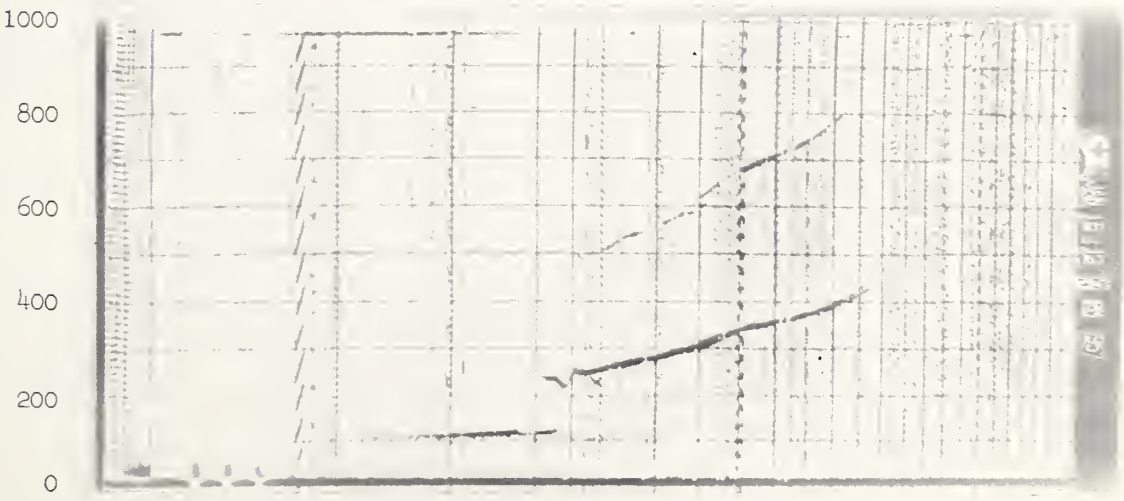
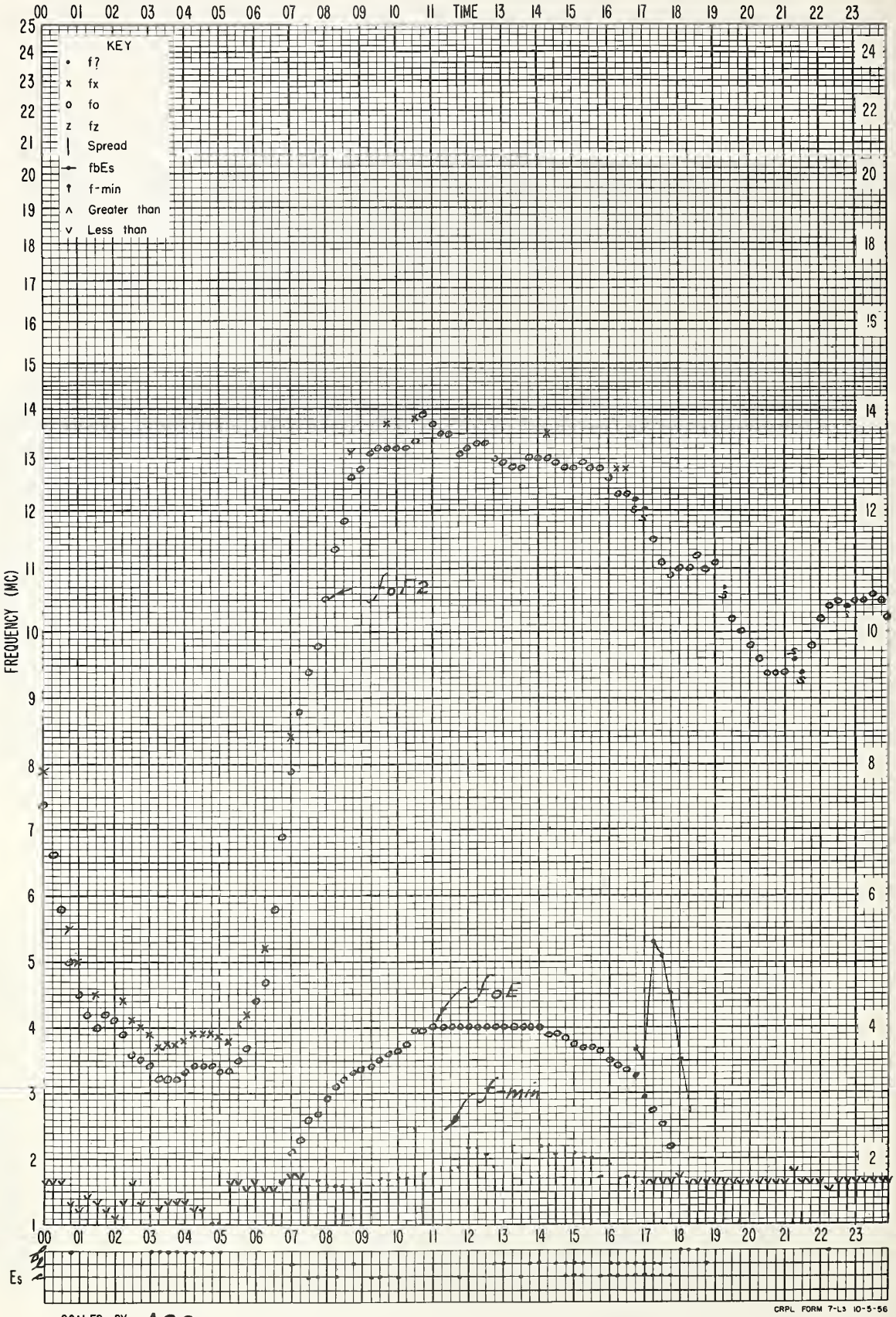


Fig. B. Panama, C.Z., Jan. 16, 1957, 1200 hours, 75°W time.

STATION Panama 75°W. f - PLOT OF IONOSPHERIC DATA DATE 16 Jan. 1957



SCALED BY A.P.C.

CRPL FORM 7-L3 10-5-56

Commerce-Standards-Boulder, Colo.

Radio Noise Data

The results of radio noise measurements are presented in the following graphs and tables. These are based on three parameters of the noise: (1) the mean power, (2) the mean envelope voltage, and (3) the mean logarithm of the envelope voltage. The mean power averaged over a period of several minutes is the basic parameter and is expressed as an effective antenna noise figure, F_a. F_a is defined as the noise power available from an equivalent lossless antenna in db above ktb (the thermal noise power available from a passive resistance) where

k = Boltzman's constant (1.38×10^{-23} joules per degree Kelvin)

t = Absolute room temperature (taken as 288° K)

b = Bandwidth in cycles per second.

The mean voltage and mean logarithm are expressed as deviations, V_d and L_d respectively, in db below the mean power.

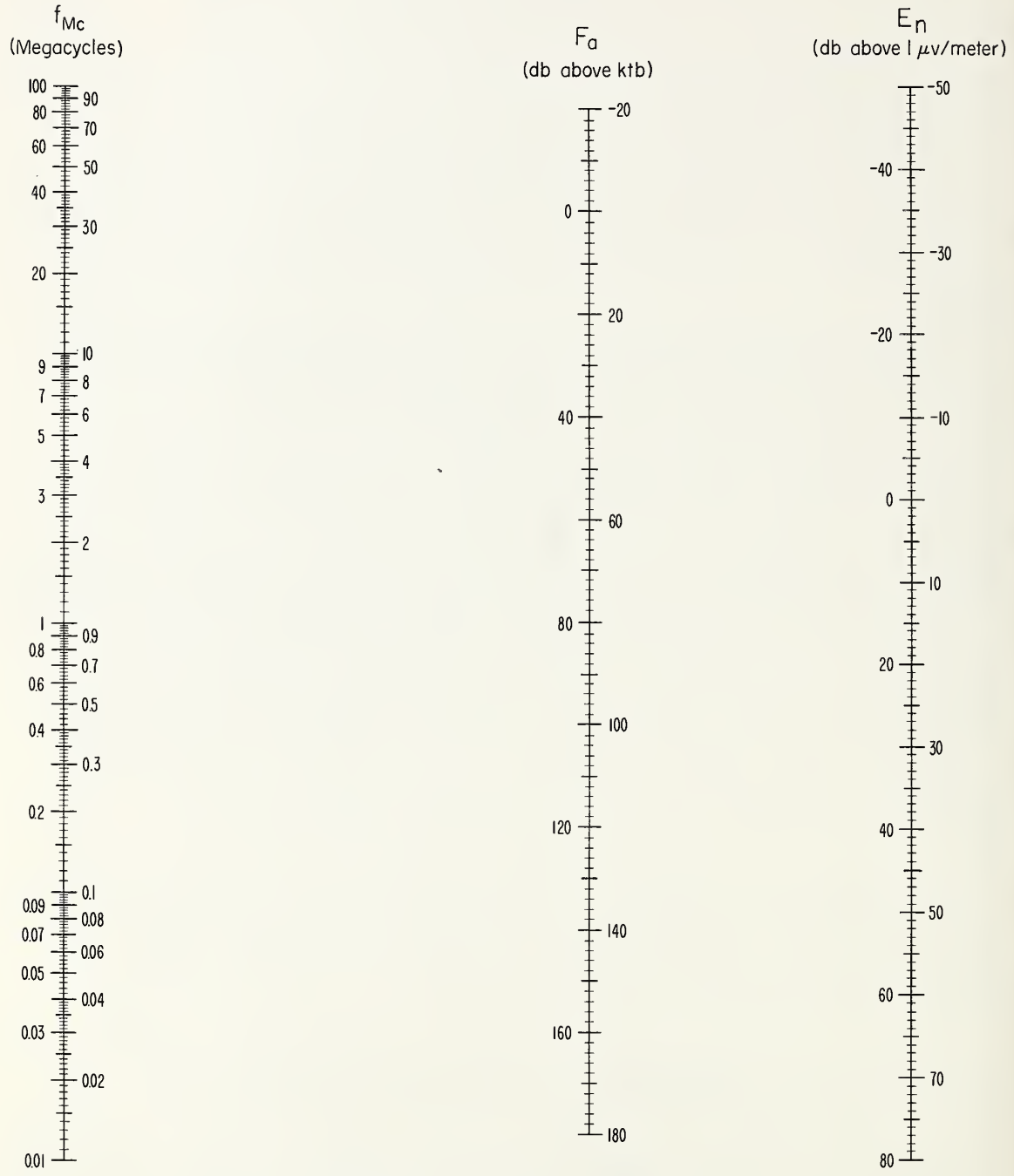
Measurements of these parameters were made with the National Bureau of Standards Radio Noise Recorder, Model ARN-2, which has an effective noise bandwidth of 280 cycles per second and uses a standard 21.75' vertical antenna. A 15 minute recording is made on each frequency each hour, and these 15 minute samples are taken as representing the noise conditions for the full hour. The month-hour medians, F_{am}, V_{dm}, and L_{dm} are determined from these hourly values for each of the corresponding parameters and the resulting medians are plotted at the half-hour point on the curves.

The upper and lower decile values of F_a are also reported in the following tabulation to give an indication of the extent of the variation of the noise power from day to day at a given time of day. These are expressed in db above and below the month-hour median, F_{am}, and designated by D_u and D_ℓ respectively.

To convert F_a to an r.m.s. noise field strength, E_n, the nomogram or the equation on the following page may be used.

Information on expected worldwide noise levels and their application to systems problems is presented in NBS Circular 557 (available from the Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C.) More recent estimates of radio noise levels are given in CCIR Report No. 65, "Report on Revision of Atmospheric Radio Noise Data", Warsaw, 1956 (available from the International Telecommunication Union, Geneva).

NOMOGRAM FOR TRANSFORMING EFFECTIVE ANTENNA NOISE FIGURE TO NOISE FIELD STRENGTH AS A FUNCTION OF FREQUENCY



$$E_n = F_a + 20 \log_{10} f_{Mc} - 65.5$$

F_a = Effective Antenna Noise Figure = External Noise Power Relative to ktb Available from an Equivalent Short, Lossless, Vertical Antenna in db Above ktb.

E_n = Equivalent Vertically Polarized Ground Wave R.M.S. Noise Field Strength in db Above 1 μv/meter for a 1 kc Bandwidth.

f_{Mc} = Frequency in Megacycles.

RADIO NOISE DATA

Station Bill, Wyoming Lat. 43.2° N Long. 105.2° W Type Recorder ARN-2 Month Feb. 7 to March 8 19 57

Local 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
	510kc																							
F_{am}	124	124	124	124	124	126	120	118	116	114	114	114	*115	*117	118	118	118	116	118	120	120	120	120	122
D_u	6	6	8	8	6	4	4	4	4	6	6	8			2	4	4	10	8	8	8	10	10	8
D_ℓ	8	8	8	6	6	10	6	10	10	10	8	10			10	10	14	6	6	6	4	4	4	6
V_{dm}																								
L_{dm}																								
	113kc																							
F_{am}	110	112	112	112	110	110	104	102	102	102	102	102	*103	*103	100	104	102	102	106	106	106	106	106	108
D_u	6	4	4	6	6	8	4	6	6	6	6	4			8	4	6	6	6	8	6	10	10	8
D_ℓ	12	12	16	8	8	14	10	8	8	8	10	8			14	16	16	10	10	6	4	8	6	6
V_{dm}																								
L_{dm}																								
	246kc																							
F_{am}	95	97	95	93	93	91	91	89	91	89	89	89	*91	*89	89	91	89	89	91	91	91	93	93	95
D_u	6	6	6	8	6	8	8	8	4	6	6	4			8	6	6	4	6	8	8	6	6	4
D_ℓ	6	10	8	4	6	6	6	4	8	4	4	4			4	22	6	6	6	4	6	8	6	6
V_{dm}																								
L_{dm}																								
	545kc																							
F_{am}	83	81	81	79	81	79	71	67	67	69	67	69	*69	*69	67	67	67	69	73	77	81	81	83	81
D_u	6	10	8	12	6	6	10	4	10	2	6	4			8	4	4	6	6	4	6	8	6	6
D_ℓ	4	8	6	6	10	6	6	4	2	4	4	4			4	2	2	4	6	10	14	8	8	6
V_{dm}																								
L_{dm}																								
	2.5Mc																							
F_{am}	53	57	55	53	53	49	43	35	29	21	21	21	*22	*22	21	21	23	33	43	49	51	51	51	53
D_u	10	6	10	6	6	14	14	8	8	6	8	8			6	10	10	12	14	12	8	10	8	10
D_ℓ	8	14	10	8	10	8	6	12	8	2	4	4			4	2	4	6	6	10	8	6	6	8
V_{dm}																								
L_{dm}																								
	5Mc																							
F_{am}	56	56	58	58	56	54	48	38	28	26	26	26	*27	*24	26	28	32	46	50	52	54	54	54	54
D_u	2	4	4	4	6	4	8	8	6	6	4	4			6	4	8	4	10	10	4	6	6	4
D_ℓ	8	6	8	6	6	6	6	6	4	2	6	2			14	8	8	10	6	8	8	8	4	6
V_{dm}																								
L_{dm}																								
	10Mc																							
F_{am}	44	44	42	44	42	40	38	36	30	28	24	24	*24	26	28	34	40	42	44	44	44	44	44	44
D_u	4	4	4	2	4	6	6	4	4	2	2	2		4	4	6	4	6	4	4	6	4	4	6
D_ℓ	6	6	2	8	4	6	4	4	2	4	2	2		4	2	6	10	4	6	6	4	6	4	4
V_{dm}																								
L_{dm}																								
	20Mc																							
F_{am}																								
D_u																								
D_ℓ																								
V_{dm}																								
L_{dm}																								

*Average of less than 15 observations.

RADIO NOISE DATA

Station Boulder, Colorado Lat. 40.1° N Long. 105.1° W Type Recorder ARN-2 Month February 1957

	Local 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
	51 kc																							
F_{am}	125	125	125	125	125	123	121	117	111	107	107	109	109	109	113	111	114	113	117	119	121	123	123	123
D_u	6	6	8	8	8	10	4	10	8	12	14	14	14	14	13	13	13	14	14	12	10	8	4	4
D_ℓ	10	8	6	6	6	4	6	6	4	4	4	6	4	5	7	7	9	8	10	8	6	8	8	6
V_{dm}	9	8	8	8	8	8	8	8	6	4	*5	*6	*6	*6	*6	*6	9	7	8	8	8	8	10	10
L_{dm}	15	15	14	13	14	13	13	12	8	8	*9	*11	*11	*10	*11	*9	*12	*12	*13	*14	*15	*15	*16	*16
	113 kc																							
F_{am}	107	109	105	103	105	101	99	91	91	91	90	89	89	89	94	93	95	99	101	105	105	105	105	105
D_u	12	10	14	16	14	18	10	10	16	15	15	10	12	12	9	14	8	12	14	12	12	10	12	12
D_ℓ	12	12	10	8	10	10	8	4	4	4	3	2	1	0	5	4	6	8	10	14	10	12	10	10
V_{dm}	8	8	8	8	8	7	6	4	3	4	*4	*4	*4	*4	*4	*4	*6	7	6	7	8	8	8	8
L_{dm}	12	14	14	12	12	12	9	7	7	*8	*8	*8	*7	*7	*7	*8	*9	*11	*11	*12	*14	*13	*14	*14
	246 kc																							
F_{am}	93	93	91	91	89	85	77	75	75	77	75	77	77	77	77	77	79	84	85	87	89	89	91	93
D_u	12	12	12	12	14	16	10	6	6	4	6	2	2	4	4	6	6	9	14	12	12	12	12	12
D_ℓ	12	14	12	14	14	10	2	2	2	3	2	3	2	2	2	2	4	7	8	10	10	10	12	12
V_{dm}	6	6	6	6	7	4	4	4	4	*3	*3	*3	*3	*4	*3	*3	*4	4	5	6	7	*8	6	6
L_{dm}	11	11	11	10	12	10	7	7	6	*6	*5	*5	*5	*6	*5	*6	*6	*8	*9	*10	*11	*12	*12	*12
	545 kc																							
F_{am}	87	85	85	81	87	87	73	87	85	67	69	71	71	71	71	73	77	77	85	85	89	91	91	87
D_u	6	6	5	10	6	4	10	8	6	14	14	8	7	12	8	6	8	6	8	6	6	4	4	4
D_ℓ	14	14	15	16	14	13	10	19	15	2	6	4	3	4	17	7	17	18	12	22	13	11	15	8
V_{dm}	*6	*5	*6	*5	*6	*4	*4	*3	*3	*3	*3	*2	*3	*4	*2	*3	*6	*4	*4	*4	*3	*4	*4	*6
L_{dm}	*11	*11	*10	*9	*9	*7	*6	*7	*8	*5	*6	*4	*5	*7	*5	*4	*10	*8	*7	*8	*8	*6	*7	*10
F_{am}																								
D_u																								
D_ℓ																								
V_{dm}																								
L_{dm}																								
F_{am}																								
D_u																								
D_ℓ																								
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F_{am}																								
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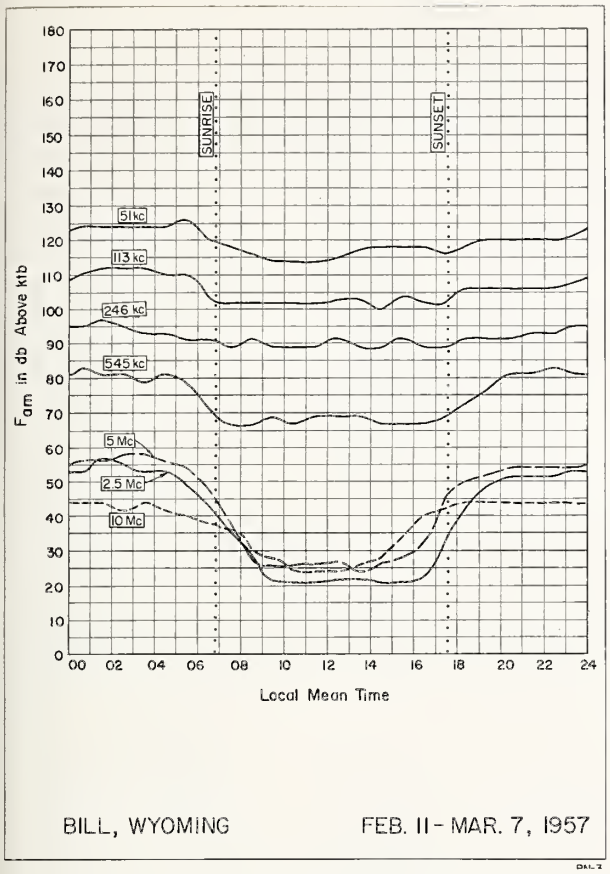
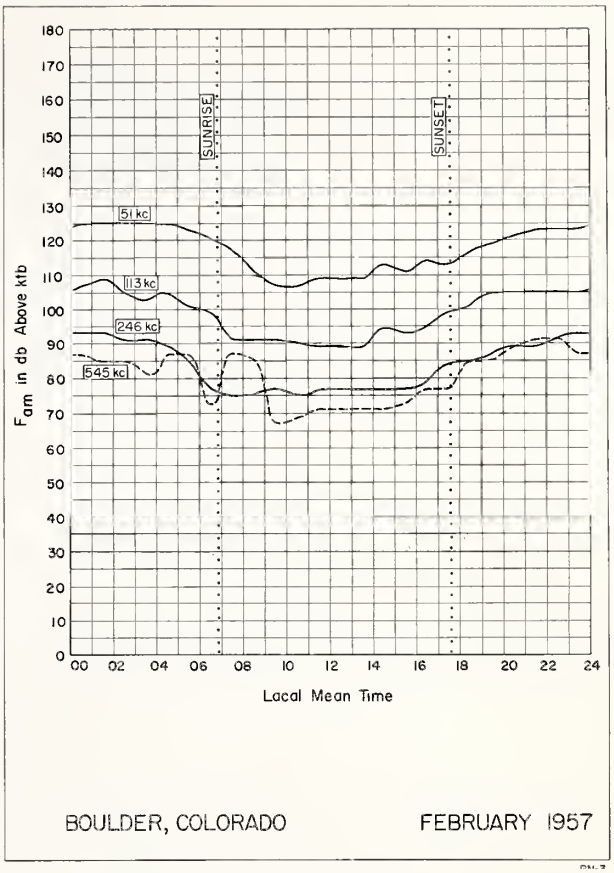
D_ℓ																								
V_{dm}																								
L_{dm}																								
F_{am}																								
D_u																								
D_ℓ																								
V_{dm}																								
L_{dm}																								

*Average of less than 15 observations

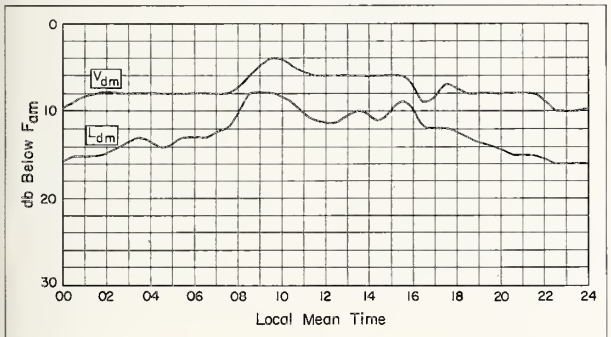
GRAPHS OF RADIO NOISE DATA



BILL, WYOMING FEB. 11 - MAR. 7, 1957

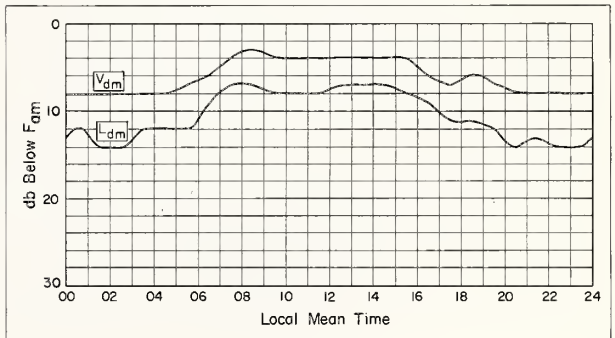


BOULDER, COLORADO FEBRUARY 1957



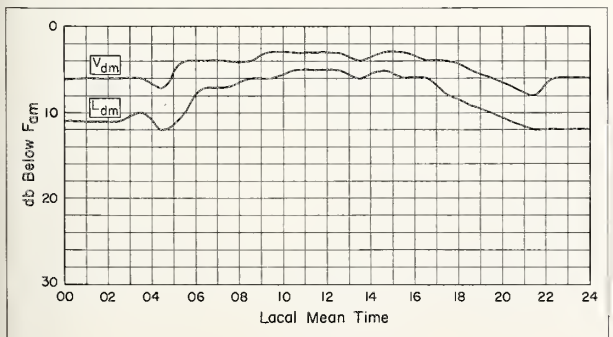
51 kc

BOULDER, COLORADO FEBRUARY 1957



113 kc

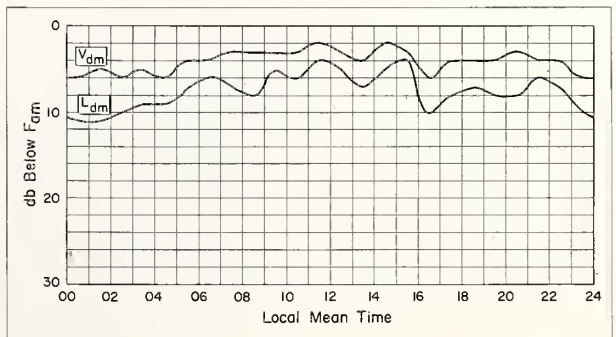
BOULDER, COLORADO FEBRUARY 1957



246 kc

BOULDER, COLORADO FEBRUARY 1957

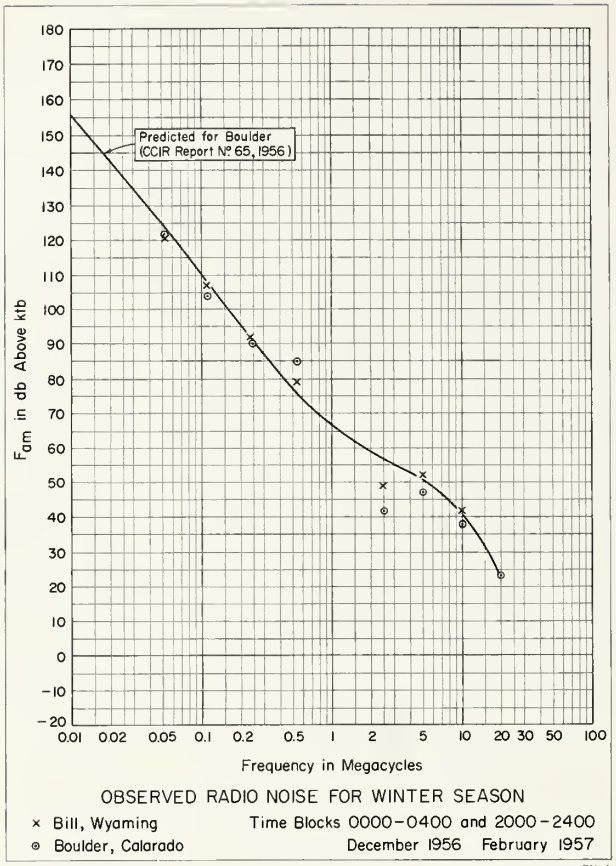
RN-2



545 kc

BOULDER, COLORADO FEBRUARY 1957

RN-2



SEASONAL TIME BLOCK VALUES OF RADIO NOISE

LAT 43N LONG 105W STATION BILL, WYOMING SEASON Winter (Dec. – Feb.*) 19 56-57

	TIME BLOCKS (LMT)																	
	0000–0400			0400–0800			0800–1200			1200–1600			1600–2000			2000–2400		
FREQUENCY (Mc)	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ
.051	122	8	6	120	7	4	114	7	7	116	5	10	118	8	8	120	9	4
.113	108	7	8	105	8	10	102	6	7	103	6	16	105	7	8	106	8	5
.246	92	6	6	89	9	6	89	8	6	89	7	12	91	6	7	92	8	7
.645	78	8	7	76	7	6	69	6	4	68	6	6	76	7	6	80	8	7
2.6	60	11	8	45	11	8	25	7	4	22	9	5	37	14	8	46	11	6
6.0	55	6	6	46	7	6	28	6	5	26	6	9	44	7	7	61	7	8
10.0	41	4	6	37	6	6	26	4	6	28	6	6	41	6	6	42	6	4

LAT 40N LONG 105W STATION BOULDER, COLORADO SEASON Winter (Dec.–Feb.**) 1956-57

	TIME BLOCKS (LMT)																	
	0000–0400			0400–0800			0800–1200			1200–1600			1600–2000			2000–2400		
FREQUENCY (Mc)	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ	F_{am}	D_u	D_ℓ
.051	124	7	6	122	6	4	110	10	4	110	12	6	114	12	7	121	6	6
.118	105	12	8	99	11	7	88	14	5	86	14	5	97	16	7	103	15	7
.246	91	10	9	85	9	6	76	6	4	79	6	4	82	14	6	89	10	6
.645	82	8	9	85	7	10	76	6	6	74	6	6	85	6	10	88	6	6
2.6 **	42	7	3	41	6	5	56	6	4	56	5	2	59	7	5	42	6	4
6.0 **	46	4	4	46	6	4	55	5	4	55	4	5	42	6	4	46	6	4
10.0 **	56	6	4	56	6	4	27	5	2	61	4	6	58	6	4	59	4	5
20.0 **	25	4	0	24	3	1	26	6	2	52	20	6	60	20	4	25	4	1

F_{am} = Time block median value of effective antenna noise figure in db above ktb

D_u = Ratio of upper decile to median in db

D_ℓ = Ratio of median to lower decile in db

* No data for January; includes 7 days of March

** No data for February these frequencies

Table 1

Washington, D. C. (38.7°N, 77.1°W) April 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		6.5	300					2.60
01		6.1	300					2.60
02		6.0	310					2.50
03		5.6	310					2.60
04		5.2	300					2.60
05		5.1	310					2.60
06	---	6.2	275		119	1.90		2.90
07	---	7.2	245	---	111	2.75		2.90
08	(300)	7.7	235	---	109	3.10		2.85
09	400	8.0	225	5.4	109	3.40		2.75
10	430	9.1	215	5.6	109	(3.65)		2.65
11	420	9.2	210	5.7	109	3.75		2.70
12	420	9.7	220	5.8	109	(3.80)		2.65
13	440	9.8	225	5.8	109	(3.85)		2.60
14	410	9.8	225	5.8	109	(3.70)		2.60
15	415	9.7	230	5.7	110	3.60		2.60
16	400	9.6	235	5.3	109	3.35		2.60
17	(395)	9.4	250	4.8	111	2.85		2.65
18	---	9.4	265		121	2.20		2.70
19		9.2	265		---	-----		2.75
20		8.2	260					2.70
21		7.0	270				(2.4)	2.65
22		7.2	280					2.60
23		6.8	300					2.60

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 2

Lycksele, Sweden (64.6°N, 18.0°E) March 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		5.8	340				2.3	2.65
01		5.8	330				2.4	2.6
02		5.6	350				2.0	2.5
03		5.7	330					2.5
04		5.1	300					2.6
05		5.0	200		---	E		2.7
06		5.8	260		---	E		2.95
07	---	6.8	250	----	115	2.15		2.9
08	---	7.8	245	----	110	2.50		2.95
09	(310)	8.5	240	(4.15)	110	2.80		2.9
10	(315)	9.0	240	----	110	3.00		2.9
11	(270)	9.7	230	----	110	3.05		2.9
12	(260)	10.1	230	(4.30)	110	3.10		2.9
13	---	10.0	230	----	110	3.10		2.9
14	---	9.6	230	----	110	2.95		3.0
15	---	9.5	230	----	110	2.80		3.0
16		9.2	240		115	2.40		3.0
17		9.0	240		120	2.10		3.0
18		7.0	255		---	1.55		2.9
19		6.6	250		---	E	2.0	2.8
20		6.0	290		---	---	2.3	2.7
21		5.4	310				2.4	2.5
22		5.6	345				2.3	2.5
23		5.6	350				2.3	2.6

Time: 15.0°E.
Sweep: 1.4 Mc to 17.0 Mc in 6 minutes, automatic operation.

Table 3

Oslo, Norway (60.0°N, 11.1°E) March 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		(3.8)	315					2.40
01		(3.9)	315				1.8	2.40
02		(4.7)	325				(1.8)	(2.40)
03		(3.9)	320				1.4	2.40
04		3.8	310					2.40
05		4.0	300		---	-----		2.55
06		4.6	260		---	1.70		2.55
07		6.0	255		120	2.10		2.85
08	---	7.2	250	---	115	2.50		2.90
09	---	8.6	240	---	110	2.85		2.80
10	---	9.7	240	---	110	3.10		2.80
11	---	10.2	240	---	110	3.30		2.75
12	---	10.7	240	---	110	3.30		2.70
13	---	11.1	245	---	110	3.35		2.70
14		11.2	240	---	115	3.25		2.70
15		11.0	240	---	115	3.10		2.70
16		11.1	245	---	120	2.85		2.80
17		10.5	250		120	2.50		2.85
18		9.8	250		---	1.90		2.85
19		8.7	245		---	(1.60)		2.85
20		8.0	250					2.75
21		6.7	250					2.55
22		6.1	300				(2.6)	2.55
23		(4.9)	340				(2.1)	2.40

Time: 15.0°E.
Sweep: 0.7 Mc to 25.0 Mc in 5 minutes, automatic operation.

Table 4

Upsala, Sweden (59.8°N, 17.6°E) March 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		4.6	345					2.4
01		4.4	330					2.5
02		4.4	330				1.8	2.4
03		4.0	320					2.5
04		3.7	300					2.5
05		4.0	280		---	E		2.6
06		5.4	255		---	1.50		2.8
07		6.6	245		115	2.10		2.9
08	310	7.7	240	4.25	110	2.60	2.7	2.9
09	310	8.9	240	4.80	110	2.95		2.9
10	310	9.4	235	5.00	105	3.10		2.9
11	300	10.3	230	(5.20)	105	3.20		2.8
12	320	11.0	230	(5.60)	105	3.25		2.8
13	305	10.9	225	5.35	105	3.25		2.8
14	290	11.0	230	(5.05)	110	3.15		2.8
15	330	10.8	240	---	110	3.00		2.8
16	---	10.9	240	---	110	2.70		2.9
17	---	10.3	240	---	120	2.15		2.9
18		9.4	240		---	1.50		3.0
19		8.0	240		---	E		2.9
20		6.6	245					2.7
21		5.6	265					2.6
22		4.9	320					2.5
23		4.8	330					2.5

Time: 15.0°E.
Sweep: 1.4 Mc to 17.0 Mc in 6 minutes, automatic operation.

Table 5

Formosa, China (25.0°N, 121.5°E) March 1957

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	250	(14.2)						(2.85)
01	250	12.8						2.85
02	250	11.4						2.8
03	250	9.4						2.9
04	250	8.8						2.8
05	260	6.8					2.2	2.8
06	260	7.9					2.5	2.8
07	240	11.1			---	---	2.7	2.9
08	240	12.6			120	3.1		2.9
09	240	13.9	---	---	120	3.5	3.8	2.8
10	(230)	14.6	220	---	110	3.7	4.0	2.7
11	---	15.6	220	---	110	3.9		2.7
12	---	>16.4	220	---	120	4.0	4.0	2.6
13	---	(17.1)	230	---	120	4.0		2.6
14	---	(17.5)	240	---	120	3.7		2.6
15	---	(17.7)	240	---	120	3.5	3.8	2.65
16	---	17.2	240	---	120	3.3	3.8	2.7
17	250	16.?	240	---	120	2.9	3.4	2.8
18	280	(16.6)					(3.0)	(2.8)
19	300	16.6					(3.1)	2.7
20	280	17.8						(2.7)
21	280	>17.1						(2.8)
22	260	>17.0						(2.9)
23	250	>15.4						(2.8)

Time: 120.0°E.
Sweep: 1.1 Mc to 19.5 Mc in 15 minutes, manual operation.

Table 6

Thule, Greenland (76.6°N, 68.7°W) February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		5.4	255					2.80
01		5.1	260					2.75
02		5.2	270					2.80
03		5.2	260					2.80
04		4.6	250					2.90
05		4.8	250					2.80
06		5.0	250					2.80
07		4.9	260					2.90
08		5.7	250					2.90
09		6.1	250					3.00
10		6.7	250					2.95
11		7.0	260		---	---		2.95
12		7.8	250		---	---		2.95
13		8.0	250		---	---		2.95
14		8.0	240		---	---		2.95
15		7.6	250					2.85
16		7.0	250					2.80
17		7.0	250					2.80
18		6.6	245					2.85
19		6.8	250					2.80
20		6.4	255					2.75
21		6.6	250					2.85
22		6.0	250					2.80
23		5.6	265					2.80

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 7

Fairbanks, Alaska (64.9°N, 147.8°W) February 1957

Time	h'F2	foF2	h'F1	foF1	h'E	foE	foEs	(M3000)F2
00		(4.1)					3.8	(2.90)
01		(4.3)					4.1	(2.80)
02		(4.1)					3.4	2.60
03		(4.4)					3.0	2.60
04		(4.6)					3.2	(2.70)
05		(4.8)					3.8	(2.65)
06		(5.0)					3.4	(2.00)
07		(5.2)						(2.95)
08		(5.9)			---	----		(3.20)
09		6.7			119	----		3.20
10		8.3			119	2.30		3.20
11		9.6			123	2.65		3.10
12		10.0			121	2.60		3.05
13		10.3			121	2.50		3.00
14		10.5			123	2.50		3.00
15		10.9			126	2.25		3.00
16		10.6			131	1.90		3.00
17		10.0			---	----		3.10
18		8.0						3.05
19		6.1						3.10
20		5.1						3.05
21		4.4						3.10
22		3.6					2.4	3.10
23		(3.4)					3.3	(3.00)

Time: 150.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 8

Narsarssuak, Greenland (61.2°N, 45.4°W) February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		---	330				(3.6)	----
01		---	355				3.0	
02		---	350				2.6	
03		---	355				3.2	----
04		---	<340				3.0	----
05		---	310				3.7	----
06		(4.8)	310					----
07		(5.0)	290					(3.00)
08		(6.6)	265		---	----		(3.15)
09		8.4	240		---	----		3.10
10	---	9.4	250	---	---	----		3.10
11	---	10.3	<250	---	---	----		3.05
12	(305)	(11.1)	240	---	---	----		3.00
13	(280)	11.0	245	---	---	----		2.95
14	---	10.9	245	---	122	2.65		3.00
15	---	10.2	250	---	127	2.40		3.05
16		(10.0)	260		---	----		(3.00)
17		(7.7)	280				2.4	(3.00)
18		(5.0)	290				2.5	----
19		(5.5)	310				2.9	----
20		(5.6)	340				3.2	----
21		---	<330				3.7	----
22		---	330				3.7	
23		---	330				(4.4)	----

Time: 45.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 9

San Francisco, California (37.4°N, 122.2°W) February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		4.1	260				(2.8)	2.70
01		4.0	<275				(2.3)	2.75
02		4.1	<300				(1.9)	2.70
03		4.1	290				(2.1)	2.65
04		4.1	280				(2.3)	2.70
05		4.0	280				(2.3)	2.70
06		(4.0)	270				(2.2)	2.75
07		(6.2)	250				2.2	3.00
08		9.1	230		113	2.60		3.25
09		11.0	230		115	3.00		3.20
10		(12.0)	225		115	3.40		(3.05)
11		(12.5)	<220		115	3.55		(3.00)
12	---	(12.7)	215		115	3.60		(2.95)
13	---	>12.5	220		115	3.70		----
14	---	(12.4)	225		115	3.60		(2.85)
15		(12.3)	230		115	3.35		2.90
16		11.9	230		115	3.00	3.1	2.90
17		11.5	230		115	(2.20)	2.7	2.95
18		10.5	225				(2.8)	3.00
19		9.0	220				(2.3)	3.00
20		7.0	225				(3.2)	3.10
21		5.8	230				(2.9)	3.10
22		4.7	245				(2.3)	2.95
23		4.2	260				(2.3)	2.80

Time: 120.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 10

White Sands, New Mexico (32.3°N, 106.5°W) February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		4.8	250				(2.0)	2.80
01		4.8	<260					2.75
02		4.7	250				(1.8)	2.70
03		4.5	240					2.75
04		4.4	<255					2.65
05		4.5	<270					2.65
06		4.5	250				(1.7)	2.80
07		6.9	240		---	1.90	2.0	3.10
08		9.8	235		111	2.75		3.20
09		11.5	230		109	3.20		3.10
10		12.7	220		109	3.55		3.00
11	---	13.0	215		109	(3.75)		2.90
12	---	13.2	215		107	3.85		2.85
13	---	13.1	220		109	3.80		2.80
14	---	12.8	225		109	3.70		2.80
15		12.8	225		109	3.50	3.7	2.80
16		12.4	235		109	3.10	3.4	2.80
17		12.0	235		111	2.45	3.0	2.95
18		10.6	220				2.8	2.95
19		9.0	215				2.4	2.95
20		7.5	<225				(2.5)	2.95
21		6.1	230				(2.5)	2.95
22		5.4	235				(2.5)	2.90
23		4.9	<260				(2.0)	2.80

Time: 105.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 11

Okinawa I. (26.3°N, 127.8°E) February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		(10.8)	235				(2.2)	(2.95)
01		9.5	230				(2.1)	3.00
02		8.2	220					3.00
03		6.4	230					3.00
04		4.9	235				1.6	2.80
05		4.4	250					2.70
06		4.1	(275)					2.75
07		6.0	270				(2.0)	2.95
08		10.2	240		119	2.60		3.20
09		12.7	235		111	3.25	3.2	3.10
10		14.4	230		111	3.60	3.8	3.00
11		15.4	225		111	(3.80)	4.2	2.95
12	---	15.9	225		111	3.90	4.4	2.80
13	(345)	16.4	<220		113	3.95	4.5	2.75
14	(340)	15.8	230		112	3.85	4.4	2.75
15	(335)	15.5	230		111	3.75	4.2	2.75
16	---	15.0	230		111	3.40	4.3	2.75
17		14.8	245		113	2.85	3.8	2.80
18		14.4	250		---	----	2.5	2.90
19		14.5	250				(3.2)	2.90
20		(15.2)	250				(3.1)	(2.85)
21		15.2	240				(2.4)	2.90
22		(14.2)	230				(2.1)	(2.95)
23		(12.5)	230				(2.6)	(2.95)

Time: 135.0°E.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 12

Adak, Alaska (51.9°N, 176.6°W) January 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		2.7	340					2.60
01		(2.8)	330					2.55
02		2.8	325					2.55
03		(2.9)	315					(2.65)
04		3.0	290					2.65
05		2.7	290					2.60
06		(2.8)	<270					(2.60)
07		3.9	<260		---	----		2.55
08		7.2	230		---	----		3.05
09		10.0	230		125	(2.50)		3.15
10	---	11.9	230	---	121	(2.80)		3.10
11	---	12.4	230		119	3.00	3.3	3.10
12	---	12.4	225		119	(3.00)		3.00
13	---	12.5	230		117	3.00	3.0	2.90
14	---	12.0	230		119	(2.70)	2.8	3.00
15	---	10.9	220		121	(2.40)	2.4	3.00
16	---	9.4	220		129	----		3.00
17		8.5	220					3.00
18		7.1	220					3.05
19		4.5	220					3.10
20		2.8	240					3.05
21		2.7	<280					2.80
22		(2.6)	<300					(2.65)
23		2.8	330					2.55

Time: 180.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 27 seconds.

Table 13

Panama Canal Zone (9.4°N, 79.9°W) January 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		9.1	220				(3.0)	3.05
01		7.4	215					3.05
02		5.6	220				(2.5)	2.95
03		4.7	235				(2.9)	2.85
04		3.7	260				(3.7)	2.70
05		3.6	280				(3.8)	2.65
06		4.6	290				(4.0)	2.60
07		9.0	260		144	2.30	(2.4)	3.00
08	---	12.2	245		111	3.10	3.1	3.00
09	260	13.4	235		107	3.60	(4.4)	2.90
10	(290)	13.6	225		107	3.95	4.4	2.80
11	(325)	13.2	220		105	4.10	4.5	2.65
12	395	13.0	220	---	106	4.15	4.8	2.60
13	410	12.8	220	6.9	107	4.15	4.9	2.50
14	410	12.6	220	6.6	107	4.05	(4.8)	2.50
15	400	12.4	235	---	110	3.90	(5.1)	2.50
16	(380)	11.8	240		111	3.60	(4.4)	2.50
17		11.2	250		115	3.00	(4.2)	2.50
18		11.0	260		---	----	(4.0)	2.60
19		10.5	260				(3.3)	2.70
20		10.0	240				(2.8)	2.70
21		9.6	250				(2.8)	2.70
22		10.2	250				(3.2)	2.85
23		9.8	230				(3.0)	2.95

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 14

Thule, Greenland (76.6°N, 68.7°W) December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		(5.6)						(2.70)
01		(5.0)						(2.70)
02		(5.1)						2.70
03		(4.5)						2.60
04		(4.6)						(2.70)
05		(5.1)						(2.65)
06		(4.8)						(2.70)
07		(4.8)						(2.75)
08		(5.1)						(2.75)
09		(5.4)						(2.80)
10		5.6						2.80
11		(5.8)						(2.75)
12		7.0						2.80
13		7.0						2.80
14		7.0						2.80
15		6.8						2.70
16		(7.1)						2.65
17		(6.8)						(2.70)
18		(6.8)						(2.70)
19		(6.1)						(2.70)
20		(6.2)						2.65
21		6.2						(2.65)
22		(5.8)						(2.70)
23		(5.6)						(2.60)

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 15

Tromso, Norway (69.7°N, 19.0°E) December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	---	(5.45)					3.7	----
01	---	(5.30)					3.2	----
02	(295)	(5.80)					3.2	(2.50)
03	(300)	(5.60)					4.0	(2.45)
04	285	(5.65)					3.2	(2.60)
05	270	5.70					3.0	2.65
06	265	5.50					2.7	2.70
07	270	4.80					2.7	2.55
08	280	4.95					1.8	2.55
09	255	6.00						2.70
10	250	8.55			---	1.30		2.75
11	250	10.60			---	----	1.8	2.90
12	245	11.40			105	1.40		2.90
13	245	11.55			---	1.35	1.4	2.90
14	240	10.30					1.1	2.90
15	245	8.85					1.7	2.90
16	245	5.30					2.6	2.80
17	250	(5.50)					2.5	(2.75)
18	250	4.65					3.0	(2.90)
19	(260)	4.15					3.2	(2.70)
20	---	(3.70)					3.3	----
21	---	----					3.3	----
22	---	----					3.2	
23	---	----					3.2	----

Time: 15.0°E.
Sweep: 0.7 Mc to 25.0 Mc in 5 minutes, automatic operation.

Table 16

Lulea, Sweden (65.6°N, 22.1°E) December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(325)	---					2.6	
01	325	---					2.4	
02	300	---					2.6	
03	300	---					2.4	
04	290	---						
05	255	---						
06	250	(2.5)						
07	250	(2.2)						
08	255	---						
09	240	---			---	1.5		
10	230	>7.5			---	1.8		
11	240	>7.9			---	2.0		
12	225	>8.0			140	2.0		
13	225	>8.0			---	1.8		
14	225	>7.8			---	1.6		
15	210	---						
16	225	---						
17	220	---						
18	235	---						
19	255	(2.2)						
20	280	---						
21	(270)	---						
22	(300)	---					2.4	
23	(340)	---					2.0	

Time: 15.0°E.
Sweep: 1.5 Mc to 10.0 Mc in 6 minutes, automatic operation.

Table 17

De Bilt, Holland (52.1°N, 5.2°E) December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	325	4.0						2.4
01	320	3.9						2.35
02	320	3.6						2.25
03	300	3.5						2.5
04	<290	3.6						2.6
05	270	3.5						2.8
06	<265	3.2						2.7
07	240	4.8						2.65
08	220	8.9			130	2.1		3.0
09	220	12.0			120	2.5		3.0
10	215	14.0	---	---	120	2.8	2.8	2.8
11	220	14.4	---	---	120	3.0		3.0
12	220	14.3	---	---	115	3.1		2.9
13	220	14.3	---	---	115	3.0		2.8
14	220	14.2	---	---	120	2.7		2.85
15	215	13.1	---	---	120	2.2		3.0
16	210	11.8						3.0
17	210	9.5						3.0
18	220	8.0						3.0
19	230	5.7						2.9
20	260	4.8						2.6
21	300	4.3						2.45
22	320	4.2						2.35
23	<320	4.1						2.5

Time: 0.0°.
Sweep: 1.4 Mc to 16.0 Mc in 40 seconds.

Table 18

Lindau/Harz, Germany (51.6°N, 10.1°E) December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	310	4.05					3.0	2.55
01	300	4.00					3.0	2.55
02	300	3.80					2.7	2.55
03	300	3.70			---	E	2.7	2.65
04	280	3.50			---	E	2.8	2.70
05	270	3.60			---	E	2.5	2.70
06	250	3.40			---	E	2.5	2.75
07	250	3.50			---	E	2.7	2.80
08	240	6.40			---	1.45	3.2	2.80
09	230	10.30			125	2.20	3.8	3.10
10	220	12.70			115	2.60	3.8	3.00
11	225	14.10			115	2.90	4.0	3.00
12	230	14.40			115	3.00	4.4	2.95
13	225	14.10			115	2.90	4.0	2.95
14	235	14.20			115	2.75	3.9	2.90
15	225	13.60			120	2.40	4.0	2.90
16	220	12.70			---	1.50	3.8	2.90
17	220	11.00			---	E	3.4	2.90
18	220	8.90			---	E	3.2	2.90
19	230	7.45			---	E	3.2	2.95
20	230	5.35			---	E	3.1	2.95
21	250	4.60					3.0	2.70
22	290	4.10					3.0	2.60
23	320	4.00					3.0	2.55

Time: 15.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 4 minutes.

