

CRPL-F 157 PART A

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PART A
IONOSPHERIC DATA

ISSUED
SEPTEMBER 1957

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

IONOSPHERIC DATA

CONTENTS

	<u>Page</u>
Symbols, Terminology, Conventions	2
Predicted and Observed Sunspot Numbers.	5
World-Wide Sources of Ionospheric Data.	6
Erratum	8
Examples of Ionospheric Vertical Soundings Reykjavik, Iceland; June 1, 1957.	9
Radio Noise Data.	11
Tables of Ionospheric Data.	17
Graphs of Ionospheric Data.	29
Index of Tables and Graphs of Ionospheric Data in CRPL-F157 (Part A).	65

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.

In the Second Report of the Special Committee on World-Wide Ionospheric Soundings of the URSI/AGI Committee, May 1957, a new descriptive letter was introduced:

M Measurement questionable because the ordinary and extraordinary components are not distinguishable.

There was an expansion in meaning of the following:

- Z (1) (qualifying letter) Measurement deduced from the third magnetioionic component.
(2) (descriptive letter) Third magnetioionic component present.

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 f_0F2 (and f_0E 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 f_0F2 , as equal to or less than f_0F1 .
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 f_0E , 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 f_0F2 ; otherwise it is omitted from the median count.

Values of fEs missing for any other reason, and values of $h'E$ s 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.

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 Zurich sunspot numbers were used in constructing the contour charts:

Month	Predicted Sunspot Number										
	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948
December	150*	150	42	11	15	33	53	86	108	114	
November	150*	147	35	10	16	38	52	87	112	115	
October	150*	135	31	10	17	43	52	90	114	116	
September	150*	119	30	8	18	46	54	91	115	117	
August	150*	105	27	8	18	49	57	96	111	123	
July	150*	95	22	8	20	51	60	101	108	125	
June	150*	89	18	9	21	52	63	103	108	129	
May	150*	77	16	10	22	52	68	102	108	130	
April	150*	68	13	10	24	52	74	101	109	133	
March	150*	60	14	11	27	52	78	103	111	133	
February	150*	150*	53	14	12	29	51	82	103	113	133
January	150*	150*	48	12	14	30	53	85	105	112	130

*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 beginning with the minimum of April 1954. Final numbers are listed through June 1956.

WORLD - WIDE SOURCES OF IONOSPHERIC DATA

The ionospheric data given here in tables 1 to 72 and figures 1 to 143 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

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

British Department of Scientific and Industrial Research, Radio Research Board:
Falkland Is.
Ibadan, Nigeria (University College of Ibadan)
Port Lockroy
Slough, England

Defence Research Board, Canada:
Baker Lake, Canada
Ottawa, Canada
Winnipeg, Canada

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

Danish National Committee of URSI:
Godhavn, Greenland

National Laboratory of Radio-Electricity (French Ionospheric Bureau):
Casablanca, Morocco
Poitiers, France

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

Icelandic Post and Telegraph Administration:
Reykjavik, Iceland

Indian Council of Scientific and Industrial Research, Radio Research Committee, New Delhi, India:

Ahmedabad (Physical Research Laboratory)

Bombay (All India Radio)

Delhi (All India Radio)

Kodaikanal (India Meteorological Department)

Madras (All India Radio)

Tiruchi (All India Radio)

Ministry of Postal Services, Radio Research Laboratories, Tokyo, Japan:

Akita, Japan

Tokyo (Kokubunji), Japan

Wakkai, 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

Institute of Terrestrial Magnetism, Ionosphere and Radio Propagation, Moscow, U.S.S.R.:

Alma-Ata

Chita

Leningrad

Moscow

Simferopol

Tomsk

Yakutsk

Yuzhno-Sakhalinsk

South African Council for Scientific and Industrial Research:

Capetown, Union of South Africa

Johannesburg, Union of South Africa

Nairobi, Kenya (East African Meteorological Department)

Research Institute of National Defence, Stockholm, 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:

Ft. Monmouth, New Jersey

Okinawa I.