Table 19

Schwarzenburg, Switzerland (46.8°N, 7.3°E) — December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	4.6						2.9
01	290	4.4						2.9
02	300	4.4						2.9
03	300	4.3						2.9
04	280	4.0						3.0
05	270	3.6						3.0
06	270	3.5						3.0
07	250	3.8						3.1
08	210	7.0			150	1.9		3.4
09	210	10.5			110	2.3		3.5
10	210	13.0			100	2.7		3.4
11	205	14.0			100	3.0		3.4
12	210	14.2			100	3.1		3.3
13	210	13.6			100	3.1		3.2
14	210	13.4			100	3.0		3.2
15	220	13.2			100	2.7		3.2
16	220	12.3			100	2.2		(3.2)
17	205	10.2						3.3
18	200	9.0					2.6	3.3
19	210	8.0						3.35
20	210	6.5						3.3
21	230	5.0						3.3
22	285	4.4						3.0
23	300	4.3						2.95

Time: 15.0°E.
Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 20

Wakkanai, Japan (45.4°N, 141.7°E) — December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	310	4.0						
01	310	4.0						
02	300	3.9						
03	300	3.8						
04	290	3.7						
05	270	3.6						
06	270	3.6						
07	240	6.6						
08	220	10.0						
09	220	11.4						
10	230	12.7						
11	230	12.5						
12	230	12.1						
13	240	11.6						
14	230	11.3						
15	230	10.4						
16	230	9.3						
17	220	7.7						
18	240	6.9						
19	240	6.0						
20	250	4.5						
21	290	4.0						
22	320	4.0						
23	310	4.2						

Time: 135.0°E.
Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 21

Akita, Japan (39.7°N, 140.1°E) — December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	4.3					2.2	
01	300	4.2					2.2	
02	300	4.2					2.4	
03	300	4.0					2.4	
04	290	3.9					2.2	
05	300	3.8					2.2	
06	270	4.2						
07	250	7.6					2.7	
08	240	10.4						
09	240	11.8						
10	240	12.3						
11	240	12.5						
12	240	12.0						
13	240	11.8						
14	240	11.5						
15	240	11.2					3.5	
16	240	9.0						
17	240	8.7						
18	240	7.6						
19	240	6.6					2.2	
20	240	5.4					2.4	
21	260	4.5						
22	300	4.3					2.0	
23	310	4.4					2.2	

Time: 135.0°E.
Sweep: 0.05 Mc to 22.0 Mc in 2 minutes.

Table 22

Tokyo, Japan (35.7°N, 139.5°E) — December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	4.7						2.6
01	300	4.4						2.6
02	300	4.2						2.6
03	290	4.1					2.1	2.6
04	280	3.8					1.9	2.6
05	310	3.7						2.5
06	280	4.2						2.7
07	250	8.5			160	2.1		3.0
08	240	11.1	---	---	120	2.8	3.2	3.1
09	240	12.8	---	---	120	3.2		3.0
10	240	13.3	---	---	120	3.5		2.9
11	240	12.6	---	---	120	3.6		2.7
12	250	12.8	240	---	120	3.6		2.7
13	250	12.7	240	---	110	3.5		2.6
14	250	12.5	250	---	110	3.3		2.6
15	250	11.8	---	---	120	2.9	3.2	2.7
16	250	10.7	---	---	140	2.2		2.8
17	240	9.6			---	---		2.8
18	250	8.5						2.8
19	250	7.4						2.8
20	250	6.5						2.8
21	260	5.6						2.7
22	280	5.1						2.6
23	310	4.8						2.6

Time: 135.0°E.
Sweep: 1.0 Mc to 17.2 Mc in 2 minutes.

Table 23

Yamagawa, Japan (31.2°N, 130.6°E) — December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	270	6.0					2.3	
01	270	5.9					2.3	
02	260	5.3					2.3	
03	260	4.8					2.4	
04	250	4.6					2.4	
05	260	3.9					2.3	
06	300	3.9					2.3	
07	270	6.8					2.4	
08	240	11.3						
09	240	13.4						
10	240	13.6						
11	240	13.2						
12	240	13.6						
13	240	13.6						
14	240	13.6						
15	250	13.6						
16	240	13.3						
17	240	12.6					3.1	
18	220	10.9					2.4	
19	240	9.8					2.4	
20	240	9.3					2.4	
21	240	9.0					2.3	
22	240	7.5					2.3	
23	250	6.3					2.3	

Time: 135.0°E.
Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 24

Huancayo, Peru (12.0°S, 75.3°W) — December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	440	(7.9)					(4.2)	(2.20)
01	430	(7.6)					4.5	(2.35)
02	400	(8.0)					4.5	(2.40)
03	320	(8.3)					5.6	(2.65)
04	250	7.8					4.4	2.90
05	240	7.0					4.5	3.00
06	280	9.3			129	2.2	3.2	2.80
07	250	11.6	---	---	115	3.1	6.4	2.70
08	240	13.1	235	---	113	3.6	8.4	2.60
09	---	13.6	230	---	---	---	11.0	2.45
10	---	13.8	225	---	---	---	12.0	2.30
11	---	13.8	220	---	---	---	12.3	2.15
12	---	13.6	215	---	---	---	12.3	2.10
13	---	13.6	215	---	---	---	12.2	2.05
14	---	13.1	220	---	---	---	11.6	2.05
15	---	12.9	220	---	---	---	11.2	2.05
16	(250)	12.6	235	---	---	---	9.4	2.05
17	260	12.0	260	---	---	---	0.8	2.05
18	300	(11.6)			---	---	5.6	(2.10)
19	350	10.5						2.10
20	400	9.9						2.05
21	410	9.2						2.00
22	420	9.2						2.10
23	440	8.6					(4.7)	2.20

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 25

Johannesburg, Union of S. Africa (26.2°S, 28.1°E) December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	<300	6.8					2.7	2.6
01	200	6.6					2.5	2.6
02	200	6.0					3.1	2.6
03	200	5.8					2.9	2.6
04	290	5.2					2.2	2.5
05	300	5.7			---	---		2.6
06	260	7.6	250	---	120	2.6	3.1	2.8
07	200	9.0	240	---	110	3.2	3.8	2.7
08	350	10.0	230	6.2	110	3.0	4.3	2.5
09	380	10.4	220	6.2	110	4.1	4.1	2.5
10	410	10.7	220	6.6	110	---	4.6	2.4
11	440	10.8	220	6.6	110	---	4.8	2.4
12	440	10.9	220	6.6	110	---	4.7	2.4
13	440	10.0	220	6.5	110	---	4.7	2.4
14	440	10.8	230	6.2	110	---	4.7	2.4
15	430	10.6	230	6.0	110	4.0		2.4
16	410	10.2	240	5.0	110	3.8	4.2	2.4
17	370	10.0	250	5.2	110	3.3	4.0	2.5
18	(320)	9.6	260	---	110	2.6	3.2	2.6
19	200	9.4			---	---	2.6	2.6
20	270	9.0					2.5	2.6
21	270	0.5					2.3	2.6
22	<290	8.0					2.5	2.6
23	290	7.4					2.6	2.6

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

Table 26

Capetown, Union of S. Africa (34.2°S, 10.3°E) December 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(300)	6.0					2.0	2.5
01	<310	5.9					2.9	2.5
02	300	5.6					2.6	2.5
03	<290	5.2					2.9	2.5
04	<310	4.0					2.4	2.4
05	320	5.0						2.5
06	200	6.8	---	---	120	2.2	2.9	2.6
07	(350)	0.2	250	---	120	3.0		2.6
08	370	9.3	250	5.8	110	3.5		2.5
09	400	10.1	240	6.0	110	3.0		2.4
10	440	10.5	240	6.4	110	---	4.6	2.4
11	450	10.7	---	6.4	110	---	4.7	2.4
12	450	10.8	---	6.2	110	---	5.0	2.3
13	460	10.7	---	6.2	110	---	5.1	2.3
14	450	10.4	---	6.1	110	---	4.9	2.3
15	450	10.2	240	6.0	110	---	4.6	2.4
16	450	9.8	240	5.9	110	---	4.1	2.4
17	410	9.6	250	5.7	110	3.6	4.0	2.4
18	370	9.0	250	5.1	110	3.2	3.6	2.5
19	320	0.9	270	---	110	2.6	3.4	2.6
20	280	0.5					2.8	2.6
21	270	7.8					2.0	2.6
22	280	7.0					2.8	2.5
23	<290	6.7					2.8	2.5

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

Table 27

Resolute Bay, Canada (74.7°N, 94.9°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		5.7			---	---		----
01		5.6			---	---		(2.55)
02		5.2			---	---		----
03		5.3			---	1.7		(2.6)
04		5.0			---	1.4		----
05		4.8			---	---	<1.5	----
06		4.8			---	---	<1.4	----
07		4.8			---	---	<1.6	----
08		5.0			---	1.5		(2.8)
09		5.6			140	1.5	1.5	(2.8)
10		6.0			130	1.7	1.7	(2.65)
11		6.8			120	1.8	1.8	(2.75)
12		7.0			120	1.8	1.8	(2.8)
13		8.0			120	1.8	1.8	(2.6)
14		7.0			120	1.7	1.7	(2.6)
15		6.8			115	1.6	1.6	(2.65)
16		6.2			110	1.6		----
17		6.0			---	---	<1.2	(2.7)
18		6.6			---	---	<1.2	(2.6)
19		6.0			---	---	<1.2	----
20		6.4			---	---	<1.2	(2.8)
21		5.9			---	---		----
22		5.2			---	---	<1.3	----
23		5.2			---	---		----

Time: 90.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 28

Kiruna, Sweden (67.8°N, 20.3°E) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	365	6.1					5.0	2.55
01	365	(6.8)					5.0	(2.6)
02	335	(6.0)					4.4	(2.45)
03	310	6.0					4.5	2.6
04	295	6.0					3.5	2.7
05	290	5.3					3.0	2.8
06	260	5.0					3.0	2.75
07	275	5.2			---	E	3.1	2.7
08	260	6.0			---	1.4	2.8	2.8
09	250	7.6			110	2.0	<3.0	2.8
10	245	10.0			---	2.2	3.2	2.9
11	245	11.7	---	---	---	2.4	<3.2	2.95
12	240	12.3			---	2.4	<4.0	3.0
13	235	12.0			---	2.3	4.0	2.9
14	235	11.0			---	2.0	3.2	3.0
15	230	9.4			---	E	3.0	3.0
16	245	7.3			---	E	<3.0	3.0
17	275	6.0					3.3	2.8
18	260	5.7					3.3	2.8
19	320	5.3					3.6	2.8
20	330	4.9					4.3	2.7
21	340	(6.0)					4.2	2.55
22	365	(6.0)					4.5	---
23	365	(6.0)					5.0	---

Time: 15.0°E.
Sweep: 0.8 Mc to 14.0 Mc in 30 seconds.

Table 29

Lulea, Sweden (65.6°N, 22.1°E) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(330)	---					3.0	
01	(340)	---					3.0	
02	310	---					2.9	
03	300	---					1.7	
04	290	---						
05	260	---						
06	260	---						
07	250	---						
08	250	---			---	1.8		
09	240	>7.4			---	2.2		
10	230	>7.5			---	2.4		
11	240	>7.7			---	2.5		
12	235	>8.0			---	2.5		
13	22S	>7.9			---	2.5		
14	225	>7.6			---	2.1		
15	225	---			---	1.7		
16	225	---						
17	230	---						
18	240	---						
19	260	---						
20	295	---						
21	290	---					2.8	
22	310	---					2.8	
23	(345)	---					2.4	

Time: 15.0°E.
Sweep: 1.5 Mc to 10.0 Mc in 9 minutes, automatic operation.

Table 30

Baker Lake, Canada (64.3°N, 96.0°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		5.4					5.2	(2.8)
01		5.2			---	---	5.6	(2.85)
02		5.0			---	---	4.6	(2.85)
03		5.0			---	---	4.8	---
04		4.7			---	1.6	4.5	---
05		4.6			---	1.4	4.7	(2.7)
06		4.6			130	1.8	4.0	---
07		4.8			120	1.9	2.4	---
08		5.1			110	2.2	3.3	---
09		6.0			110	2.4		(2.95)
10		7.0			110	2.6		2.8
11		8.2			110	2.8		2.8
12		9.7			115	2.8		2.9
13		11.9			115	2.5		2.9
14		10.4			120	2.4		2.8
15		8.2			120	2.1		2.8
16		7.0			120	1.9		(2.8)
17		6.1			130	2.0	3.8	(2.8)
18		6.2			120	2.0	3.5	---
19		6.2			120	2.0	5.2	(2.8)
20		6.4			---	2.0	4.5	---
21		6.0			---	---	4.0	(3.0)
22		6.2			---	---	5.1	---
23		5.8			---	---	4.7	(2.8)

Time: 90.0°W.
Sweep: 1.0 Mc to 16.0 Mc in 16 seconds.

Table 31

Churchill, Canada (50.0°N, 94.2°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		(5.0)			130	2.6	5.9	
01		(5.0)			130	2.4	5.0	
02		5.0			145	2.1	5.0	---
03		(5.2)			135	2.0	4.6	
04		4.9			130	2.2	4.3	---
05		4.6			120	2.5	4.2	---
06		5.1			120	2.6	4.4	---
07		5.0			120	2.6	4.5	---
08		6.0			120	2.7	3.0	2.9
09		8.0			120	2.8	<2.9	2.9
10		10.0			120	2.8	<3.2	2.9
11		11.4			125	3.0		2.9
12		12.5			120	3.0		2.75
13		13.4			130	2.0	<3.2	2.8
14		13.6			125	2.8		2.75
15		13.3			130	2.5		2.8
16		11.8			120	2.0		2.8
17		6.6			125	2.0	<3.0	(2.75)
18		(5.8)			120	2.2	2.9	---
19		6.0			120	2.3	3.5	---
20		(5.6)			120	2.2	3.0	---
21		(5.8)			120	2.2	4.3	---
22		(5.7)			130	2.3	5.0	
23		(5.4)			120	2.5	5.8	

Time: 90.0°W.
Sweep: 1.0 Mc to 17.0 Mc in 16 seconds.

Table 32

De Bilt, Holland (52.1°N, 5.2°E) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	315	4.4						2.5
01	330	4.4						2.3
02	325	4.1						2.5
03	300	3.8						2.5
04	300	3.9						2.5
05	250	3.6						2.7
06	280	4.0						2.45
07	225	6.0						2.95
08	220	9.7	---	---	120	2.4		3.0
09	215	12.1	---	---	110	2.8		2.95
10	220	13.2	---	---	110	3.0		2.85
11	220	>14.0	---	---	100	3.1		2.8
12	220	>14.5	---	---	100	3.2		2.85
13	215	>14.4	---	---	110	3.1		2.8
14	220	>14.2	---	---	110	2.8		2.9
15	220	>13.0	---	---	115	2.4		2.9
16	210	12.0						2.95
17	215	>10.9						2.9
18	215	>9.0						3.0
19	225	>6.6						2.8
20	250	5.7						2.7
21	290	>5.5						2.65
22	295	5.0						2.5
23	300	4.6						2.5

Time: 0.0°.
Sweep: 1.4 Mc to 16.0 Mc in 40 seconds.

Table 33

Lindau/Harz, Germany (51.6°N, 10.1°E) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	310	5.00					3.1	2.50
01	310	4.80					3.1	2.45
02	330	4.70					3.0	2.40
03	320	4.40			---	E	2.9	2.50
04	290	4.15			---	E	3.1	2.60
05	270	3.90			---	E	2.9	2.70
06	250	3.40			---	E	3.1	2.60
07	255	4.70			---	E	3.1	2.65
08	240	7.75			130	2.00	3.5	2.95
09	240	11.05			120	2.50	4.0	3.00
10	235	12.90			120	2.90	4.0	2.95
11	230	14.25			115	3.00	4.0	2.85
12	235	14.55			120	3.10	4.4	2.85
13	240	14.10			115	3.10	4.0	2.80
14	240	14.00			120	2.90	4.5	2.80
15	240	13.50			125	2.60	4.0	2.80
16	235	12.85			130	2.00	3.9	2.85
17	230	11.95			---	E	3.6	2.05
18	230	9.95			---	E	3.4	2.80
19	230	8.30			---	E	3.4	2.80
20	240	6.30			---	E	3.1	2.70
21	260	5.60					3.1	2.55
22	280	5.70					3.0	2.50
23	290	5.25					3.1	2.50

Time: 15.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 4 minutes.

Table 34

Winnipeg, Canada (49.9°N, 97.4°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		5.0					<1.8	(2.8)
01		5.0					<1.5	(2.8)
02		5.0					<2.0	---
03		4.8					<1.5	---
04		4.8					<2.2	---
05		4.6					<1.5	---
06		4.6					<1.6	(2.6)
07		4.9					<1.6	2.75
08		6.8			130	2.0		2.9
09		9.8			125	2.6		3.0
10		11.2			120	3.0		2.9
11		12.6			120	3.0		2.9
12		13.1			120	3.1		2.9
13		13.4			120	3.1		2.8
14		13.8			120	3.0		2.8
15		13.2			120	2.8		2.8
16		13.0			130	2.4		2.85
17		12.6			---	1.8		2.8
18		11.0			---	---	<1.6	2.8
19		9.4			---	---	<1.8	2.9
20		8.0			---	---	<1.8	2.9
21		6.8			---	---	<1.7	2.85
22		6.0					<1.8	2.9
23		5.7					<1.8	2.8

Time: 90.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 35

Ottawa, Canada (45.4°N, 75.9°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		6.0					<1.5	2.7
01		6.0					<1.5	2.7
02		5.8					<1.8	2.7
03		5.8					<1.7	2.7
04		5.5					<1.6	2.7
05		5.1					<1.5	2.7
06		4.9					<1.6	2.7
07		6.2			130	1.9		2.9
08		9.2			120	2.6		3.0
09		11.8			115	3.0		3.0
10		12.8			110	3.2		2.9
11		13.5			110	3.3		2.8
12		13.8			115	3.3		2.8
13		13.8			115	3.3		2.9
14		13.8			115	3.0		2.9
15		13.5			115	2.8		2.85
16		13.0			130	2.2		2.9
17		12.2			---	1.5		2.8
18		10.9					<1.6	2.85
19		9.5					<1.6	2.9
20		8.4					<1.6	2.8
21		7.6					<1.6	2.8
22		7.0					<1.6	2.8
23		6.2					<1.6	2.7

Time: 75.0°W.
Sweep: 1.0 Mc to 20.0 Mc in 15 seconds.

Table 36

Talara, Peru (4.6°S, 81.3°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	(11.8)					5.4	2.75
01	250	10.8					4.7	2.80
02	240	10.3					4.4	3.00
03	240	9.0					3.8	3.00
04	240	7.8					4.1	3.05
05	240	6.8					4.0	3.05
06	280	7.6					3.6	2.85
07	260	11.6			---	---	4.2	2.95
08	250	14.0	245	---	119	3.5	4.8	2.90
09	---	15.0	240	---	119	3.9	5.8	2.70
10	---	15.0	230	---	117	4.2	5.2	2.50
11	---	14.7	225	---	117	4.3		2.35
12	---	14.8	220	---	117	4.4		2.20
13	---	14.5	220	---	113	4.3	4.8	2.15
14	---	14.2	225	---	113	4.2	4.6	2.15
15	---	(13.7)	225	---	112	4.0	6.2	2.15
16	240	(13.1)	240	---	---	---	6.7	(2.10)
17	260	(12.8)			---	---	5.4	(2.20)
18	290	(13.0)					4.8	(2.15)
19	340	(12.0)					3.6	(2.30)
20	380	(11.7)					3.4	(2.30)
21	330	(11.8)					3.3	(2.40)
22	290	(11.5)					4.4	(2.50)
23	270	(11.6)					5.4	(2.60)

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 37

Huancayo, Peru (12.0°S, 75.3°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	9.4					3.9	2.60
01	270	9.7					3.6	2.70
02	250	9.6					4.5	2.90
03	240	8.5					4.4	2.90
04	230	7.2					3.6	3.10
05	230	6.7					4.3	3.00
06	260	10.2			123	2.4	5.2	3.00
07	240	12.7	---	---	112	3.2	5.6	2.90
08	---	13.9	230	---	111	3.6	9.3	2.70
09	---	14.5	225	---	---	---	11.6	2.50
10	---	14.8	220	---	---	---	12.5	2.30
11	---	14.5	215	---	---	---	12.8	2.15
12	---	13.9	210	---	---	---	12.8	2.10
13	---	13.2	210	---			13.0	2.00
14	---	12.5	210	---			13.2	2.05
15	(230)	12.0	220	---			12.2	2.05
16	240	11.6	---	---			11.1	2.00
17	270	11.5					8.5	2.05
18	300	(10.4)					5.0	(2.15)
19	400	9.6						2.10
20	430	8.8						2.00
21	400	8.8						2.05
22	360	9.4						2.20
23	320	9.4					(3.8)	2.45

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 38

Rarotonga I. (21.2°S, 159.8°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	(9.5)					2.6	(2.75)
01	310	9.5					1.9	2.7
02	330	(9.0)						(2.6)
03	320	(9.0)						(2.7)
04	300	8.9						2.7
05	310	9.0			---	E	1.8	2.7
06	260	10.5	---	---	115	2.4		2.9
07	260	11.6	250	4.5	115	3.1		2.8
08	260	12.2	250	5.2	110	3.5		2.7
09	340	12.6	250	7.2	110	3.8	5.5	2.5
10	360	13.7	240	7.2	110	4.0	4.8	2.5
11	400	14.2	240	7.5	110	4.0	4.6	2.5
12	410	14.6	240	7.5	110	4.0		2.5
13	430	14.6	250	7.4	110	4.0		2.6
14	420	14.6	250	7.2	110	4.0	4.3	2.6
15	420	14.3	250	6.8	110	3.9		2.6
16	400	13.8	250	6.8	110	3.6	5.3	2.55
17	370	13.2	260	6.4	115	3.0	6.0	2.6
18	320	12.6	---	---	120	2.2	5.6	2.6
19	340	12.5					5.2	2.5
20	360	11.6					5.2	2.5
21	350	(10.8)					4.4	(2.5)
22	330	(10.0)					3.4	(2.55)
23	320	(10.2)					2.9	(2.8)

Time: 157.5°W.
Sweep: 1.5 Mc to 20.0 Mc in 5 minutes, manual operation.

Table 39

Johannesburg, Union of S. Africa (26.2°S, 20.1°E) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	<280	7.6					2.2	2.7
01	<270	6.6					2.2	2.7
02	<280	6.1					1.8	2.6
03	<280	5.8						2.6
04	<300	5.2						2.5
05	300	5.9			---	---		2.6
06	250	8.0	---	---	120	2.6	3.0	2.85
07	250	9.4	240	---	110	3.2		2.8
08	290	10.6	230	---	110	3.7		2.7
09	350	11.1	220	6.1	110	4.0		2.6
10	400	11.3	220	6.4	110	4.1	4.6	2.5
11	400	11.8	220	6.4	110	---		2.5
12	420	12.0	230	6.5	110	---		2.5
13	440	12.0	220	6.4	110	---		2.5
14	420	11.8	230	6.2	110	---		2.5
15	410	11.4	240	6.1	110	4.0		2.5
16	400	11.0	240	5.5	110	3.7		2.5
17	(380)	10.8	250	---	110	3.1	3.8	2.5
18	270	10.8	270	---	120	2.2	2.9	2.6
19	260	10.6					2.0	2.7
20	260	9.7						2.7
21	<260	9.0						2.7
22	260	8.4					2.0	2.6
23	<280	8.0					2.1	2.6

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

Table 40

Watheroo, W. Australia (30.3°S, 115.9°E) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	320	7.2					3.6	2.6
01	300	6.8					3.1	2.5
02	310	6.4					2.7	2.4
03	320	6.2					2.7	2.4
04	330	6.0					2.6	2.5
05	320	6.0				1.8		2.6
06	260	7.1	270	---		2.6	2.8	2.8
07	260	8.8	250	4.6		3.2	3.7	2.7
08	420	9.5	230	5.8		3.6	4.0	2.6
09	430	9.5	240	6.4		3.9	4.5	2.55
10	440	9.5	240	6.4		4.0	4.5	2.5
11	410	10.8	250	6.6		4.2	4.9	2.5
12	430	9.8	240	6.5		4.2	5.2	2.5
13	430	10.2	240	6.5		4.1	4.6	2.4
14	450	9.8	250	6.3		4.1	4.4	2.4
15	420	9.6	240	6.4		4.0	4.2	2.5
16	410	9.5	250	6.2		3.7	3.9	2.5
17	(380)	9.0	260	5.6		3.2	3.4	2.6
18	270	9.0	280	---		2.4	2.7	2.5
19	280	8.7				1.6	2.2	2.6
20	280	8.4					2.7	2.5
21	300	8.2					2.2	2.5
22	320	7.6					2.9	2.45
23	310	7.1					3.0	2.5

Time: 120.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 45 seconds.

Table 41

Capetown, Union of S. Africa (34.2°S, 18.3°E) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	200	6.7						2.6
01	<290	6.0					2.0	2.5
02	<300	5.8					2.0	2.5
03	<280	5.5					1.0	2.4
04	<300	5.2						2.4
05	330	5.1						2.4
06	280	6.6	300	---	130	2.2	2.6	2.7
07	260	8.2	250	---	120	2.9		2.7
08	490	9.4	250	5.4	110	3.4		2.5
09	410	10.6	240	5.6	110	3.8		2.5
10	430	11.0	230	6.4	110	---		2.4
11	420	11.4	220	6.4	110	---	4.6	2.4
12	410	11.8	---	6.3	110	---	4.6	2.4
13	420	12.0	---	6.4	110	---	4.3	2.4
14	420	11.8	240	6.4	110	---		2.4
15	410	11.7	250	6.3	110	---		2.4
16	400	11.2	250	6.0	110	3.8		2.4
17	370	11.0	250	5.6	110	3.5		2.5
18	(320)	10.8	260	---	110	3.0		2.55
19	270	10.4	---	---	120	2.1	2.8	2.6
20	260	10.0					2.1	2.7
21	250	8.7					1.8	2.6
22	260	7.0					1.8	2.6
23	270	7.0						2.6

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

Table 42

Buenos Aires, Argentina (34.5°S, 58.5°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	320	12.1						2.7
01	300	11.9						2.7
02	310	11.0						2.6
03	320	10.0						2.5
04	330	9.5						2.4
05	260	9.6						2.5
06	220	10.2						2.8
07	230	11.1	210	---				2.7
08	320	11.5	220	---				2.6
09	380	11.8	220	---				2.6
10	400	12.5	220	---	---	---		2.5
11	410	13.1	220	---	---	---		2.6
12	410	13.2	220	---	---	---		2.6
13	410	13.3	220	---				2.65
14	410	13.0	220	---				2.6
15	400	12.5	230	---				2.7
16	370	13.0	230	---				2.7
17	330	12.5	250	---				2.7
18	300	13.0	270	---				2.7
19	320	(12.7)						(2.6)
20	390	(12.0)						(2.5)
21	390	(12.6)						2.5
22	380	12.6						2.5
23	360	12.5						2.6

Time: 60.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 27 seconds.

Table 43

Decepcion I. (63.0°S, 60.7°W) November 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	310	9.0						2.8
01	310	8.8						2.8
02	310	8.1						2.8
03	330	7.8						2.8
04	330	8.2						2.75
05	300	8.0						2.8
06	280	8.2					3.4	2.95
07	260	8.9					3.4	3.2
08	250	8.6					3.5	3.2
09	240	9.0					3.5	3.1
10	250	9.4					3.6	3.1
11	240	9.2					3.4	3.3
12	240	9.2					3.4	3.3
13	240	8.8					3.4	3.4
14	240	8.8					3.4	3.5
15	230	8.6					3.6	3.3
16	240	8.4					3.4	3.2
17	240	8.0					3.4	3.3
18	250	8.3					3.4	3.2
19	250	8.1					3.4	3.2
20	280	8.4						3.1
21	300	8.2						3.1
22	300	8.6						2.9
23	310	8.8						2.9

Time: 60.0°W.
Sweep: 1.5 Mc to 16.0 Mc in 15 minutes, manual operation.

Table 44

Resolute Bay, Canada (74.7°N, 94.9°W) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		6.0			130	---		
01		6.1			135	---		---
02		6.1			130	---		---
03		6.0			140	---		---
04		5.3			---	---		
05		5.2			150	1.3		
06		5.3			135	1.5		---
07		6.3			130	1.6		(2.6)
08		6.9			130	1.7		(2.5)
09		8.0			125	1.9		(2.7)
10		7.5			130	2.1		(2.6)
11		8.3		---	130	2.2		(2.6)
12		7.8		---	130	2.2		(2.6)
13		7.8		---	130	2.2		---
14		7.8		---	130	2.0		2.75
15		8.0		3.9	130	2.0		(2.7)
16		7.9		---	130	1.8		---
17		7.3		---	110	1.7		(2.7)
18		7.1			120	1.6		(2.7)
19		7.0			115	1.4		(2.7)
20		6.3			135	---		
21		6.8			120	---		---
22		6.7			120	---		
23		6.0			130	---		---

Time: 90.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 45

Tromso, Norway (69.7°N, 19.0°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(305)	----					3.2	----
01	(305)	(6.45)					3.2	(2.45)
02	(285)	(6.25)					2.9	(2.55)
03	295	(6.00)					3.0	(2.70)
04	265	5.70					2.7	2.60
05	295	5.50					2.0	2.60
06	275	5.75	---	---	---	----	1.3	2.70
07	250	7.05	---	---	---	1.60	1.7	2.05
08	250	8.25	---	---	110	2.20		2.90
09	250	9.60	250	---	105	2.40		2.90
10	250	11.00	250	---	105	2.55		2.90
11	250	11.10	245	---	105	2.60		2.00
12	250	11.70	250	---	110	2.55		2.85
13	245	11.30	245	---	110	2.50		2.90
14	245	11.00	250	---	105	2.35		2.90
15	245	10.50	---	---	115	2.05		2.90
16	240	10.90			---	----	2.1	2.90
17	240	10.00					2.6	2.90
18	240	9.10					2.0	2.90
19	240	0.00					3.3	2.80
20	250	8.25					3.2	(2.75)
21	(245)	(7.05)					2.9	----
22	(290)	(7.05)					2.9	----
23	(310)	(6.80)					2.7	----

Time: 15.0°E.
Sweep: 0.7 Mc to 25.0 Mc in 5 minutes, automatic operation.

Table 46

Churchill, Canada (58.8°N, 94.2°W) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		5.3			---	1.9	6.0	(2.65)
01		5.2			---	1.8	5.7	----
02		(5.0)			---	1.7	5.0	----
03		4.7			145	1.8	4.8	----
04		(4.6)			130	2.0	4.5	----
05		4.6			130	2.5	4.5	----
06		5.0			120	2.7		2.8
07		6.0		---	120	2.7		3.0
08		7.3		---	110	3.0		3.1
09		8.0		4.3	110	3.0		3.0
10		9.0		4.6	110	3.1		2.9
11		9.0		4.5	110	3.1		2.0
12		10.9		4.8	110	3.1		2.8
13		11.2		4.8	110	3.0		2.8
14		11.5		4.8	120	3.0		2.7
15		11.8		---	120	2.9		2.8
16		11.0		---	120	2.6		2.9
17		10.8			130	2.1		2.9
18		6.6			130	2.0		2.05
19		6.0			130	2.2	4.0	2.9
20		6.0			130	2.4	3.2	(2.8)
21		5.8			130	2.2	4.0	(2.6)
22		5.5			135	2.0	5.0	----
23		5.9			130	2.0	5.5	(2.7)

Time: 90.0°W.
Sweep: 1.0 Mc to 16.0 Mc in 16 seconds.

Table 47

Lindau/Harz, Germany (51.6°N, 10.1°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	295	6.10					2.5	2.55
01	290	5.90					2.9	2.45
02	290	5.75					2.7	2.50
03	290	5.50			---	E	2.6	2.50
04	290	5.30			---	E	2.7	2.60
05	260	4.95			---	E	2.9	2.65
06	260	4.80			---	E	3.0	2.65
07	250	7.10			---	1.70	3.5	2.95
08	235	10.05			120	2.45	3.5	3.00
09	235	11.90			110	2.90	3.6	2.95
10	235	12.85			110	3.10	3.8	2.90
11	230	13.30			110	3.20	3.9	2.80
12	230	13.40			110	3.25	4.0	2.75
13	235	13.35			110	3.25	3.9	2.75
14	240	13.30			115	3.15	3.0	2.75
15	240	13.20			115	2.95	3.6	2.75
16	240	13.00			115	2.50	3.5	2.80
17	240	12.30			---	1.80	3.4	2.85
18	230	11.20			---	E	3.1	2.05
19	230	9.60			---	E	3.2	2.05
20	240	8.10			---	E	3.1	2.80
21	240	7.10					3.0	2.70
22	270	6.55					2.9	2.60
23	280	6.30					2.7	2.55

Time: 15.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 4 minutes.

Table 48

Winnipeg, Canada (49.9°N, 97.4°W) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		5.0					<1.5	2.80
01		5.0					<1.5	2.80
02		4.6					<1.5	(2.70)
03		4.6					<1.5	(2.70)
04		4.4					<1.5	(2.70)
05		4.3					<1.6	(2.75)
06		4.3					<1.5	(2.80)
07		5.5			135	1.8		2.95
08		7.2		---	120	2.4		3.10
09		8.9		---	120	2.9		3.00
10		9.6		---	120	3.0		2.90
11		10.8			115	3.2		2.85
12		11.0			110	3.3		2.80
13		12.0			110	3.2		2.80
14		12.2			110	3.1		2.80
15		12.2			115	3.0		2.80
16		12.2			130	2.7		2.80
17		12.0			130	2.1		2.90
18		11.0			---	---		2.90
19		9.5					<1.5	2.90
20		8.0					<1.5	2.90
21		7.0					<1.5	2.90
22		6.0					<1.5	2.80
23		5.2					<1.5	2.80

Time: 90.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 49

Ottawa, Canada (45.4°N, 75.9°W) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		6.2					<1.5	2.7
01		6.0					<1.5	2.7
02		5.5					<1.5	2.7
03		5.0					<1.5	2.7
04		4.7					<1.5	2.7
05		4.4			---	---	<1.5	2.7
06		5.0			---	1.6		2.7
07		7.3			115	2.2		3.0
08		10.0			110	2.8		3.0
09		11.0			105	3.1		3.0
10		11.9			105	3.3		2.9
11		12.2			105	3.5		2.9
12		12.3			105	3.6		2.9
13		12.4			105	3.5		2.9
14		12.1			105	3.3		2.9
15		12.2			110	3.0		2.9
16		12.0			110	2.7		2.9
17		11.6			120	2.0		3.0
18		10.7			---	---	<1.5	2.9
19		9.2					<1.5	2.9
20		8.1					<1.5	2.8
21		7.2					<1.5	2.8
22		6.9					<1.5	2.7
23		6.8					<1.5	2.7

Time: 75.0°W.
Sweep: 1.0 Mc to 15.0 Mc in 15 seconds.

Table 50

Wakkanai, Japan (45.4°N, 141.7°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	6.0						
01	300	6.0					1.8	
02	290	5.8					1.5	
03	280	5.8						
04	270	5.8					2.0	
05	270	5.6						
06	240	7.7						
07	230	11.0						
08	220	12.5						
09	220	12.0						
10	220	12.8						
11	230	12.8						
12	230	12.7						
13	230	12.6						
14	240	12.5						
15	240	12.5						
16	240	12.3						
17	230	11.5					2.0	
18	230	9.8						
19	230	8.5						
20	240	7.3						
21	260	6.6						
22	260	6.4						
23	280	6.1						

Time: 135.0°E.
Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 51

Akita, Japan (39.7°N, 140.1°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	290	6.0					2.2	
01	290	6.0					2.4	
02	290	6.0					2.8	
03	280	5.8					2.5	
04	280	5.5					2.8	
05	290	5.5					2.4	
06	240	8.0					2.5	
07	240	11.2					3.2	
08	240	12.6						
09	240	12.9						
10	240	13.5						
11	240	13.6						
12	240	13.6						
13	240	13.4						
14	240	13.4						
15	250	12.8						
16	250	12.2					3.5	
17	240	11.7					3.5	
18	240	10.2					3.5	
19	250	8.6					3.1	
20	240	7.8					2.4	
21	260	7.2					2.3	
22	280	6.6					2.2	
23	280	6.3					2.2	

Time: 135.0°E.
Sweep: 0.85 Mc to 22.0 Mc in 2 minutes.

Table 52

Tokyo, Japan (35.7°N, 139.5°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	290	6.7						2.6
01	290	6.3						2.6
02	280	6.1						2.6
03	280	6.0						2.6
04	270	5.4					1.9	2.6
05	280	5.4						2.6
06	250	8.0			160	1.9		3.0
07	230	11.8	---	---	120	2.5	3.0	(3.15)
08	240	13.0	230	---	110	3.1	3.2	3.1
09	230	13.0	230	---	120	3.3	3.4	2.9
10	240	13.6	220	---	110	3.4		2.8
11	250	13.8	220	4.6	120	3.6		2.8
12	250	14.0	230	---	120	3.5		2.7
13	250	14.0	240	---	120	(3.6)		2.7
14	250	13.8	250	---	120	3.4		2.7
15	250	13.6	240	---	120	3.2	4.4	2.7
16	250	12.9	---	---	120	2.5	3.8	2.8
17	250	12.5	---	---	---	---	3.2	2.9
18	240	11.0					3.1	2.9
19	250	9.1					2.8	2.8
20	260	8.5					2.4	2.8
21	260	7.6					2.2	2.7
22	270	7.3						2.7
23	280	6.8						2.7

Time: 135.0°E.
Sweep: 1.0 Mc to 17.2 Mc in 2 minutes.

Table 53

Yamagawa, Japan (31.2°N, 130.6°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	250	8.6						
01	260	7.8						
02	260	7.2						
03	250	6.9					1.8	
04	240	6.2						
05	250	5.7						
06	260	6.1						
07	240	9.8						
08	240	12.3						
09	230	13.0					4.5	
10	240	13.4					4.7	
11	240	13.8					4.7	
12	240	14.4					4.6	
13	240	14.6					4.9	
14	240	14.6					4.6	
15	240	14.4					4.6	
16	240	14.2					4.8	
17	250	13.8					4.8	
18	240	13.4					4.2	
19	240	12.1					3.4	
20	250	11.8					3.1	
21	240	10.6					2.5	
22	250	10.0					2.0	
23	250	9.2					2.0	

Time: 135.0°E.
Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 54

Leopoldville, Belgian Congo (4.4°S, 15.2°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	240	12.7						2.56
01	245	12.0						2.66
02	230	10.5						2.74
03	220	8.7					1.6	2.89
04	215	5.8					1.9	2.91
05	240	7.4			130	2.1	2.9	2.84
06	235	9.7	235	---	115	3.0	3.2	2.78
07	250	10.8	225	---	110	3.5	4.0	2.50
08	(295)	12.0	220	---	110	4.0		2.34
09	---	13.0	220	---	110	4.1		2.27
10	440	>13.3	235	---	110	4.1		2.23
11	425	>13.7	240	---	110	4.2		2.24
12	420	14.5	240	---	105	4.1		2.24
13	410	15.0	230	---	110	4.0		2.26
14	400	14.5	240	---	110	3.6		2.28
15	400	14.4	240	---	110	3.2		<2.28
16	390	>14.0	260	---	115	2.5	3.0	2.26
17	310	>13.2	---	---			2.4	<2.45
18	370	>13.3						<2.43
19	290	>13.2						<2.79
20	240	>14.0						<3.00
21	220	>14.0						<3.15
22	215	>13.5						<2.98
23	215	13.1						<2.50

Time: 0.0°.
Sweep: 1.0 Mc to 16.0 Mc in 7 seconds.

Table 55

Elisabethville, Belgian Congo (11.6°S, 27.5°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	250	8.6						2.45
01	260	8.0						2.57
02	250	7.4						2.63
03	240	6.4						2.71
04	245	7.9	---	---	140	1.8		2.78
05	240	10.2	240	---	110	2.0		2.84
06	240	11.1	230	---	110	3.4		2.65
07	(290)	11.7	225	---	110	3.8		2.56
08	---	12.0	220	---	110	4.0		<2.42
09	---	13.0	220	---	110	4.0		2.35
10	(360)	13.1	220	---	110	---		2.31
11	390	13.2	240	5.0	110	---		2.29
12	380	13.5	240	---	110	4.0		2.27
13	375	13.6	245	---	110	3.8		2.30
14	355	13.3	245	---	115	3.3	3.8	2.30
15	(320)	13.1	260	---	115	2.7	3.6	2.32
16	280	13.2			---	---	3.0	2.37
17	290	>13.4					2.4	2.39
18	280	>13.4					1.7	2.50
19	250	>13.6						2.52
20	230	13.2						2.61
21	235	11.9						2.61
22	240	11.3						2.65
23	230	9.3						2.51

Time: 0.0°.
Sweep: 1.0 Mc to 16.0 Mc in 7 seconds.

Table 56

Rarotonga I. (21.2°S, 159.8°W) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	(9.7)						(2.95)
01	270	(9.5)						(2.85)
02	280	(9.2)						(2.7)
03	300	9.0						2.7
04	300	8.7						2.7
05	300	9.1						2.7
06	280	(10.0)	---	---	---	1.8		(3.0)
07	260	(11.8)	250	4.4	120	2.8		3.05
08	260	12.7	250	5.2	115	3.4		2.9
09	270	13.0	240	6.0	110	3.7		2.8
10	290	13.7	230	6.6	110	4.0		2.7
11	340	14.4	230	7.4	110	4.0		2.7
12	350	14.7	220	7.4	110	4.0		2.6
13	370	14.5	220	7.4	110	4.0		2.6
14	380	14.2	240	7.4	110	4.0		2.6
15	380	14.2	250	7.0	110	3.8		2.6
16	360	13.8	260	6.7	115	3.4		2.6
17	320	13.9	270	6.0	120	2.9		2.7
18	300	(13.2)			---	---	3.5	(2.7)
19	310	13.4					2.2	2.7
20	310	(12.5)					2.8	---
21	300	(10.5)					1.9	(2.8)
22	300	(10.4)						(2.8)
23	300	(9.8)						---

Time: 157.5°W.
Sweep: 1.5 Mc to 20.0 Mc in 5 minutes, manual operation.

Table 57

Watheroo, W. Australia (30.3°S, 115.9°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	7.2						2.7
01	260	7.0					2.4	2.6
02	250	6.8						2.7
03	250	6.5						2.7
04	260	6.4						2.6
05	290	6.4						2.7
06	250	7.2	---	---		2.1		2.9
07	230	8.2	---	---		2.8	3.1	2.9
08	240	10.0	220	5.1		3.3	3.6	3.0
09	260	11.2	210	5.6		3.6	3.6	2.9
10	260	11.2	210	5.7		3.8	4.0	2.8
11	260	11.9	210	5.8		3.9		2.8
12	300	12.0	---	6.5		4.0		2.7
13	320	12.0	220	6.5		3.8		2.7
14	330	11.6	220	6.2		3.8	3.9	2.7
15	330	11.6	220	6.2		3.8		2.7
16	270	11.3	230	5.6		3.4		2.7
17	250	10.9	---	---		2.8	3.0	2.7
18	250	10.6				2.0		2.7
19	240	10.5						2.7
20	240	9.5						2.7
21	250	8.6						2.7
22	260	8.1						2.7
23	260	7.8						2.6

Time: 120.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 45 seconds.

Table 58

Christchurch, New Zealand (43.6°S, 172.8°E) October 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	7.7					<1.8	2.5
01	300	7.6					<1.8	2.5
02	300	7.0					<1.8	2.5
03	290	6.5					<1.7	2.5
04	300	6.5					<1.6	2.4
05	300	6.4				(1.4)		2.6
06	260	7.0	---	---		(2.3)		2.75
07	250	8.2	250	---		3.0		2.8
08	240	9.0	240	---		3.3		2.8
09	(300)	9.8	230	5.2		3.6		2.8
10	(290)	10.2	220	---		3.9		2.8
11	(280)	10.7	210	---		4.0		2.7
12	(310)	10.6	210	5.7		4.0		2.7
13	(290)	10.6	230	5.9		3.9		2.7
14	(240)	10.3	230	---		3.8		2.6
15	240	10.1	240	---		3.5		2.6
16	250	10.0	250	---		3.1		2.7
17	250	10.1	---	---		2.7		2.65
18	260	9.8				(2.0)		2.7
19	250	9.6						2.7
20	260	9.5					<1.7	2.6
21	290	8.8					<1.8	2.6
22	300	8.2					<1.8	2.5
23	300	8.0					<1.8	2.5

Time: 172.5°E.
Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 59

Townsville, Australia (19.3°S, 146.7°E) September 1956

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		>7.5	240					----
01		>6.8	230					----
02		>6.2	220					----
03		5.8	270					(2.70)
04		>5.5	280					----
05		>5.5	290					----
06		>5.8	280			1.8		----
07		>9.5	240			2.6		----
08	---	(12.4)	230			3.2	3.5	(3.15)
09	(255)	13.1	220			3.6		3.10
10	(255)	>13.5	215	---		3.8		3.05
11	(260)	13.0	210	---		---	(5.4)	2.90
12	(255)	12.6	210	---		---	(5.6)	2.80
13	(325)	12.0	205	6.5		(4.0)	(5.4)	2.75
14	(360)	>11.8	220	---		>3.7	4.6	2.70
15	---	11.7	220	---		3.6	4.0	2.70
16	---	>10.5	235			3.4	3.4	----
17	---	>10.0	250			2.8	4.1	
18		>9.0	260			1.8	3.0	
19		---	260				2.1	
20		---	260					
21		>6.4	255				1.8	
22		>8.4	270					
23		>8.4	250					

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

Table 60

Brisbane, Australia (27.5°S, 153.0°E) September 1956

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		8.0	260					2.65
01		7.5	250					2.75
02		6.7	250					2.65
03		6.0	265					2.55
04		6.0	290					2.55
05		6.0	285			E		2.60
06		7.2	250			1.9		2.90
07		10.4	240			2.8		3.00
08		11.4	230			3.3		2.95
09	(260)	12.0	230	---		3.6		2.90
10	(260)	12.1	225	5.0		<3.9	3.9	2.85
11	280	12.1	220	5.0		3.8	4.0	2.80
12	320	12.0	220	5.9		(3.9)	4.2	2.70
13	(320)	11.1	220	5.6		3.8	3.8	2.70
14	---	11.0	230	---		(3.7)	4.2	2.70
15	---	10.8	230	---		3.4		2.65
16	---	10.6	250	---		3.0		2.70
17		10.8	250			---	2.3	2.75
18		10.0	240			E		2.75
19		9.1	255			---		2.70
20		9.0	260					2.70
21		8.8	<280					2.70
22		8.6	270					2.70
23		8.4	260					2.70

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

Table 61

Canberra, Australia (35.3°S, 149.0°E) September 1956

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		7.2	<270					(2.70)
01		(7.0)	<250					(2.80)
02		(6.7)	240				(1.6)	(2.60)
03		6.0	<240				1.4	2.60
04		6.0	<280					2.60
05		5.9	250					2.60
06		6.8	260			1.85		(3.00)
07	---	8.5	240			2.60		3.10
08	250	10.0	230			3.10		3.10
09	250	10.9	220	(5.0)		3.50		3.00
10	250	11.1	220	(5.0)		3.70		2.90
11	260	12.2	210	(5.0)		3.80		2.90
12	270	12.1	200	(5.0)		3.90		2.85
13	260	11.9	210	(4.9)		3.80		2.70
14	(250)	11.2	220	---		3.80		2.75
15	(250)	11.0	220	---		3.50		2.70
16	(250)	10.9	230			3.20		2.80
17	---	10.5	240			2.50		2.85
18		>10.0	240			1.70		(2.90)
19		>9.0	<240					2.75
20		>8.5	<240					----
21		(7.5)	<250					----
22		7.5	<250					(2.80)
23		>7.0	<260					(2.70)

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

Table 62

Hobart, Tasmania (42.9°S, 147.2°E) September 1956

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		6.2	300					2.6
01		6.0	300					2.6
02		5.5	300					2.5
03		4.8	300					2.6
04		4.0	300					2.6
05		4.0	300					2.5
06		4.5	270			<2.0		2.7
07		7.0	250			2.3		3.1
08		8.5	230			2.9		3.1
09		9.5	230			3.3		3.0
10	---	10.2	220	---		3.5		3.0
11	---	11.0	220	---		3.5		3.0
12	---	12.0	220	---		3.6		2.9
13	---	11.6	230	---		3.6		2.9
14		11.5	230			3.5		2.8
15		11.0	230			3.3		2.9
16		10.6	240			3.0		2.9
17		10.6	240			2.5		2.9
18		10.3	240			1.8		2.9
19		9.0	250					2.8
20		8.0	250					2.8
21		7.4	270					2.7
22		6.5	280					2.6
23		6.5	300					2.6

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

Table 63

Townsville, Australia (19.3°S, 146.7°E) June 1956*

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	250	4.0					1.8	(3.0)
01	250	3.6					1.8	3.05
02	250	3.6					2.1	(3.2)
03	245	3.8					2.3	(3.0)
04	240	3.4					2.1	3.0
05	260	3.6					2.3	2.95
06	240	3.7					2.4	3.2
07	225	6.7				2.0	2.9	3.4
08	230	>8.4	210	---		2.7		(3.4)
09	250	10.4	220	---		3.1	3.7	3.3
10	250	10.5	220	4.8		3.4	6.0	3.3
11	(250)	10.2	210	(5.0)		3.5	6.3	3.2
12	260	(10.1)	210	5.2		3.7	5.5	(3.15)
13	260	(10.1)	200	(5.3)		3.6	5.7	(3.1)
14	(275)	9.9	---	5.0		3.5	4.9	(3.1)
15	(250)	10.0	230	---		3.2	4.1	3.1
16	(250)	(10.0)	230	---		2.9	3.7	---
17	240	>9.5				2.3	3.7	(3.1)
18	225	(7.6)				---	3.8	---
19	220	6.7					3.5	3.2
20	230	5.6					2.8	3.0
21	240	5.1						3.0
22	250	5.0					2.0	(3.0)
23	250	(5.0)						(3.1)

Time: 150.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 55 seconds.
*Data observed only from June 1 to 18, inclusive.

Table 64

Brisbane, Australia (27.5°S, 153.0°E) June 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	4.0						2.8
01	270	4.2						2.8
02	260	4.1					2.2	2.8
03	260	4.3					2.0	2.8
04	260	4.1					2.0	2.9
05	250	4.0					2.0	2.8
06	240	4.0					1.9	2.9
07	230	7.0				1.8		3.35
08	230	8.6	---	---		2.6		3.3
09	240	9.6	220	---		3.0	4.0	3.2
10	(250)	10.1	220	4.6		3.3	4.0	3.2
11	(250)	9.5	210	4.6		3.5	4.5	3.1
12	(250)	9.4	210	4.6		3.5	4.6	3.15
13	260	9.6	220	4.5		3.5	4.5	3.05
14	(255)	9.6	210	4.0		3.3	4.5	3.1
15	240	9.6	220	---		3.0	4.2	3.0
16	240	9.3	---	---		2.5	4.0	3.1
17	230	8.5				E	4.0	3.15
18	230	7.4					4.0	3.0
19	240	6.0					3.0	2.9
20	240	5.0					2.2	2.9
21	250	4.9						2.8
22	250	4.7						2.9
23	250	4.2						2.8

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

Table 65

Canberra, Australia (35.3°S, 149.0°E) June 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	---	3.6					2.1	2.8
01	---	3.9					1.6	2.8
02	---	3.9						2.8
03	---	4.0						2.8
04	<250	4.3						2.9
05	---	3.6						3.05
06	---	3.5						3.05
07	240	4.7				(1.8)		3.15
08	220	7.4	---	---		2.2		3.5
09	240	8.4	230	---		2.8		3.45
10	240	(8.5)	230	---		3.1		(3.4)
11	250	(8.6)	220	(4.5)		3.3		(3.4)
12	250	8.6	225	(4.5)		3.3	3.6	3.4
13	250	(8.5)	220	(4.6)		3.3		(3.35)
14	250	(8.6)	220	---		3.1	3.5	(3.3)
15	240	(8.6)	230	---		2.9	3.6	(3.35)
16	230	8.6	---	---		2.4	3.2	3.3
17	230	8.4				(1.7)	2.0	3.2
18	210	7.4					3.0	3.1
19	(220)	6.5						3.2
20	(220)	5.1						3.0
21	---	4.0						2.95
22	---	(4.1)						2.85
23	---	3.9						2.8

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

Table 66

Hobart, Tasmania (42.9°S, 147.2°E) June 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	290	3.3						2.6
01	300	3.2						2.65
02	300	3.3						2.6
03	300	3.2						2.6
04	280	3.2						2.7
05	250	3.0						2.9
06	250	2.7						2.8
07	250	3.0				E		2.85
08	230	6.0				1.9		3.3
09	230	8.5				2.5		3.3
10	230	9.5				2.8		3.2
11	230	10.2				3.0		3.2
12	230	10.5				3.0		3.1
13	230	11.0				3.0		3.1
14	240	11.1				2.8		3.1
15	230	10.7				2.6		3.1
16	230	10.0				2.0		3.1
17	230	9.0				E		3.0
18	230	7.4						3.0
19	240	6.0						3.0
20	250	4.6						2.9
21	250	3.9						2.9
22	270	3.5						2.7
23	280	3.4						2.7

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

Table 67

Lulea, Sweden (65.6°N, 22.1°E) — April 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	315	---					2.4	
01	320	---					2.5	
02	330	---					2.3	
03	325	---			---	---		
04	310	(4.8)			---	1.7	1.8	
05	260	5.5	---	---	120	2.0		
06	250	5.6	---	---	110	2.5		
07	250	6.0	---	4.4	110	2.7		----
08	(235)	6.8	230	4.6	100	3.0		(2.85)
09	(250)	7.1	230	4.8	100	3.5		----
10	(350)	7.4	210	4.7	100	---		----
11	(400)	7.5	225	5.0	100	---		----
12	(440)	8.0	215	5.0	100	3.5		(2.95)
13	(400)	7.8	---	4.7	100	---		----
14	(235)	7.4	---	4.5	100	---		----
15	(240)	7.2	---	4.4	100	---		----
16	(240)	7.3	---	---	110	2.6		----
17	250	6.6	---	---	110	2.5		
18	250	(5.8)			120	2.2		
19	260	(5.3)			---	1.8		
20	260	(5.5)			---	1.6		
21	285	---						
22	300	---					1.9	
23	310	---					2.3	

Time: 15.0°E.
Sweep: 1.5 Mc to 10.0 Mc in 6 minutes, automatic operation.

Table 68

Rarotonga I. (21.2°S, 159.8°W) — April 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	270	(9.2)						(2.8)
01	250	(8.8)						(2.9)
02	250	7.4						2.9
03	250	6.3						2.8
04	270	6.0						2.75
05	270	5.7						2.9
06	280	6.2			---	E	2.0	2.9
07	250	9.5	250	4.0	130	2.0	2.7	3.0
08	250	12.5	250	4.4	115	2.8		3.2
09	260	14.2	240	5.5	110	3.4		3.1
10	270	14.5	240	6.2	110	3.5		3.0
11	280	14.6	220	6.5	110	3.8		3.0
12	300	15.0	230	7.0	110	3.8	4.0	2.9
13	310	14.8	240	7.1	110	3.8	5.0	2.8
14	320	15.1	250	7.2	110	3.8	5.2	2.85
15	310	14.6	250	7.0	110	3.5	4.9	2.8
16	320	14.2	250	6.9	110	3.2	5.0	2.8
17	280	14.5	260	5.5	---	2.6	4.1	2.9
18	270	13.7					3.9	(2.9)
19	260	13.0					3.4	(2.75)
20	250	12.6					2.5	(2.9)
21	260	12.1					2.0	(2.8)
22	260	9.9						(2.8)
23	260	9.8						(2.8)

Time: 157.5°W.
Sweep: 1.5 Mc to 20.0 Mc in 5 minutes, manual operation.

Table 69

Townsville, Australia (19.3°S, 146.7°E) — March 1956*

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	>6.4					2.1	---
01	260	>6.9					2.1	---
02	250	>7.0					2.1	(3.0)
03	250	>6.0					2.1	(2.8)
04	265	>5.8					2.1	(2.8)
05	285	>5.5						2.85
06	280	>5.7				---		(2.9)
07	250	>7.9				2.2		---
08	240	>8.4	230	---		3.0	3.8	(3.2)
09	(270)	>9.5	225	---		3.5	3.8	---
10	280	>9.7	210	5.3		3.6	4.2	---
11	295	>11.3	205	5.5		3.8		---
12	290	>11.9	220	5.5		3.9		---
13	(310)	12.5	225	5.2		3.9		(2.8)
14	(320)	>12.4	205	5.6		3.8		---
15	(290)	>12.0	225	5.2		3.7	4.2	---
16	(280)	>8.4	240	---		3.3	4.0	
17	250	>8.4	250	---		2.9	4.5	
18	250	>7.5				2.1	4.0	
19	250	>7.0					3.3	
20	270	>6.0					2.8	
21	275	>6.3					2.1	---
22	290	>6.2					2.1	---
23	300	>6.0					3.0	

Time: 150.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 55 seconds.
*Data observed from March 1 to 25, inclusive.

Table 70

Brisbane, Australia (27.5°S, 153.0°E) — March 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	7.4						2.75
01	260	7.4						2.75
02	260	7.0					2.6	2.8
03	260	6.5						2.7
04	270	6.0						2.7
05	270	5.6						2.7
06	250	6.5				E		2.9
07	240	8.5				2.6	3.6	3.0
08	240	10.6	220	---		3.1	4.3	3.0
09	(280)	11.0	220	5.0		3.4	4.7	2.9
10	(270)	12.0	210	5.0		3.6	4.8	2.8
11	290	12.4	210	5.0		3.7	4.8	2.8
12	280	12.4	210	5.2		3.8	4.7	2.8
13	285	12.6	220	4.9		3.9	4.3	2.7
14	(310)	12.2	225	5.1		3.8	4.2	2.8
15	---	12.0	230	---		3.5		2.8
16	240	11.6	235	---		3.2	3.6	2.8
17	250	10.9	---	---		(2.6)	3.8	2.8
18	240	10.0				E	3.5	2.8
19	250	9.0					3.0	2.8
20	260	8.4						2.7
21	285	8.0					2.5	2.7
22	280	7.8					2.8	2.7
23	280	7.8						2.7

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

Table 71

Canberra, Australia (35.3°S, 149.0°E) — March 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	---	(6.6)					2.8	(2.7)
01	<260	6.5					2.9	2.7
02	---	6.3					2.9	2.7
03	---	5.9					2.9	2.7
04	---	5.0					2.4	2.7
05	---	4.9					2.2	2.7
06	260	4.9				1.8		3.0
07	240	7.3	240	---		2.4		3.15
08	250	8.5	230	(4.5)		3.0	3.4	3.2
09	260	8.8	220	4.5		3.3	3.6	3.1
10	260	10.5	210	4.9		3.4	3.6	3.1
11	280	>11.0	210	(5.0)		3.6	4.0	3.0
12	280	11.2	200	5.0		3.7	3.7	2.9
13	300	11.3	220	(5.3)		3.7		2.9
14	(300)	11.0	220	---		3.6	3.6	2.9
15	250	10.6	220	(4.9)		3.5	3.6	2.9
16	260	9.0	230	---		3.1	3.6	3.05
17	250	(9.0)	240	---		2.7	3.6	(3.0)
18	240	8.6	---	---		2.2	3.3	3.0
19	240	8.3					3.1	2.9
20	(240)	7.4					2.5	2.8
21	---	7.0					1.0	2.7
22	---	6.7						2.7
23	---	6.6					2.7	2.65

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

Table 72

Hobart, Tasmania (42.9°S, 147.2°E) — March 1956

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	6.0						2.8
01	300	5.4						2.7
02	300	5.5						2.7
03	300	5.0						2.7
04	300	4.5						2.7
05	300	3.5						2.7
06	280	4.0				1.5		2.9
07	250	6.0				2.3		3.1
08	240	7.3				2.8		3.1
09	230	8.0	---	---		3.1		3.1
10	240	8.8	240	4.7		3.4		3.0
11	220	9.7	220	4.8		3.5		3.0
12	230	9.2	250	4.0		3.5		3.0
13	230	9.8	230	4.7		3.5		3.0
14	240	9.9	---	---		3.5		3.0
15	240	9.8	---	---		3.4		3.0
16	240	9.7				3.1		3.0
17	250	9.4				2.7		3.1
18	250	9.3				2.2		3.0
19	250	8.6				E		3.0
20	250	7.5						2.9
21	260	7.0						2.9
22	270	6.5						2.8
23	200	6.0						2.7

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

TABLE 73
IONOSPHERIC DATA

foF2, 0.1 Mc, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Manual ☐ Mean Time Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	62	U F 50	J S 49	U F 44	U F 43	U F 43	F 64	C	94	96	100	115	118	119	122	120	115	116	U S 103	92	78	74	70	70
02	U F 63	U F 53	48	F 38	U F 35	U F 35	52	69	73	82	91	97	100	105	103	100	102	100	94	94	84	82	83	82
03	U F 76	U F 62	U F 61	U F 54	47	47	59	74	82	101	105	115	119	117	118	115	118	120	113	103	86	90	84	U F 62
04	U F 62	U F 60	U F 58	F 58	U F 50	F 51	65	91	104	U R 105	112	117	120	120	122	120	115	115	116	102	90	80	72	67
05	65	66	F 60	55	U F 52	U F 42	U F 49	C	C	C	C	C	C	C	C	C	C	C	101	92	81	78	F 67	F 56
06	U F 56	F 48	U F 46	U F 36	F 43	U F 35	U F 45	F 52	60	66	70	74	77	80	86	86	85	83	80	76	72	72	U S 70	U F 66
07	F 66	F 64	U F 60	F 56	F 50	F 47	58	78	88	91	97	107	110	109	109	110	109	106	103	100	84	84	83	U S 79
08	82	74	64	62	65	63	66	71	71	72	77	82	86	86	85	84	82	80	80	84	77	72	65	67
09	61	60	61	57	55	55	60	I C 64	68	67	70	73	80	85	86	83	85	83	90	86	86	72	68	65
10	U F 38	U F 47	U F 47	U F 43	U F 31	F 32	41	44	H 50	59	63	66	69	71	76	81	83	79	82	F 75	68	65	63	58
11	59	58	U F 58	F 52	F 49	48	63	74	79	H 76	76	81	88	93	94	97	98	100	99	95	81	73	70	69
12	69	66	61	57	57	F 55	63	77	86	97	102	108	107	107	109	I C 111	111	106	104	100	89	85	82	80
13	79	71	68	65	60	62	83	98	107	109	113	120	124	120	117	115	112	106	105	106	U S 96	89	82	76
14	F 73	71	F 69	F 65	F 59	F 56	70	84	94	101	112	113	115	117	117	110	108	107	105	100	92	87	82	82
15	79	74	F 72	F 68	F 70	67	71	82	95	100	113	117	118	117	117	112	108	105	111	U S 113	107	103	92	84
16	90	87	76	70	71	63	64	77	87	95	100	U S 103	108	107	108	104	99	90	88	84	79	U S 78	73	71
17	67	62	59	61	62	56	58	65	67	68	70	75	77	74	75	74	74	75	77	80	78	66	F 66	60
18	60	50	47	44	42	39	45	52	67	80	J R 94	102	102	103	102	109	107	107	107	U S 100	92	80	74	J S 62
19	U S 39	F 41	U F 33	U S 30	F 28	31	44	50	H 58	60	64	68	73	73	76	I A 76	76	76	76	78	70	64	57	58
20	F 56	F 55	U S 52	U F 35	U F 34	F 37	54	62	63	68	70	74	77	80	83	84	85	84	86	83	80	77	U S 78	80
21	75	67	63	J F 65	F 64	57	62	68	68	69	70	72	76	74	74	74	72	70	70	70	71	67	63	61
22	F 60	F 59	F 60	F 55	U F 51	F 51	F 72	81	86	90	93	95	99	98	100	102	102	99	97	94	89	80	80	75
23	75	72	F 72	F 70	F 66	F 63	F 70	83	96	102	102	102	103	102	102	99	96	95	99	98	92	84	78	76
24	76	75	71	65	59	56	70	79	81	75	70	70	69	74	76	75	76	76	76	76	76	76	74	67
25	60	57	57	F 54	52	F 53	66	74	77	86	92	92	97	100	98	95	92	94	93	94	87	U S 80	74	70
26	68	67	60	60	61	63	65	65	67	66	65	H 70	72	70	71	69	69	72	71	72	74	70	65	63
27	55	50	54	54	46	43	58	61	63	63	U C 69	71	U C 72	U C 76	U C 78	I C 80	80	81	79	80	78	78	70	67
28	F 65	58	U F 57	J F 53	55	U F 50	62	69	73	79	80	U S 83	90	91	91	90	85	83	86	85	82	76	70	71
29	71	70	69	63	U S 58	U S 54	62	69	69	H 70	H 69	66	66	71	68	67	69	68	68	69	69	67	F 63	F 60
30	F 58	F 56	F 56	F 56	F 50	F 50	64	76	83	91	101	102	100	102	102	107	103	U S 98	U S 99	U S 99	U S 96	84	83	77
MED	65	61	60	56	52	51	62	72	77	80	91	92	97	98	98	97	96	94	94	92	82	78	72	68
NO	30	30	30	30	30	30	30	28	29	29	29	29	29	29	29	29	29	29	30	30	30	30	30	30
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY, NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

TABLE 74
IONOSPHERIC DATA

foF2, 0.1 Mc, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Manual ☐ Mean Time Automatic ☒

	0030	0130	0230	0330	0430	0530	0630	0730	0830	0930	1030	1130	1230	1330	1430	1530	1630	1730	1830	1930	2030	2130	2230	2330
01	U F 56	U F 48	U F 46	U F 47	F 42	U F 50	C	100	91	97	106	119	119	122	120	117	117	109	94	83	75	U S 72	F 68	F 66
02	F 58	F 50	U F 41	U F 35	U F 36	F 42	F 61	72	75	87	U S 93	100	102	105	I B 102	100	100	97	92	87	82	82	82	80
03	F 74	F 62	U F 59	49	F 46	F 46	68	85	94	U C 104	110	118	117	117	116	117	118	118	105	90	90	88	F 70	U F 62
04	U F 60	U F 59	U F 55	U F 55	U F 48	57	76	97	110	112	117	117	120	125	122	117	115	114	110	96	84	76	69	66
05	65	66	F 56	U F 54	U F 42	U F 44	C	C	C	C	C	C	C	C	C	C	C	102	98	84	78	F 77	66	57
06	U F 55	U F 48	U F 37	U F 36	U F 37	U F 39	F 50	F 54	61	67	71	74	80	84	85	86	83	83	78	72	69	73	U F 69	U F 66
07	F 65	F 61	U F 57	F 55	F 47	50	69	80	91	95	102	110	110	109	110	110	107	103	102	92	85	80	85	U S 78
08	80	69	64	63	64	63	68	72	70	72	79	85	86	87	86	84	80	80	83	81	71	68	62	63
09	62	62	58	57	56	56	I C 62	I C 66	68	69	76	77	84	86	85	81	84	86	88	85	78	71	70	U F 55
10	I F 39	J F 49	U F 49	F 38	F 31	F 35	F 43	F 47	49	E G 55	U B 58	67	70	77	76	83	78	80	80	73	67	63	62	58
11	57	F 58	F 52	50	49	53	66	78	79	74	76	87	90	94	96	98	98	100	99	87	76	71	69	70
12	67	63	58	57	56	57	71	83	90	101	107	109	107	109	I C 110	111	109	105	102	93	87	83	80	80
13	76	71	67	62	F 59	69	92	101	108	111	117	121	123	120	117	113	109	105	105	100	93	86	78	74
14	71	69	67	F 62	F 56	62	77	92	98	107	114	115	115	117	115	110	108	105	U S 104	U S 95	90	85	82	82
15	U S 78	73	F 70	69	67	67	76	90	100	109	117	119	116	117	116	110	106	105	111	115	J S 102	92	89	90
16	90	80	75	72	68	61	71	H 77	91	J S 96	U S 102	107	109	107	108	101	93	90	86	84	80	76	71	70
17	63	62	58	63	58	54	63	65	68	69	71	76	75	76	75	I B 74	74	77	80	80	U S 77	70	66	63
18	54	48	45	43	39	42	48	61	70	88	97	104	102	104	105	110	108	108	107	100	82	80	62	J S 64
19	40	F	U F 31	F 29	F 28	40	46	56	61	U J 60	65	70	72	76	74	75	74	78	80	U S 74	69	60	62	57
20	F 56	F 54	U F 41	U F 35	F 34	F 45	60	63	66	69	72	75	77	82	85	82	85	85	86	83	75	77	J S 78	J S 76
21	69	U F 62	J S 65	J S 65	F 60	58	63	68	68	69	73	75	77	74	74	72	70	70	70	71	69	66	63	60
22	F 60	F 58	F 56	U F 51	F 48	F 61	78	83	88	92	95	98	98	100	100	100	101	98	99	93	86	82	77	78
23	74	72	F 70	69	F 64	F 62	80	92	102	100	J S 102	102	104	101	99	98	95	96	100	97	83	79	74	75
24	77	74	71	62	59	62	77	80	78	72	70	70	68	76	75	75	77	76	76	76	74	76	70	65
25	58	57	55	52	F 50	F 58	F 70	76	82	86	U R 90	U R 92	U R 100	U R 100	97	93	93	94	U S 93	90	82	78	70	70
26	67	64	60	62	61	65	66	64	64	62	69	72	72	71	69	69	69	70	71	73	74	67	63	59
27	J S 55	52	55	50	F 38	50	59	63	64	68	70	74	U C 73	U C 77	I C 80	80	83	80	79	80	77	U S 76	70	68
28	62	F 57	U F 55	J S 52	54	57	F 67	69	77	79	80	I R 88	90	91	91	U R 85	88	83	85	84	79	72	71	72
29	71	69	U S 68	U S 61	57	55	H 68	68	72	67	69	67	67	68	68	68	68	69	68	69	68	66	62	F 59
30	F 57	F 56	F 57	F 54	F 47	F 58	71	79	88	93	U S 101	101	102	U S 101	102	105	U S 101	99	U S 100	U S 100	90	85	80	U S 72
MED	62	62	57	54	50	56	68	76	78	86	90	92	98	100	97	98	93	95	92	84	78	76	70	67
NO	30	29	30	30	30	30	28	29	29	29	29	29	29	29	29	29	29	30	30	30	30	30	30	30
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY, NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

TABLE 75
IONOSPHERIC DATA

foFl, 0.1 Mc, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time
Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01								C	L	L	L	L	670	630	L	L	L	L						
02								L	L	L	L	L	L	L	L	L	L	L						
03									L	L	L	L	L	L	L	L	L	L	L					
04									L	L	L	L	L	L	L	L	L							
05								C	C	C	C	C	C	C	C	C	C	C						
06									L		L	L	590	L	L	L	L	L						
07									L	L	L	L	L	L	L	L	L	L						
08								L	L	L	570	580	630	590	590	L	L	L	L					
09								C	L	L	H 590	H 590	570	L	570	570	570	L						
10										H 530	530	H 530	H 560	580	L	L	L	L						
11										L	560	570	L	L	L	L	L							
12									L	L	L	L	L	L	L	C	L	L	L					
13									L	L	L	L	L	L	L	L	L	L						
14									L	L	L	L	L	L	L	L	L	L						
15									L	B	L	L	L	L	L	L	L	L	L					
16									L	L	L	L	L	L	L	L	L	L	L					
17								L	L	H 540	H 550	U S 550	550	540	580	550	B 530	490	L					
18													500	L	L	L	L	L						
19									L	560	560	550	520	I B 530	A 540	A	U A 520	L						
20									L	L	H 580	560	600	590	600	630		L	L	L				
21								L	L	550	550	560	570	580	570	550	530	480	L					
22									L	L	660	L	620	630	630	560	L	L	L					
23								L	L	L		H 650	H 680	H 620	H 610	H 640	L	L	L					
24							L	L	500	570	570	550	550	B	570	570	560	L	L					
25							L	L	L	L	L	L	L	L	L	620	570	L						
26								L	L	530	H 560	H 590	550	580	550	550	500	480	L					
27									H 500	540	U R 580	580	U C 590	U C 580	U C 600	I C 590	550	L						
28								L	U F 540	560	590	U R 600	H 630	H 590	580	590	510	450	L					
29							L	440	510	510	H 520	U S 540	540	560	530	530	490	470	L					
30								L	L	L	L	H 630	590	L	630	L	L							
MED										540	560	570	580	580	580	570	530	480						
NO								1	4	9	14	15	18	13	14	12	10	5						
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY, NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

TABLE 76

IONOSPHERIC DATA

foE, 0.05 Mc, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time
Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01							165	I C 260	H 315	360	H 360	H 375	U B 385	390	U R 370	360	325	275	190					
02							175	265	H 310	U R 335	U R 340	U R 355	360	R	R	B	330	280	215					
03							S	250	300	U R 330	I A 350	U R 355	H 370	U H 385	H 370	350	330	285	200					
04							180	U R 240	U R 290	330	U R 340	I R 365	I B 375	380	370	350	330	280	U H 200					
05							185	C	C	C	C	C	C	C	C	C	C	C	200					
06							175	245	295	325	340	I B 340	355	360	365	U H 350	I A 310	270	205					
07							U B 170	255	300	I R 340	U R 360	I B 365	U R 365	360	H 370	360	330	285	H 200					
08							175	H 260	U R 285	300	U R 320	350	I B 370	U B 385	375	360	335	275	200					
09							H 195	I C 250	H 310	H 340	360	360	360	U B 360	U H 350	H 350	H 320	280	H 220					
10							215	H 270	H 300	H 330	350	I R 350	350	U H 370	H 360	335	325	275	H 235					
11							175	H 265	H 305	325	350	350	360	I R 360	I R 350	I R 340	325	285	U H 195					
12							180	270	310	340	350	H 365	H 390	395	U B 390	I C 380	335	280	220					
13							H 190	U H 270	I R 310	335	H 370	H 375	I A 390	380	U R 380	U R 355	340	285	220					
14							H 180	285	H 320	H 355	U R 375	380	I A 390	385	U R 390	365	330	300	H 230					
15							H 195	H 280	H 330	I B 355	I B 380	H 390	I R 390	U R 385	I R 390	U R 370	335	H 290	220					
16							B	A	H 325	R	R	R	R	I R 390	U R 380	H 370	340	285	H 235					
17							H 210	H 280	U R 325	350	365	380	I R 390	U R 390	I B 385	B	B	345	H 235	175				
18							U R 190	280	320	I R 350	370	I B 380	B	B	R	I R 370	I B 340	U R 310	240					
19							U R 220	U R 280	U R 310	I R 350	U R 385	390	390	I A 390	370	350	330	H 290	H 220					
20							A	280	310	R	R	R	R	R	R	U R 360	340	300	H 245					
21							220	H 275	320	U R 345	370	U R 375	U R 380	390	385	U R 370	330	I B 290	230					
22							215	265	300	U R 330	390	U R 390	R	R	385	365	H 340	300	230					
23							H 215	290	U R 330	U R 350	I R 370	U H 390	400	I A 395	390	H 370	350	300	U R 240					
24							B	U H 275	I B 310	U R 350	U R 380	390	390	U R 390	I B 385	U R 380	U R 340	295	B					
25							B	U H 280	U R 330	R	B	R	R	R	R	B	U R 340	280	B					
26							R	290	A	R	U R 370	380	B	B	B	B	B	290	U S 240					
27							220	285	I R 330	360	I B 365	U R 370	C	C	C	C	340	300	C					
28							225	290	330	335	A	B	R	375	I B 370	365	I B 350	285	S					
29							H 230	H 280	315	U R 350	U R 375	375	I R 380	375	U R 365	H 350	340	295	H 235					
30							H 235	280	335	350	365	U R 380	I A 390	I A 390	365	350	340	H 300	230					
MED							190	275	310	340	U 365	375	U 380	U 385	U 370	360	335	285	220					
NO							24	28	28	25	25	25	21	22	23	24	27	29	26	1				
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY, NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

TABLE 77

IONOSPHERIC DATA

foEs, 0.1 Mc, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time
Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	S	S	E	E	E	S	G	C	G	G	G	B	B	B	G	B	G	G	H 23	J 18	20	J 34	S	S
02	S	S	S	S	S	S	G	G	G	G	G	G	B	B	B	B	G	G	G	S	S	J 24	S	S
03	S	S	S	S	S	S	B	29	33	G	J 35	G	G	G	G	G	G	G	G	S	S	17	S	S
04	S	S	S	S	S	S	G	G	G	35	35	G	B	G	G	G	G	G	G	S	23	27	S	S
05	S	S	S	S	S	S	G	C	C	C	C	C	C	C	C	C	C	C	G	S	S	S	S	S
06	S	S	S	S	S	S	G	G	G	G	G	B	G	G	G	34	33	29	G	S	S	S	S	S
07	S	S	S	S	S	S	G	G	G	34	G	G	G	G	G	G	G	G	G	S	S	S	S	S
08	S	S	S	S	S	S	G	G	30	32	34	G	B	B	B	40	35	G	G	B	S	S	S	S
09	S	S	S	S	S	S	G	C	G	G	G	G	G	B	G	G	G	G	G	S	S	S	S	S
10	U S 22	18	F 36	J F 22	S	S	G	G	G	G	G	G	G	G	G	G	G	G	G	B	S	S	S	S
11	S	S	S	S	J 14	S	21	G	G	G	G	G	G	B	G	G	G	G	G	17	S	S	S	S
12	S	S	S	S	S	S	19	G	G	G	H 37	G	G	G	G	C	G	G	23	S	S	S	S	S
13	S	S	S	S	S	S	G	G	31	G	G	G	41	G	40	39	G	30	24	S	S	S	S	S
14	S	S	S	J 48	J 16	S	20	G	G	G	G	G	40	G	G	G	G	G	G	S	S	S	S	S
15	S	S	S	S	S	S	G	G	G	B	B	G	G	G	G	G	G	G	G	S	S	S	S	S
16	S	S	S	S	S	S	B	28	G	G	G	G	36	G	G	G	G	G	G	B	S	S	S	S
17	S	S	S	J 38	S	S	G	G	G	G	G	G	G	36	B	B	B	G	G	G	S	S	S	S
18	S	S	S	S	S	S	G	33	35	37	40	41	B	39	G	G	B	G	G	B	S	S	S	S
19	S	J 24	S	S	S	S	G	G	G	G	G	G	G	40	47	J 78	J 68	39	25	37	S	S	S	S
20	S	S	S	S	S	S	22	G	G	G	G	G	G	G	42	40	G	G	G	S	S	S	S	S
21	S	S	S	S	S	S	G	G	G	G	J 66	G	G	G	G	G	G	B	G	B	B	S	S	S
22	S	S	S	S	S	S	G	31	33	G	G	G	G	G	G	38	G	34	G	B	S	S	S	J 27
23	S	S	S	S	22	S	G	G	G	G	G	G	42	40	G	G	37	J 41	J 35	J 34	S	S	S	S
24	S	S	S	S	S	B	B	B	B	B	B	B	B	B	B	G	B	G	B	B	S	J 20	S	S
25	S	S	S	S	S	S	B	G	G	B	B	B	B	B	B	B	G	G	B	B	S	S	S	S
26	S	S	S	S	S	S	G	G	34	G	G	G	B	B	B	B	B	G	G	B	B	S	S	S
27	S	S	S	S	S	S	G	G	G	G	G	G	C	C	C	C	G	G	C	S	S	S	S	S
28	S	S	S	S	S	17	G	30	36	42	39	B	B	B	B	B	B	B	S	B	S	S	S	S
29	S	S	S	S	S	S	G	G	G	G	G	J 47	41	G	44	G	G	G	G	B	S	S	S	S
30	S	S	S	S	S	S	26	33	37	40	40	G	B	40	G	G	G	G	B	B	S	S	S	S
MED																						U 24		
NO	1	2	2	4	4	2	30	27	29	29	29	29	28	28	28	27	29	29	28	17	4	5		1
RAN																								

TABLE 78

IONOSPHERIC DATA

fMIN, 0.1 Mc, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time
Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	E S 16	E S 16	E	E	E	E S 15	16	C	22	23	26	41	40	40	32	37	24	16	16	E S 16	E S 15	E S 16	E S 16	E S 16
02	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	17	22	27	25	40	40	38	59	26	17	16	E S 16	E S 16	E S 16	E S 16	E S 16
03	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	17	16	17	16	19	23	23	27	24	21	20	17	16	E S 16	E S 16	E S 16	E S 16	E S 16
04	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	18	22	21	28	40	35	30	23	20	18	16	E S 16	E S 16	E S 16	E S 16	E S 16
05	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	C	C	C	C	C	C	C	C	C	C	C	16	E S 16	E S 16	E S 16	E S 16	E S 16
06	E S 16	E S 16	E S 16	E S 16	E S 14	E S 16	16	19	17	21	25	39	28	29	29	26	23	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
07	E S 16	E S 16	E S 16	E S 16	E S 13	E S 16	16	16	17	20	25	27	27	22	20	20	18	18	16	E S 16	E S 16	E S 16	E S 16	E S 16
08	E S 16	E S 16	E S 16	E S 16	E S 14	E S 16	17	16	17	21	27	28	41	40	35	28	20	17	16	17	E S 16	E S 16	E S 16	E S 17
09	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	C	17	20	24	25	26	40	28	21	21	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
10	E S 16	E S 16	E S 16	E S 16	E S 19	E S 16	16	17	17	19	22	27	30	30	24	22	17	16	16	18	E S 16	E S 16	E S 16	E S 16
11	E S 16	E S 16	E S 13	E S 13	E S 13	E S 13	16	16	17	19	29	28	31	47	26	23	20	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
12	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	17	25	20	21	20	18	36	C	18	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
13	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	17	18	21	31	31	27	29	26	23	17	16	E S 16	E S 16	E S 16	E S 16	E S 16
14	E S 16	E S 16	E S 16	E S 16	E S 13	E S 16	E S 14	E S 16	19	20	21	23	28	34	31	27	18	16	16	E S 16	E S 16	E S 17	E S 16	E S 16
15	E S 16	E S 16	E S 16	E S 12	E S 11	E S 16	16	17	20	74	40	30	28	24	25	22	17	17	16	E S 16	E S 16	E S 16	E S 16	E S 16
16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	35	19	25	25	25	30	29	30	25	23	19	19	16	17	E S 16	E S 16	E S 16	E S 16
17	E S 17	E S 16	E S 15	E S 16	E S 16	E S 16	16	17	24	19	27	23	27	27	33	42	50	30	17	16	E S 16	E S 16	E S 16	E S 16
18	E S 16	E S 16	E S 16	E S 16	E S 13	E S 17	18	18	23	23	26	40	43	37	31	27	46	18	17	17	E S 16	E S 16	E S 16	E S 27
19	E S 18	E S 16	E S 16	E S 16	E S 16	E S 16	19	21	22	28	30	31	33	36	32	25	24	17	17	16	E S 16	E S 16	E S 16	E S 16
20	E S 16	E S 16	E S 16	E S 14	E S 14	E S 16	17	21	26	24	31	30	26	30	26	22	23	19	18	E S 16	E S 16	E S 16	E S 16	E S 16
21	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	18	21	22	30	33	40	43	35	34	31	27	36	21	19	17	E S 16	E S 20	E S 16
22	E S 16	E S 16	E S 16	E S 16	E S 12	E S 16	24	17	24	28	33	29	33	40	31	33	28	24	18	17	E S 16	E S 16	E S 20	E S 15
23	E S 18	E S 17	E S 16	E S 16	E S 16	E S 18	16	20	22	24	26	37	35	37	33	31	30	30	23	18	E S 16	E S 16	E S 16	E S 16
24	E S 16	E S 17	E S 16	E S 17	E S 16	17	26	31	36	33	45	45	32	58	41	29	37	25	28	26	E S 24	E S 18	E S 16	E S 17
25	E S 21	E S 18	E S 17	E S 20	E S 16	E S 17	24	31	31	37	40	50	28	37	45	39	29	25	29	19	E S 16	E S 16	E S 16	E S 18
26	E S 18	E S 16	E S 16	E S 17	E S 16	E S 17	17	18	24	26	30	34	43	42	46	39	37	29	28	18	20	E S 16	E S 19	E S 17
27	E S 16	E S 16	E S 20	E S 16	E S 19	E S 18	E S 16	19	26	29	U B 42	50	U C 45	U C 32	U C 32	C	25	21	29	E S 21	E S 22	E S 15	E S 16	E S 25
28	E S 16	E S 16	E S 13	E S 17	E S 16	E S 16	17	24	27	28	30	42	45	40	38	37	38	22	E S 29	22	E S 16	E S 21	E S 20	E S 20
29	E S 16	E S 18	E S 16	E S 16	E S 21	E S 16	18	19	23	20	33	28	31	23	20	21	16	16	16	19	E S 15	E S 16	E S 16	E S 16
30	E S 16	E S 15	E S 13	E S 16	E S 13	E S 16	16	16	20	18	30	29	24	31	28	22	25	18	26	17	E S 16	E S 16	E S 16	E S 16
MED																								
NO																								
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY, NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

TABLE 79

IONOSPHERIC DATA

h'F2, Km, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time
Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01								C	265	L	340	360	U L 380	360	L	L	L	L						
02								L	L	L	L	L	L	L	L	L	L	L						
03									L	L 270	L	L	L	L	L	L	L	L	L					
04									L	240	U L 270	L	L	L	L	L	L							
05																								
06											L	L	410	L	L	L	300	L						
07									250	250	300	L	290	L	L	L	L	L						
08								L	L	L	415	380	L	385	390	L	L	L	295					
09									335	L	L	L	415	L	380	380	U L 370	L						
10										450	L	470	L	L	L	L	L	L						
11										L	L	370	L	L	L	L	L							
12									250	L	L	L	U L 335	L	L	C	L	L	L					
13									L	250	L	U L 300	L	L	L	L	L	L						
14									L	270	L	L	L	L	L	L	L	L						
15									L	B	L	L	L	L	L	290	L	L	L					
16									L	L	L	340	L	L			L	L	280					
17									L	500	520	470	450	460	450	450	470	435	L					
18													L	L	U L 400	L	L	L						
19									L	L	L	550	470	480	460	I A 430	400	U L 390						
20									L	L	430	400	430	435	400	L	L	L	L					
21								L	L	L	450	440	420	440	445	430	430	390	L					
22									L	L	385	L	390	370	390	350	350	L	L					
23								260	260	L	L	360	370	325	365	380	L	L	L					
24							300	295	340	440	520	540	580	530	480	470	450	L	L					
25							L	L	L	L	U L 280	400	400	L	U L 380	380	360	L						
26								L	L	470	605	560	520	515	505	530	480	430	L					
27									430	500	U B 450	495	U C 520	U C 460	U C 440	C	400	L						
28								330	L	360	440	485	450	430	420	400	395	H 370	L					
29							L	350	420	515	U S 530	535	525	470	470	465	420	400	L					
30								L	L	L	350	350	U L 310	L	390	L	L	L						
MED									U 300	400	430	420	420	440	410	415	400	U 395						
NO							1	4	8	12	15	18	18	13	16	12	12	6	2					
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY, NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

TABLE 80
IONOSPHERIC DATA

h'F, Km, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time
Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	280	300	340	F 360	F 350	330	275	I C 270	260	U H 235	H 220	225	H 240	230	230	235	240	250	260	265	265	320	295	280
02	270	280	310	360	380	360	315	260	H 235	H 225	H 220	H 220	220	230	H 230	B 255	H 250	255	255	260	260	290	280	275
03	260	275	275	260	320	310	270	240	240	220	H 220	205	220	230	210	230	230	250	255	235	260	260	250	285
04	310	300	315	295	295	300	275	230	220	U H 200	U H 200	210	210	225	220	230	230	240	250	240	245	250	260	300
05	300	310	300	320	280	300	270	C	C	C	C	C	C	C	C	C	C	C	270	265	280	315	300	330
06	325	330	370	390	F 370	F 360	290	370	235	230	230	215	230	220	235	230	230	255	275	265	260	295	300	300
07	295	285	280	280	270	280	260	250	225	230	205	190	205	225	215	230	235	250	260	250	250	260	280	280
08	290	290	330	350	330	320	300	250	235	230	230	235	245	230	230	240	250	250	260	280	250	260	265	300
09	305	330	330	350	330	320	290	I C 265	240	230	H 215	H 210	230	230	230	230	245	250	275	270	250	270	270	300
10	F 365	F 420	F 370	F 335	425	380	335	290	275	H 240	235	H 220	H 215	240	240	235	250	260	270	250	250	270	285	275
11	295	290	280	280	280	265	245	240	235	220	210	210	225	I B 230	235	225	230	240	245	235	240	260	275	295
12	285	295	310	320	290	270	255	240	230	225	215	215	230	220	245	I C 240	240	240	250	250	240	260	280	280
13	280	275	295	300	300	320	255	240	220	225	205	210	220	225	220	220	230	245	260	250	240	245	250	270
14	280	280	280	270	260	260	260	240	230	230	210	H 210	210	225	220	230	230	230	260	250	250	250	270	270
15	270	275	290	300	280	260	250	240	230	I B 225	220	210	215	225	220	230	230	245	265	275	250	250	240	290
16	290	270	270	270	290	290	U B 330	265	245	245	220	225	230	220	230	235	240	250	270	260	260	270	280	280
17	290	325	335	330	280	270	275	245	H 240	H 220	H 230	H 205	H 210	240	225	: B	B	270	295	295	275	270	270	280
18	300	340	350	350	320	310	300	265	235	225	225	225	220	250	U B 220	230	U B 260	250	265	270	255	300	300	430
19	500	380	380	390	390	380	300	250	240	U B 230	205	220	240	B	A	A	U A 250	250	280	250	260	260	300	300
20	310	330	335	335	330	335	280	245	245	225	U B 225	205	U B 220	220	225	215	225	240	265	270	260	290	300	300
21	300	325	325	310	295	300	285	250	H 220	220	220	210	215	U B 215	220	235	230	260	290	290	280	280	300	300
22	300	300	300	280	270	280	250	230	210	215	H 200	H 205	H 200	H 200	H 220	230	235	235	250	250	250	255	300	315
23	310	310	310	290	265	265	250	240	230	220	210	H 210	H 215	H 200	220	230	225	U A 260	270	260	255	260	285	290
24	280	280	260	280	300	335	275	250	230	225	210	U B 200	H 205	I B 220	U B 235	235	230	250	265	295	300	320	270	300
25	300	325	340	330	335	320	260	230	230	220	210	210	R 220	230	220	I B 225	230	230	270	270	260	260	270	U S 305
26	320	335	350	340	320	320	265	250	240	230	210	H 230	230	225	U B 230	235	245	250	265	300	300	270	270	280
27	350	U S 400	355	305	310	315	280	250	235	225	I B 210	200	U C 205	U C 200			240	240	280	270	290	270	270	310
28	280	300	315	310	300	300	270	H 230	220	220	240	U B 250	225	220	230	220	240	230	280	275	260	285	U S 300	U S 310
29	300	305	280	270	300	305	275	240	245	225	H 210	I A 215	220	230	240	230	235	240	275	290	265	270	280	320
30	320	340	310	280	260	270	250	240	230	220	205	200	H 200	200	H 220	230	235	220	270	265	235	250	250	280
MED	300	300	310	310	300	310	275	245	235	225	215	210	220	225	225	230	235	250	265	265	260	270	280	300
NO	30	30	30	30	30	30	30	29	29	29	29	29	29	28	27	26	28	29	30	30	30	30	30	30
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY, NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

TABLE 81

IONOSPHERIC DATA

h'E, Km, April 1957 Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01								I C		H	H	U B	U B	U B	U B	U B	U B							
							131	121	111	109	111	111	109	119	119	111	115	111	129					
02									H	H						I B	U B							
							141	115	111	109	109	109	109	109	109	113	117	111	125					
03							S			H		H	H	H										
								111	109	105	105	109	109	109	109	109	109	115	125					
04												I R	H	U B										
							135	109	109	109	109	109	109	119	115	119	115	117	121					
05								C	C	C	C	C	C	C	C	C	C	C						
							135												121					
06												I B				H	U A							
							129	119	111	115	115	114	113	113	115	109	113	117	127					
07							U B					U B			H									
							139	119	115	111	109	111	109	109	109	111	111	115	125					
08								H				U B	I B	U B	U B									
							129	115	111	111	115	117	116	115	115	119	111	115	125					
09							H	I C	H	H				U B	U B	H	H		H					
							129	119	109	111	109	109	109	111	109	109	109	109	121					
10								H	H	H														
							119	113	109	105	109	111	115	109	109	109	109	115	121					
11								H	H										H					
							119	117	111	111	107	111	113	111	109	109	109	109	129					
12												H	H	U B	B	C								
							119	111	109	111	105	101	101	117			109	111	115					
13							H					H			U B	U B								
							115	111	109	105	109	111	113	109	111	111	111	115	125					
14									H	H			U B	U B	U B				H					
							119	111	109	109	109	109	109	119	115	111	105	109	121					
15							H	H	H	B	B	H	H			H		H						
							121	109	109			109	107	105	105	109	101	111	119					
16							B	U B	U B	U B			U A		H	H			H					
								111	111	111	109	109	105	109	103	105	111	119	119					
17							H	H	H		U B				B	B	B	U B	H	U S				
							125	109	109	109	111	109	109	109				119	119	121				
18							B		U B			B	B	B			I B							
								111	113	107	109				109	115	113	111	121					
19							U R				U B			I B				H	H					
							119	109	111	111	109	109	109	109	109	101	101	101	121					
20							A		U B	U B	U B	U B	U B		U B	U B	U B	U B	U B					
								111	109	111	111	109	105	109	109	109	109	111	111					
21								H	U B			U B	U B	U B	U B	U B		B	U S					
							119	115	109	111	111	111	115	115	115	111	109		135					
22											U B		U B	U B			U B	U B						
							119	111	111	109	115	109	105	103	101	119	117	115	119					
23							H					U B	U B	U B	U B	U B	U B							
							115	115	109	103	101	109	109	109	111	113	117	111	119					
24							B	U B	I B	U B	U B	U B			B	B								
								109	110	111	115	111	101			101	109	119	B					
25							B	U B	U B	U B	I B	U B		U B	R	B	U B	U B	B					
								109	103	111	115	119	101	111			119	111						
26									I A				B	B	B	B	B		B					
							111	109	109	109	109	109						119						
27									U B		I B		C	C	C	C		U B	C					
							111	105	109	105	103	101					109	111						
28								U B	U B		U B	I B	U B		I B	U B	I B	U B	S					
							125	111	111	109	109	108	107	111	115	119	114	109						
29							H	H																
							119	109	105	103	109	109	109	103	107	109	105	105	117					
30							H					U B	U A	U A				H						
							119	109	109	105	103	109	103	105	109	109	109	109	119					
MED							119	111	109	109	109	109	109	109	109	110	109	111	121					
NO							24	29	29	28	28	28	26	25	23	24	27	28	25	1				
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY, NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

TABLE 82

IONOSPHERIC DATA

h'Es, Km, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time
Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	S	S	E	E	E	S	G	C	G	G	G	B	B	B	G	B	G	G	141	119	119		S	S
02	S	S	S	S	S	S	G	G	G	G	G	G	B	B	B	B	G	G	G	S	S	109	S	S
03	S	S	S	S	S	S	B	131	125	G	103	G	G	G	G	G	G	G	G	S	S	111	S	S
04	S	S	S	S	S	S	G	G	G	111	115	G	B	G	G	G	G	G	G	S	111	109	S	S
05	S	S	S	S	S	S	G	C	C	C	C	C	C	C	C	C	C	C	G	S	S	S	S	S
06	S	S	S	S	S	S	G	G	G	G	G	B	G	G	G	115	119	121	G	S	S	S	S	S
07	S	S	S	S	S	S	G	G	G	115	G	G	G	G	G	G	G	G	G	S	S	S	S	S
08	S	S	S	S	S	S	G	G	127	119	119	G	B	B	B	121	131	G	G	B	S	S	S	S
09	S	S	S	S	S	S	G	C	G	G	G	G	G	B	G	G	G	G	G	S	S	S	S	S
10	S	U S 165	131	129	S	S	G	G	G	G	G	G	G	G	G	G	G	G	G	B	S	S	S	S
11	S	S	S	S	125	S	119	G	G	G	G	G	G	B	G	G	G	G	G	123	S	S	S	S
12	S	S	S	S	S	S	129	G	G	G	119	G	G	G	G	C	G	G	137	S	S	S	S	S
13	S	S	S	S	S	S	G	G	119	G	G	G	111	G	131	125	G	149	121	S	S	S	S	S
14	S	S	S	103	121	S	121	G	G	G	G	G	115	G	G	G	G	G	G	S	S	S	S	S
15	S	S	S	S	S	S	G	G	G	B	B	G	G	G	G	G	G	G	G	S	S	S	S	S
16	S	S	S	S	S	S	B	110	G	G	G	G	103	G	G	G	G	G	G	B	S	S	S	S
17	S	S	S	129	S	S	G	G	G	G	G	G	G	115	B	B	B	G	G	G	S	S	S	S
18	S	S	S	S	S	S	G	167	135	131	119	U B 115	B	119	G	G	B	G	G	B	S	S	S	S
19	S	139	S	S	S	S	G	G	G	G	G	G	G	109	119	109	111	111	151	131	S	S	S	S
20	S	S	S	S	S	S	119	G	G	G	G	G	G	G	129	125	G	G	G	S	S	S	S	S
21	S	S	S	S	S	S	G	G	G	G	101	G	G	G	G	G	G	B	G	B	B	S	S	S
22	S	S	S	S	S	S	G	109	115	G	G	G	G	G	G	135	G	115	G	B	S	S	S	109
23	S	S	S	S	119	S	G	G	G	G	G	G	113	111	G	G	131	119	115	115	S	S	S	S
24	S	S	S	S	S	B	B	B	B	B	B	B	B	B	B	G	B	G	B	B	S	105	S	S
25	S	S	S	S	S	S	B	G	G	B	B	B	B	B	B	B	G	G	B	B	S	S	S	S
26	S	S	S	S	S	S	G	G	101	G	G	G	B	B	B	B	B	G	G	B	B	S	S	S
27	S	S	S	S	S	S	G	G	G	G	G	G	C	C	C	C	G	G	C	S	S	S	S	S
28	S	S	S	S	S	119	G	141	119	109	119	B	B	B	B	B	B	B	S	B	S	S	S	S
29	S	S	S	S	S	S	G	G	G	G	G	113	139	G	119	G	G	G	G	B	S	S	S	S
30	S	S	S	S	S	S	145	141	129	125	117	G	B	109	G	G	G	G	B	B	S	S	S	S
MED							121	136	122	117	118		113	111		123		119	137					
NO		2	1	3	3	1	5	6	8	6	8	2	5	5	4	6	4	5	5	4	2	4		1
RAN																								