St. Johns, Newfoundland

Thule, Greenland

National Bureau of Standards (Central Radio Propagation Laboratory):

Fairbanks, Alaska (Geophysical Institute of the University of Alaska)

Huancayo, Peru (Instituto Geofisico de Huancayo)

ERRATUM

For Nurmijarvi, Finland, values of (M3000)F2 as published in Part A of CRPL-F154, 155, and 156, are incorrect.

EXAMPLES OF IONOSPHERIC VERTICAL SOUNDINGS
Reykjavik, Iceland, June 1, 1957

The following ionograms were obtained at the Reykjavik, ionosphere vertical sounding station operated by the Icelandic Post and Telegraph. They are typical of day and night conditions for June at this geomagnetic latitude (70°). 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.

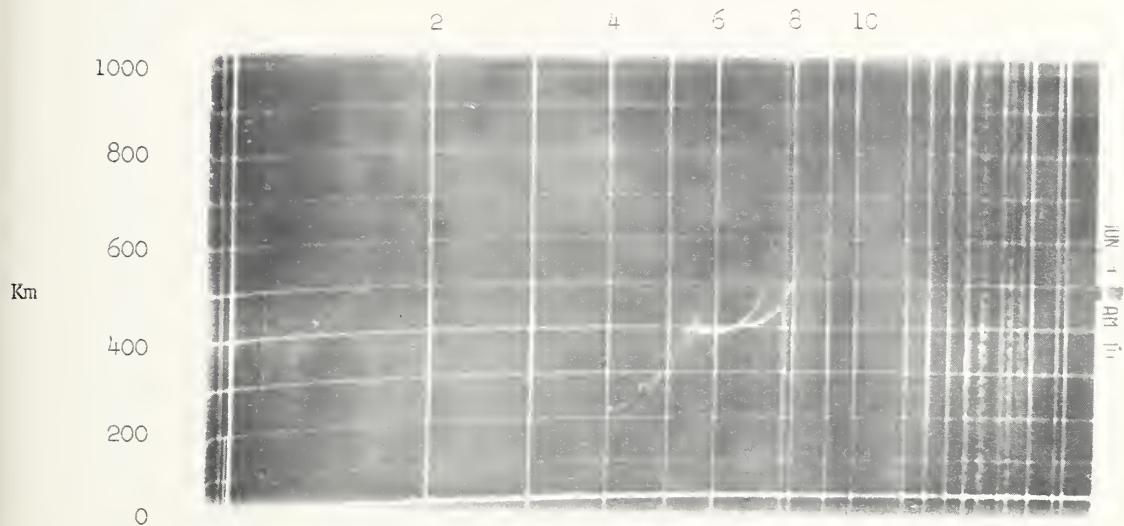


Fig. A. Reykjavik, June 1, 1957, 1001 hours, 15°W time.