TABLE 83

IONOSPHERIC DATA

(M3000)F2, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time
Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	260	U F 270	S	F	U F 260	U F 260	F 290	C	320	280	260	260	250	255	250	255	260	270	U S 270	270	260	255	250	270
02	U F 270	U F 275	250	F 240	U F 235	U F 240	275	290	300	285	275	275	270	265	255	260	260	270	275	275	260	260	270	275
03	U F 285	U F 270	U F 270	U F 270	250	245	290	310	290	290	280	270	270	255	260	255	255	265	270	275	260	265	270	U F 245
04	U F 260	U F 250	U F 255	F 260	U F 260	F 250	280	295	290	U R 275	275	270	265	260	260	260	265	275	285	290	280	270	270	265
05	250	260	F 260	250	U F 260	U F 265	U F 305	C	C	C	C	C	C	C	C	C	C	C	290	290	270	250	F 270	F 250
06	U F 260	F 250	U F 240	U F 240	F 235	U F 250	U F 260	F 300	280	265	280	275	270	270	275	275	285	280	290	280	265	270	U S 290	U F 280
07	F 280	F 290	U F 290	F 290	F 270	F 270	295	315	300	285	290	275	275	275	270	270	270	275	280	280	280	265	270	U S 285
08	270	270	240	240	240	250	270	285	275	275	260	265	260	265	260	255	260	260	270	275	270	265	255	250
09	260	255	235	240	255	255	280	C	285	270	255	255	260	265	260	260	260	260	270	270	270	265	260	240
10	U F 260	U F 250	U F 250	U F 265	U F 245	F 250	250	280	H 230	270	255	245	245	245	260	265	270	275	280	F 280	265	255	260	270
11	255	270	U F 260	F 265	F 265	280	315	310	300	H 275	265	275	275	275	275	280	275	280	290	290	285	275	265	275
12	275	265	250	250	270	F 280	305	305	300	295	285	285	275	270	265	C	265	270	280	275	275	260	255	260
13	270	265	250	250	250	240	290	320	300	305	280	280	270	270	270	270	275	275	280	285	U S 280	280	280	275
14	F 275	270	F 270	F 280	F 270	F 280	300	305	300	290	285	275	280	275	270	275	270	280	280	290	270	270	270	280
15	275	270	F 260	F 260	F 260	275	290	290	305	295	280	275	275	265	265	265	265	260	265	U S 280	280	270	270	255
16	260	265	255	255	250	255	275	275	265	265	265	U S 270	265	260	265	270	270	270	275	270	260	U S 270	260	245
17	250	245	240	245	260	270	285	290	260	240	240	245	250	250	250	245	245	240	255	260	275	250	F 260	245
18	250	240	235	230	240	260	265	275	290	285	J R 275	280	270	255	250	255	260	260	265	U S 270	270	255	255	S
19	U S 210	F 240	U F 250	U S 250	F 240	250	270	280	H 280	250	240	235	235	240	245	A	265	270	270	285	260	270	260	260
20	F 260	F 250	U S 245	U F 270	U F 260	F 260	275	285	270	240	260	250	260	255	260	265	270	260	275	270	260	265	U S 260	260
21	260	255	245	F	F 260	270	280	270	260	260	250	255	265	260	255	260	260	260	260	260	260	260	265	260
22	F 260	F 270	F 260	F 275	U F 270	F 290	F 310	310	290	280	260	260	265	265	255	255	260	275	280	285	285	270	260	255
23	260	250	F 260	F 270	F 280	F 285	F 290	300	285	280	265	265	265	270	260	260	260	265	265	275	280	260	265	255
24	250	265	270	265	250	245	280	290	275	255	240	275	230	235	245	250	255	260	265	265	250	245	260	260
25	260	250	250	F 260	260	F 280	290	295	295	285	270	270	270	260	265	265	270	260	270	265	275	U S 275	260	260
26	250	240	230	235	245	250	275	275	265	250	225	H 230	245	240	240	235	240	245	255	250	255	255	250	250
27	235	225	230	255	255	265	290	265	260	245	U C 255	250	C	C	C	C	260	265	275	270	260	270	265	265
28	F 265	260	U F 265	J F 260	265	U F 290	290	280	270	270	255	U S 250	245	250	245	245	255	255	265	270	255	255	250	255
29	255	250	250	260	U S 245	U S 255	275	275	255	H 220	H 225	235	235	240	250	250	255	260	265	275	260	260	F 255	F 250
30	F 255	F 250	F 260	F 270	F 285	F 285	295	300	285	285	275	275	265	255	255	260	260	U S 265	U S 280	U S 285	U S 280	270	260	260
MED	260	260	250	260	260	260	290	290	285	275	265	270	265	260	260	260	260	265	270	275	270	265	260	260
NO	30	30	29	28	30	30	30	27	29	29	29	29	28	28	28	26	29	29	30	30	30	30	30	29
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY, NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

TABLE 84

IONOSPHERIC DATA

(M3000)F1, April 1957
Station WASHINGTON Lat. 38.7N Long. 77.1W Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec. 75.0W Mean Time
Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01								C	L	L	L	L	325	320	L	L	L	L						
02								L	L	L	L	L	L	L	L	L	L	L						
03									L	L	L	L	L	L	L	L	L	L	L					
04									L	L	L	L	L	L	L	L	L							
05								C	C	C	C	C	C	C	C	C	C	C						
06									L		L	L	335	L	L	L	L	L						
07									L	L	L	L	L	L	L	L	L	L						
08								L	L	L	315	315	310	315	315	L	L	L	L					
09								C	L	L	H 320	H 320	320	L	330	320	315	L						
10										H 320	315	H 325	H 305	310	L	L	L	L						
11										L	340	335	L	L	L	L	L							
12									L	L	L	L	L	L	L	C	L	L	L					
13									L	L	L	L	L	L	L	L	L	L						
14									L	L	L	L	L	L	L	L	L	L						
15									L	B	L	L	L	L	L	L	L	L	L					
16									L	L	L	L	L	L	L	L	L	L	L					
17								L	L	H 320	H 335	U S 345	340	360	325	325	B	310	L					
18													395	L	L	L	L	L						
19									L	300	310	330	350	B	A	A	U A 330	L						
20									L	L	H 330	340	325	330	315	315	L	L	L					
21								L	L	320	335	330	330	330	320	335	320	320	L					
22									L	L	325	L	340	315	320	340	L	L	L					
23								L	L	L		H 335	H 330	H 340	H 335	H 325	L	L	L					
24							L	L	340	320	330	350	350	B	320	325	315	L	L					
25							L	L	L	L	L	L	L	L	L	330	340	L						
26								L	L	340	H 350	H 325	345	335	335	330	335	310	L					
27									H 345	320	R	330	U C 320	C	C	C	330	L						
28								L	U F 330	340	340	U R 320	H 310	H 330	330	310	340	340	L					
29							L	330	330	340	H 350	U S 340	350	325	340	335	330	320	L					
30								L	L	L	L	H 345	345	L	325	L	L							
MED										320	330	330	330	330	325	325	330	320						
NO								1	4	9	13	15	18	11	12	11	9	5						
RAN																								

CENTRAL RADIO PROPAGATION LABORATORY NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

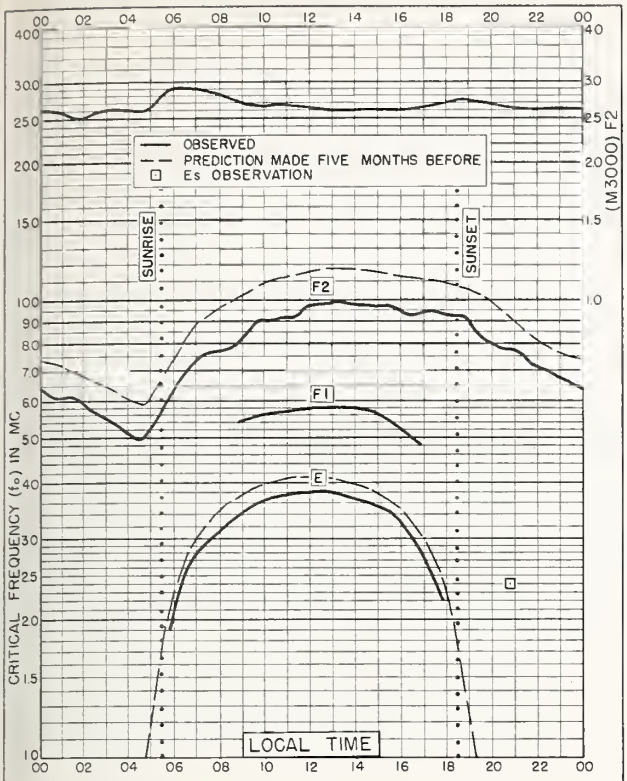


Fig. 1. WASHINGTON, D. C.
38.7°N, 77.1°W APRIL 1957

NBS 503

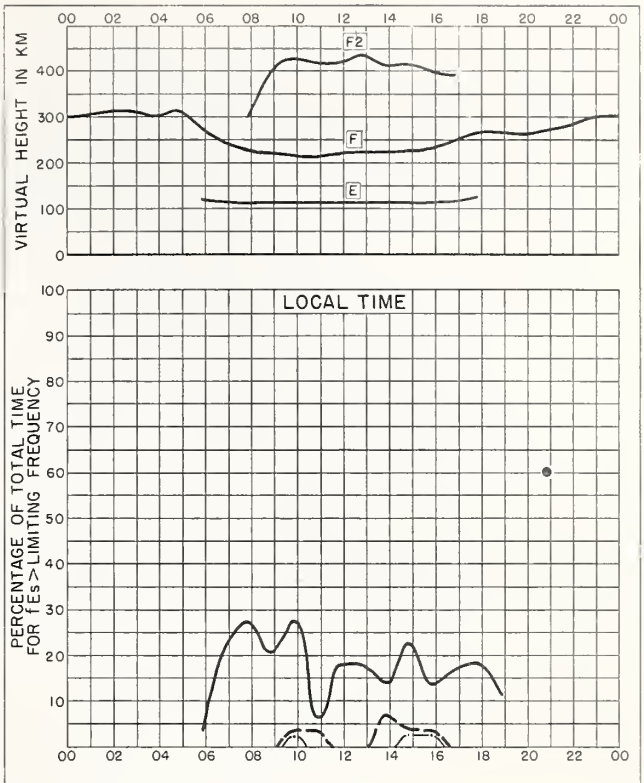


Fig. 2. WASHINGTON, D. C. APRIL 1957

NBS 490

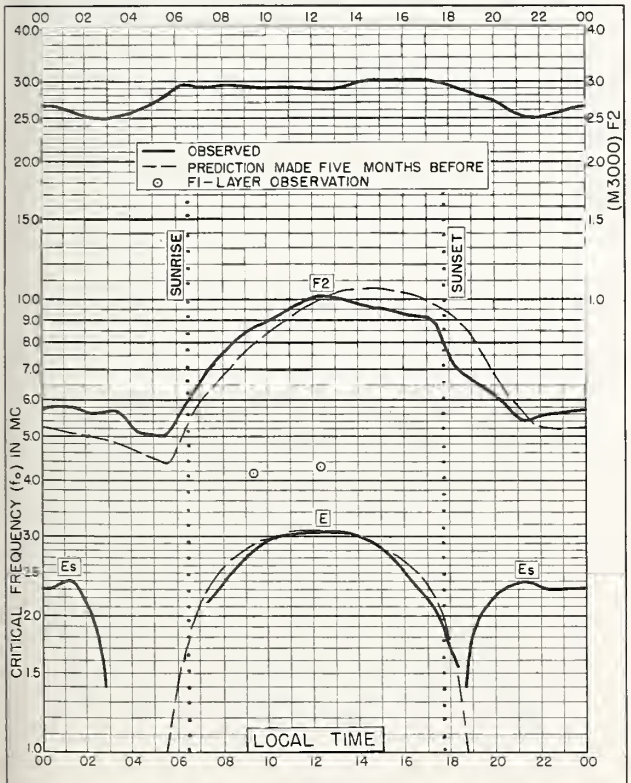


Fig. 3. LYCKSELE, SWEDEN
64.6°N, 18.8°E MARCH 1957

NBS 503

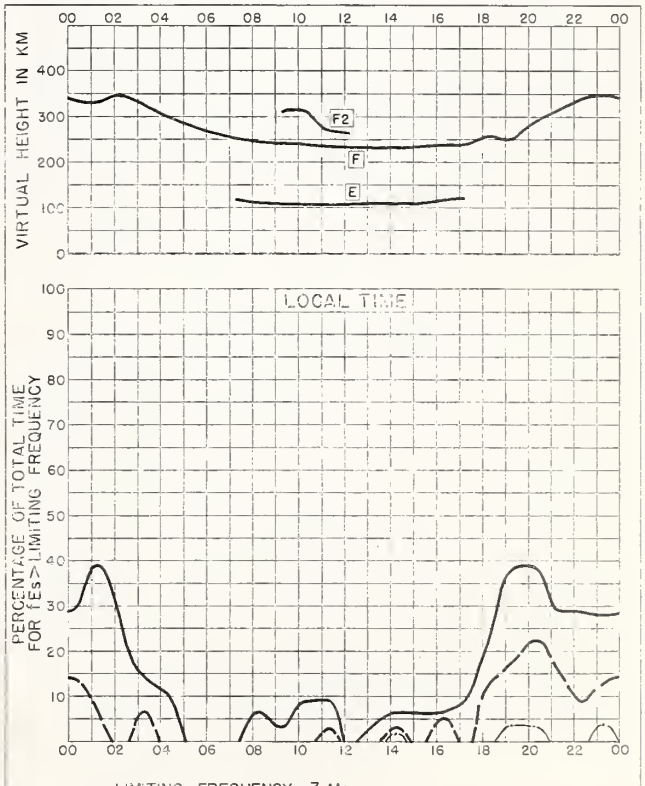


Fig. 4. LYCKSELE, SWEDEN MARCH 1957

NBS 490

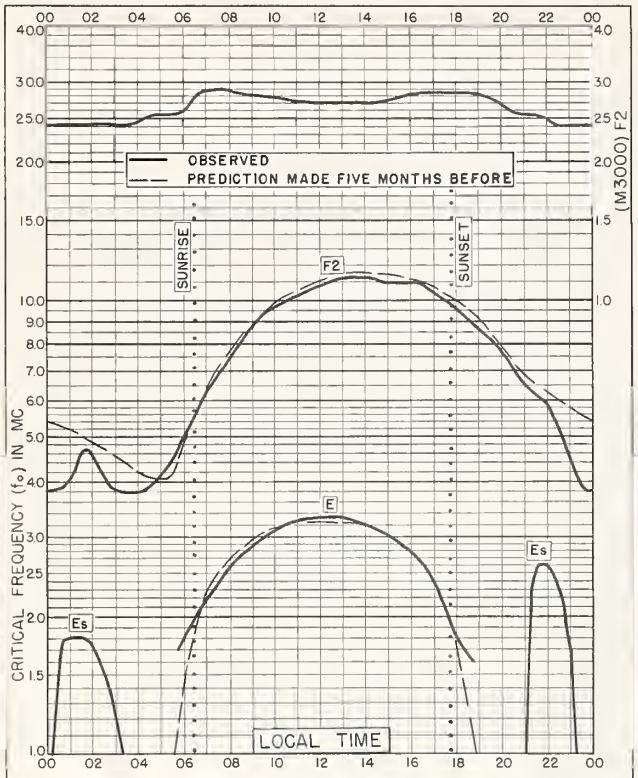


Fig. 5. OSLO, NORWAY
60.0°N, 11.1°E MARCH 1957

NBS 503

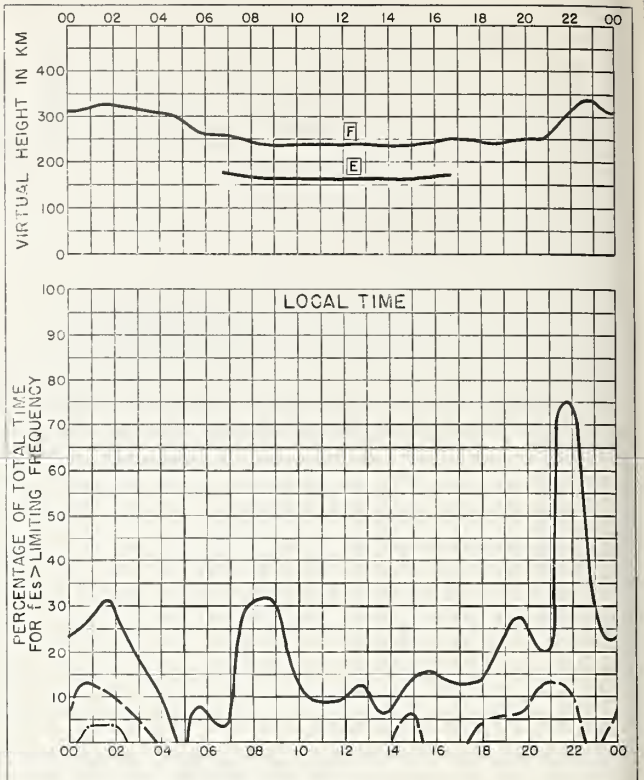


Fig. 6. OSLO, NORWAY MARCH 1957

NBS 490

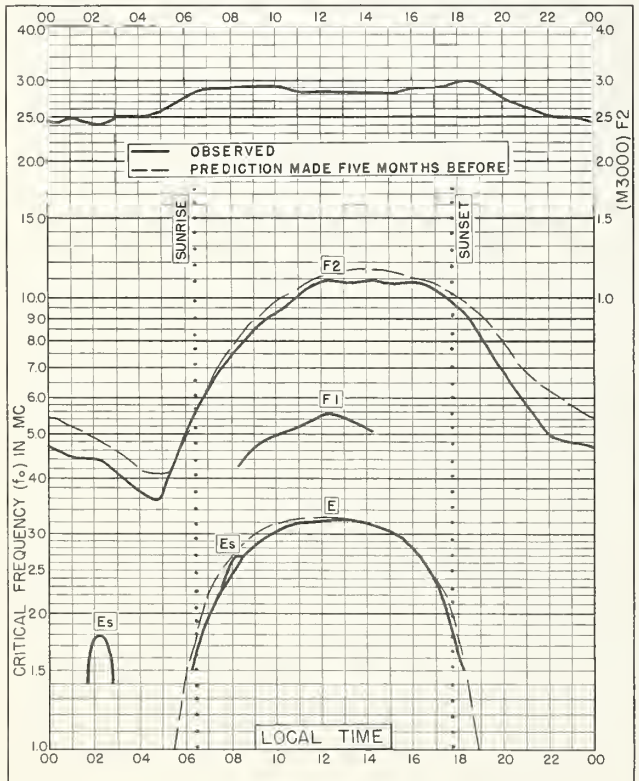


Fig. 7. UPSALA, SWEDEN
59.8°N, 17.6°E MARCH 1957

NBS 503

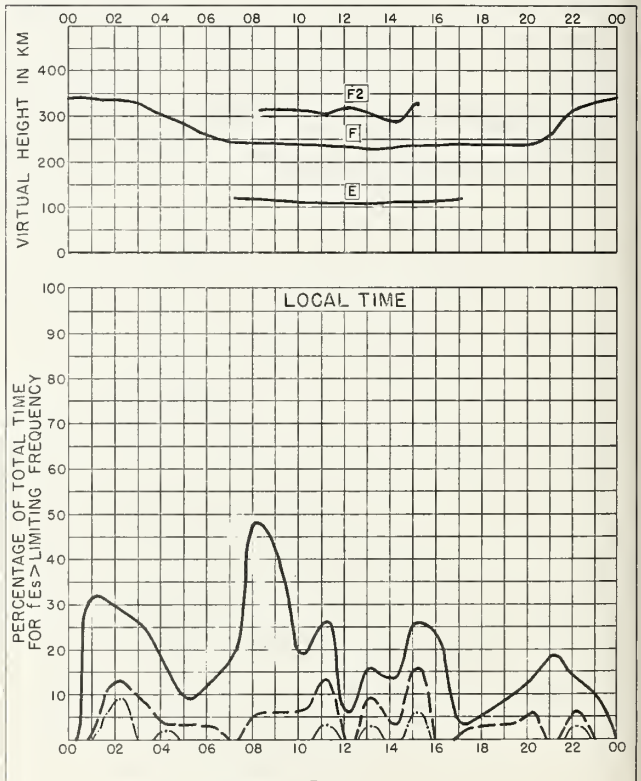


Fig. 8. UPSALA, SWEDEN MARCH 1957

NBS 490

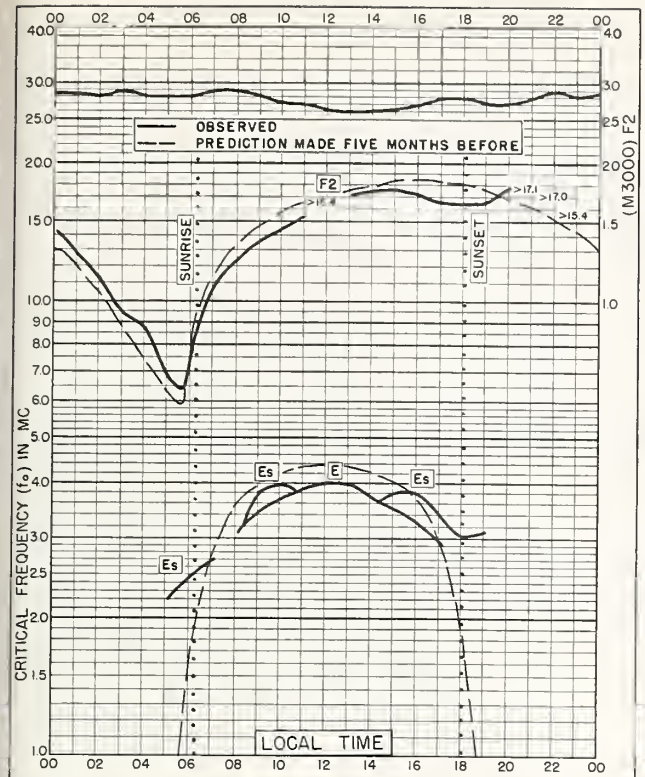


Fig. 9. FORMOSA, CHINA
25.0°N, 121.5°E MARCH 1957

NBS 503

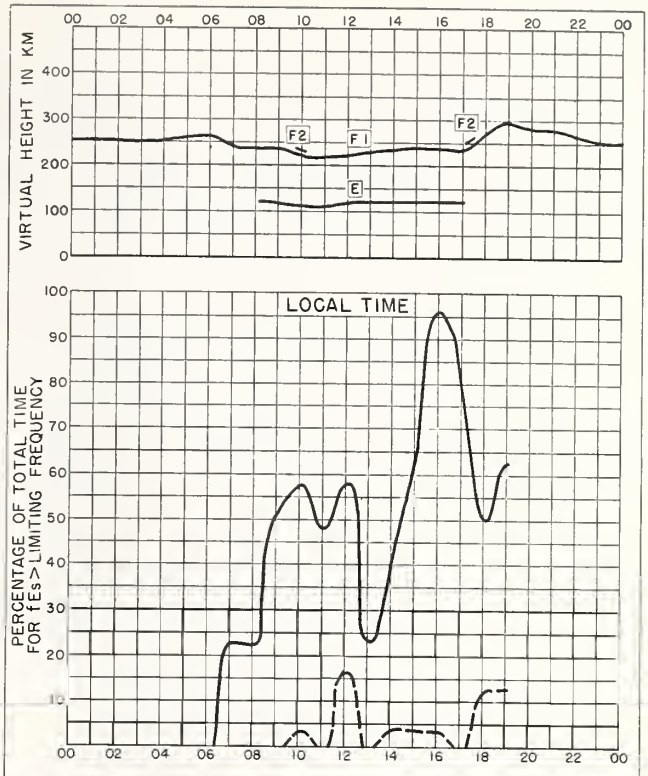


Fig. 10. FORMOSA, CHINA MARCH 1957

NBS 490

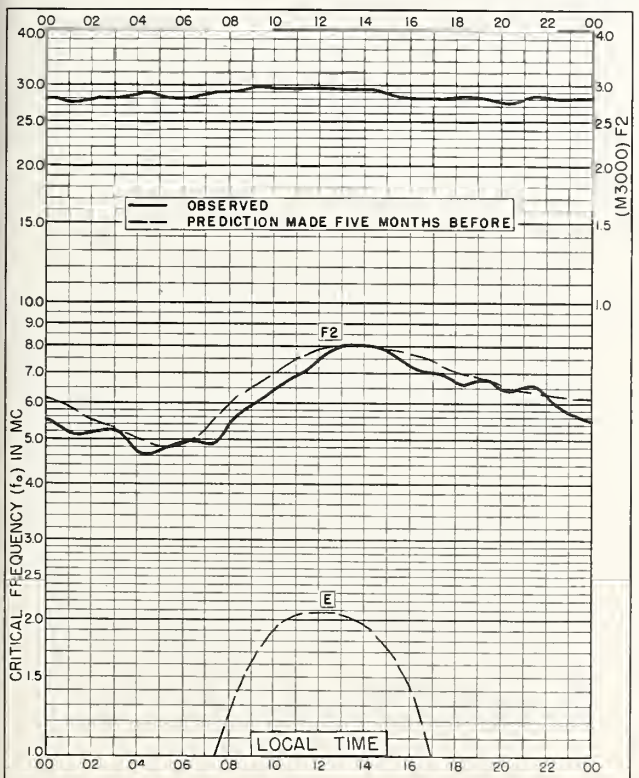


Fig. 11. THULE, GREENLAND
76.6°N, 68.7°W FEBRUARY 1957

NBS 503

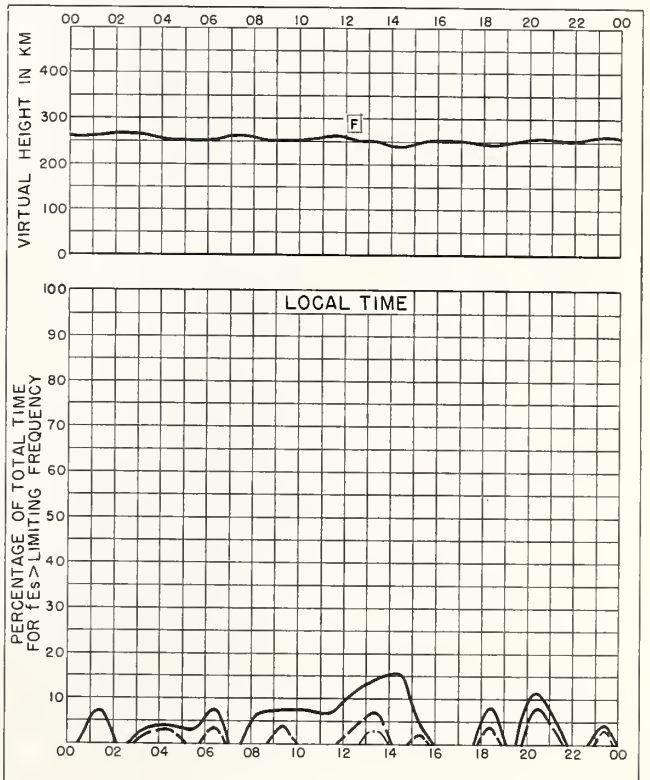


Fig. 12. THULE, GREENLAND FEBRUARY 1957

NBS 490

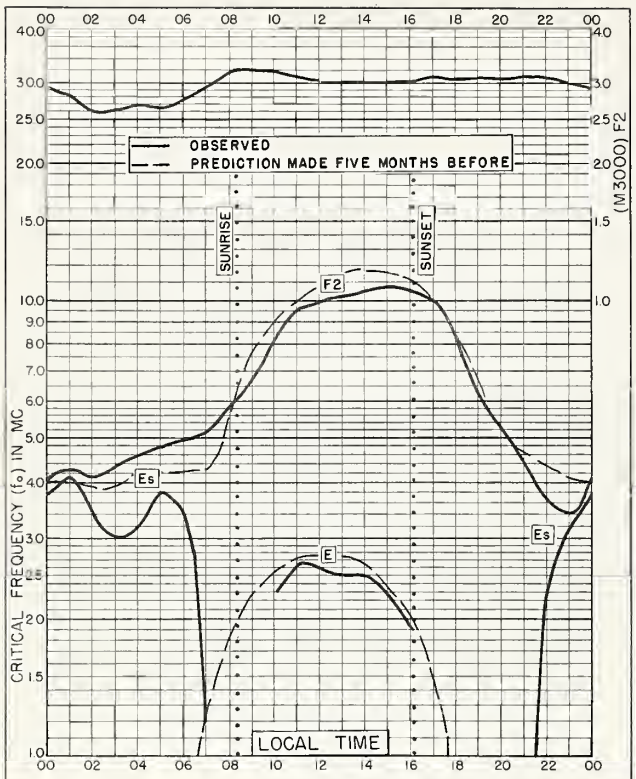


Fig. 13. FAIRBANKS, ALASKA
64.9°N, 147.8°W FEBRUARY 1957

NBS 503

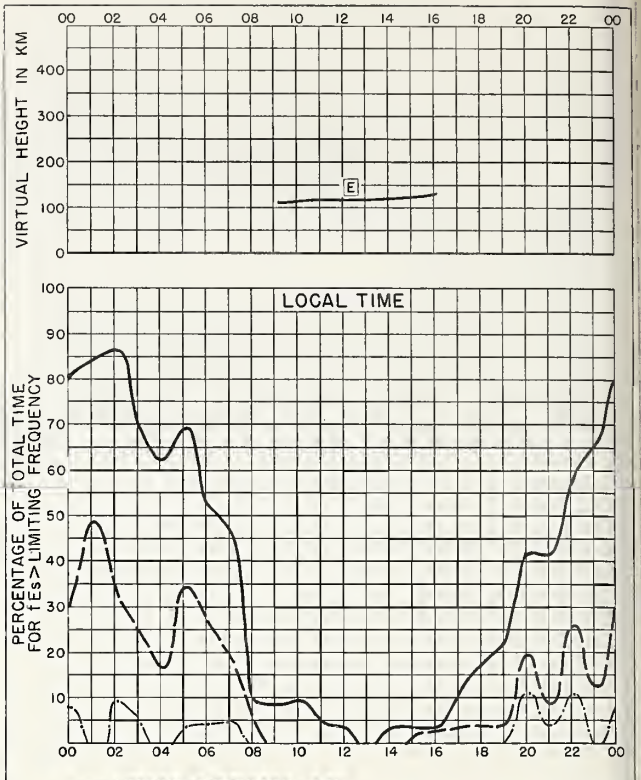


Fig. 14. FAIRBANKS, ALASKA FEBRUARY 1957

NBS 490

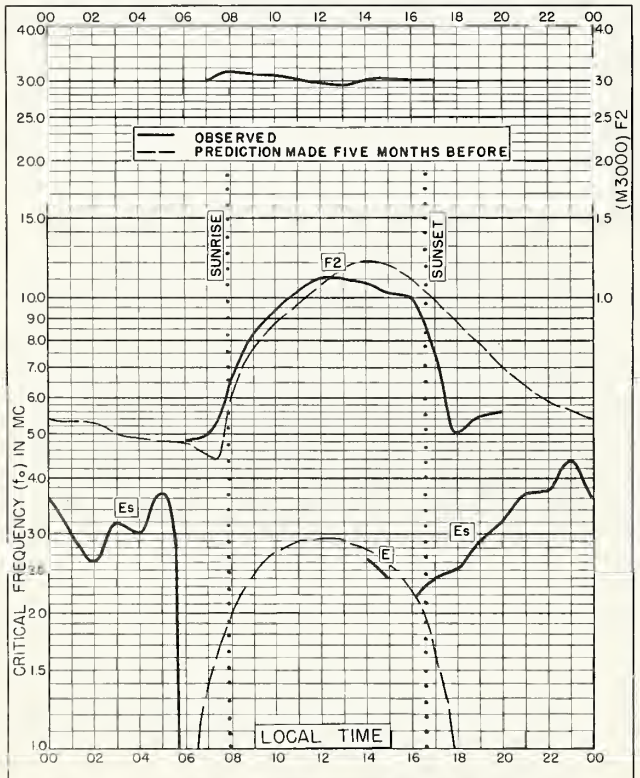


Fig. 15. NARSARSSUAK, GREENLAND
61.2°N, 45.4°W FEBRUARY 1957

NBS 503

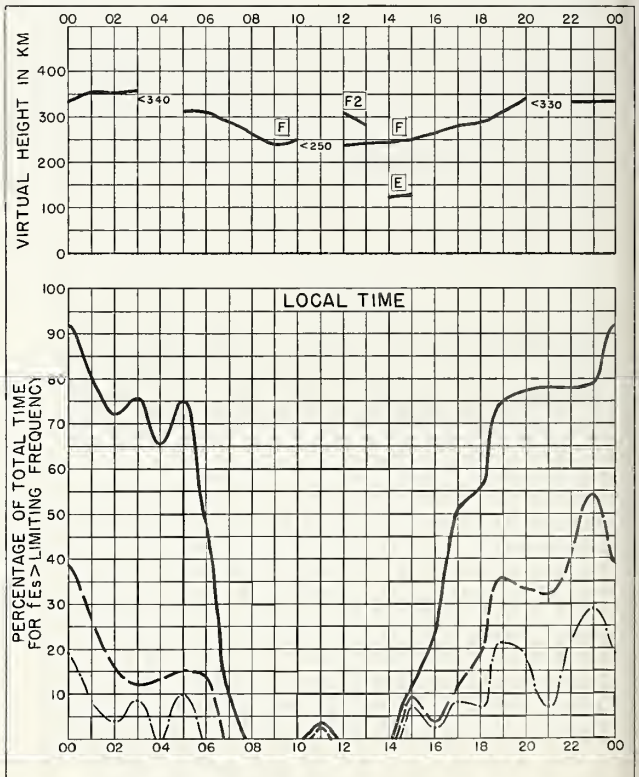


Fig. 16. NARSARSSUAK, GREENLAND FEBRUARY 1957

NBS 490

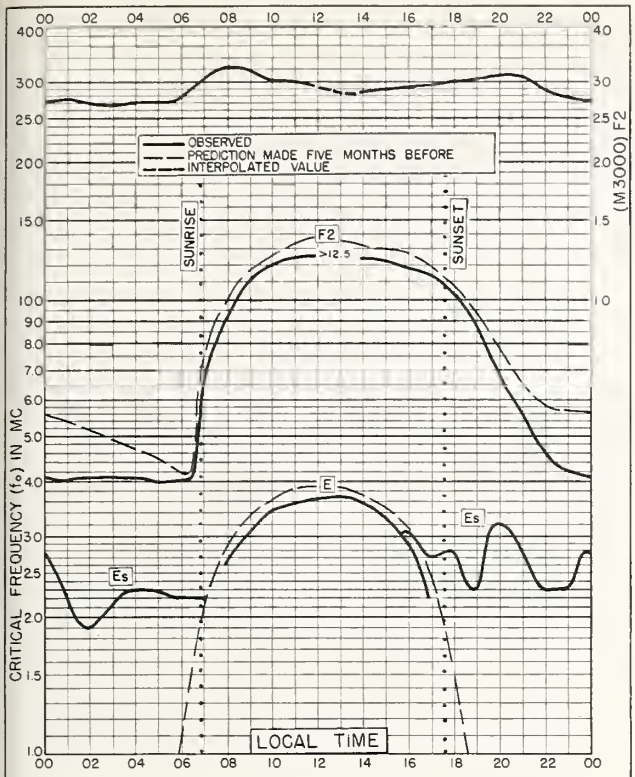
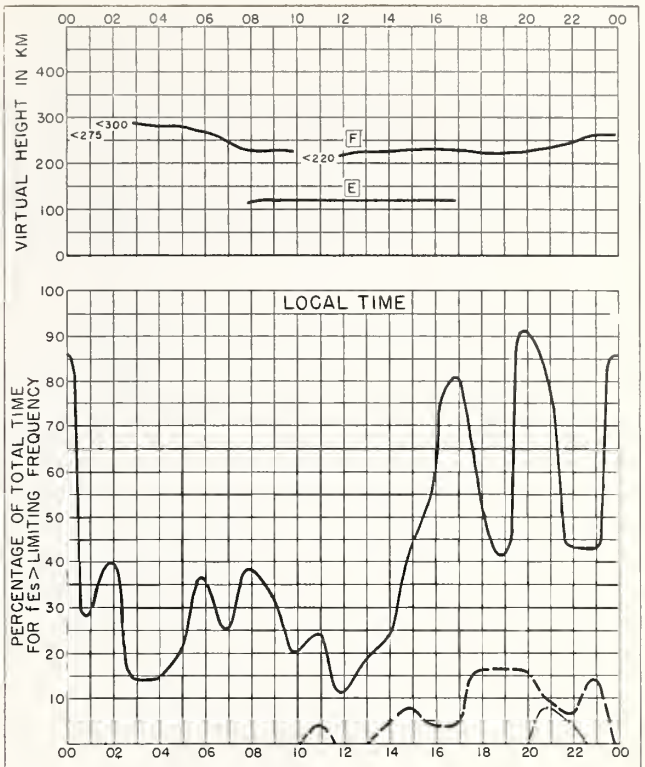


Fig. 17. SAN FRANCISCO, CALIFORNIA
37.4°N, 122.2°W FEBRUARY 1957

NBS 503



FEBRUARY 1957

Fig. 18. SAN FRANCISCO, CALIFORNIA

NBS 490

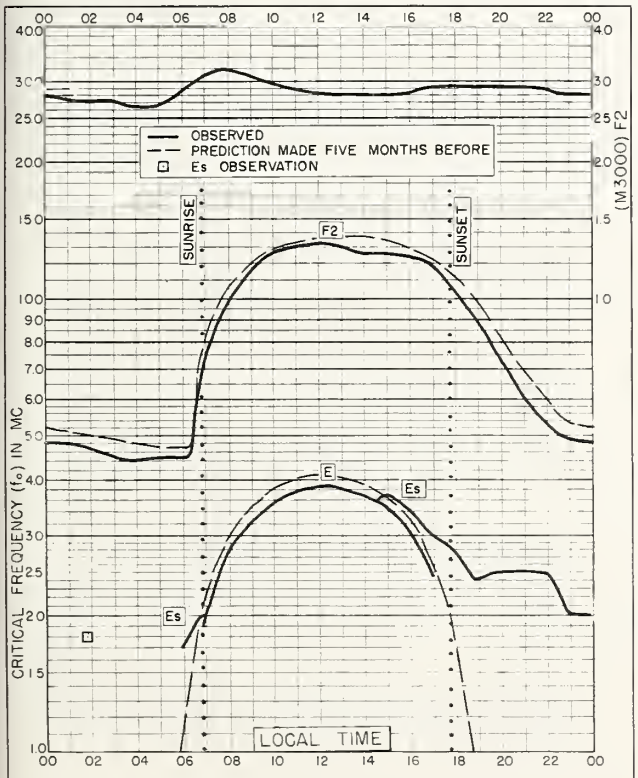
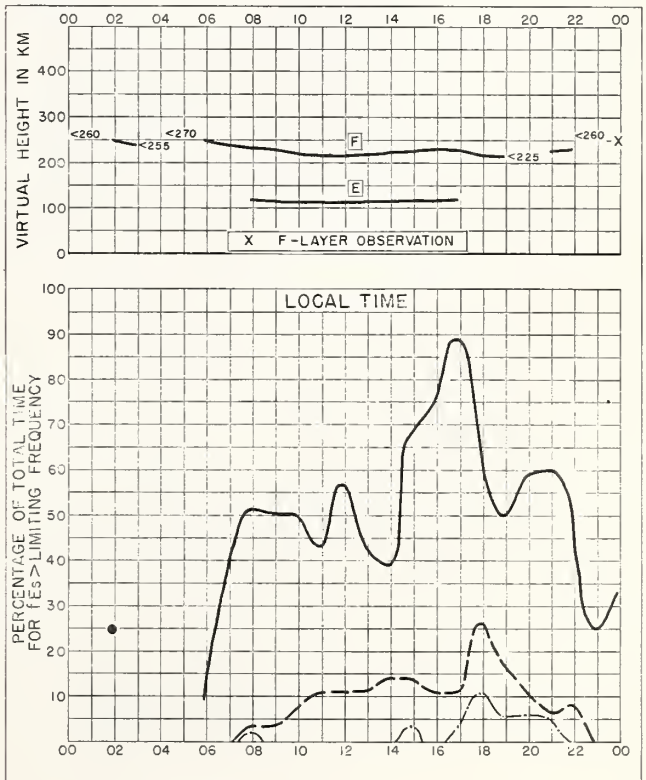


Fig. 19. WHITE SANDS, NEW MEXICO
32.3°N, 106.5°W FEBRUARY 1957

NBS 503



FEBRUARY 1957

Fig. 20. WHITE SANDS, NEW MEXICO

NBS 490

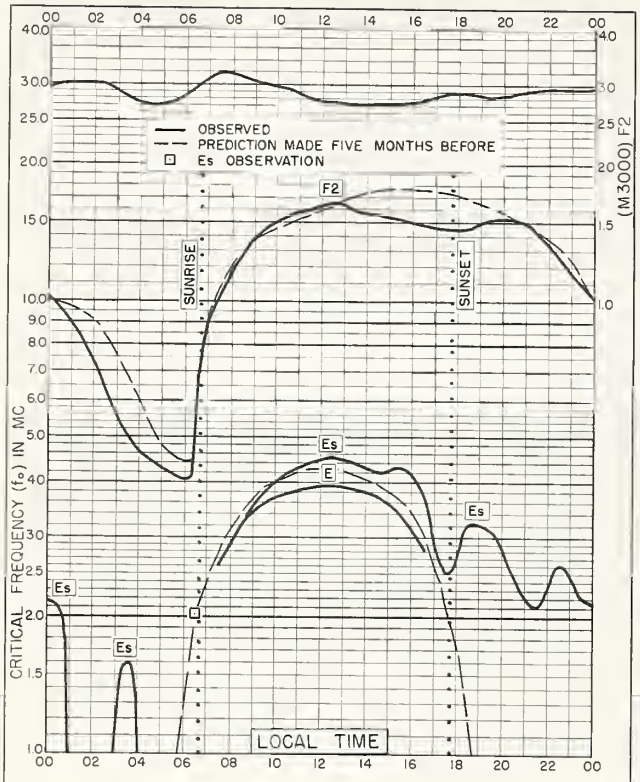


Fig. 21. OKINAWA I.
26.3°N, 127.8°E FEBRUARY 1957

NBS 503

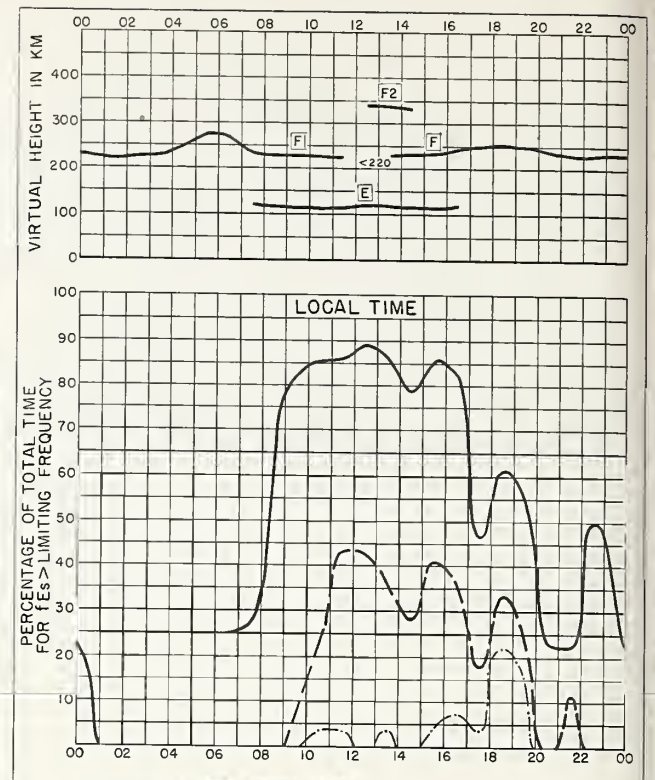


Fig. 22. OKINAWA I. FEBRUARY 1957

NBS 490

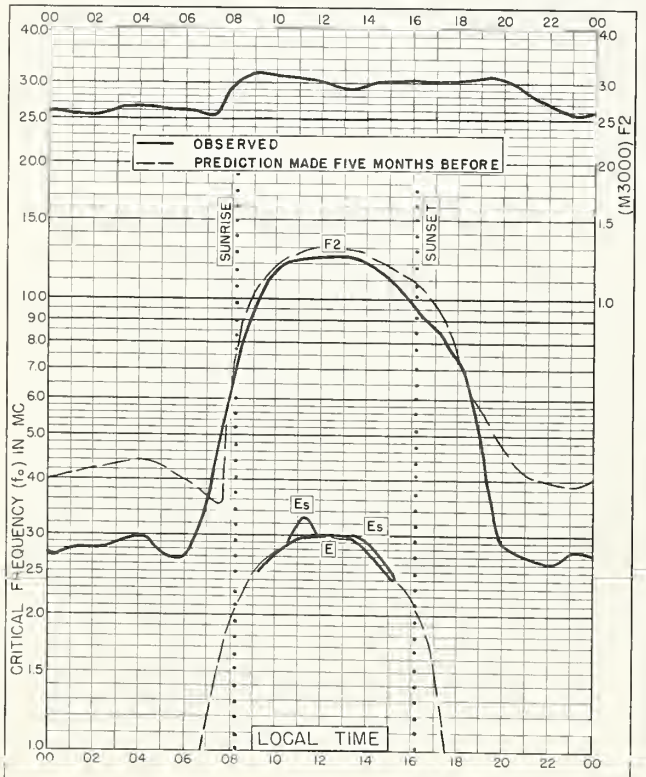


Fig. 23. ADAK, ALASKA
51.9°N, 176.6°W JANUARY 1957

NBS 503

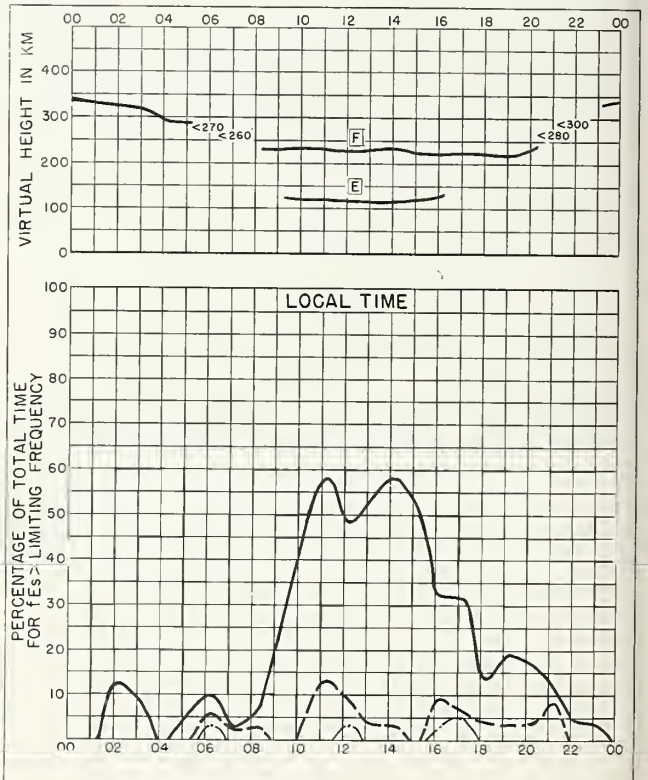


Fig. 24. ADAK, ALASKA JANUARY 1957

NBS 490

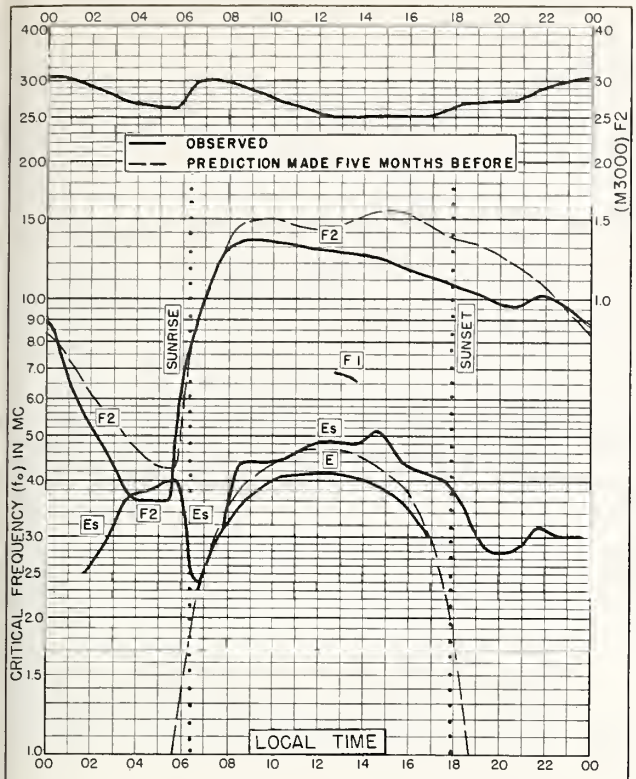


Fig. 25. PANAMA CANAL ZONE
9.4°N, 79.9°W JANUARY 1957

NBS 503

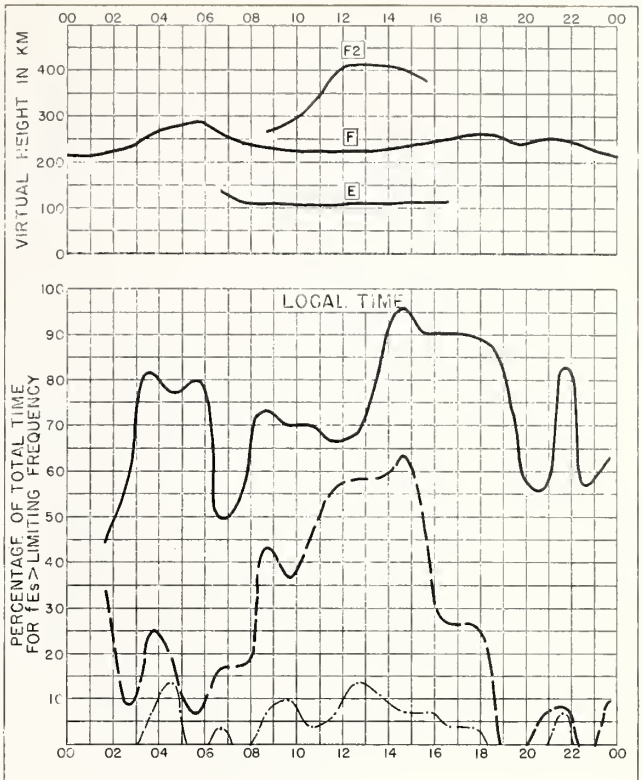


Fig. 26. PANAMA CANAL ZONE JANUARY 1957

NBS 490

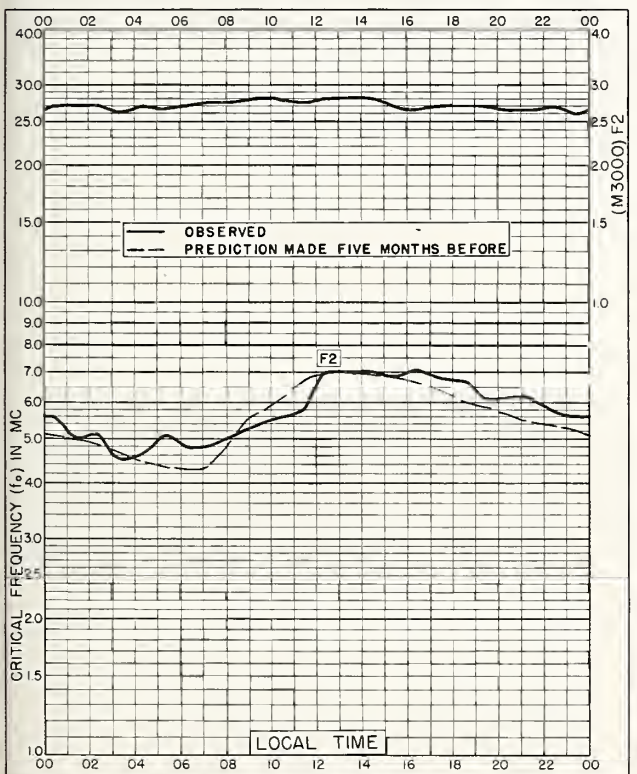


Fig. 27. THULE, GREENLAND
76.6°N, 68.7°W DECEMBER 1956

NBS 503

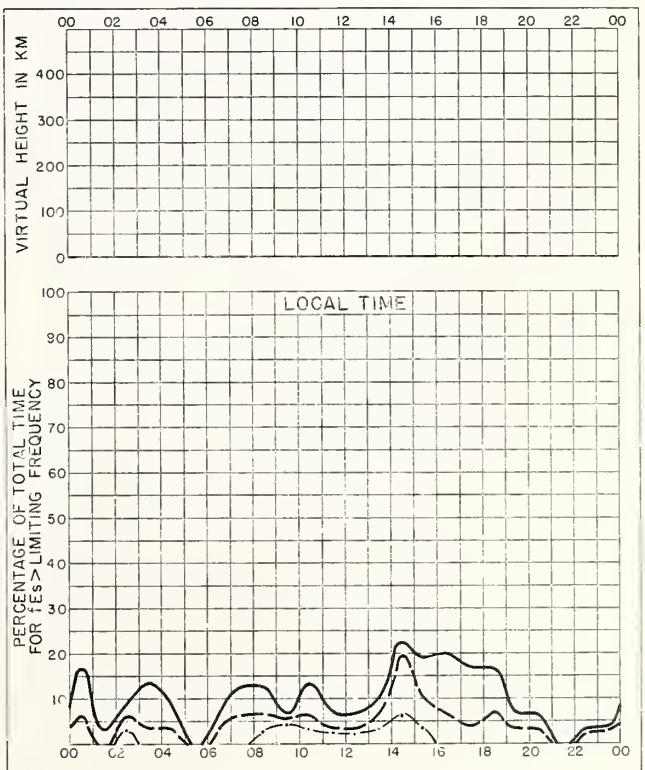


Fig. 28. THULE, GREENLAND DECEMBER 1956

NBS 490

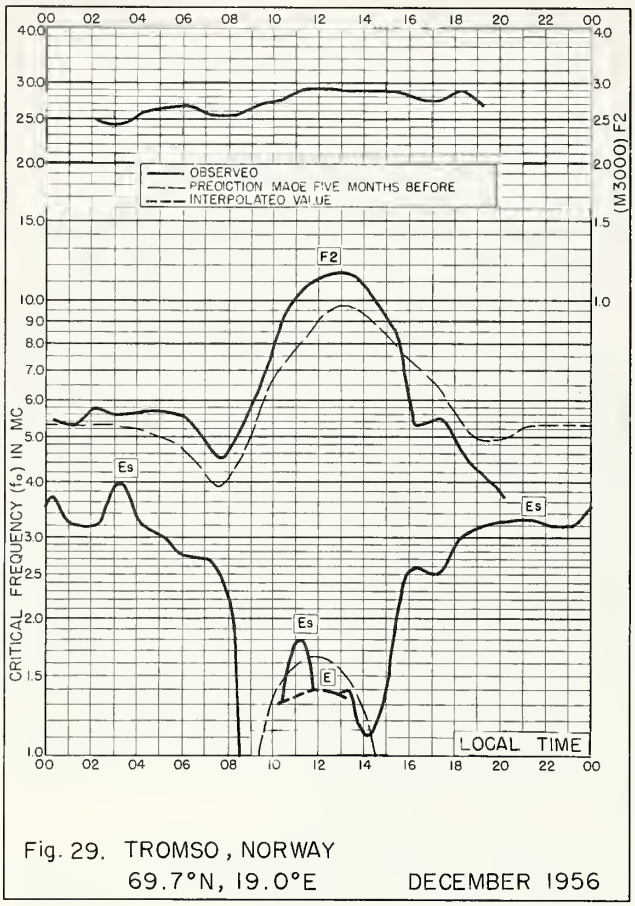


Fig. 29. TROMSO, NORWAY
69.7°N, 19.0°E DECEMBER 1956

NBS 503

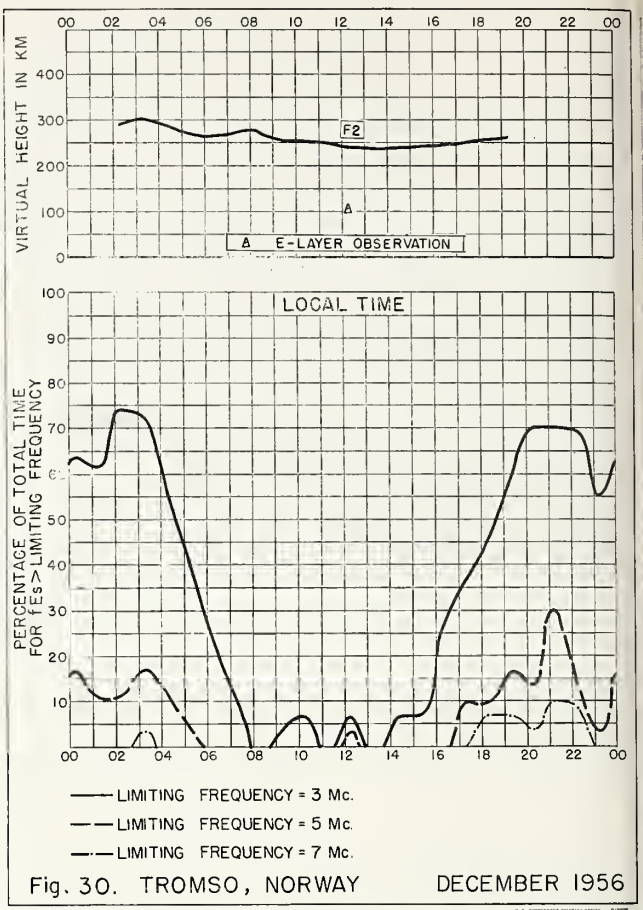


Fig. 30. TROMSO, NORWAY DECEMBER 1956

NBS 490

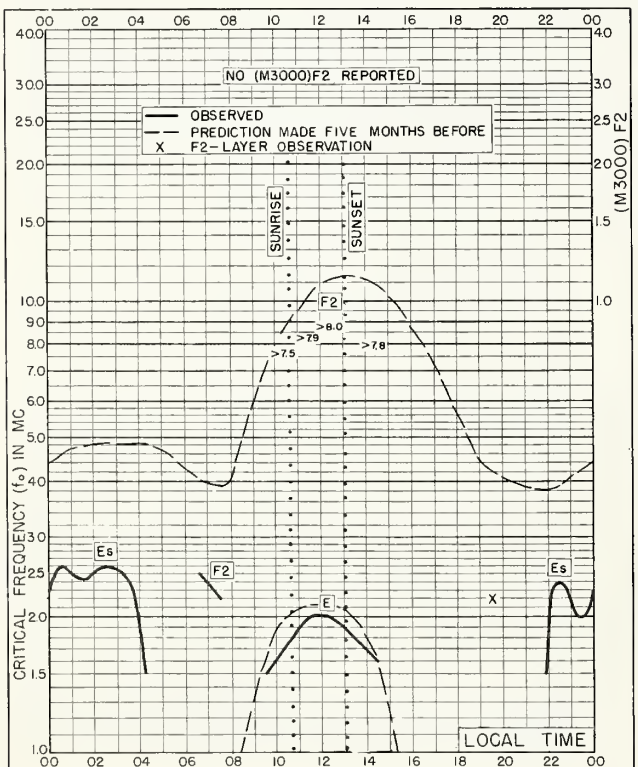


Fig. 31. LULEA, SWEDEN
65.6°N, 22.1°E DECEMBER 1956

NBS 503

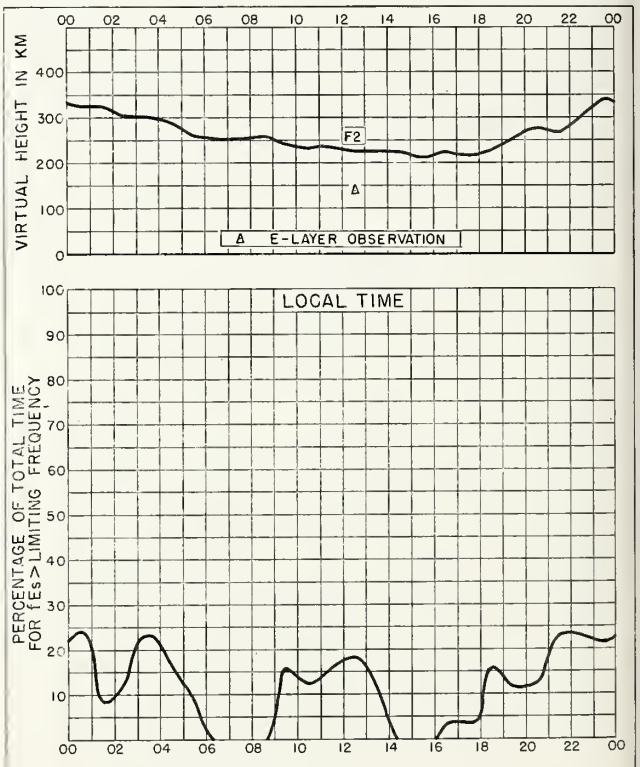


Fig. 32. LULEA, SWEDEN DECEMBER 1956

NBS 490

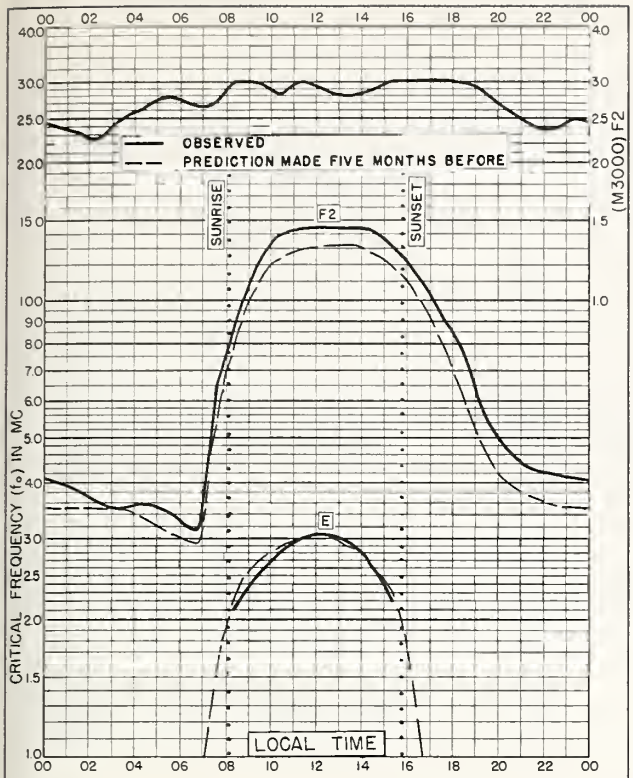


Fig. 33. De BILT, HOLLAND
52.1°N, 5.2°E DECEMBER 1956

NBS 503

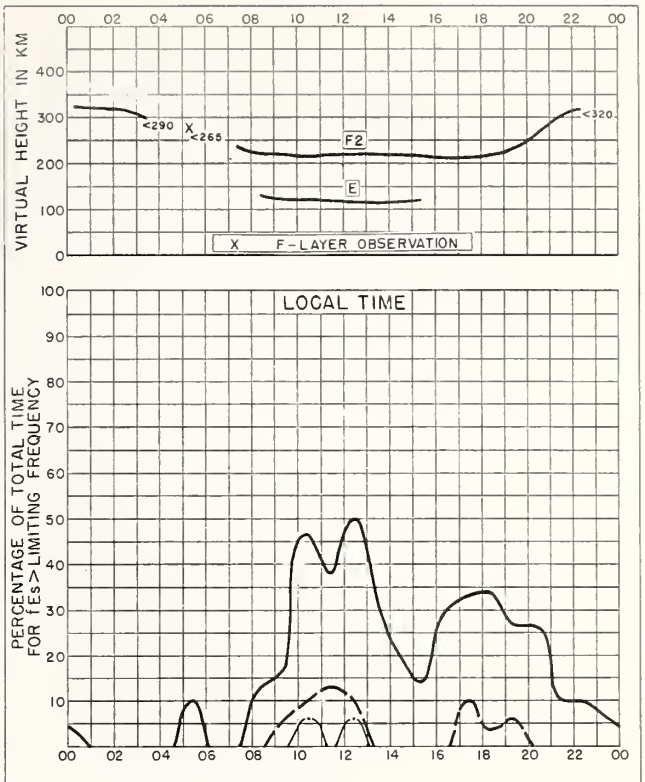


Fig. 34. De BILT, HOLLAND DECEMBER 1956

NBS 490

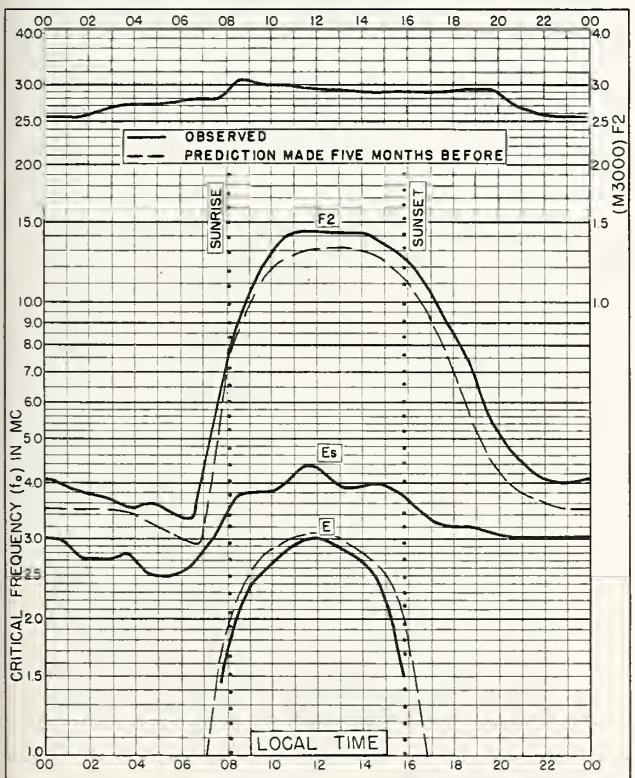


Fig. 35. LINDAU/HARZ, GERMANY
51.6°N, 10.1°E DECEMBER 1956

NBS 503

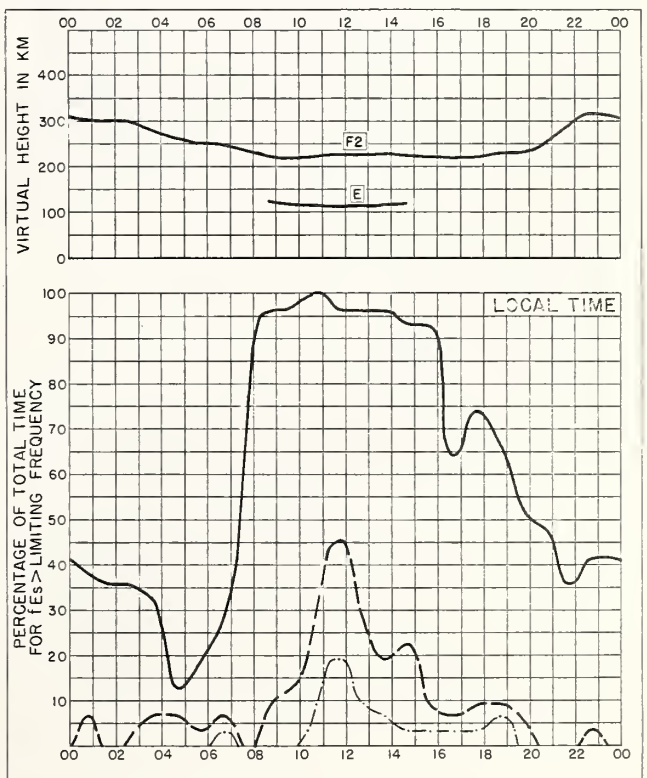


Fig. 36. LINDAU/HARZ, GERMANY DECEMBER 1956

NBS 490

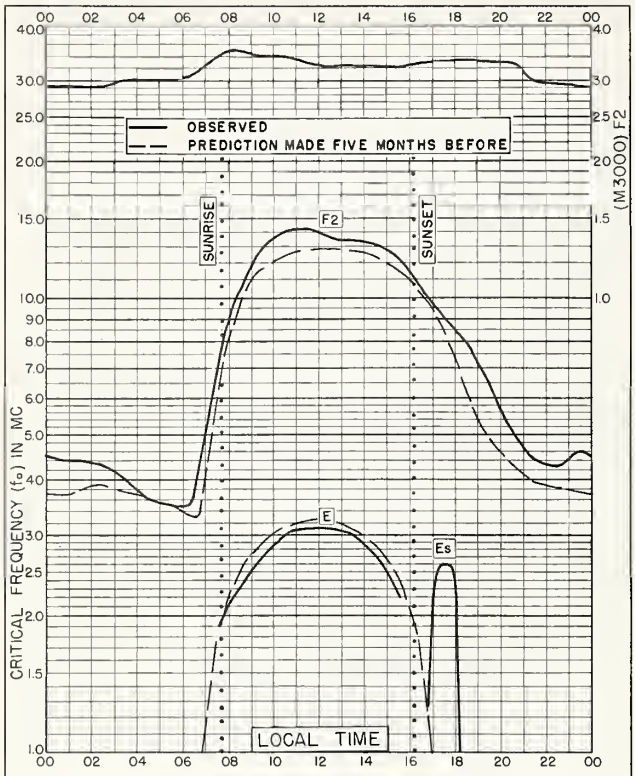
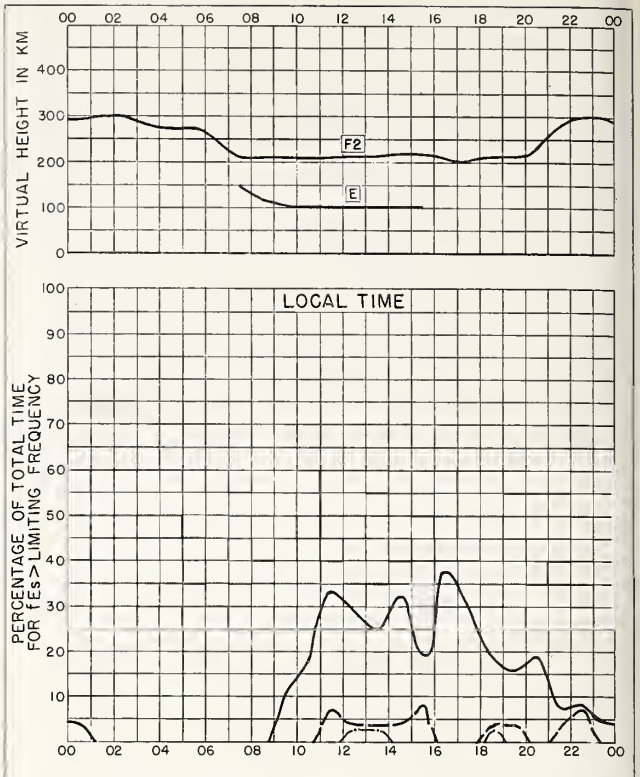


Fig. 37. SCHWARZENBURG, SWITZERLAND
46.8°N, 7.3°E DECEMBER 1956

NBS 503



DECEMBER 1956

Fig. 38. SCHWARZENBURG, SWITZERLAND

NBS 490

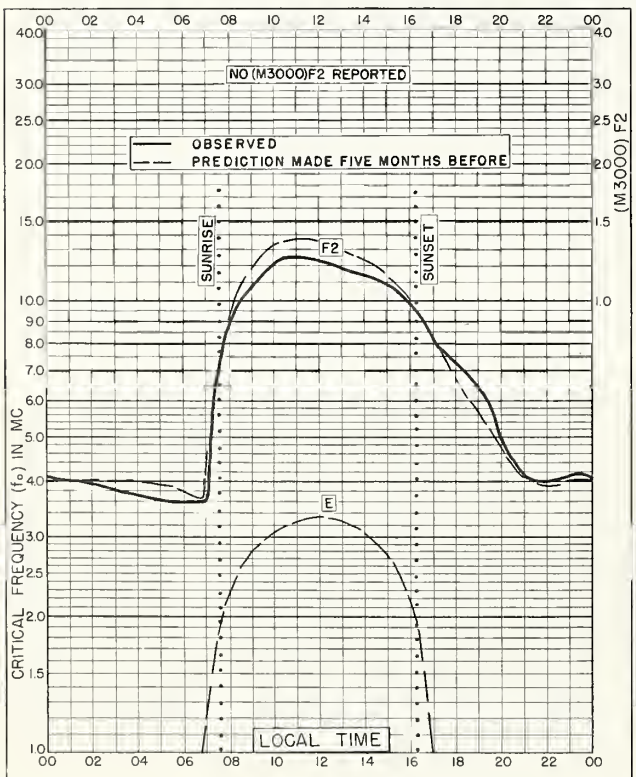


Fig. 39. WAKKANAI, JAPAN
45.4°N, 141.7°E DECEMBER 1956

NBS 503

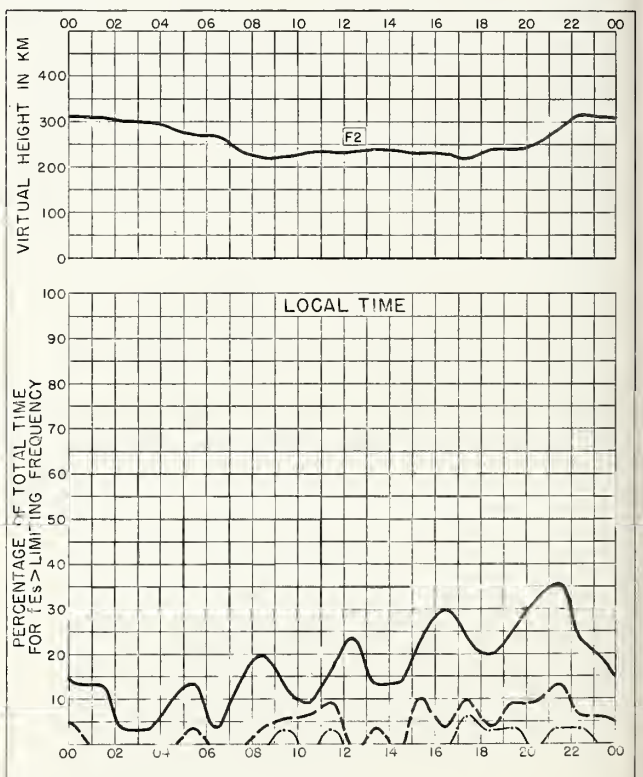


Fig. 40. WAKKANAI, JAPAN DECEMBER 1956

NBS 490

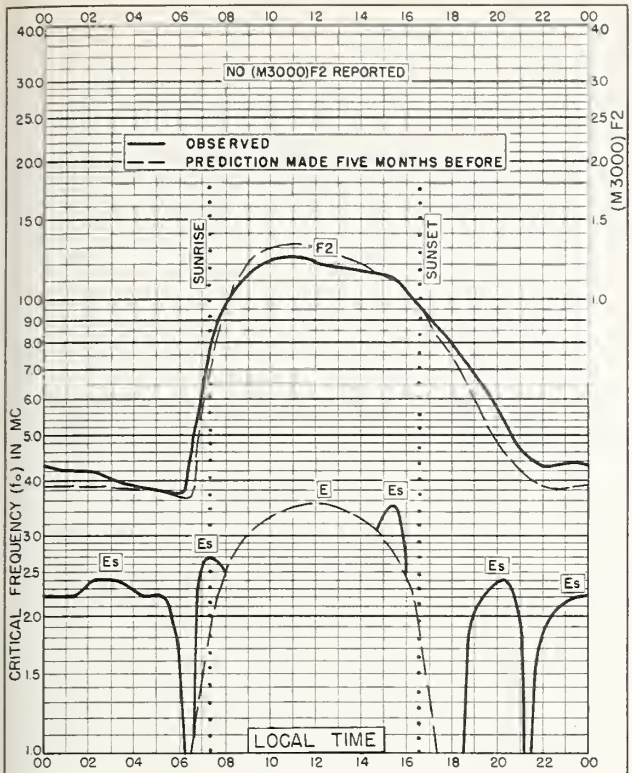


Fig. 41. AKITA, JAPAN
39.7°N, 140.1°E DECEMBER 1956

NBS 503

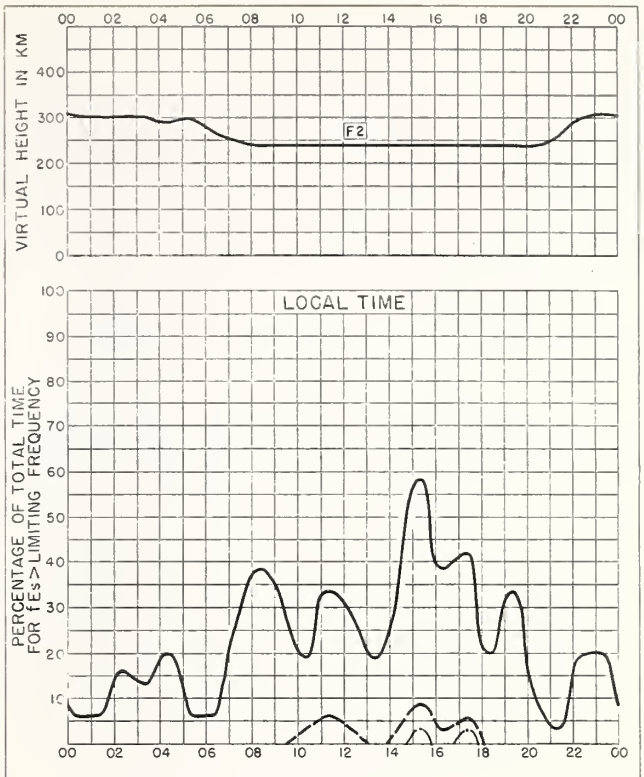


Fig. 42. AKITA, JAPAN DECEMBER 1956

NBS 490

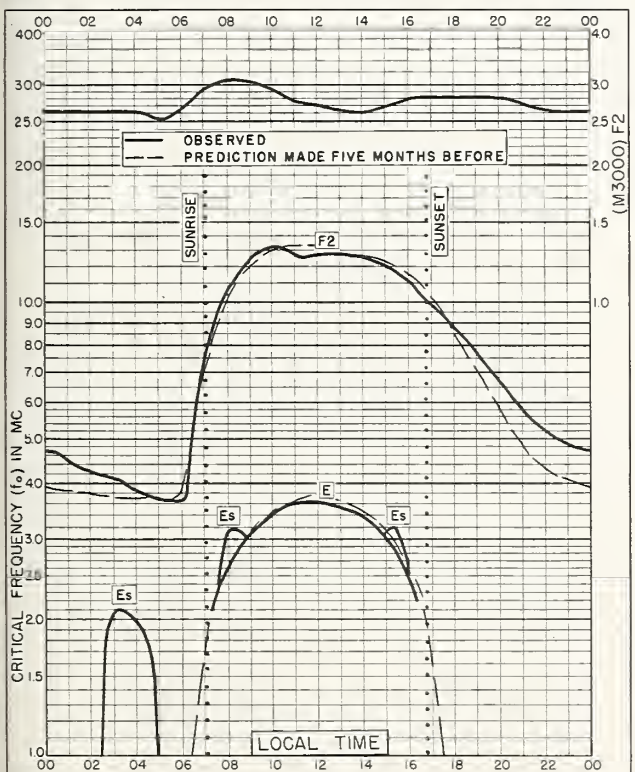


Fig. 43. TOKYO, JAPAN
35.7°N, 139.5°E DECEMBER 1956

NBS 503

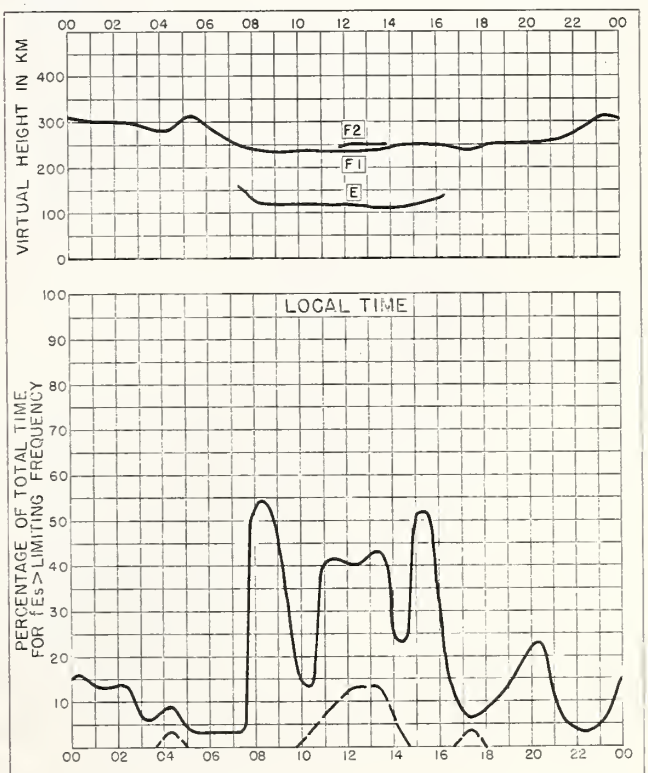


Fig. 44. TOKYO, JAPAN DECEMBER 1956

NBS 490

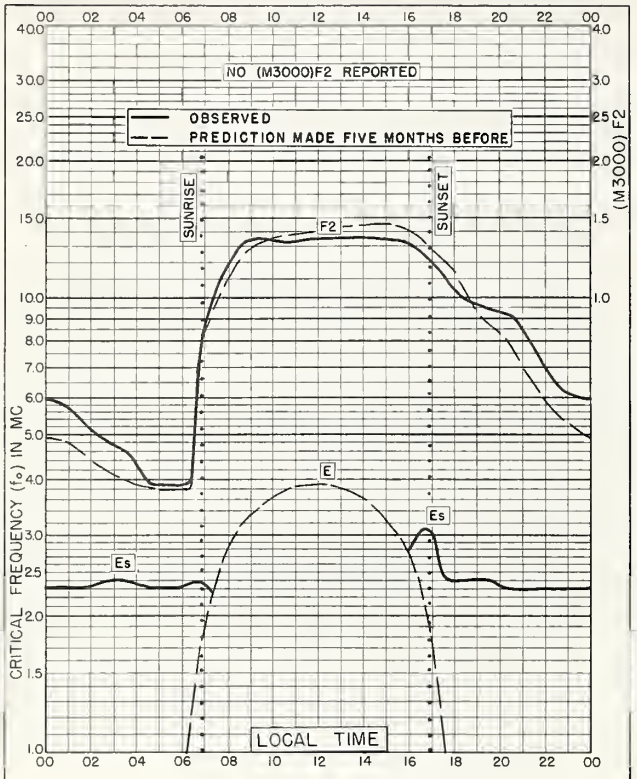


Fig. 45. YAMAGAWA, JAPAN
31.2°N, 130.6°E DECEMBER 1956

NBS 503

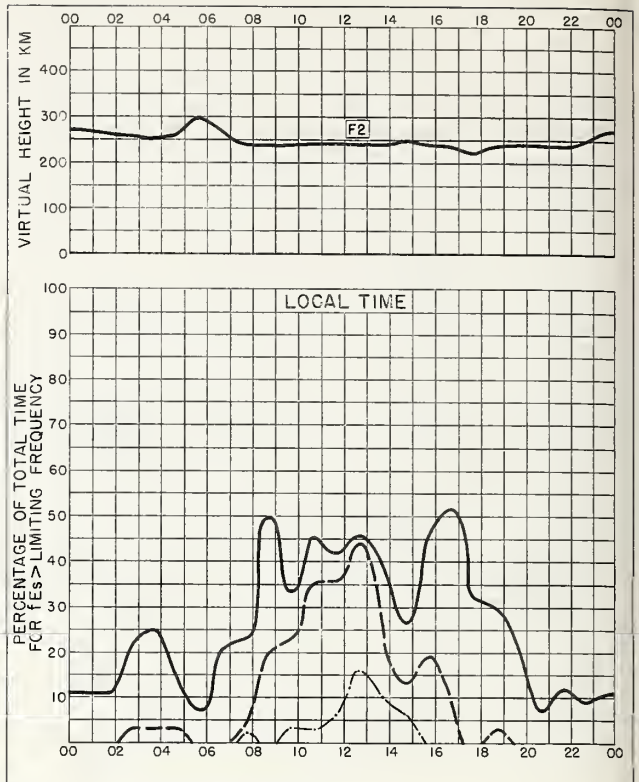


Fig. 46. YAMAGAWA, JAPAN DECEMBER 1956

NBS 490

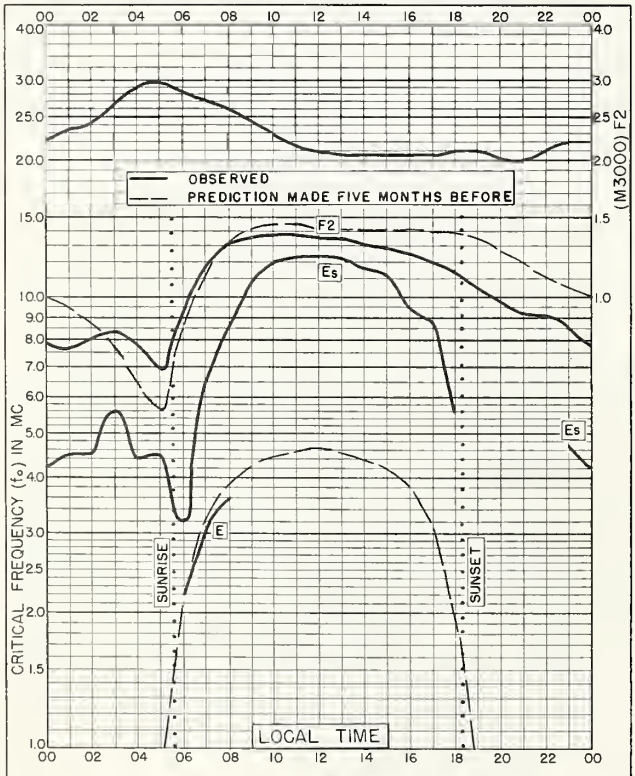


Fig. 47. HUANCAYO, PERU
12.0°S, 75.3°W DECEMBER 1956

NBS 503

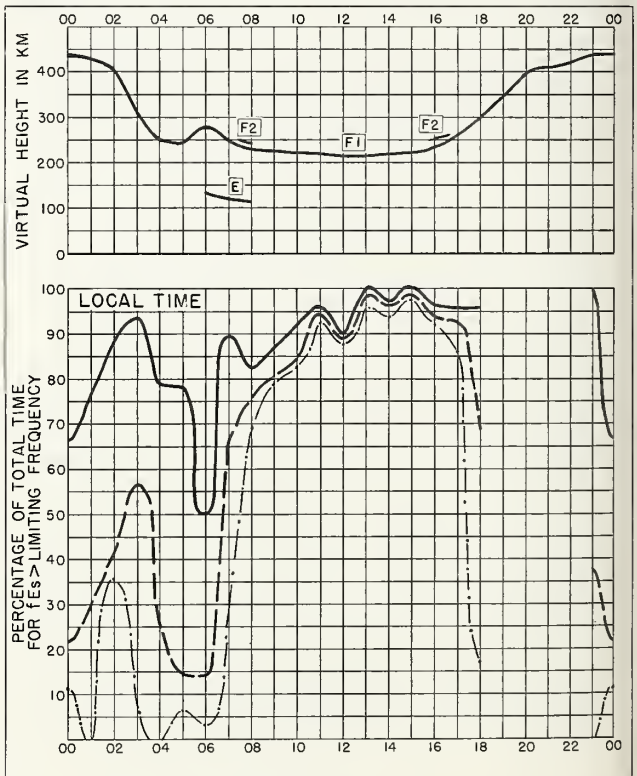


Fig. 48. HUANCAYO, PERU DECEMBER 1956

NBS 490

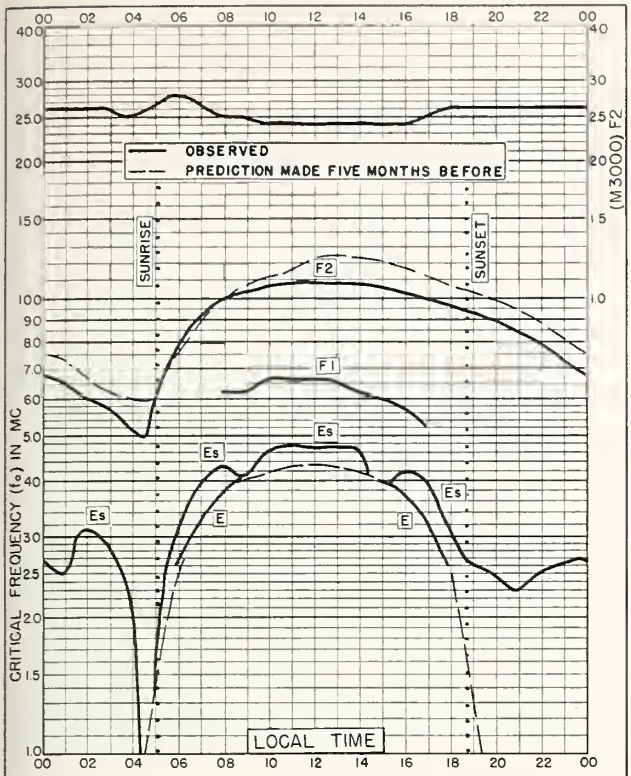


Fig. 49. JOHANNESBURG, UNION OF S. AFRICA
26.2°S, 28.1°E DECEMBER 1956

NBS 503

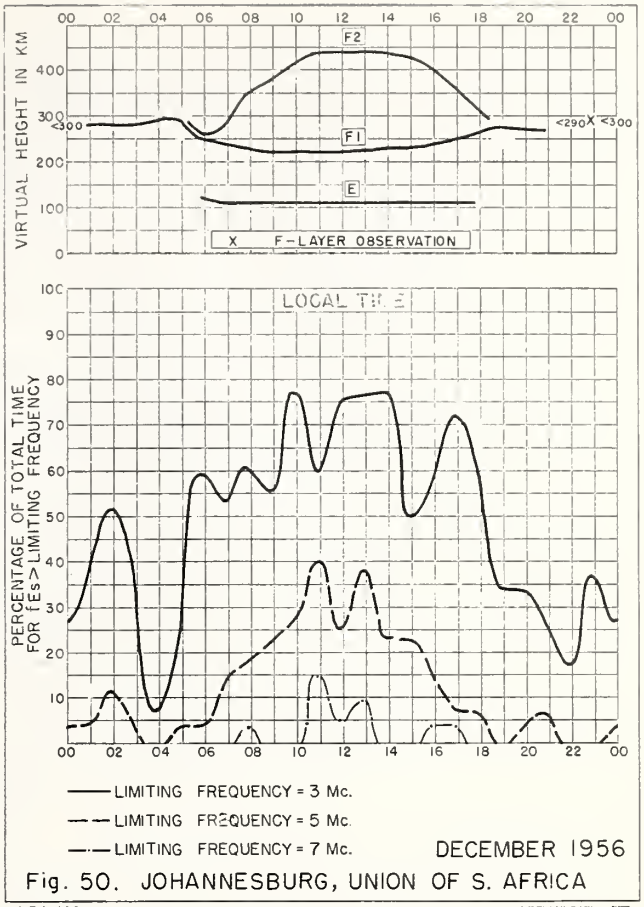


Fig. 50. JOHANNESBURG, UNION OF S. AFRICA DECEMBER 1956

NBS 490

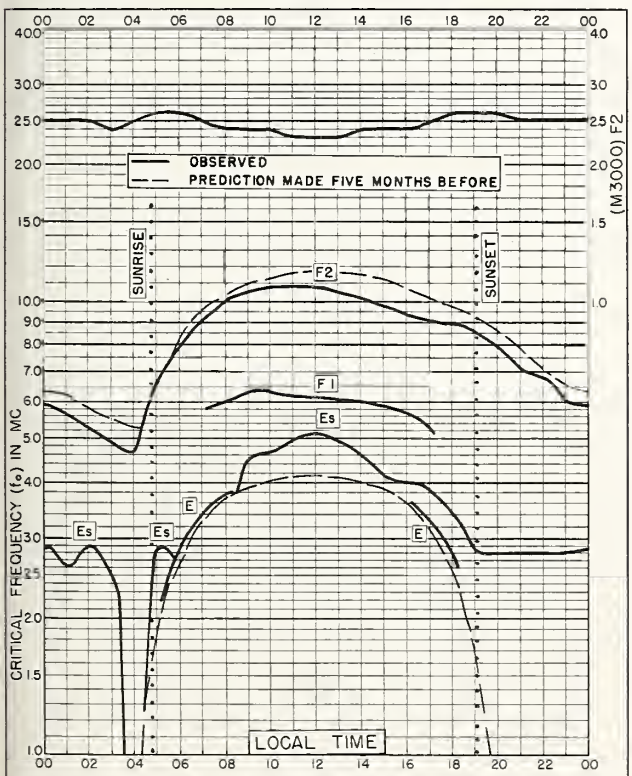


Fig. 51. CAPETOWN, UNION OF S. AFRICA
34.2°S, 18.3°E DECEMBER 1956

NBS 503

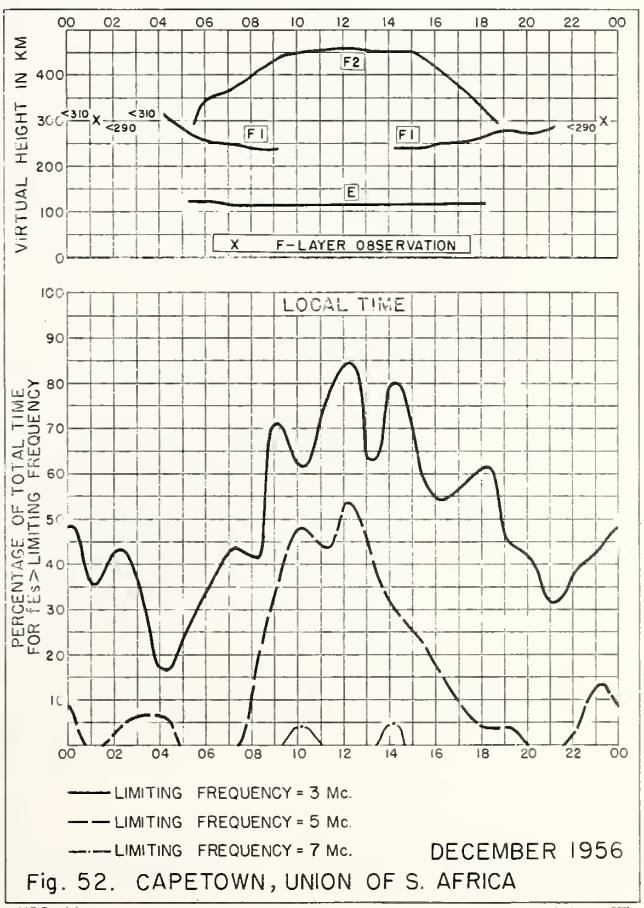


Fig. 52. CAPETOWN, UNION OF S. AFRICA DECEMBER 1956

NBS 490

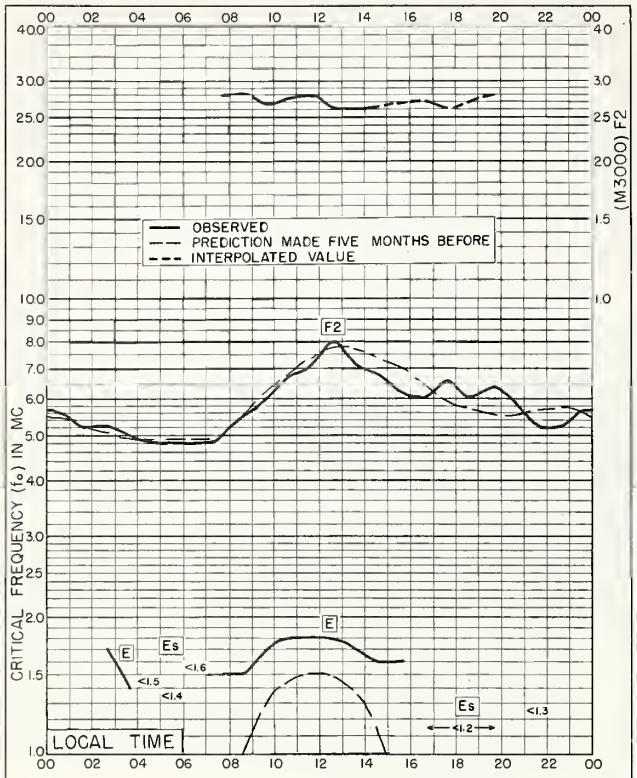
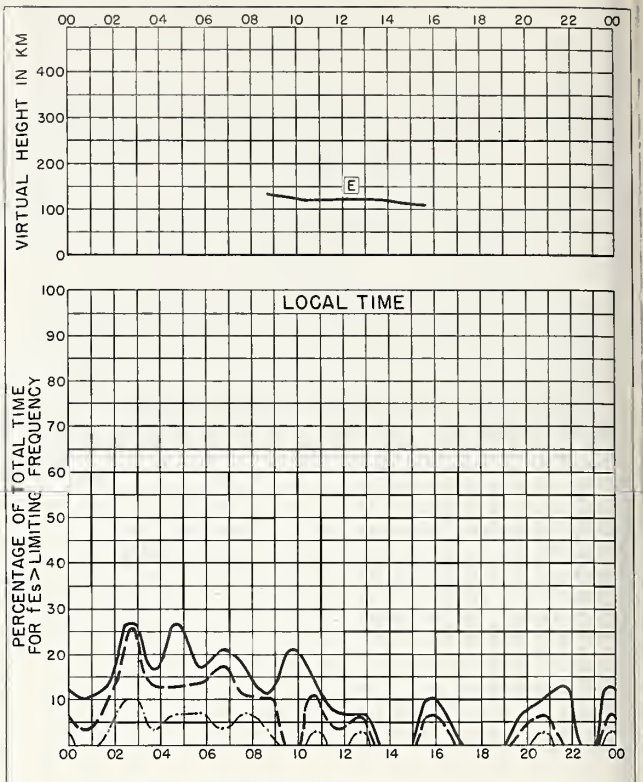