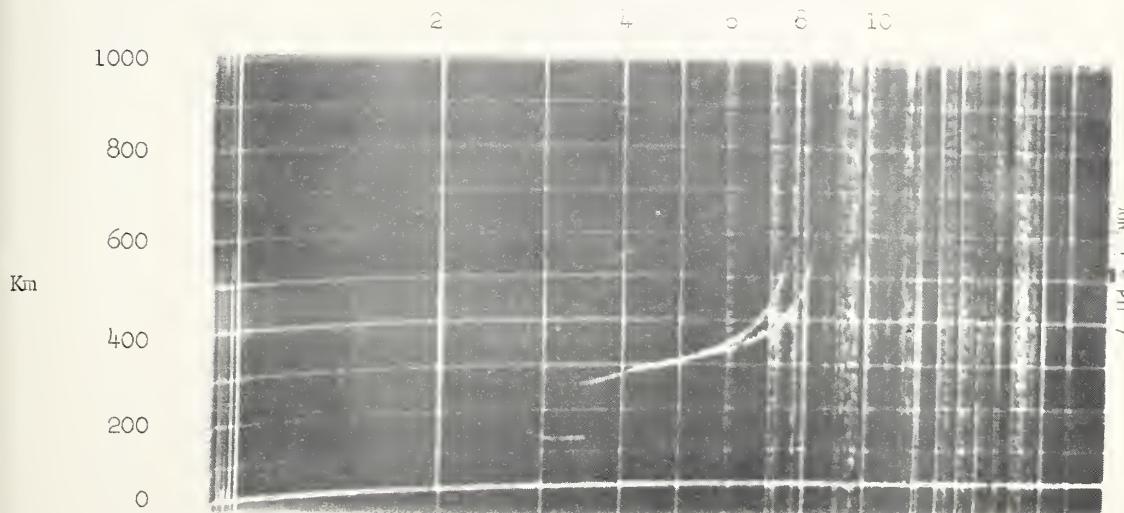


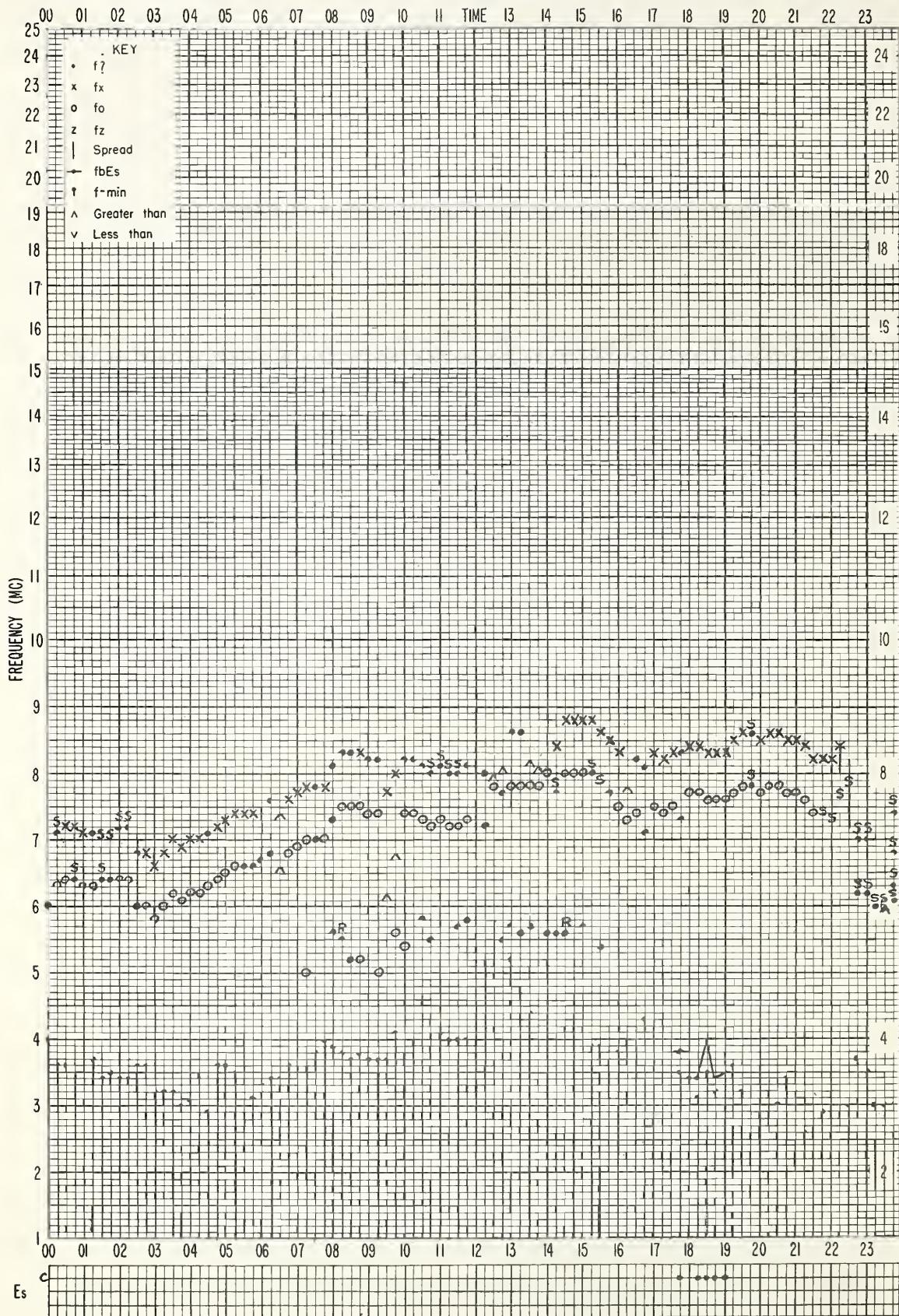
Fig. B. Reykjavik, June 1, 1957, 1901 hours, 15°W time.