Fig. 53. RESOLUTE BAY, CANADA
74.7°N, 94.9°W NOVEMBER 1956

NBS 503



NOVEMBER 1956

Fig. 54. RESOLUTE BAY, CANADA

NBS 490

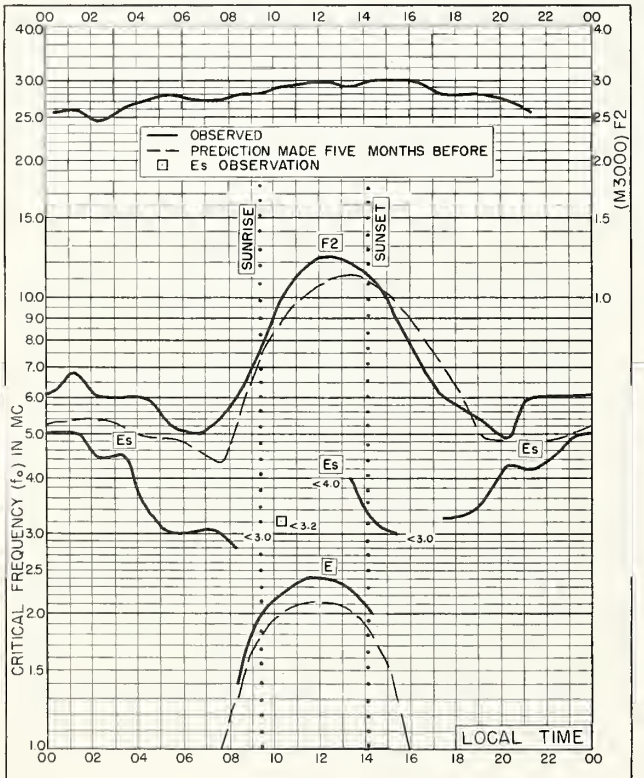


Fig. 55. KIRUNA, SWEDEN
67.8°N, 20.3°E NOVEMBER 1956

NBS 503

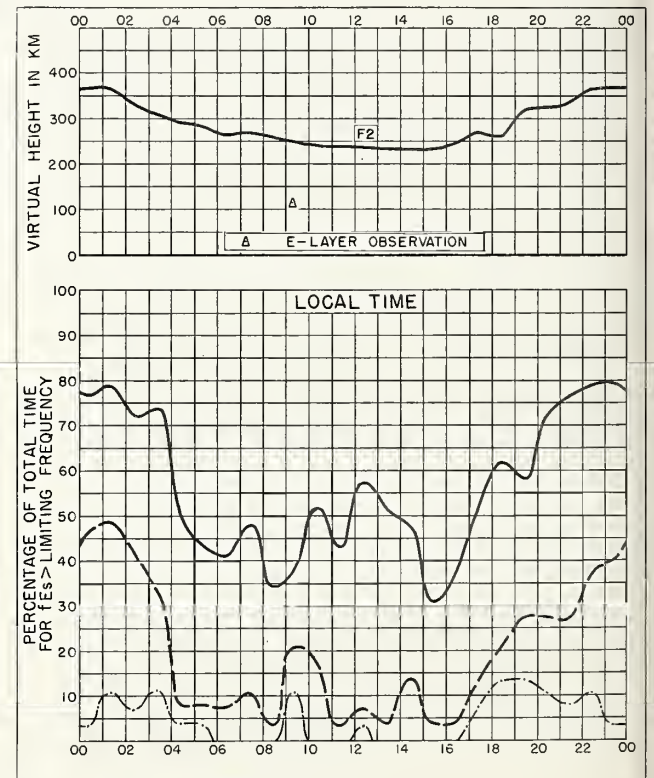


Fig. 56. KIRUNA, SWEDEN NOVEMBER 1956

NBS 490

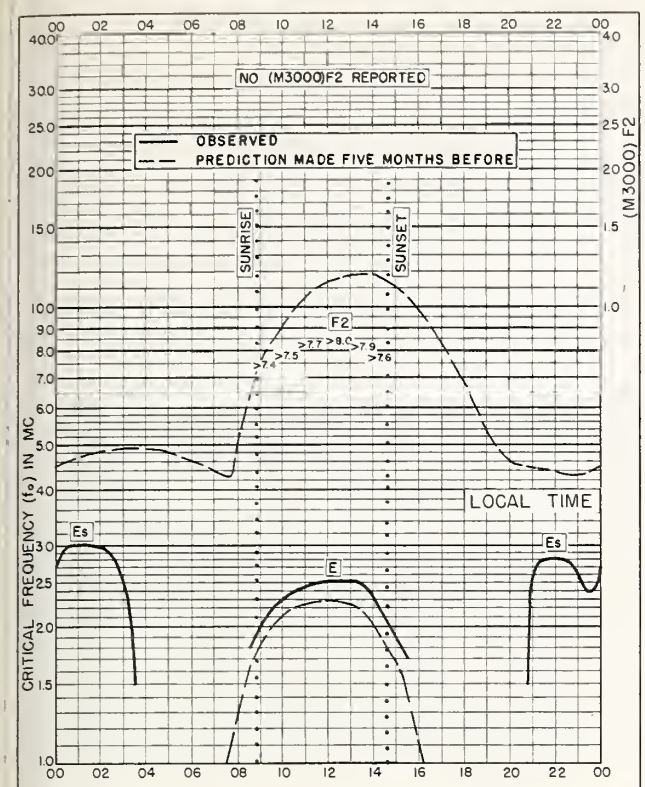


Fig. 57. LULEA, SWEDEN
65.6°N, 22.1°E NOVEMBER 1956

NBS 503

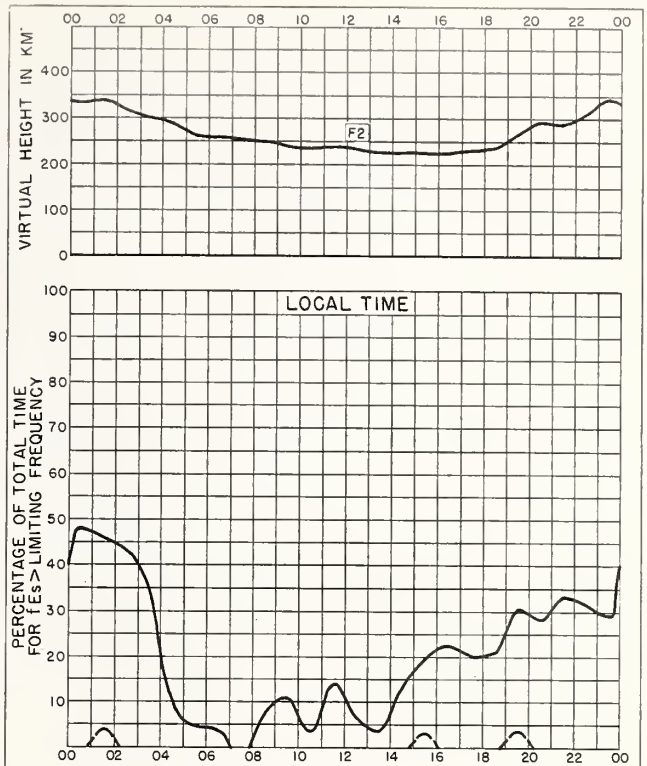


Fig. 58. LULEA, SWEDEN NOVEMBER 1956

NBS 490

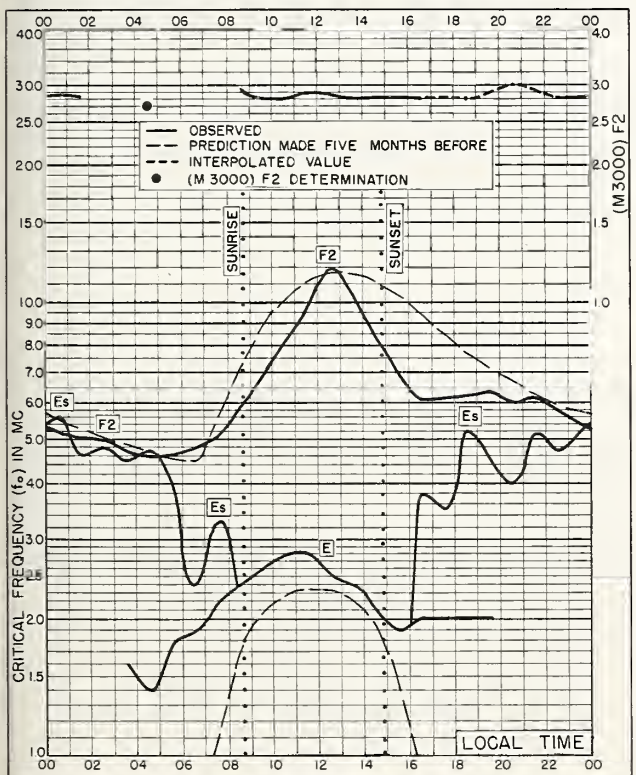


Fig. 59. BAKER LAKE, CANADA
64.3°N, 96.0°W NOVEMBER 1956

NBS 503

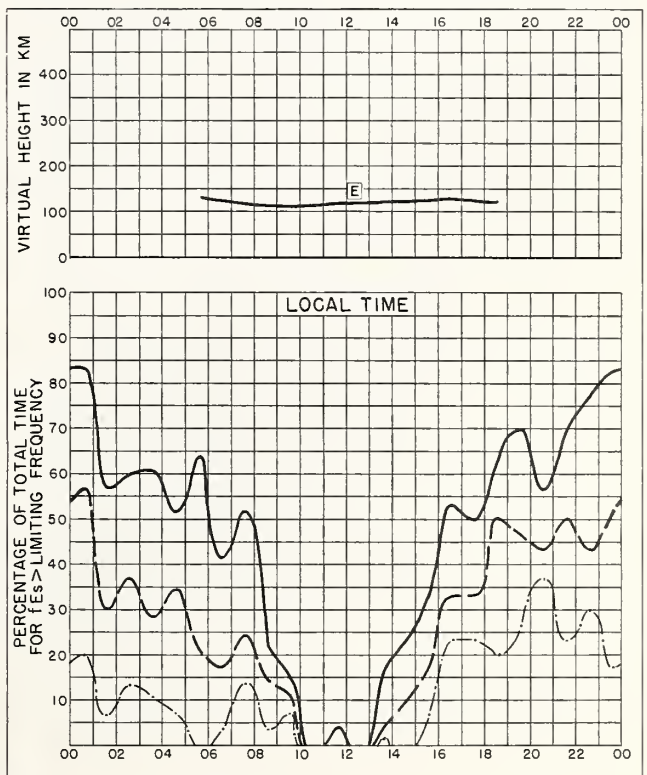


Fig. 60. BAKER LAKE, CANADA NOVEMBER 1956

NBS 490

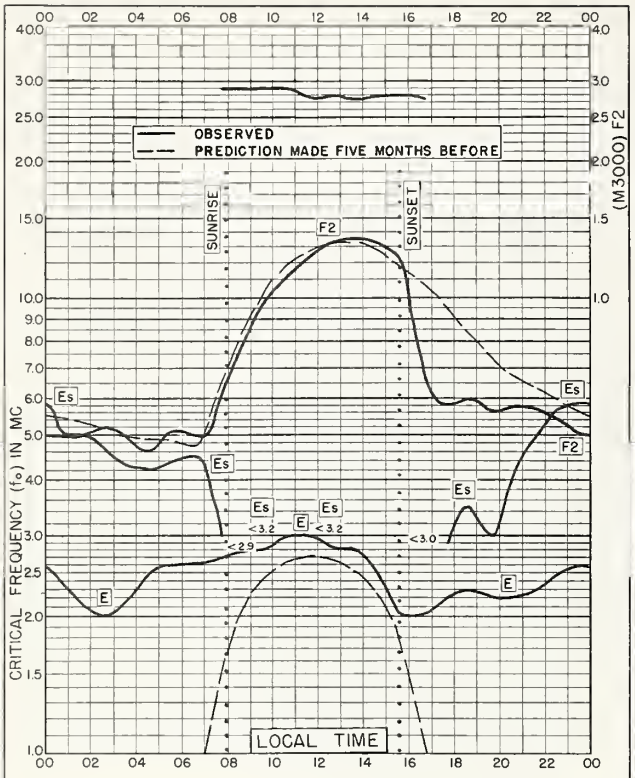


Fig. 61. CHURCHILL, CANADA
58.8°N, 94.2°W NOVEMBER 1956

NBS 503

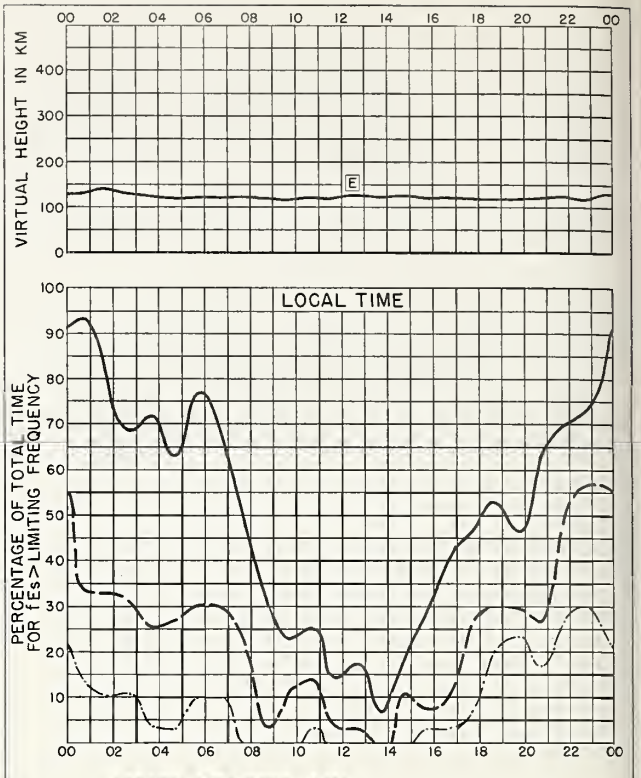


Fig. 62. CHURCHILL, CANADA NOVEMBER 1956

NBS 490

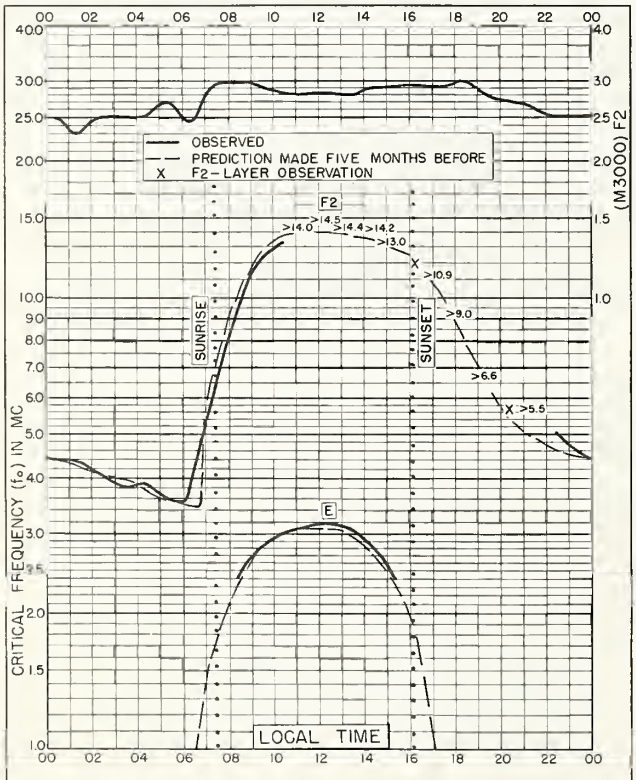


Fig. 63. De BILT, HOLLAND
52.1°N, 5.2°E NOVEMBER 1956

NBS 503

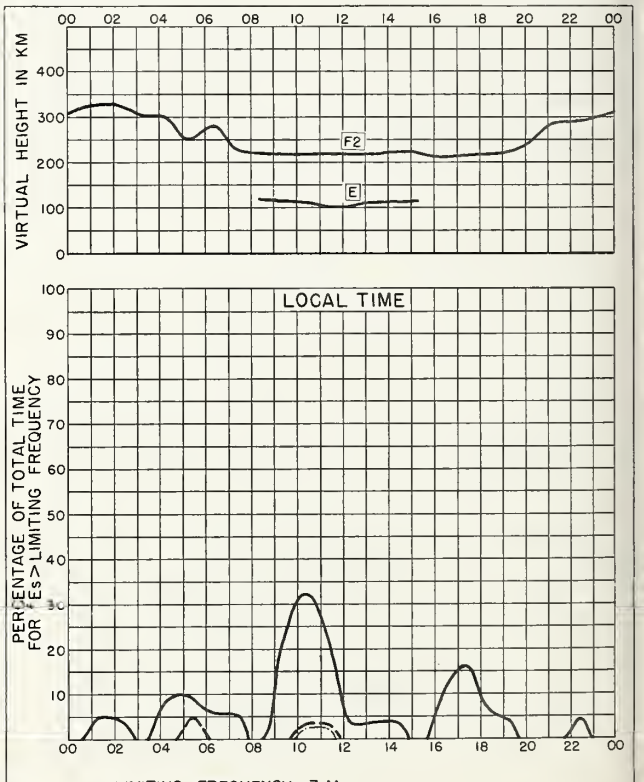


Fig. 64. De BILT, HOLLAND NOVEMBER 1956

NBS 490

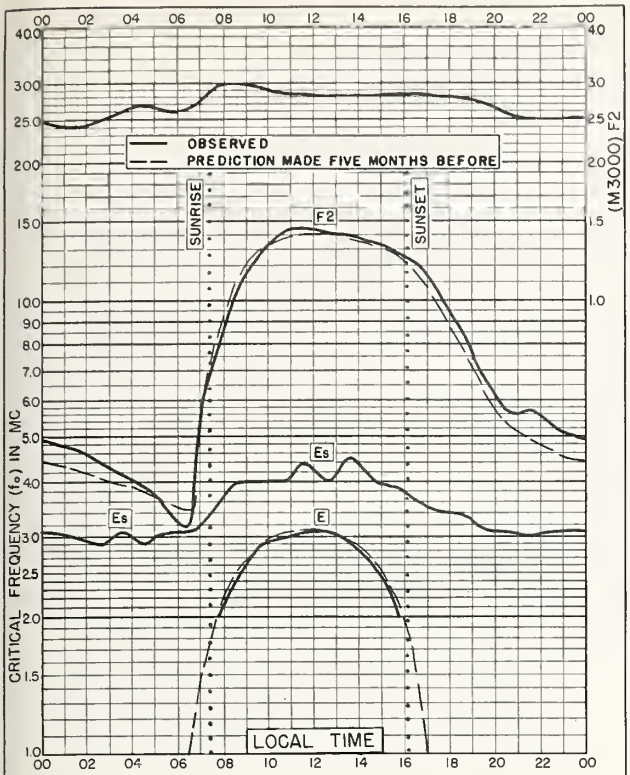


Fig. 65. LINDAU/HARZ, GERMANY
51.6°N, 10.1°E NOVEMBER 1956

NBS 503

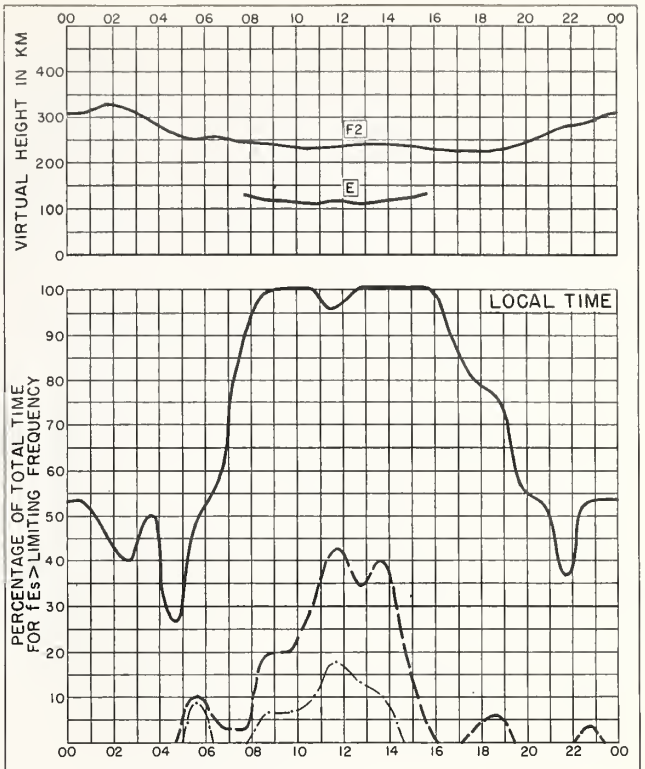


Fig. 66. LINDAU/HARZ, GERMANY NOVEMBER 1956

NBS 490

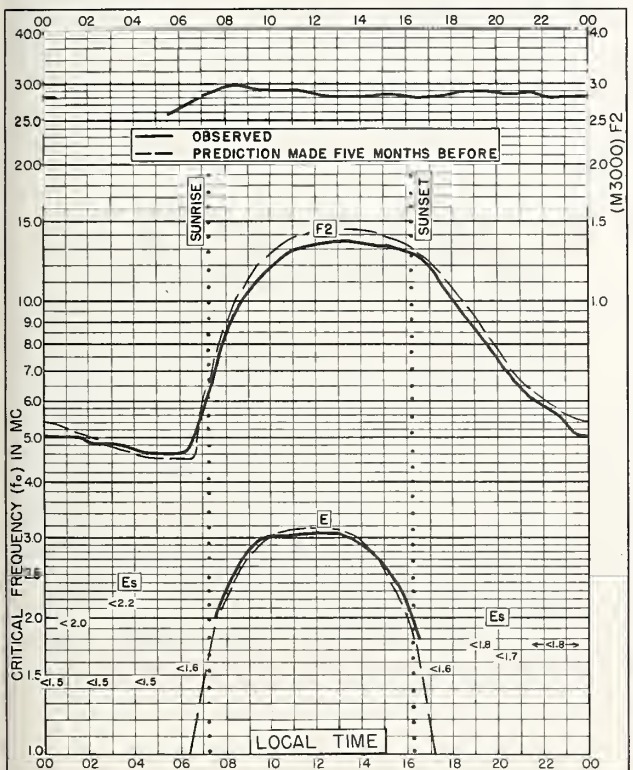


Fig. 67. WINNIPEG, CANADA
49.9°N, 97.4°W NOVEMBER 1956

NBS 503

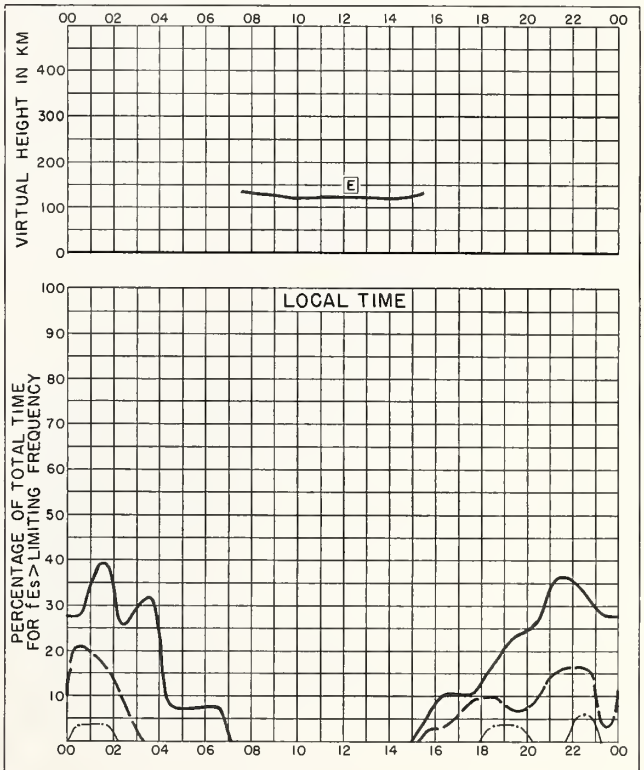


Fig. 68. WINNIPEG, CANADA NOVEMBER 1956

NBS 490

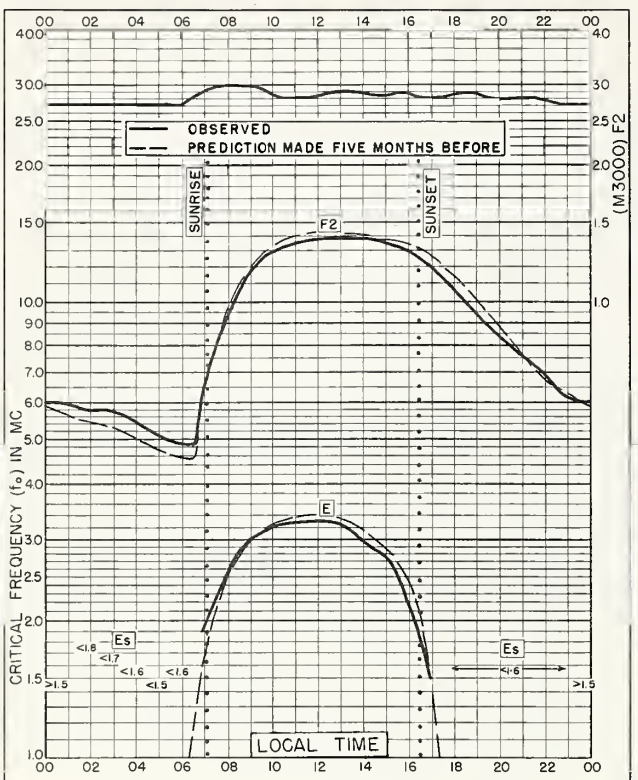


Fig. 69. OTTAWA, CANADA
45.4°N, 75.9°W NOVEMBER 1956

NBS 503

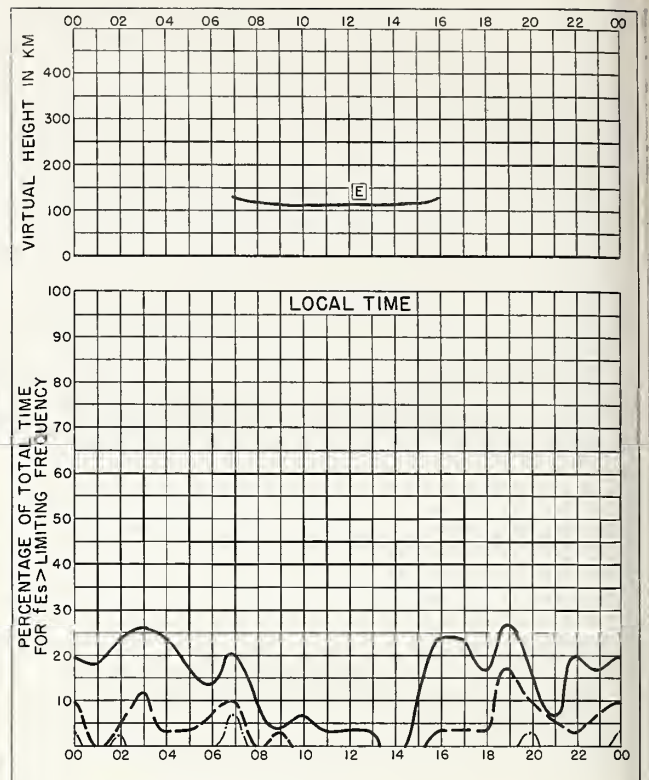


Fig. 70. OTTAWA, CANADA NOVEMBER 1956

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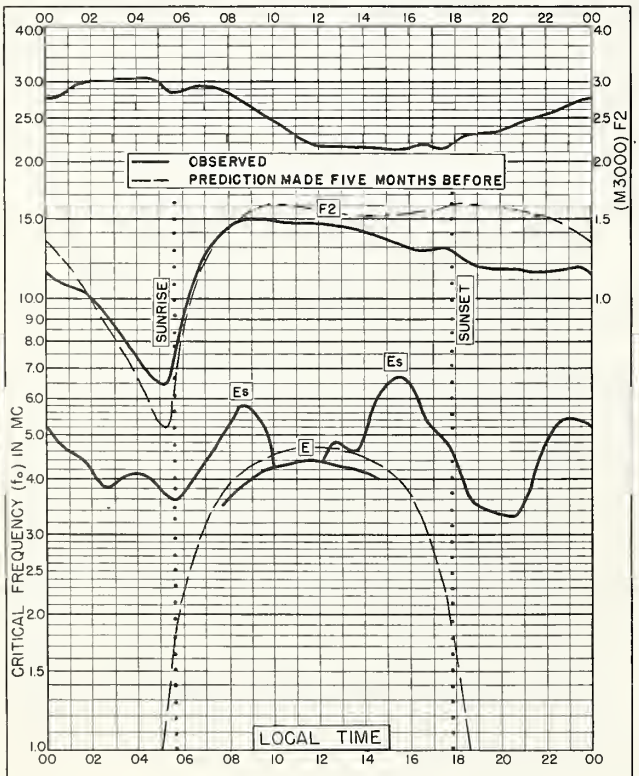


Fig. 71. TALARA, PERU
4.6°S, 81.3°W NOVEMBER 1956

NBS 503

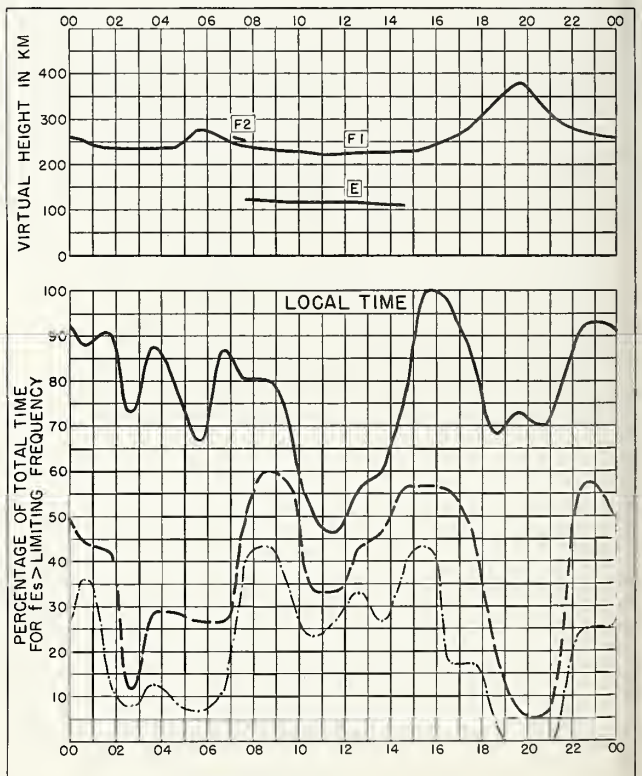


Fig. 72. TALARA, PERU NOVEMBER 1956

NBS 490

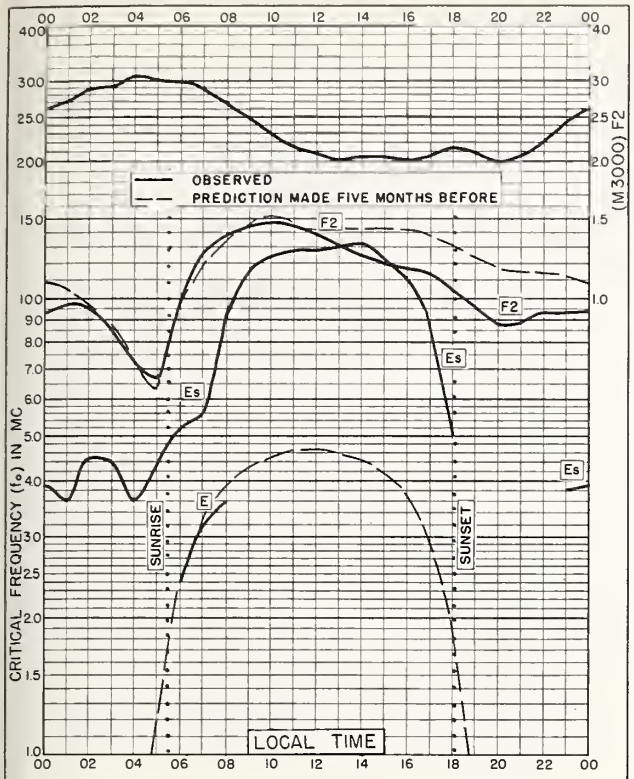


Fig. 73. HUANCAYO, PERU
12.0°S, 75.3°W NOVEMBER 1956

NBS 503

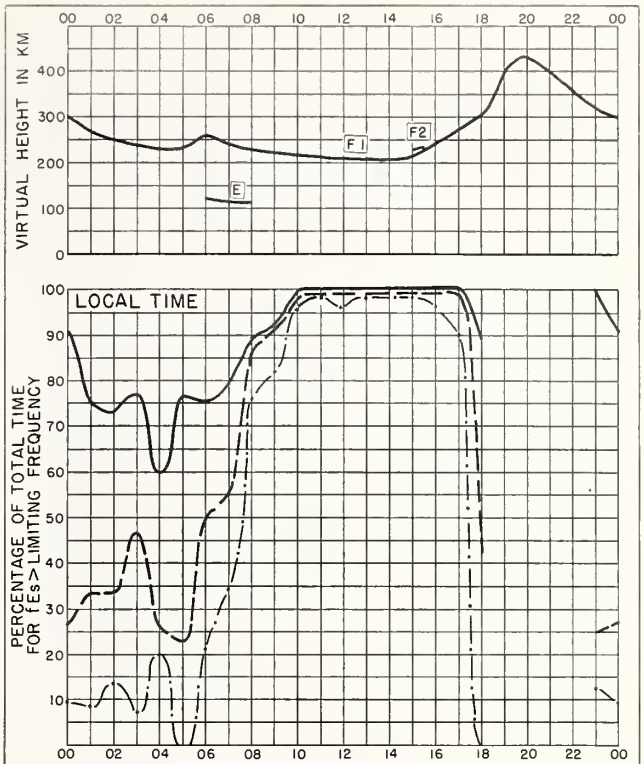


Fig. 74. HUANCAYO, PERU NOVEMBER 1956

NBS 490

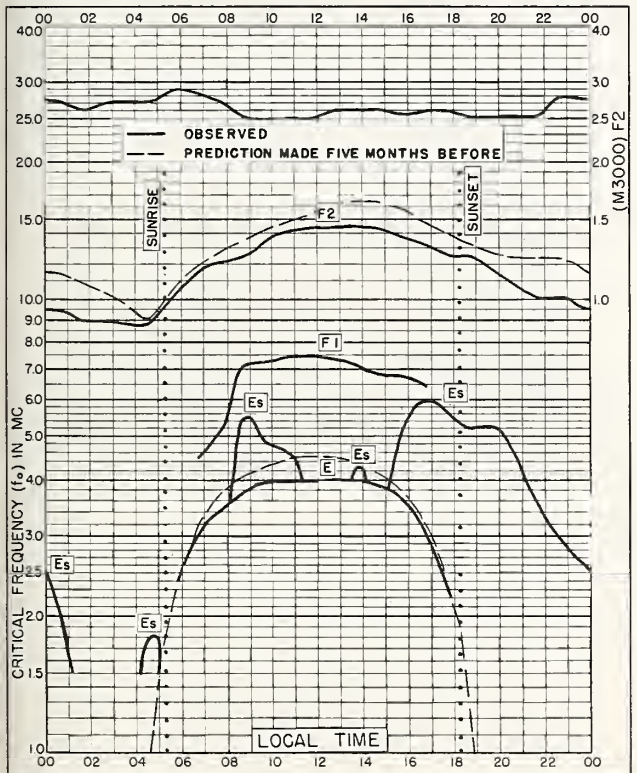


Fig. 75. RAROTONGA I.
21.2°S, 159.8°W NOVEMBER 1956

NBS 503

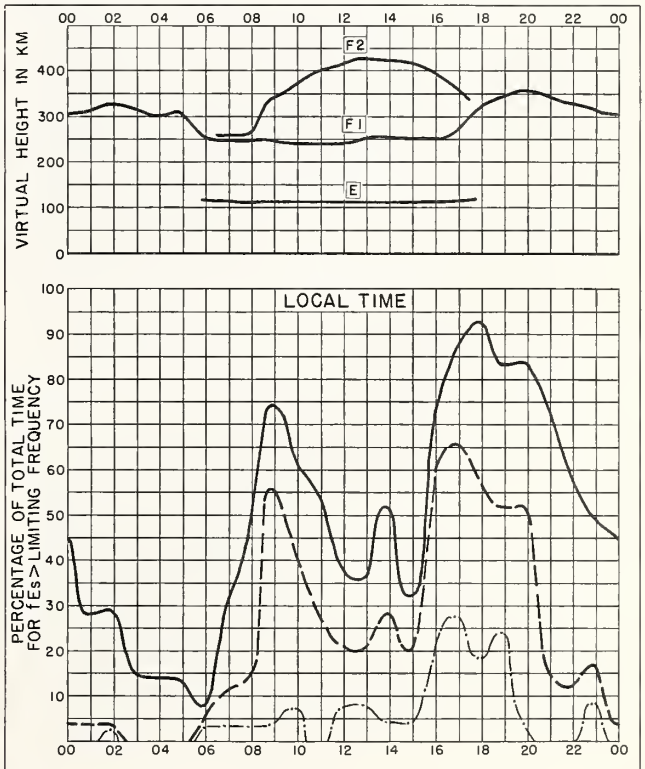


Fig. 76. RAROTONGA I. NOVEMBER 1956

NBS 490

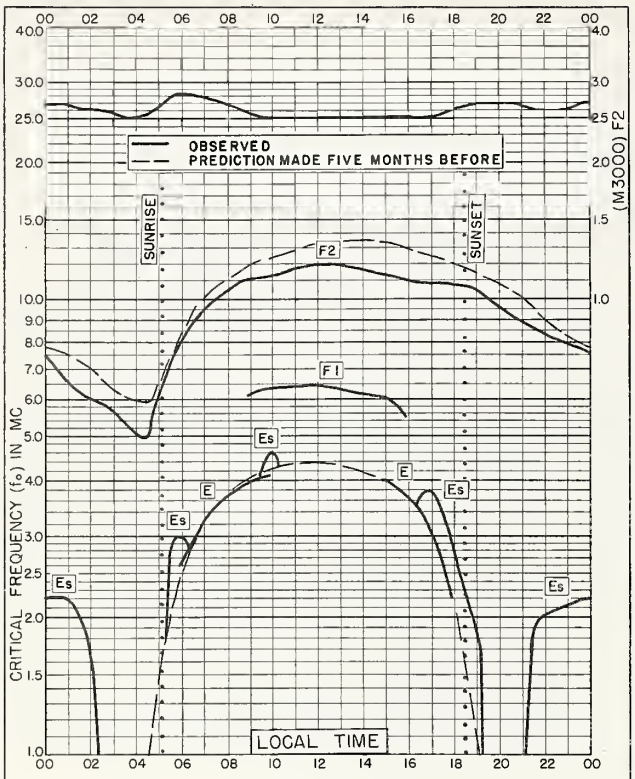


Fig. 77. JOHANNESBURG, UNION OF S. AFRICA
26.2°S, 28.1°E NOVEMBER 1956

NBS 503

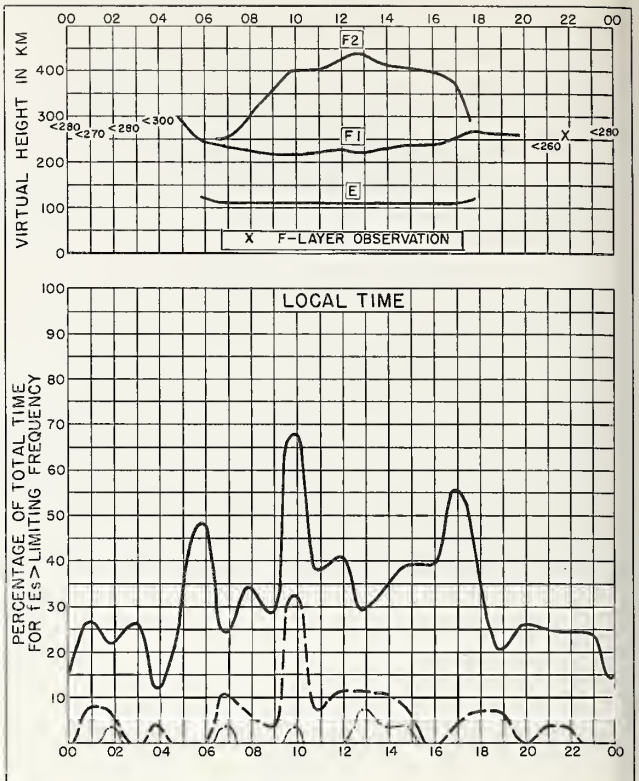


Fig. 78. JOHANNESBURG, UNION OF S. AFRICA NOVEMBER 1956

NBS 490

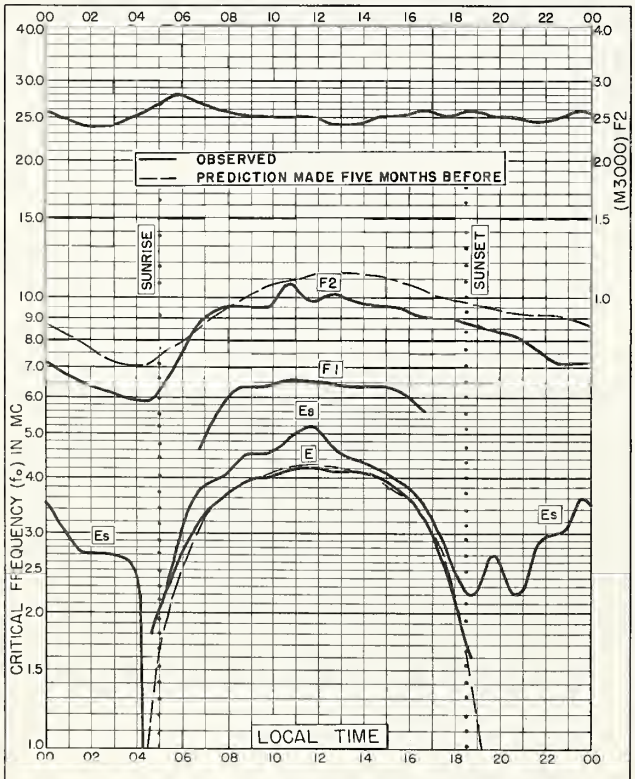


Fig. 79. WATHEROO, W. AUSTRALIA
30.3°S, 115.9°E NOVEMBER 1956

NBS 503

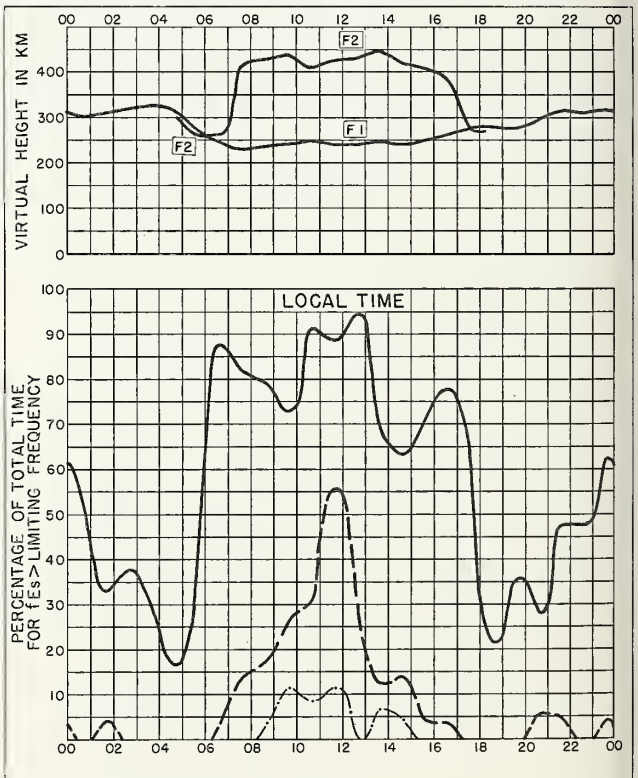


Fig. 80. WATHEROO, W. AUSTRALIA NOVEMBER 1956

NBS 490

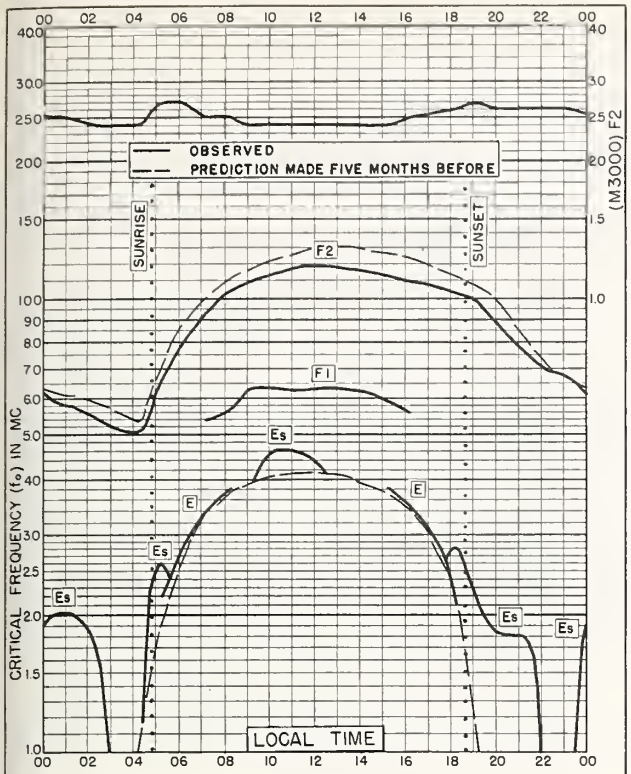
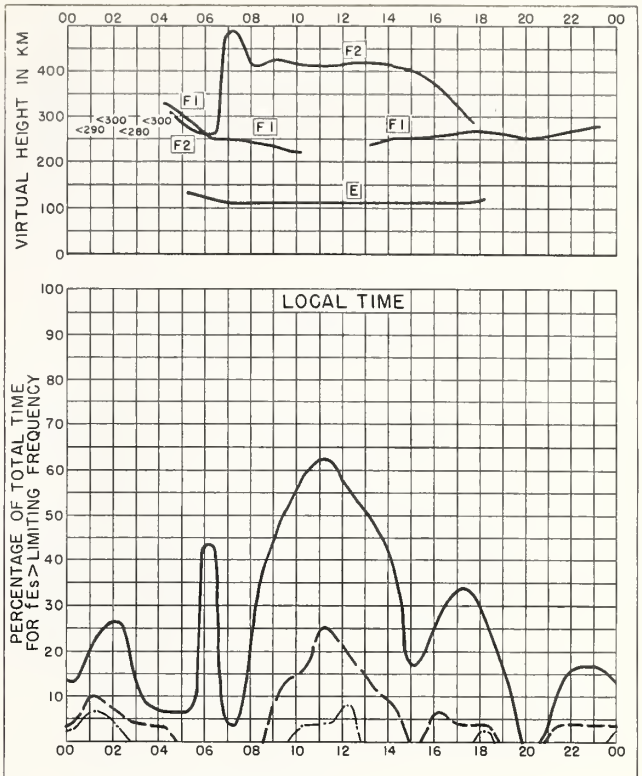


Fig. 81. CAPETOWN, UNION OF S. AFRICA
34.2°S, 18.3°E NOVEMBER 1956

NBS 503



NOVEMBER 1956

Fig. 82. CAPETOWN, UNION OF S. AFRICA

NBS 490

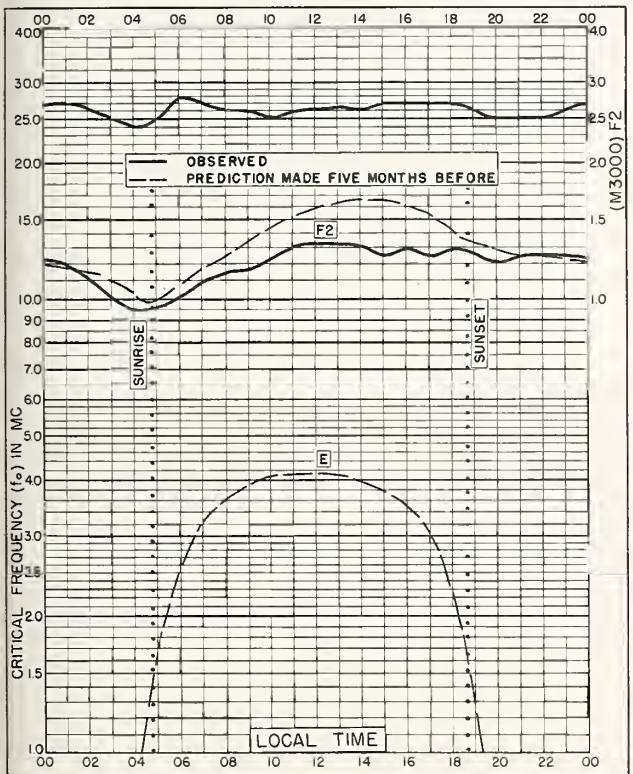
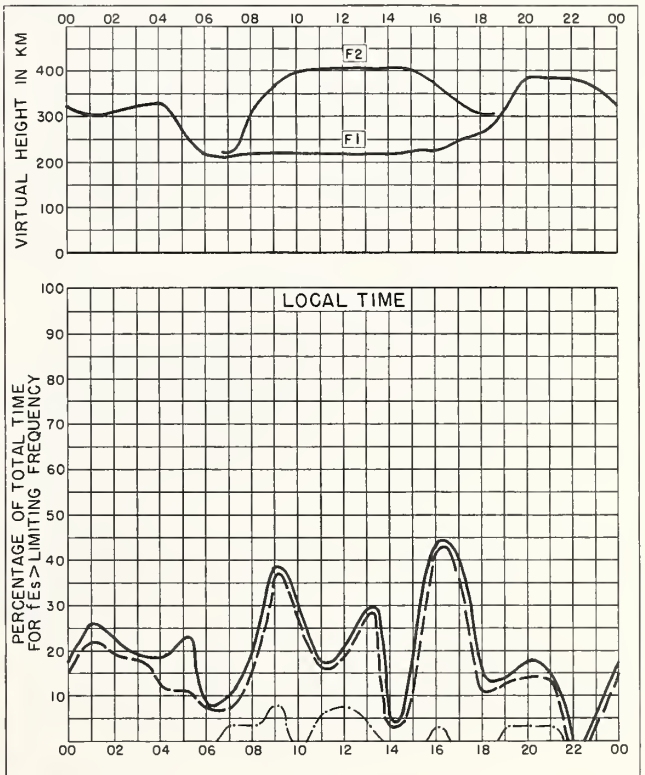