10

REYKJAVIK, ICELAND
STATION IONR/K

f - PLOT OF IONOSPHERIC DATA

DATE 1 JUNE 1957



SCALED BY HJ/JS

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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

$$k = \text{Boltzman's constant } (1.38 \times 10^{-23} \text{ joules per degree Kelvin})$$

$$t = \text{Absolute room temperature (taken as } 288^{\circ} \text{ K)}$$

$$b = \text{Bandwidth in cycles per second.}$$

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

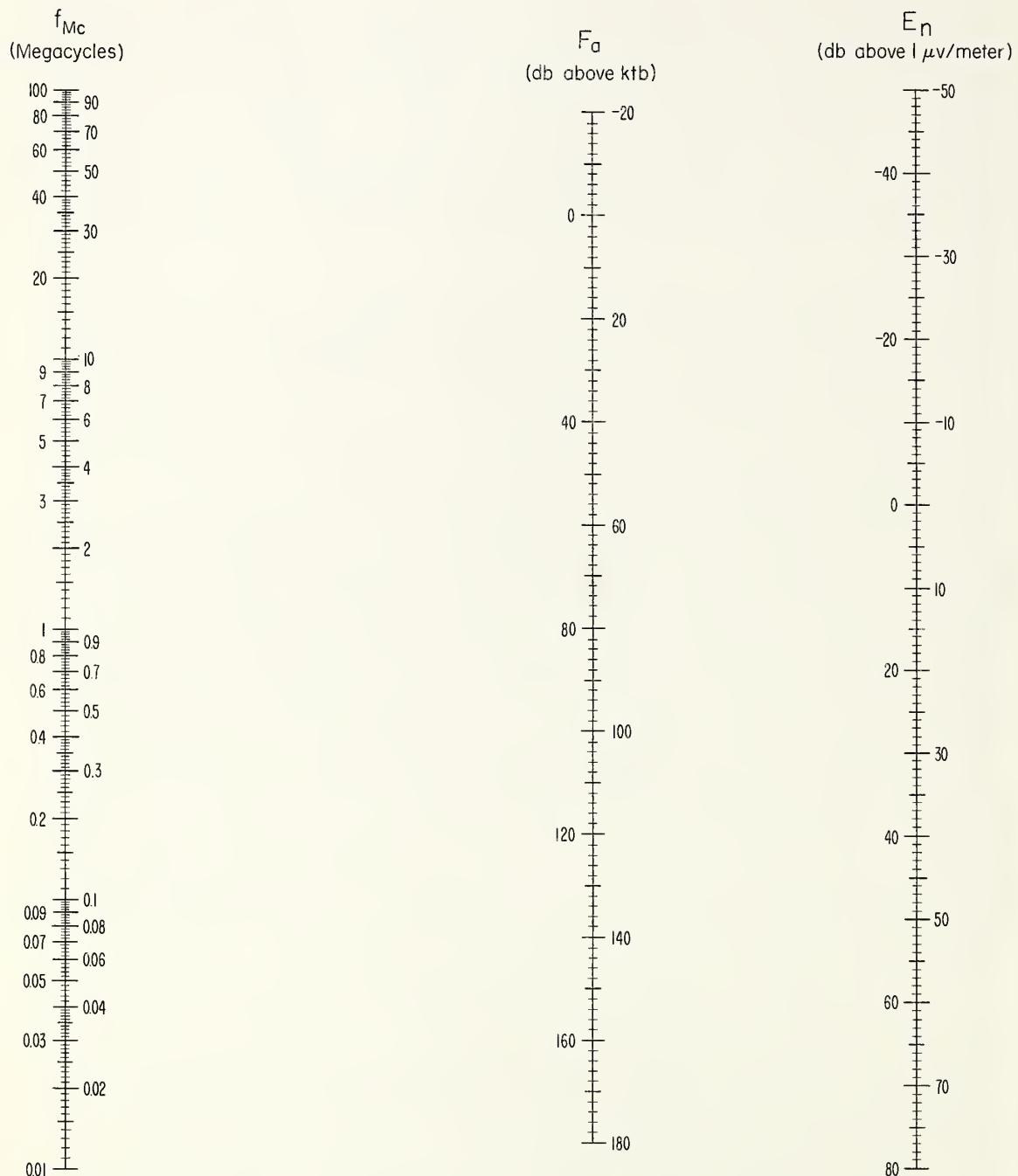
Measurements of these parameters were made with the National Bureau of Standards Radio Noise Recorder, Model ARN-2, which has an effective noise bandwidth of 280 cycles per second and uses a standard 21.75' vertical antenna. A 15-minute recording is made on each frequency each hour, and these 15-minute 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. Normally from 25 to 30 observations of the mean power are obtained monthly for each hour of the day, and from 10 to 15 observations of the voltage and logarithm deviations. When there are fewer than 15 observations of the mean power, or 7 observations of the voltage and logarithm deviations, the tabulated values are identified by an asterisk (*).