Fig. 83. BUENOS AIRES, ARGENTINA
34.5°S, 58.5°W NOVEMBER 1956

NBS 503



NOVEMBER 1956

Fig. 84. BUENOS AIRES, ARGENTINA

NBS 490

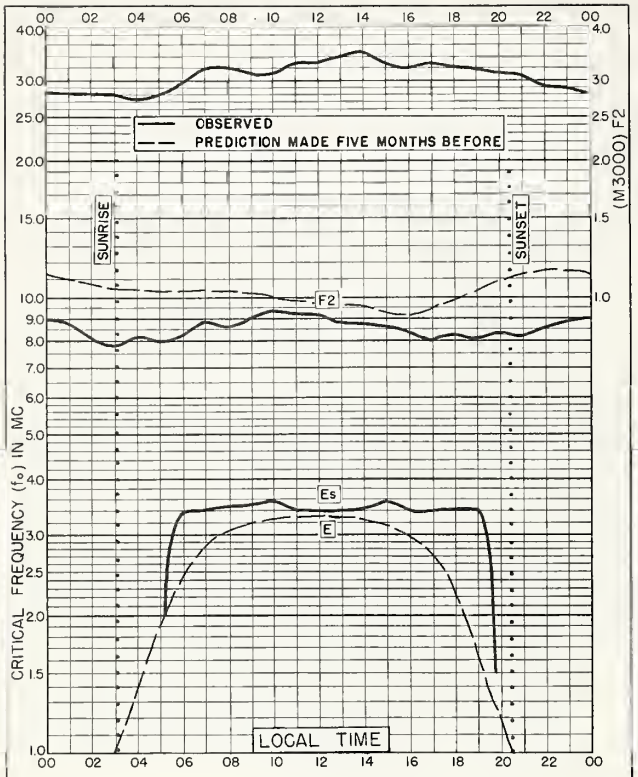


Fig. 85. DECEPCION I.
63.0°S, 60.7°W NOVEMBER 1956

NBS 503

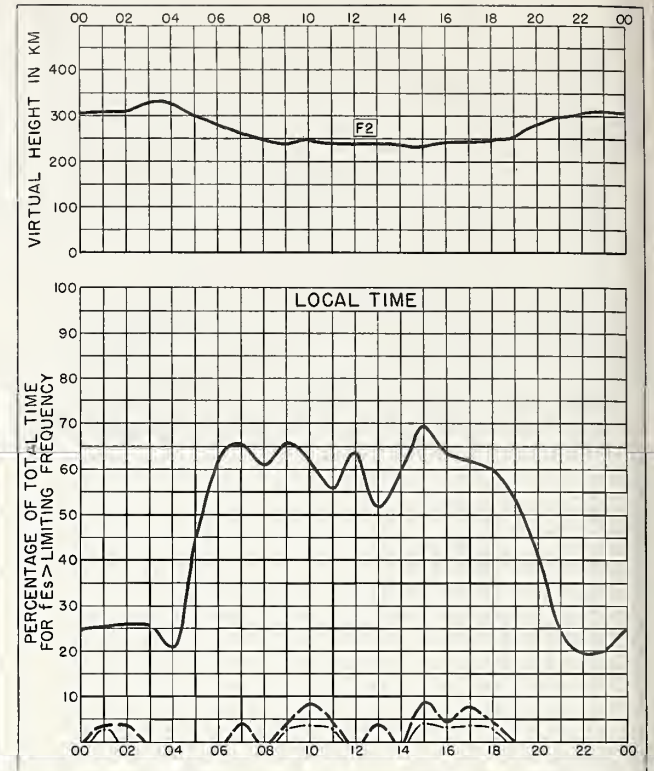


Fig. 86. DECEPCION I. NOVEMBER 1956

NBS 490

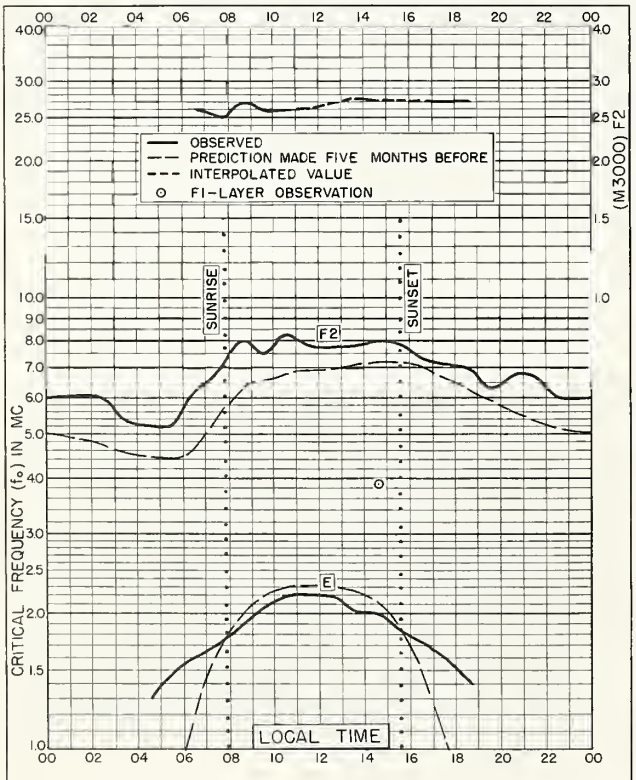


Fig. 87. RESOLUTE BAY, CANADA
74.7°N, 94.9°W OCTOBER 1956

NBS 503

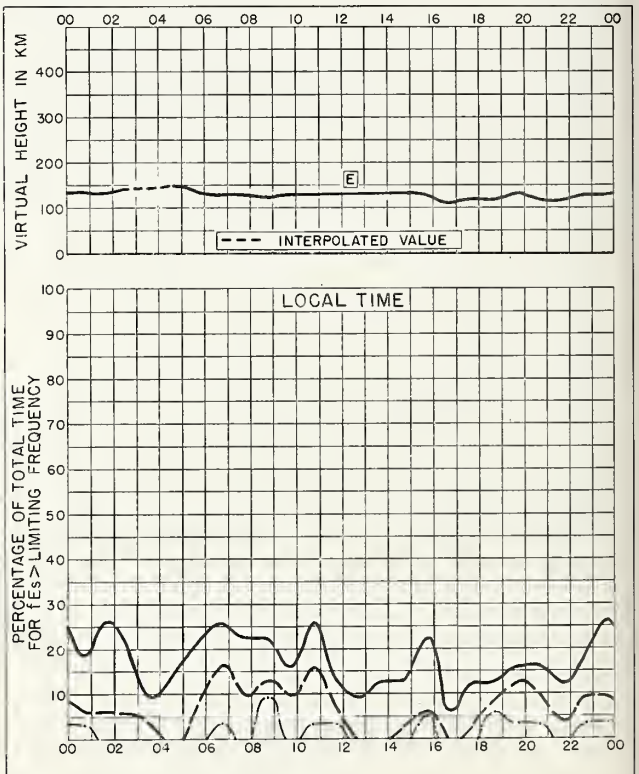


Fig. 88. RESOLUTE BAY, CANADA OCTOBER 1956

NBS 490

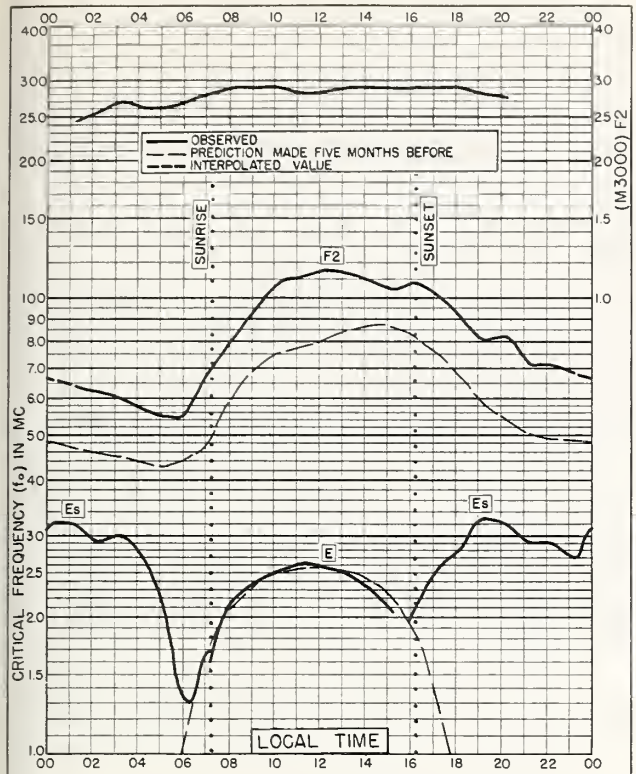


Fig. 89. TROMSO, NORWAY
69.7°N, 19.0°E OCTOBER 1956

NBS 503

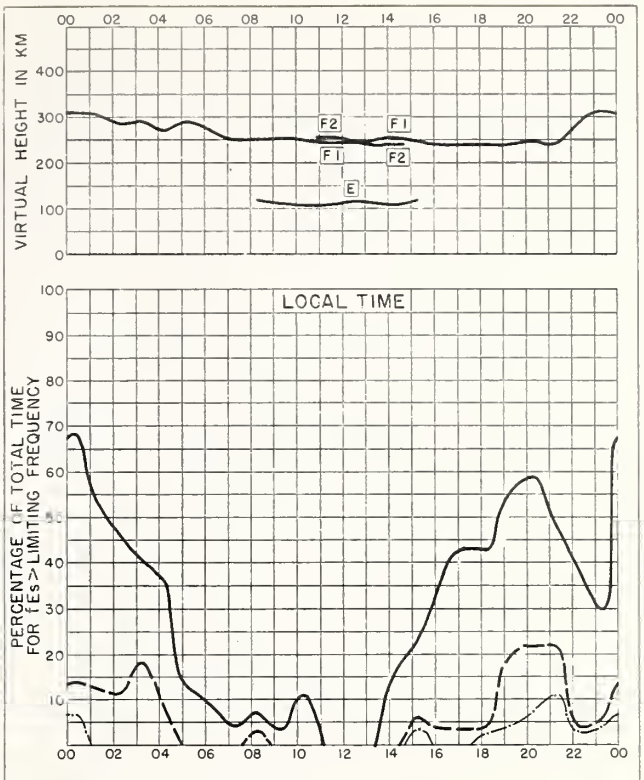


Fig. 90. TROMSO, NORWAY OCTOBER 1956

NBS 490

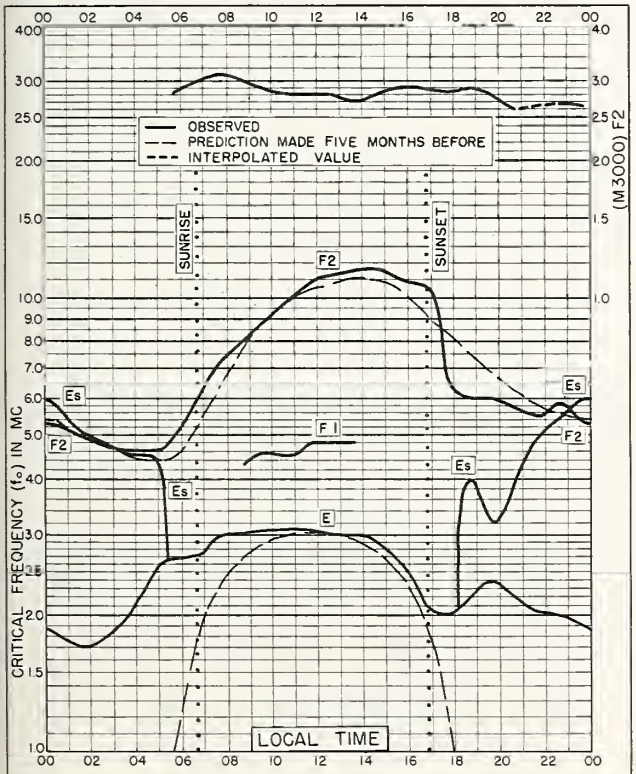


Fig. 91. CHURCHILL, CANADA
58.8°N, 94.2°W OCTOBER 1956

NBS 503

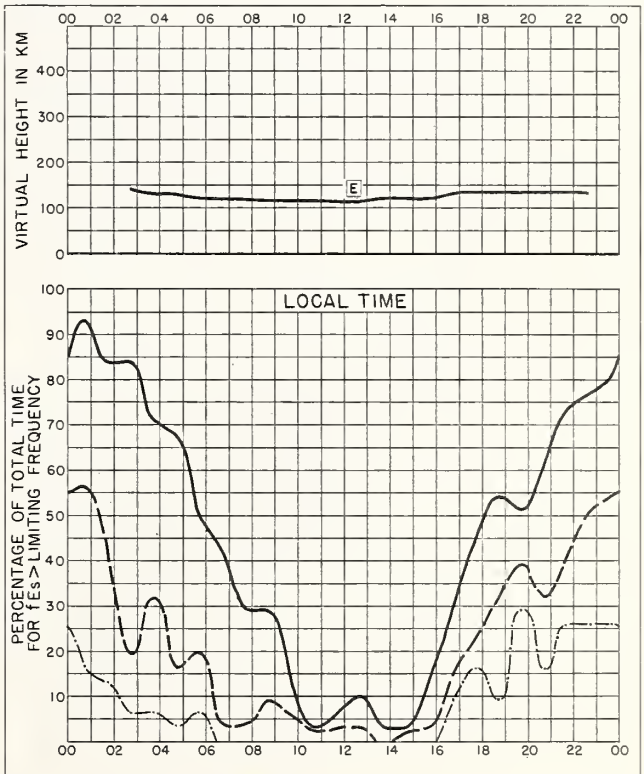


Fig. 92. CHURCHILL, CANADA OCTOBER 1956

NBS 490

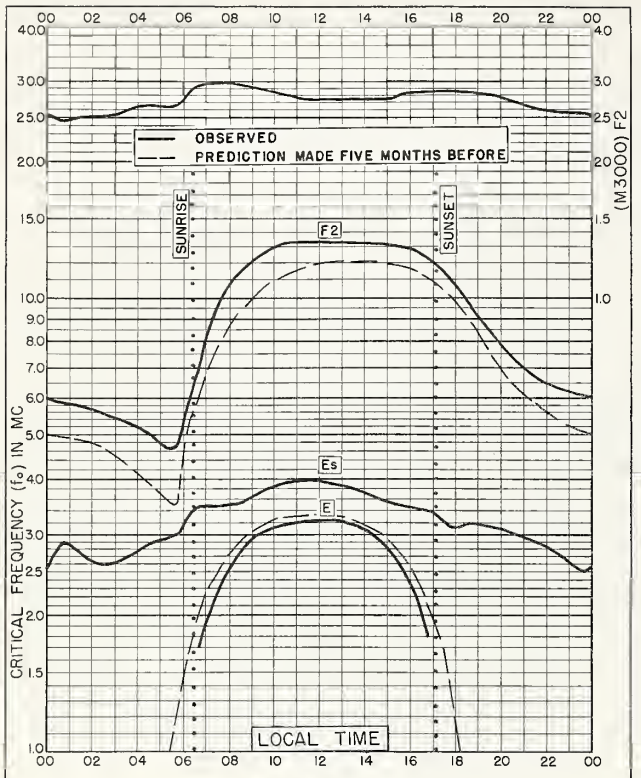


Fig. 93. LINDAU/HARZ, GERMANY
51.6°N, 10.1°E OCTOBER 1956

NBS 503

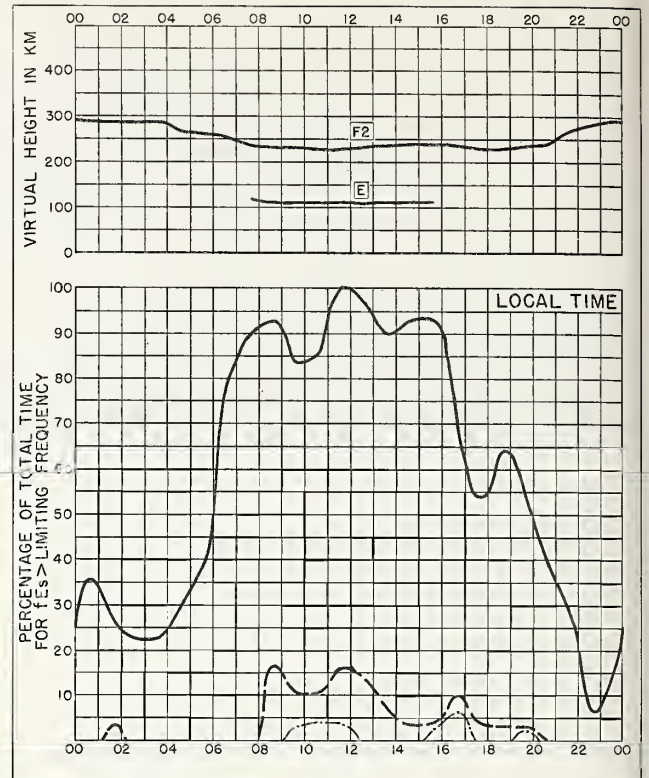


Fig. 94. LINDAU/HARZ, GERMANY OCTOBER 1956

NBS 490

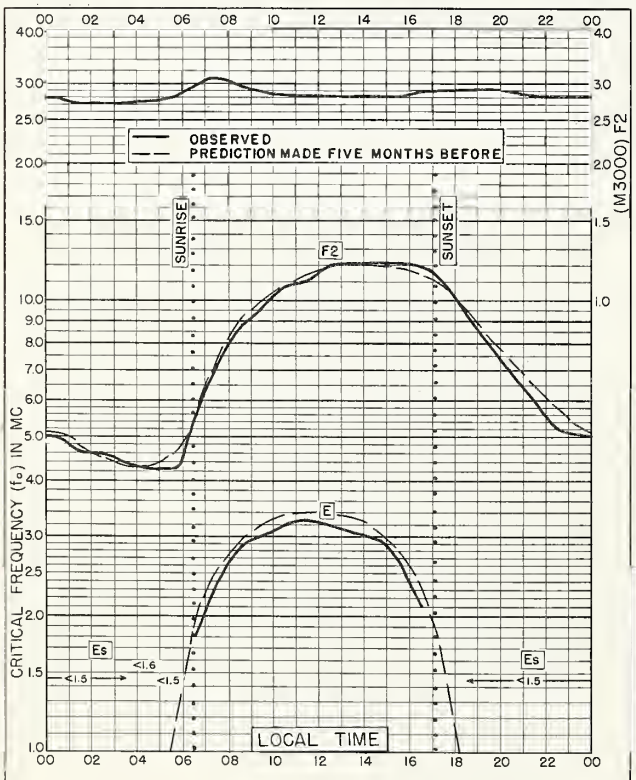


Fig. 95. WINNIPEG, CANADA
49.9°N, 97.4°W OCTOBER 1956

NBS 503

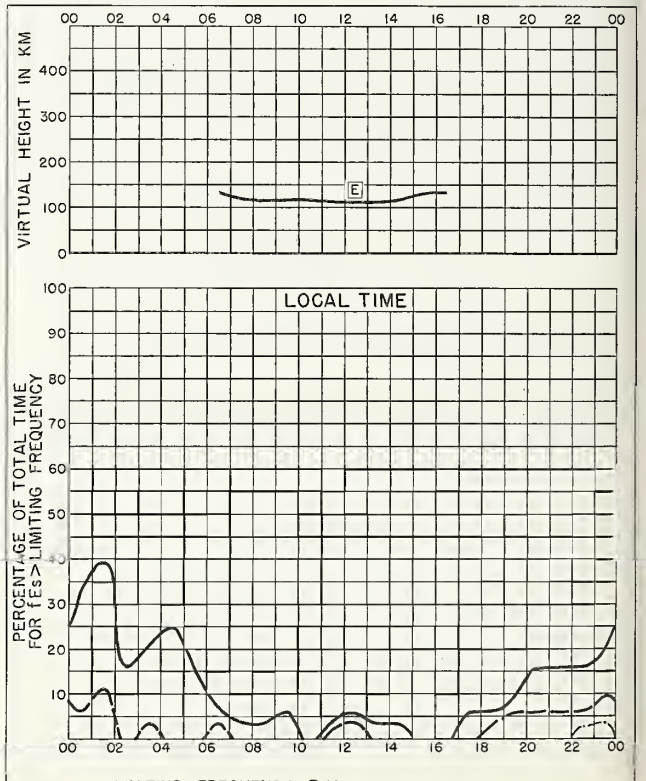


Fig. 96. WINNIPEG, CANADA OCTOBER 1956

NBS 490

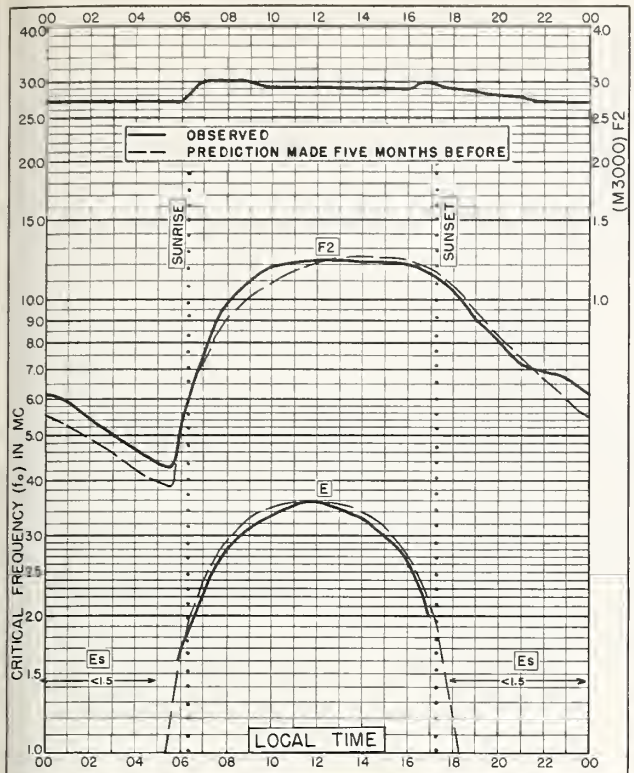


Fig. 97. OTTAWA, CANADA
45.4°N, 75.9°W OCTOBER 1956

NBS 503

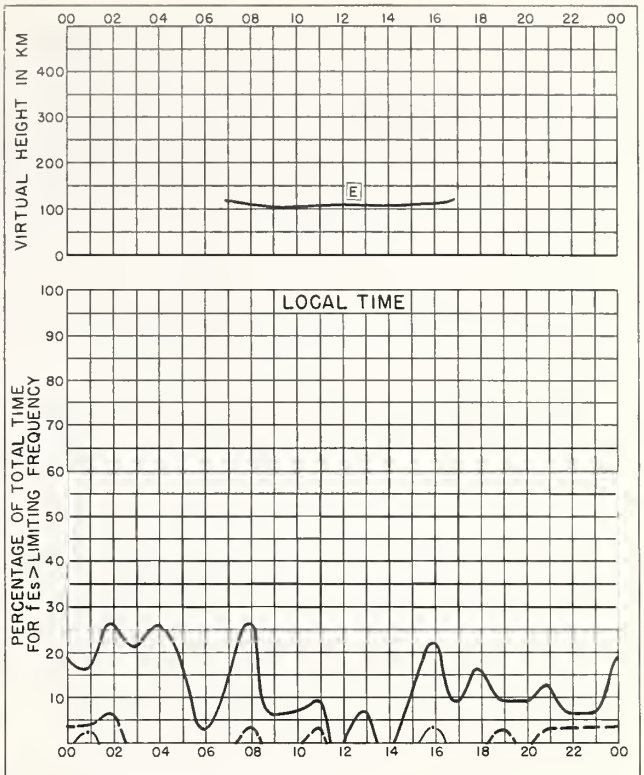


Fig. 98. OTTAWA, CANADA OCTOBER 1956

NBS 490

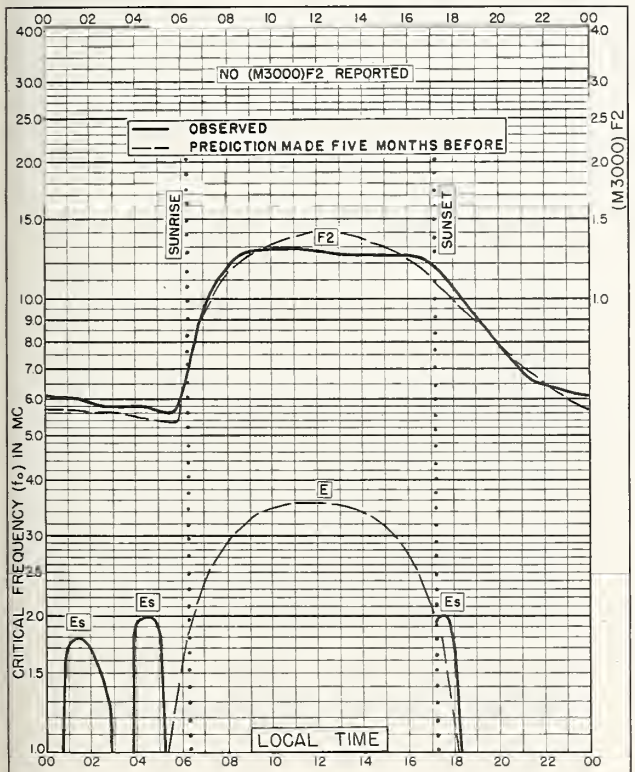


Fig. 99. WAKKANAI, JAPAN
45.4°N, 141.7°E OCTOBER 1956

NBS 503

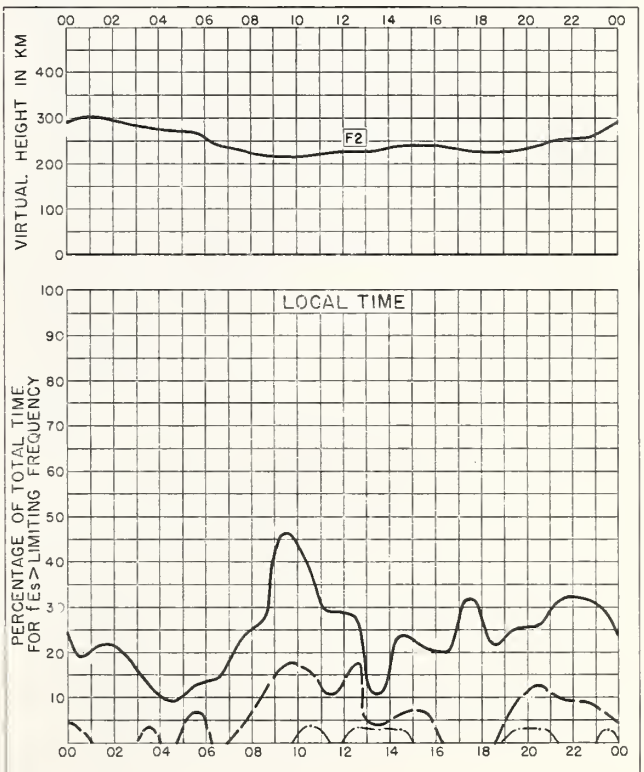


Fig. 100. WAKKANAI, JAPAN OCTOBER 1956

NBS 490

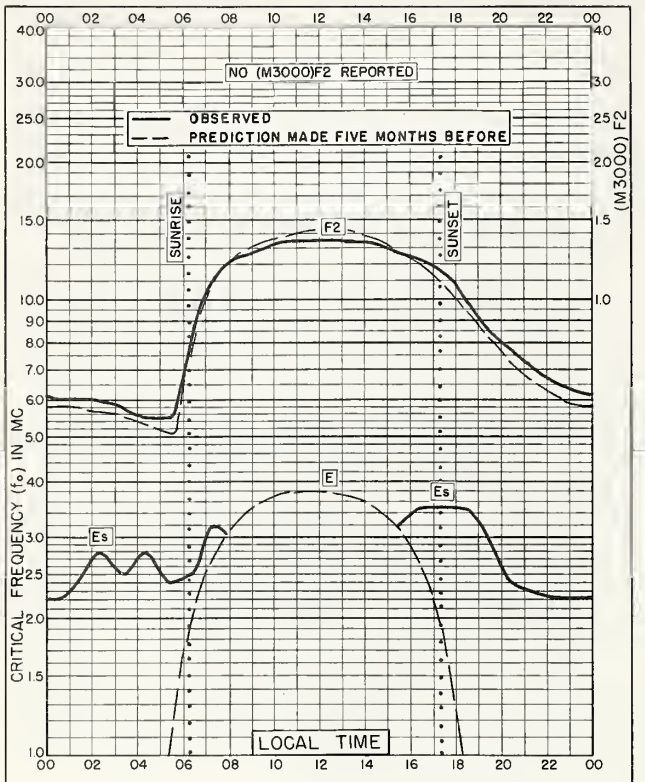


Fig. 101. AKITA, JAPAN
39.7°N, 140.1°E OCTOBER 1956

NBS 503

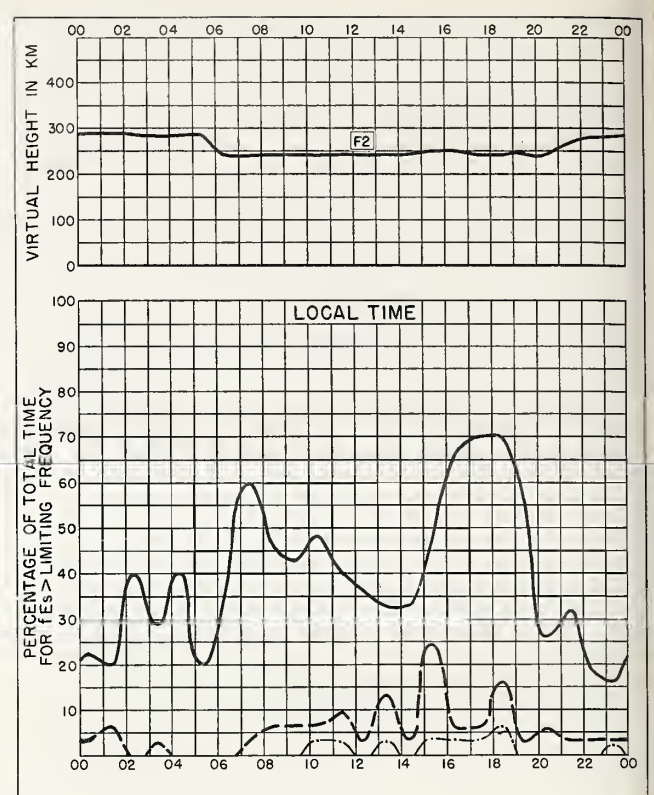


Fig. 102. AKITA, JAPAN OCTOBER 1956

NBS 490

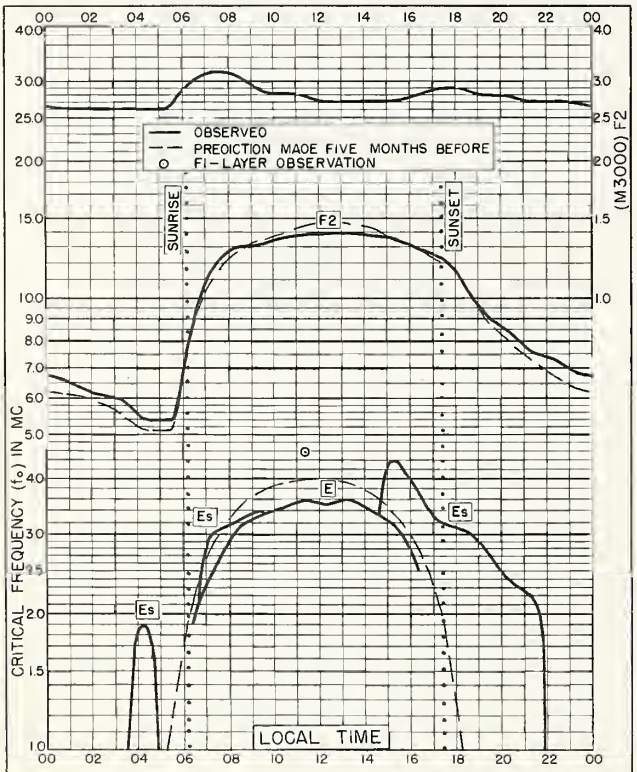


Fig. 103. TOKYO, JAPAN
35.7°N, 139.5°E OCTOBER 1956

NBS 503

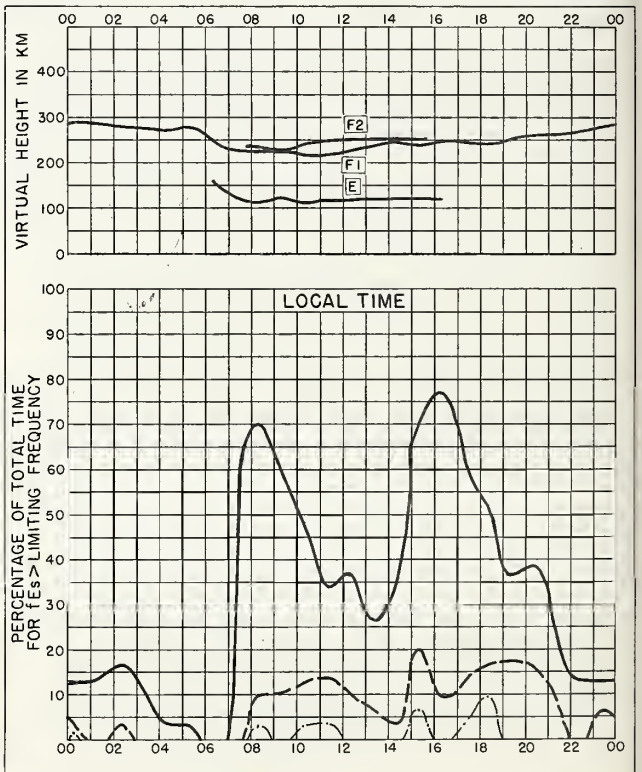


Fig. 104. TOKYO, JAPAN OCTOBER 1956

NBS 490

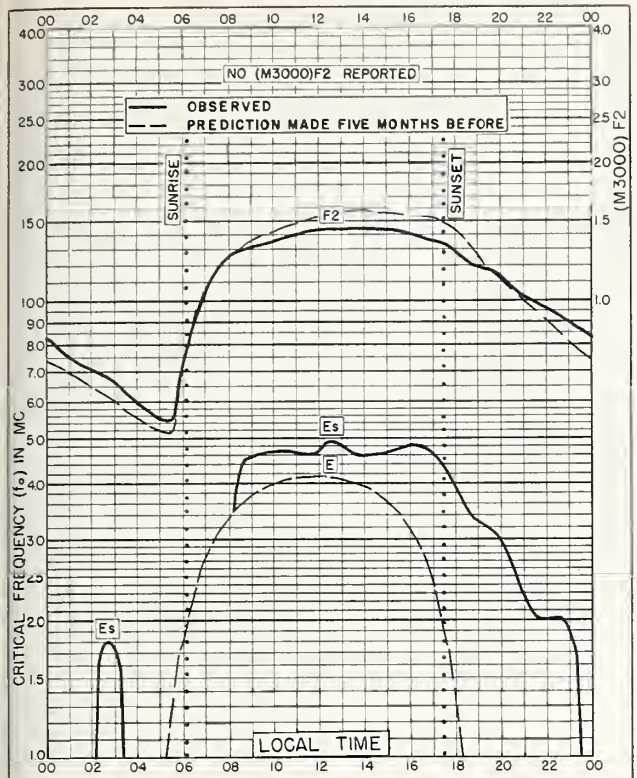


Fig. 105. YAMAGAWA, JAPAN
31.2°N, 130.6°E OCTOBER 1956

NBS 503

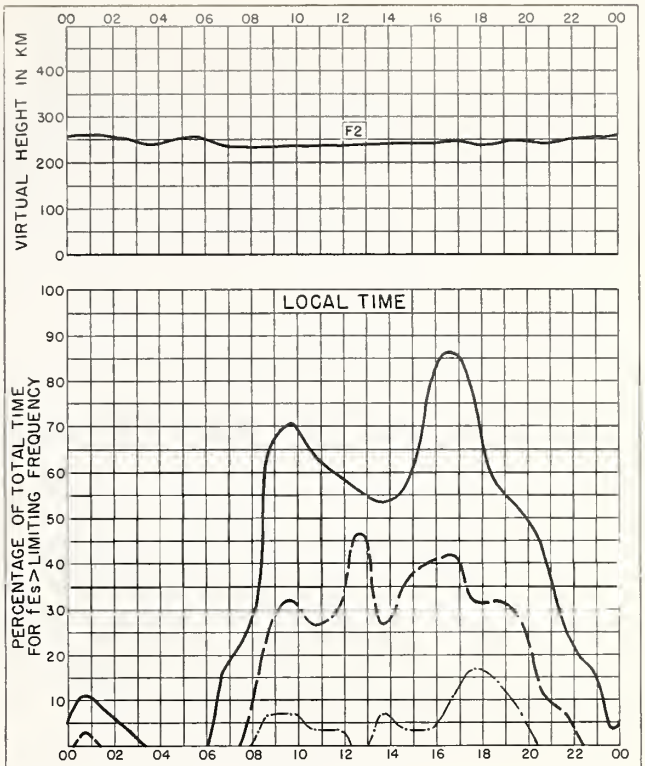


Fig. 106. YAMAGAWA, JAPAN OCTOBER 1956

NBS 490

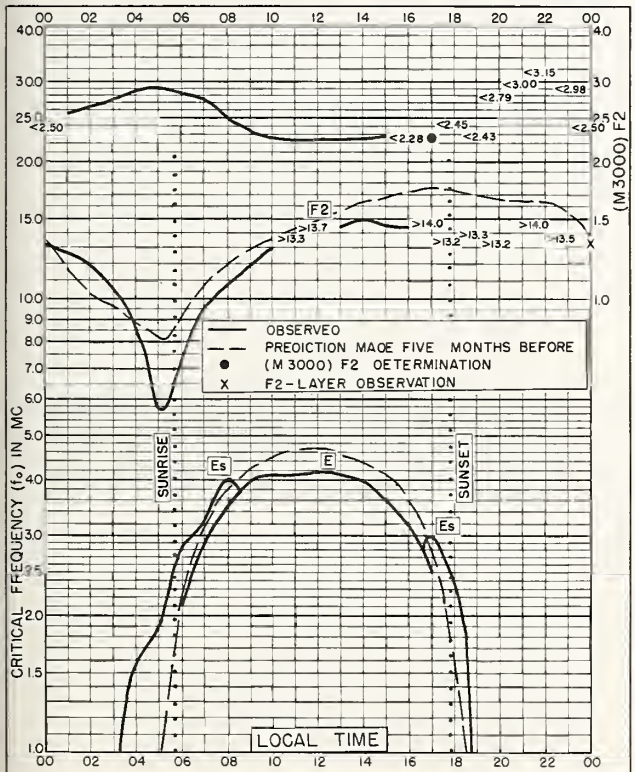


Fig. 107. LEOPOLDVILLE, BELGIAN CONGO
4.4°S, 15.2°E OCTOBER 1956

NBS 503

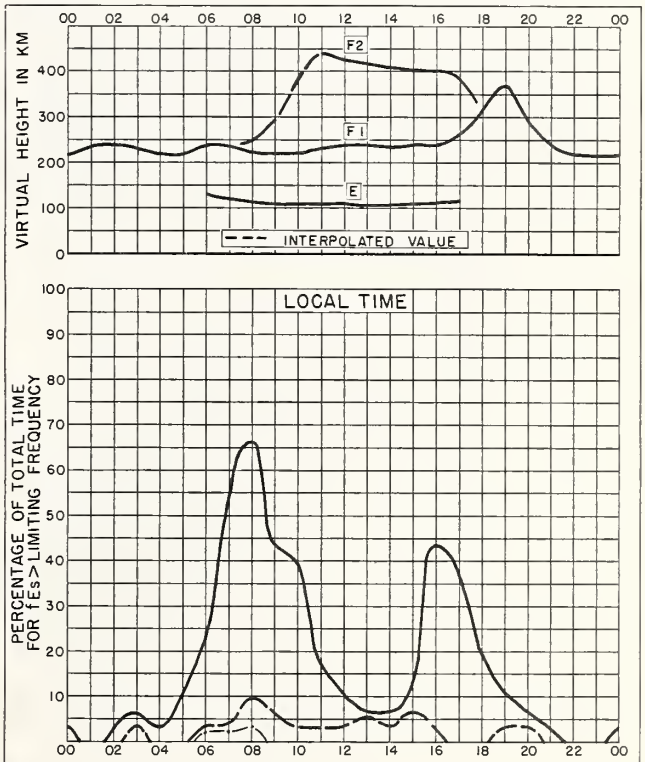


Fig. 108. LEOPOLDVILLE, BELGIAN CONGO OCTOBER 1956

NBS 490

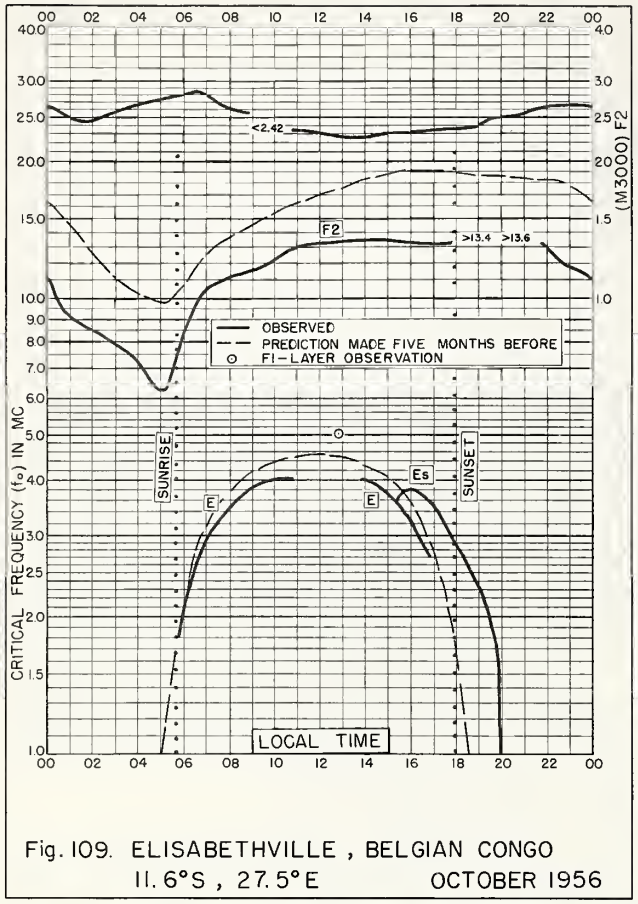


Fig. 109. ELISABETHVILLE, BELGIAN CONGO
11.6°S, 27.5°E OCTOBER 1956

NBS 503

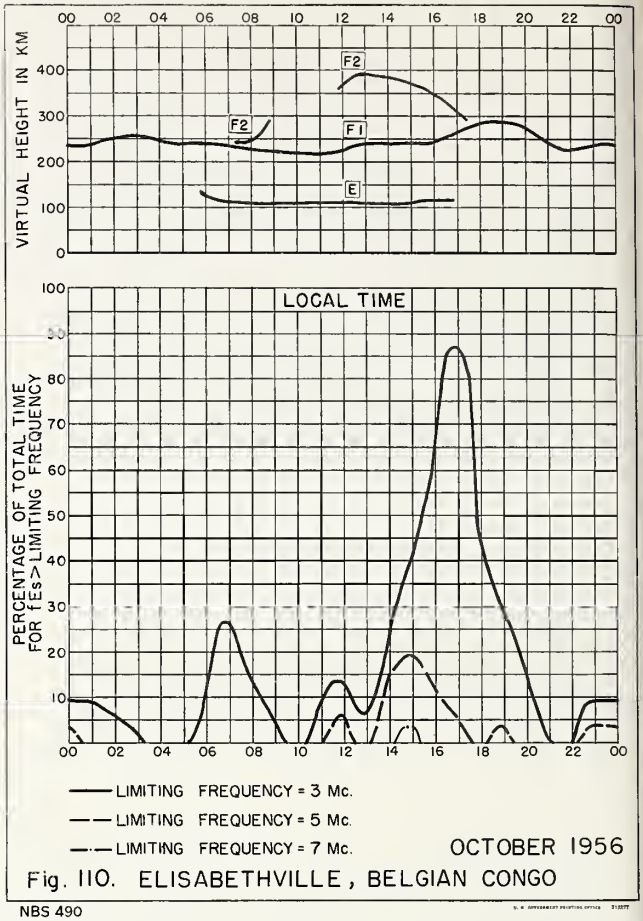


Fig. 110. ELISABETHVILLE, BELGIAN CONGO
OCTOBER 1956

NBS 490

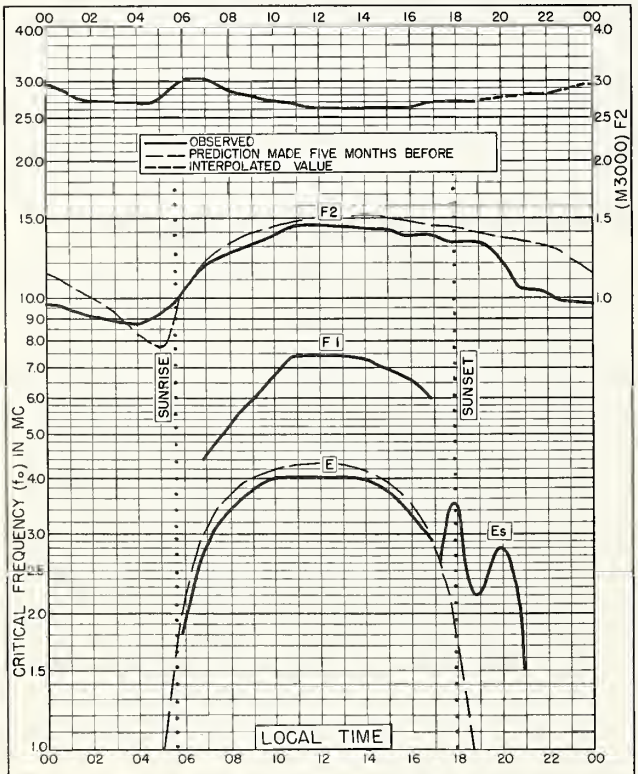


Fig. 111. RAROTONGA I.
21.2°S, 159.8°W OCTOBER 1956

NBS 503

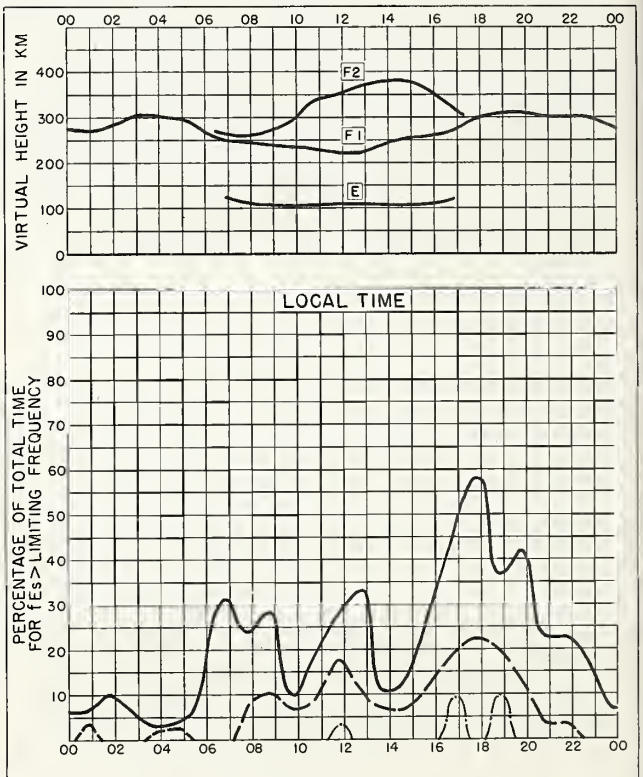


Fig. 112. RAROTONGA I. OCTOBER 1956

NBS 490

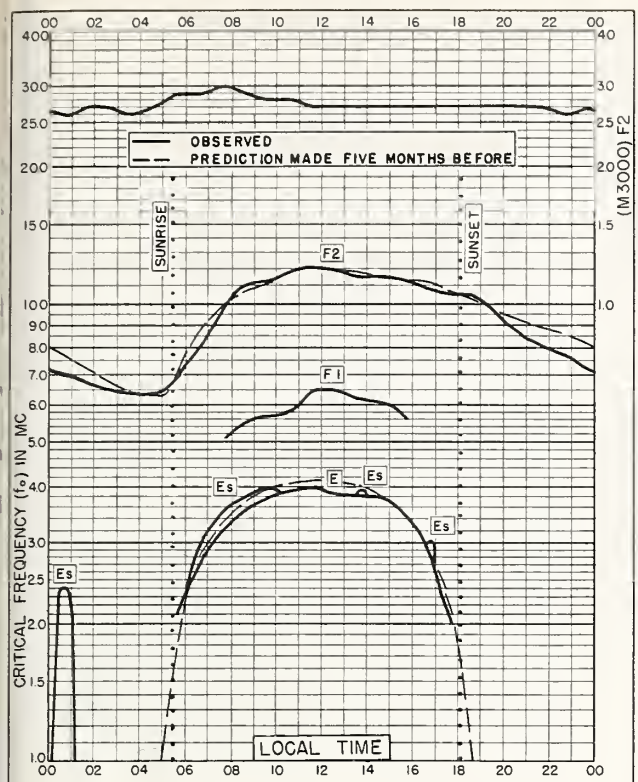
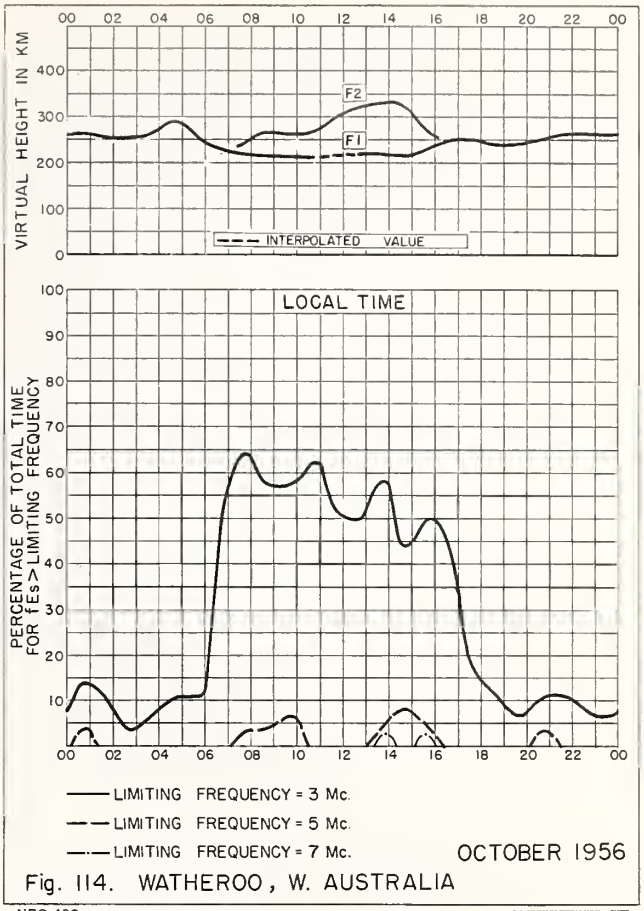


Fig. 113. WATHEROO, W. AUSTRALIA
30.3°S, 115.9°E OCTOBER 1956

NBS 503



OCTOBER 1956

Fig. 114. WATHEROO, W. AUSTRALIA

NBS 490

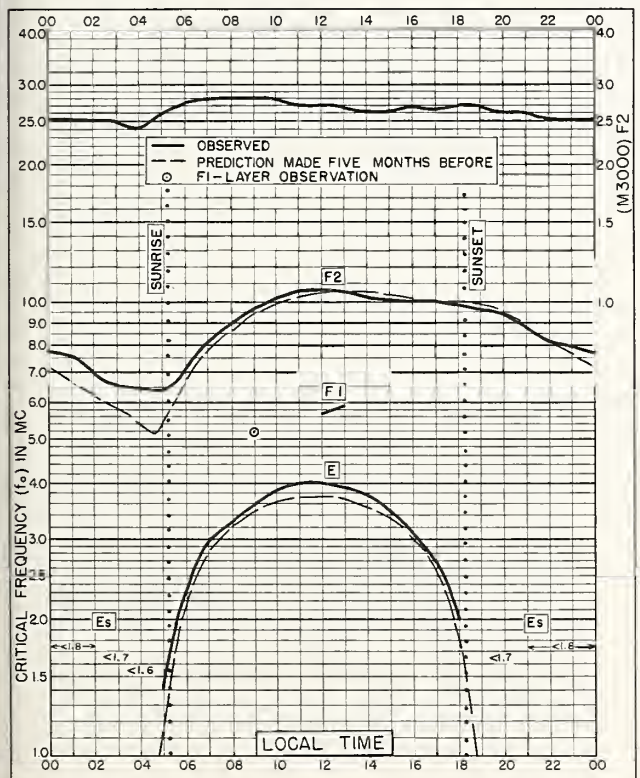
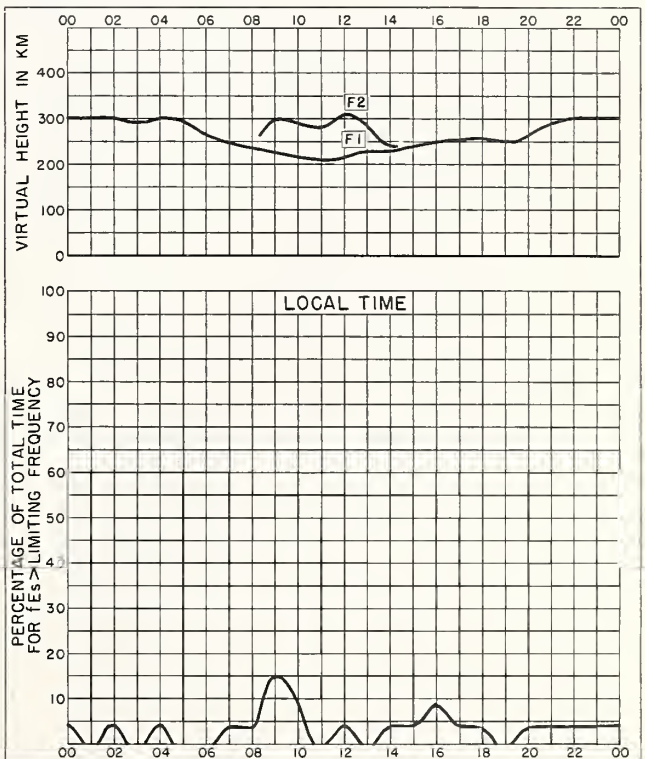


Fig. 115. CHRISTCHURCH, NEW ZEALAND
43.6°S, 172.8°E OCTOBER 1956

NBS 503



OCTOBER 1956

Fig. 116. CHRISTCHURCH, NEW ZEALAND

NBS 490

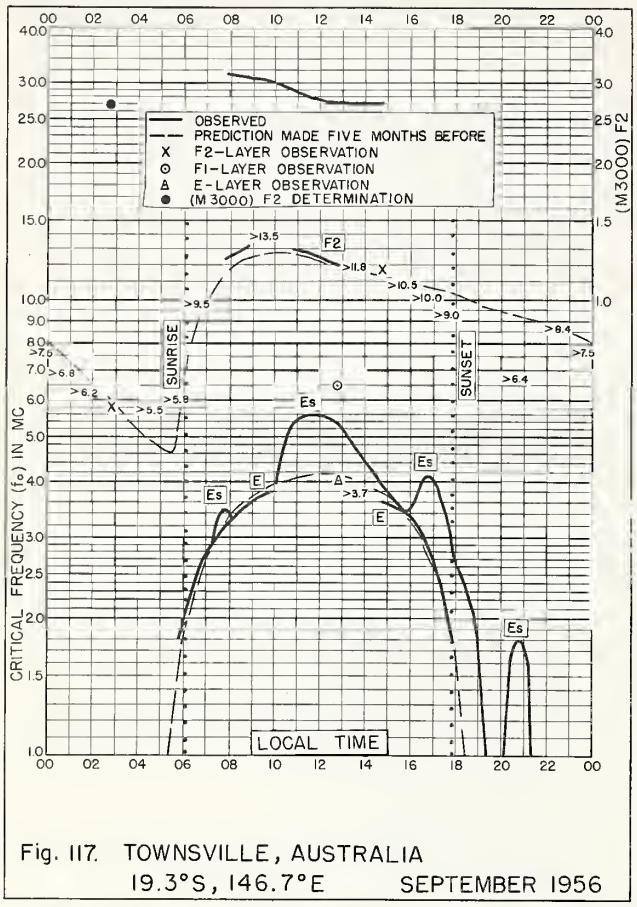
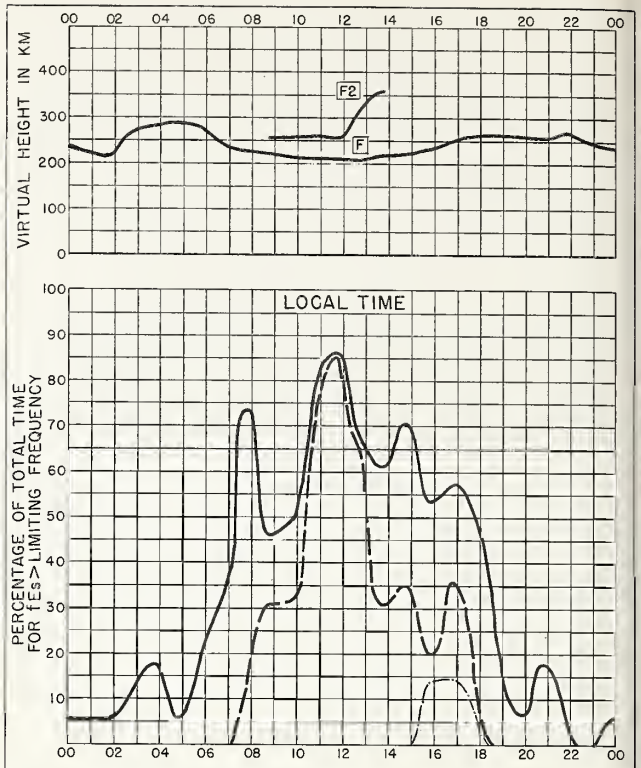


Fig. 117. TOWNSVILLE, AUSTRALIA
19.3°S, 146.7°E SEPTEMBER 1956

NBS 503



SEPTEMBER 1956

Fig. 118. TOWNSVILLE, AUSTRALIA

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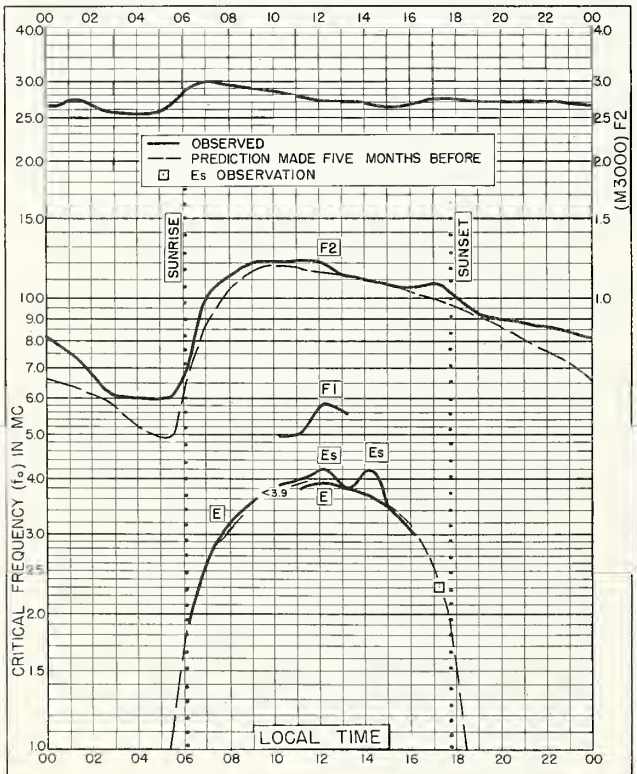
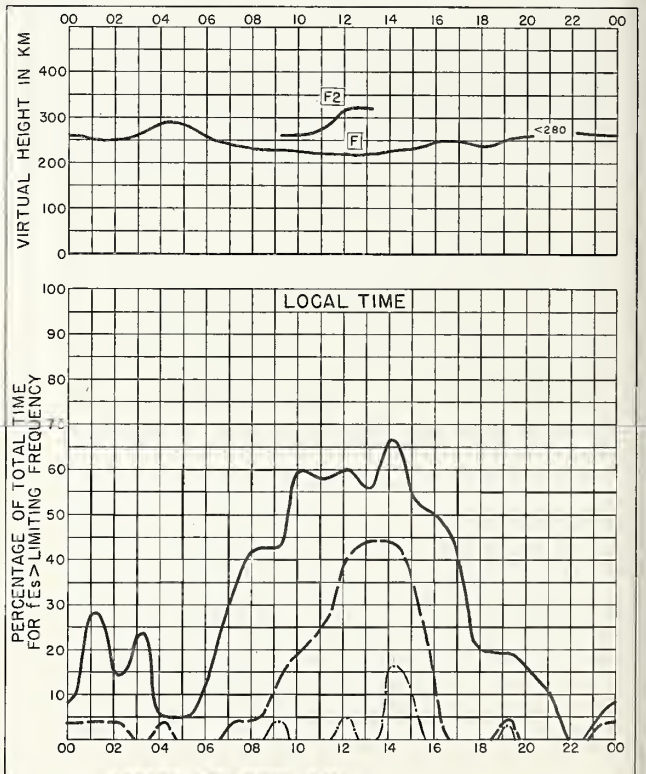


Fig. 119. BRISBANE, AUSTRALIA
27.5°S, 153.0°E SEPTEMBER 1956

NBS 503



SEPTEMBER 1956

Fig. 120. BRISBANE, AUSTRALIA

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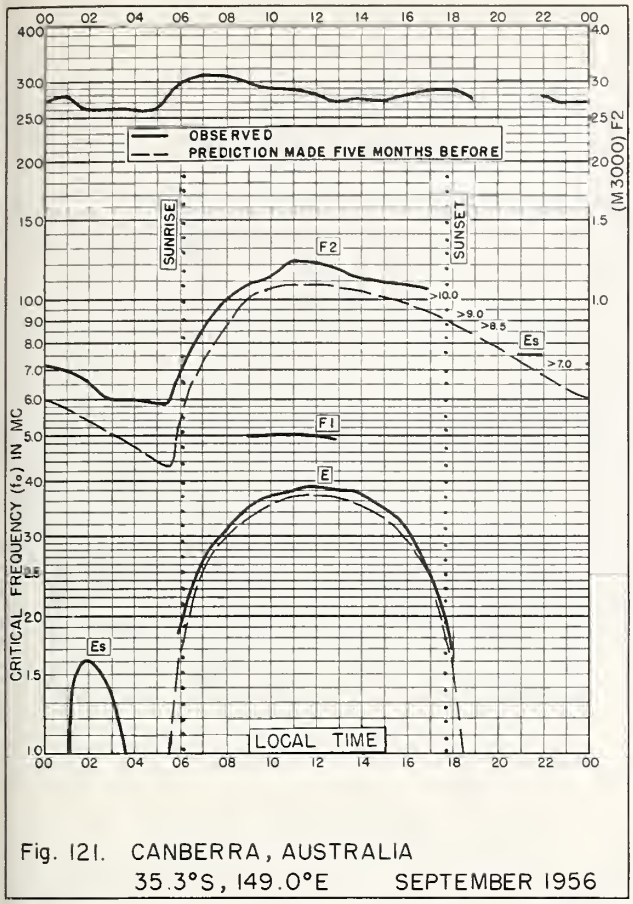
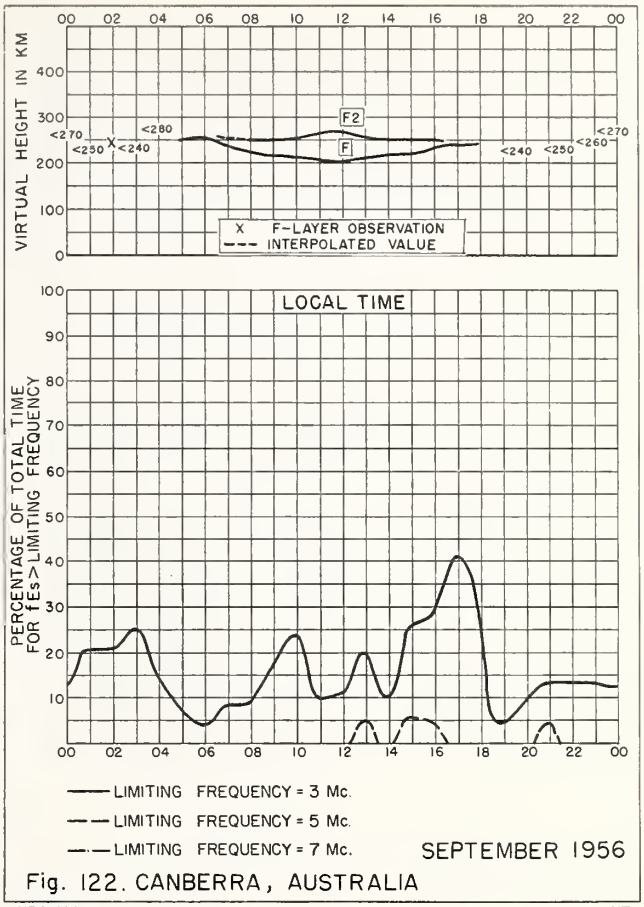


Fig. 121. CANBERRA, AUSTRALIA
35.3°S, 149.0°E SEPTEMBER 1956

NBS 503



SEPTEMBER 1956

Fig. 122. CANBERRA, AUSTRALIA

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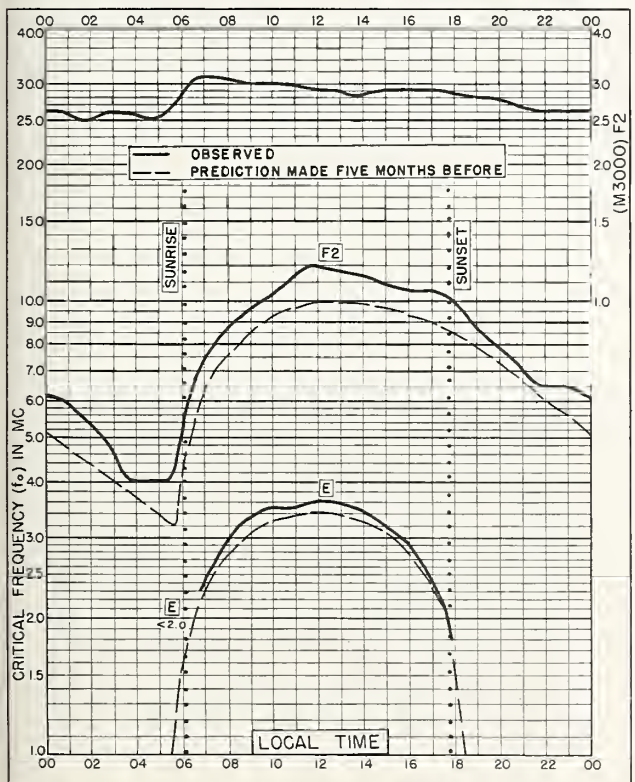
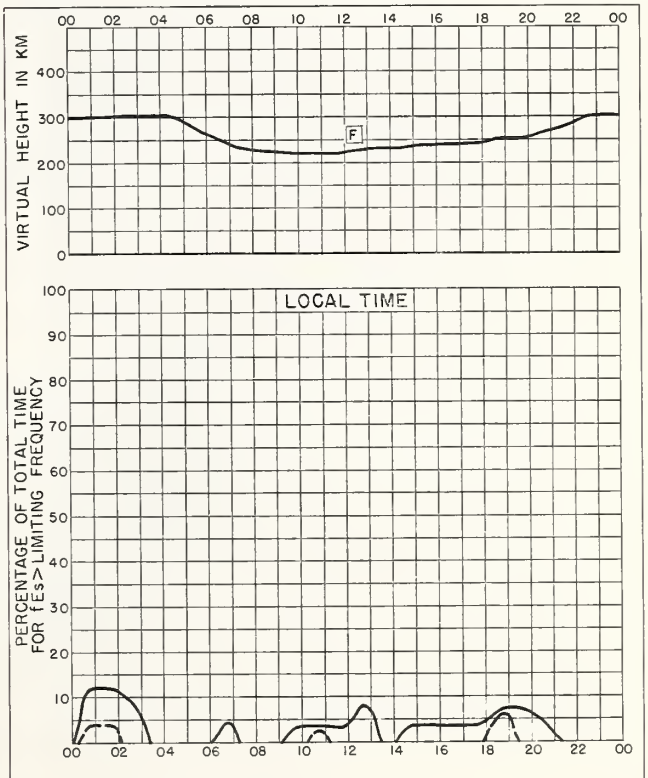


Fig. 123. HOBART, TASMANIA
42.9°S, 147.2°E SEPTEMBER 1956

NBS 503



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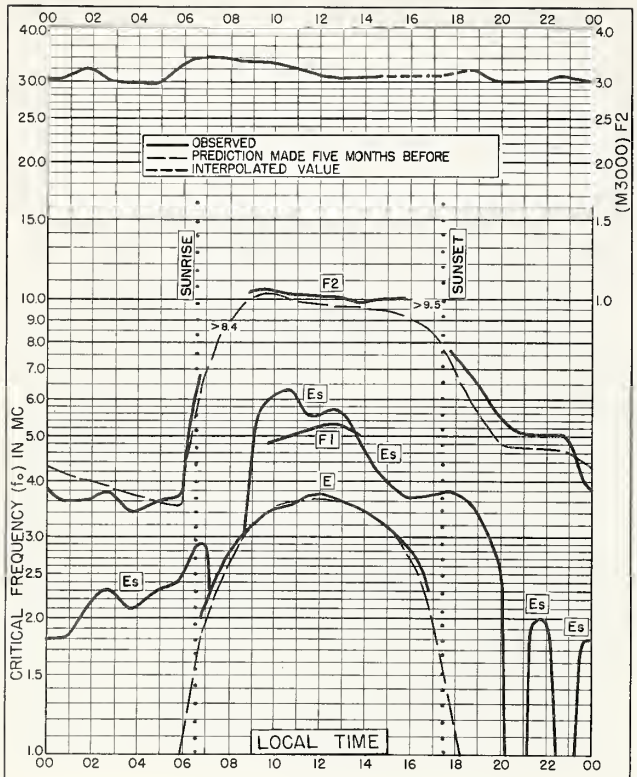

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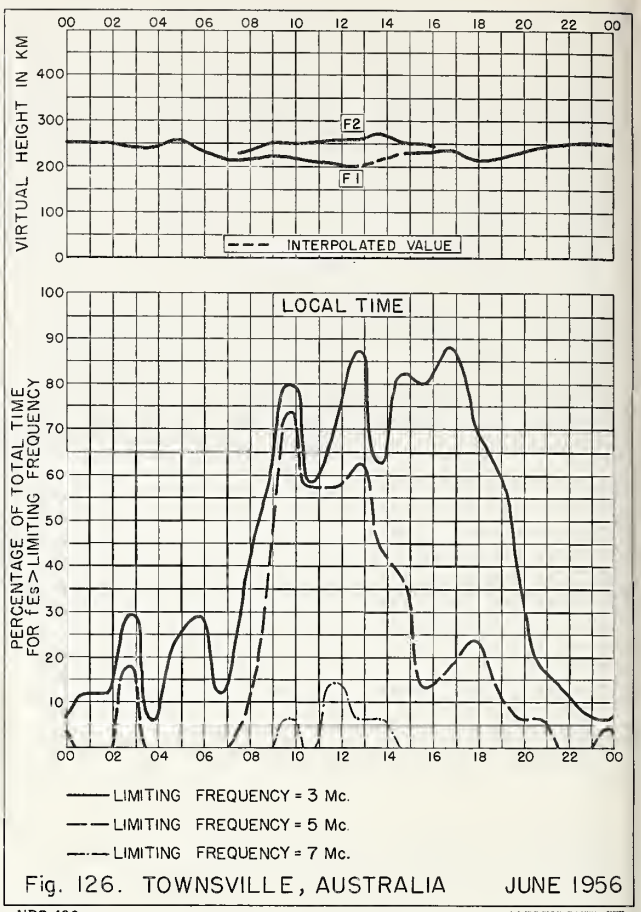

Fig. 126. TOWNSVILLE, AUSTRALIA JUNE 1956

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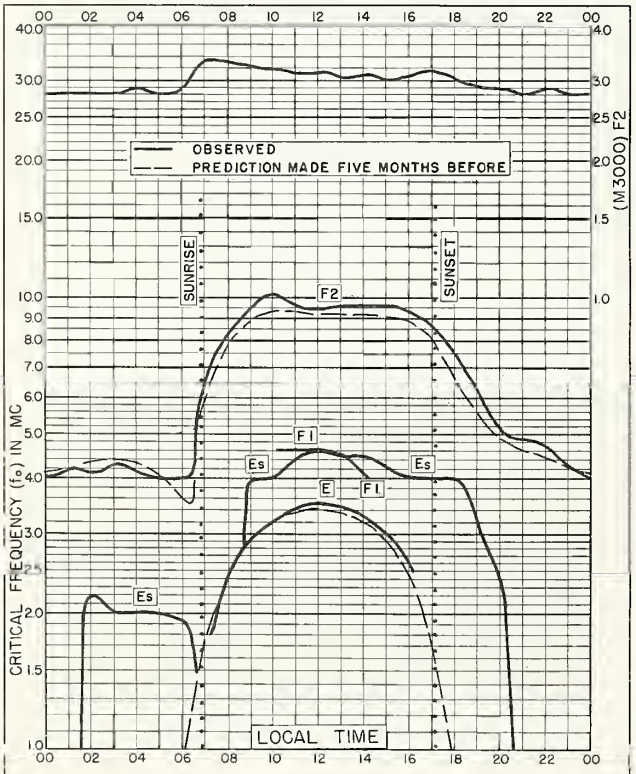

Fig. 127. BRISBANE, AUSTRALIA
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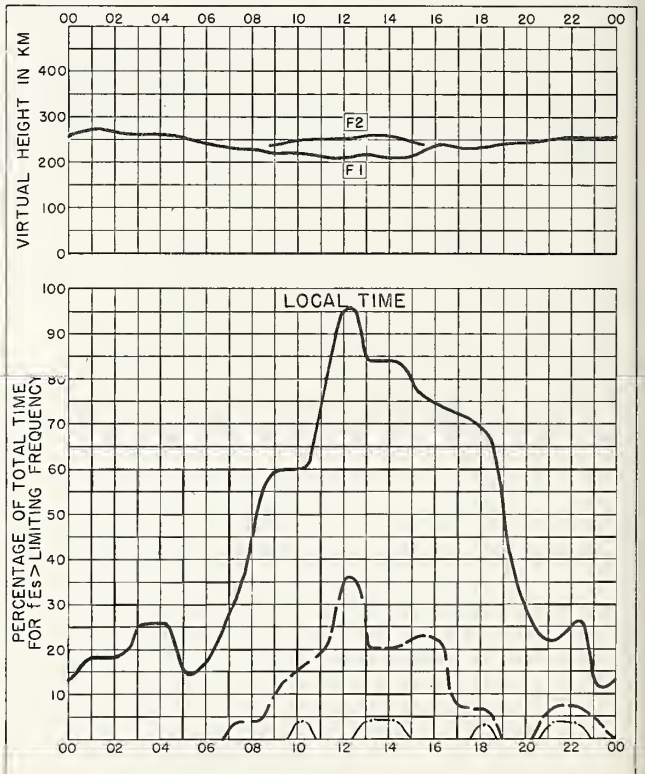

Fig. 128. BRISBANE, AUSTRALIA JUNE 1956

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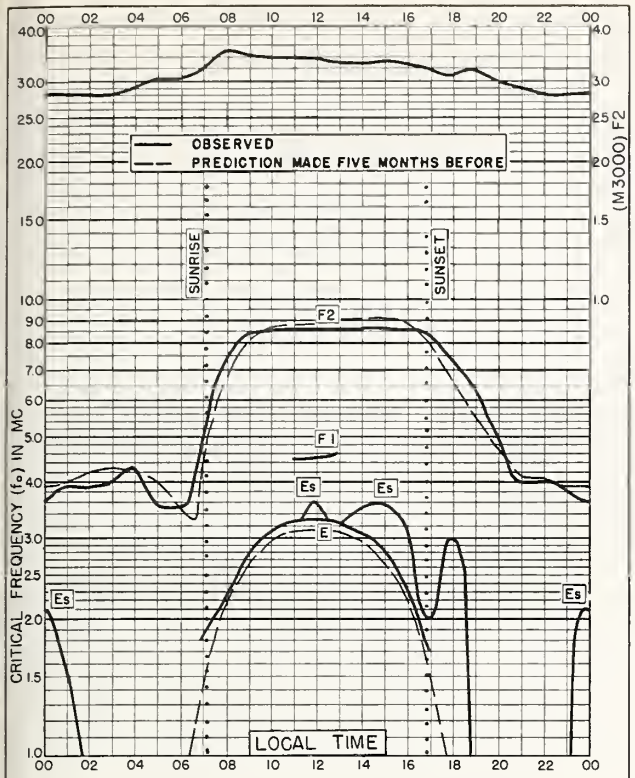

Fig. 129. CANBERRA, AUSTRALIA
35.3°S, 149.0°E JUNE 1956

NBS 503

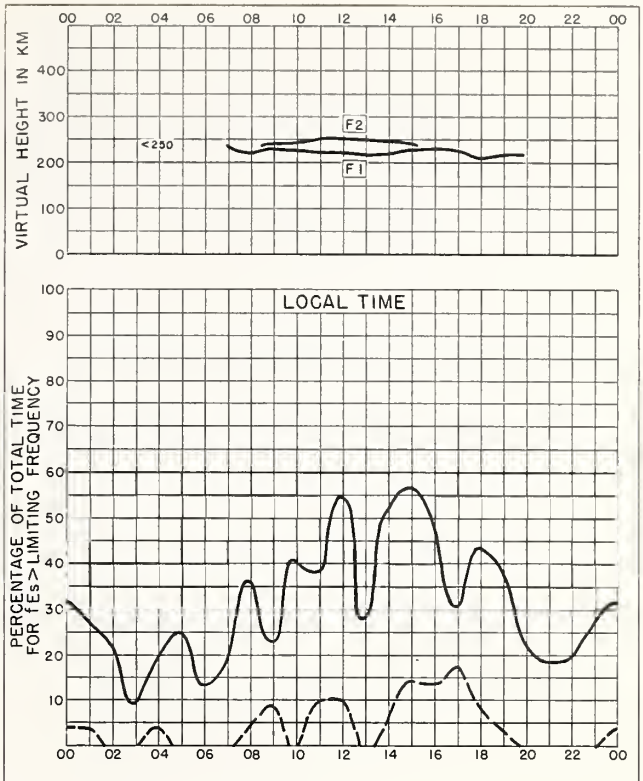

Fig. 130. CANBERRA, AUSTRALIA JUNE 1956

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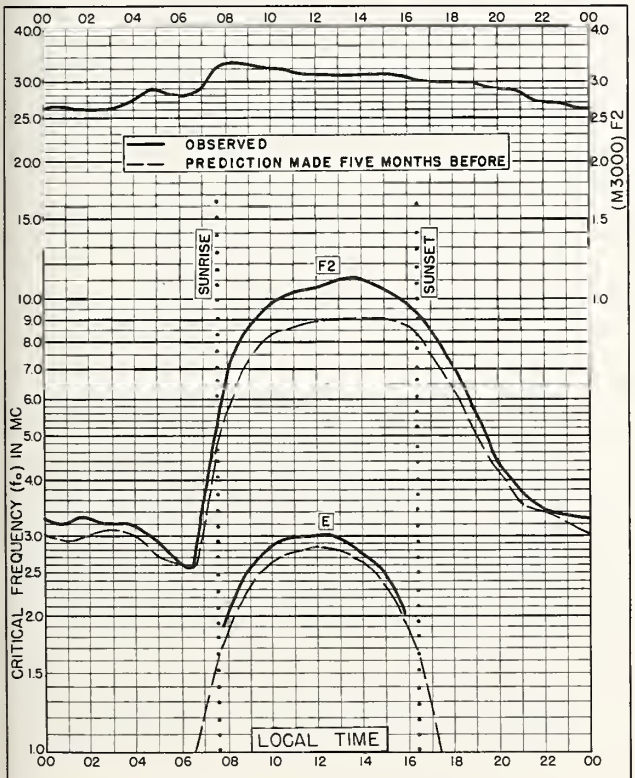

Fig. 131. HOBART, TASMANIA
42.9°S, 147.2°E JUNE 1956

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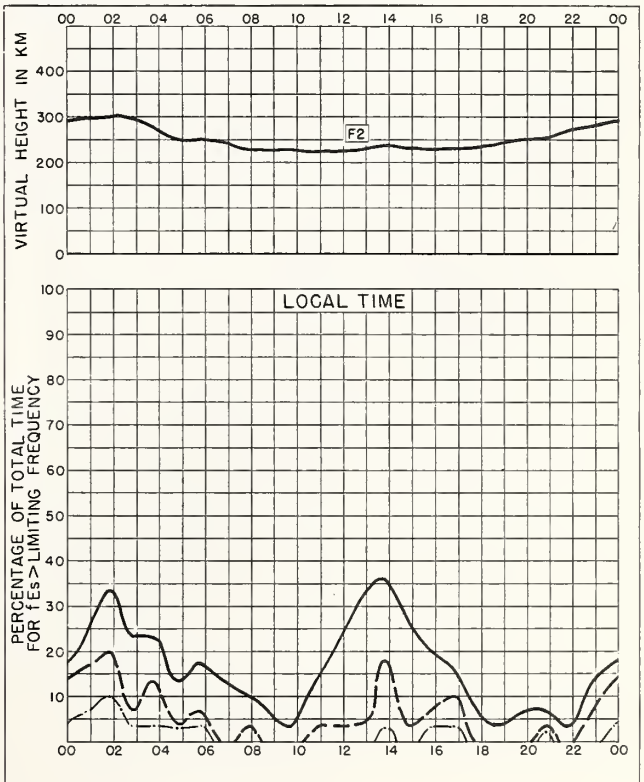

Fig. 132. HOBART, TASMANIA JUNE 1956

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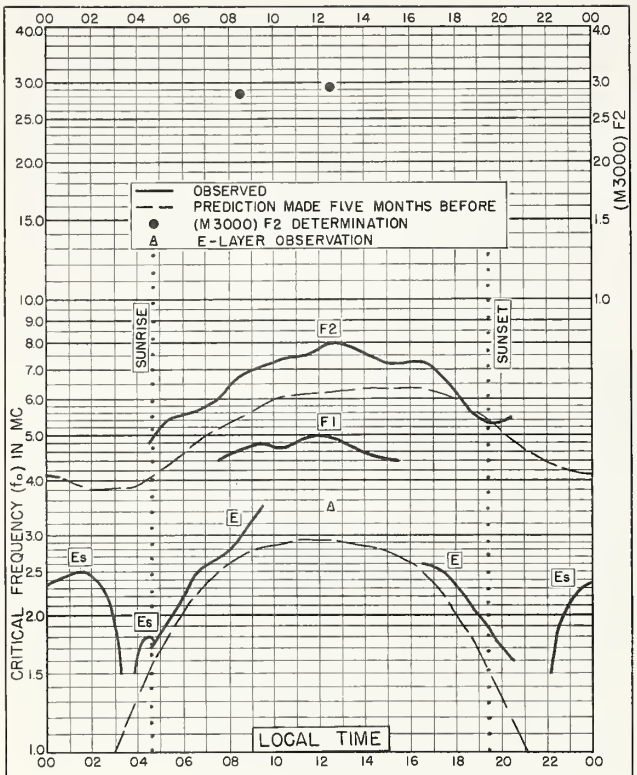


Fig. 133. LULEA, SWEDEN
65.6°N, 22.1°E APRIL 1956

NBS 503

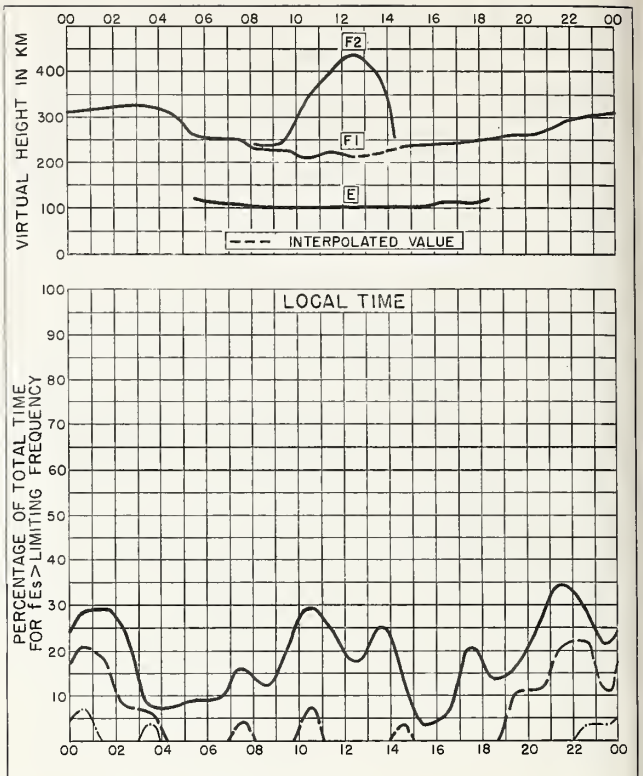
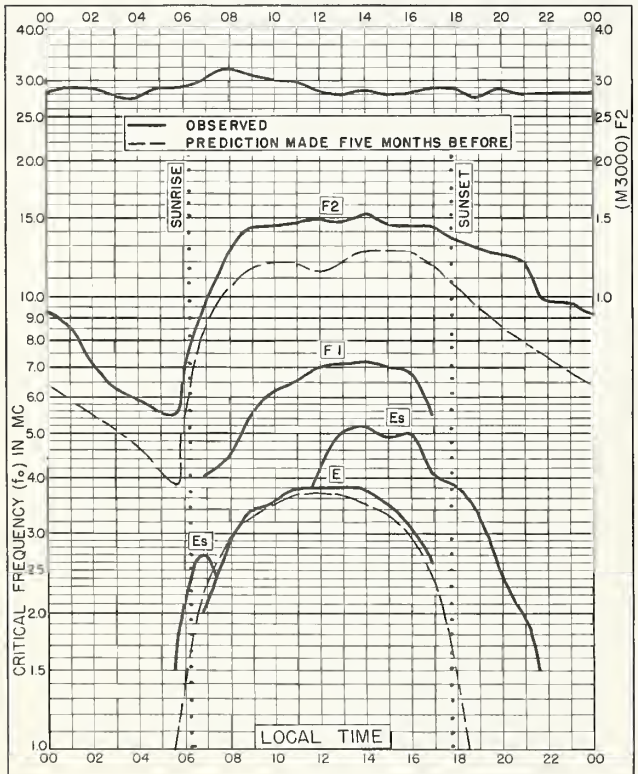


Fig. 134. LULEA, SWEDEN APRIL 1956

NBS 490



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21.2°S, 159.8°W APRIL 1956

NBS 503

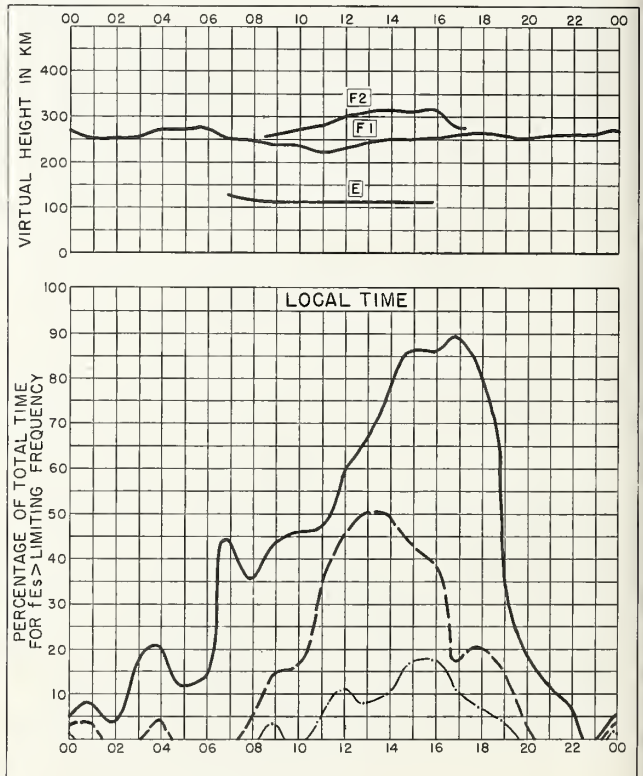

Fig. 136. RAROTONGA I. APRIL 1956

NBS 490

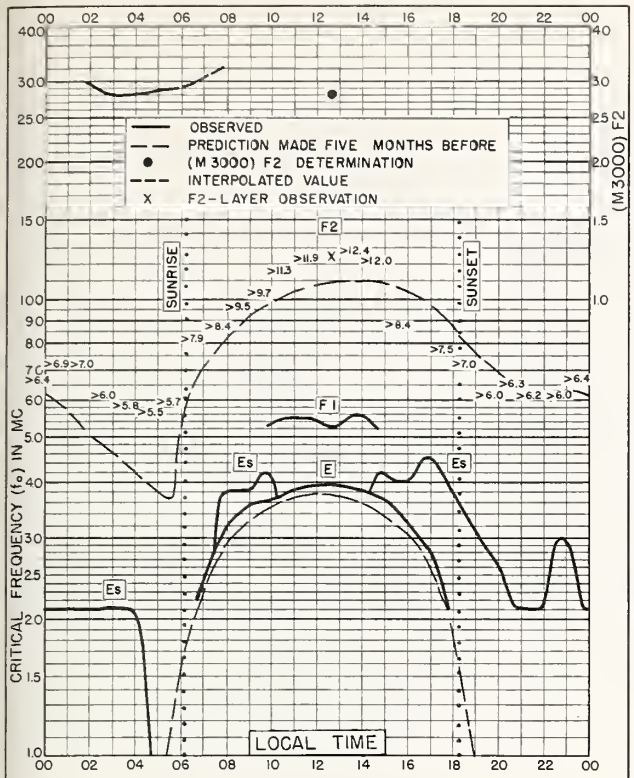

Fig. 137. TOWNSVILLE, AUSTRALIA
19.3°S, 146.7°E MARCH 1956

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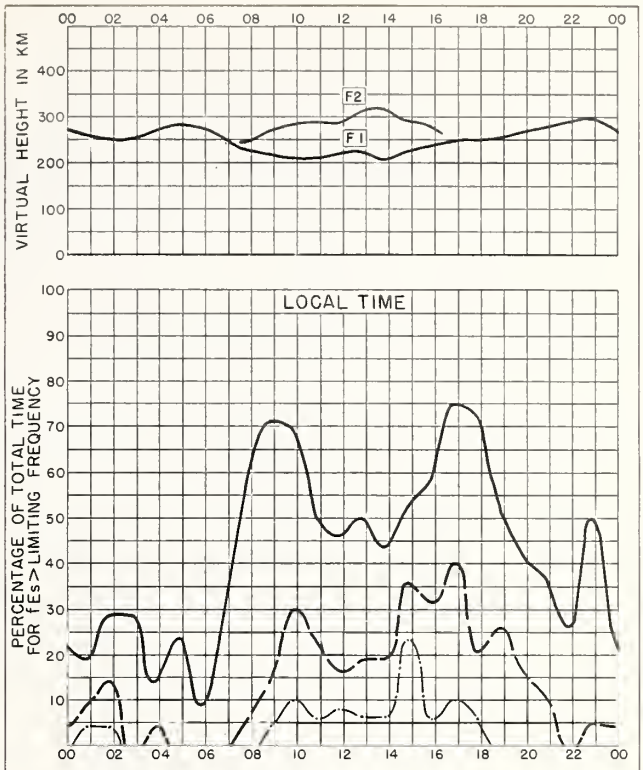

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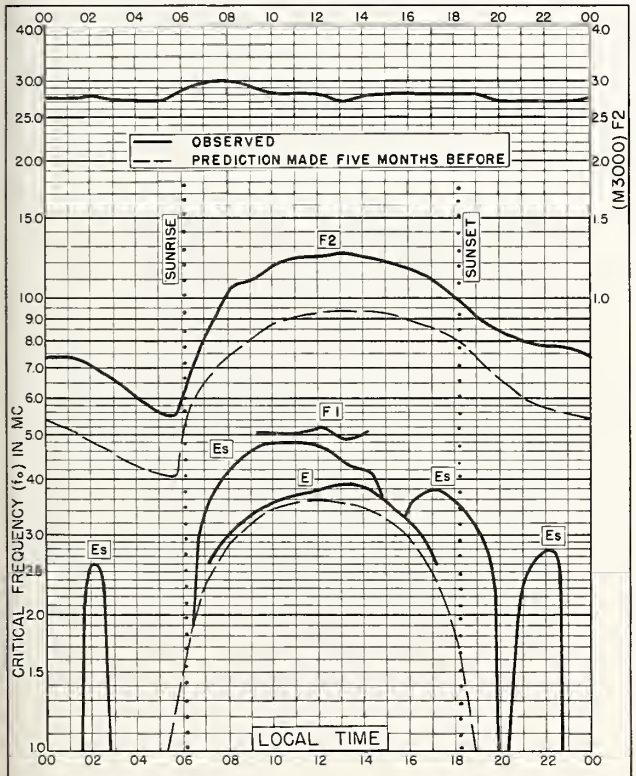

Fig. 139. BRISBANE, AUSTRALIA
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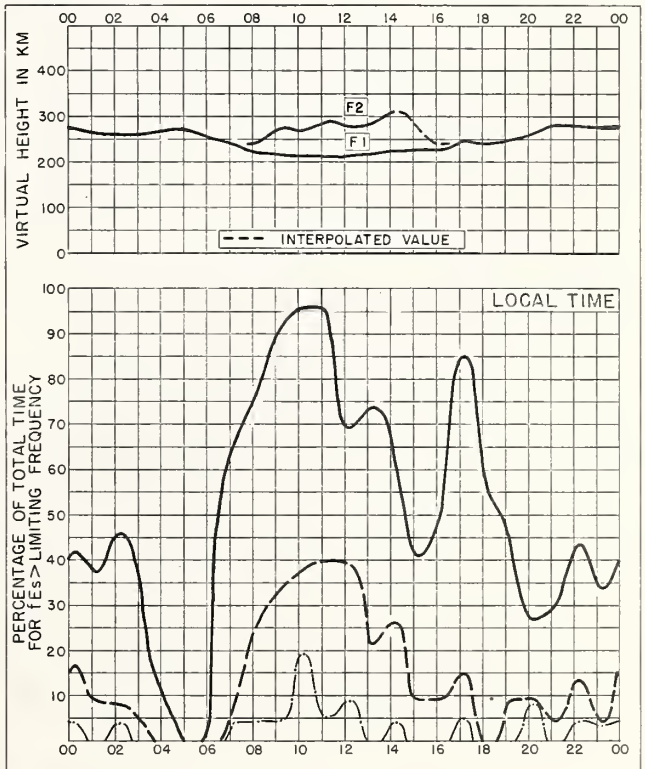

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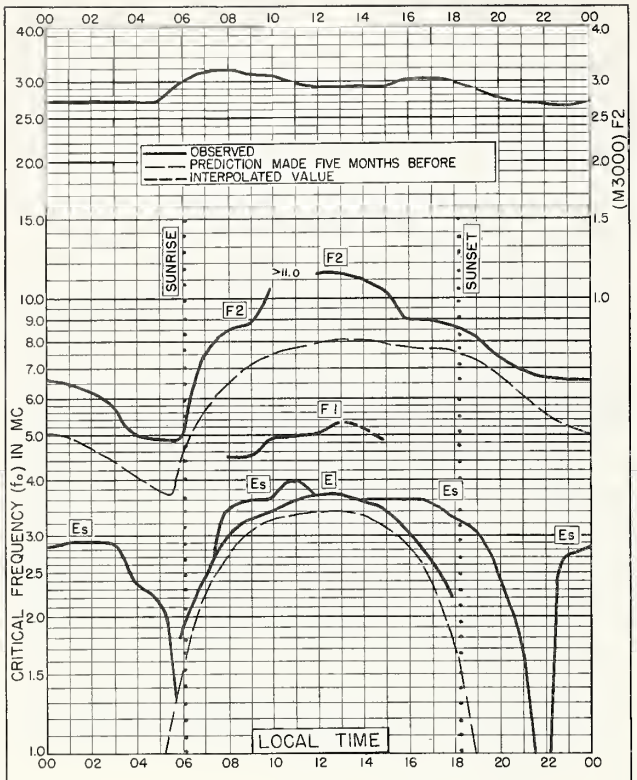

Fig. 141. CANBERRA, AUSTRALIA
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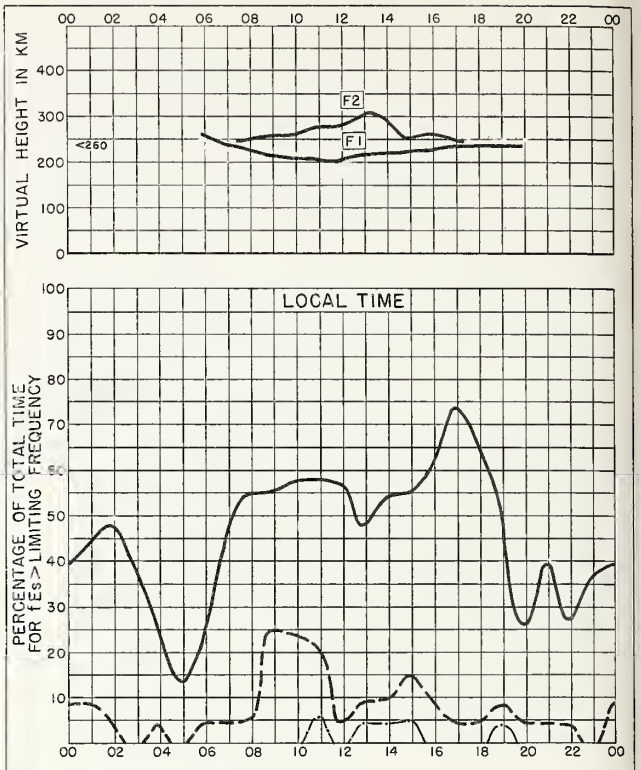

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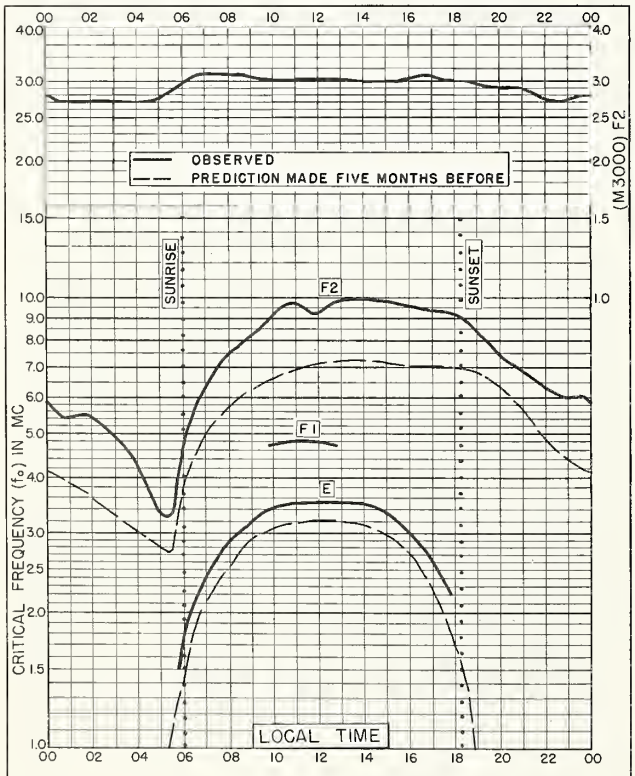

Fig. 143. HOBART, TASMANIA
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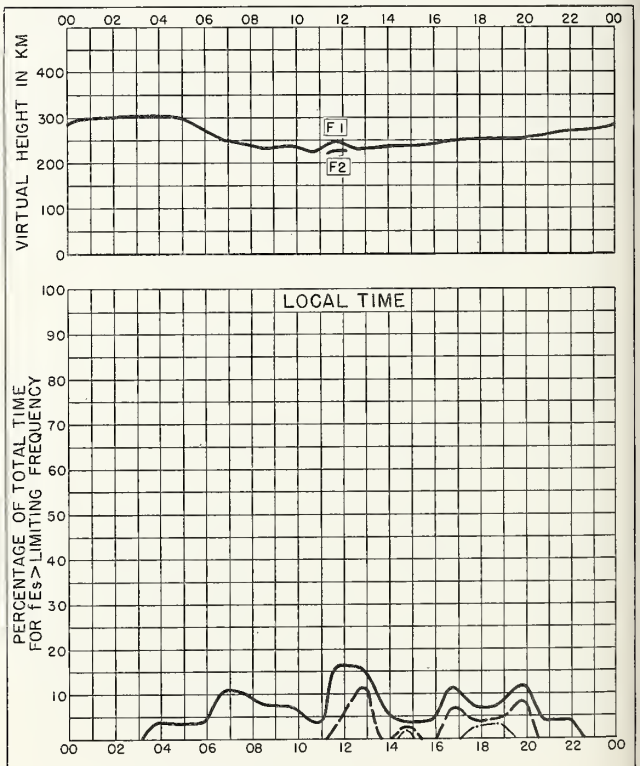

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