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 $1\mu\text{v}/\text{meter}$ for a 1kc Bandwidth.

f_{Mc} = Frequency in Megacycles.

RADIO NOISE DATA

Station Bill, Wyoming Lot. 43.2° N Long. 105.2° W Type Recorder ARN-2 Month July 19 57

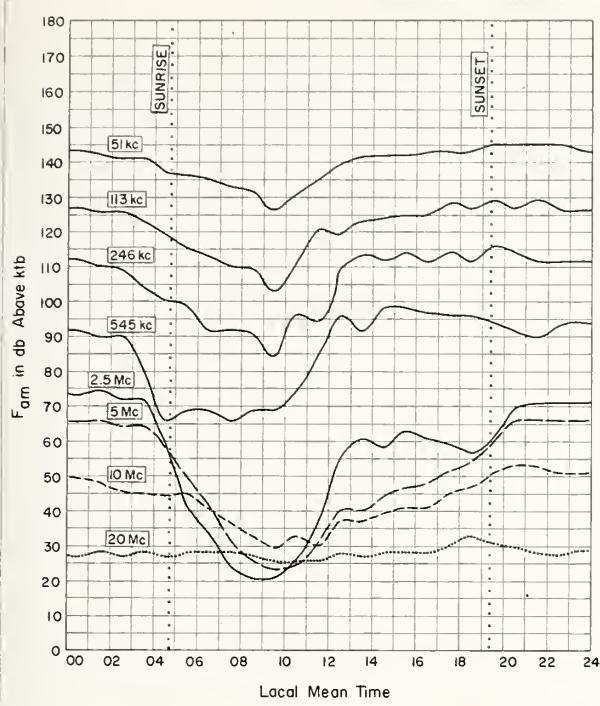
	Local Mean Time																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
[51 kc]																										
F _{am}	*143	*142	*141	*141	*137	*136	*135	*133	*132	*127	*131	*135	*139	*142	*142	*142	143	*143	143	145	145	145	145	143		
D _u			.															10	8	4	4	4	2	4		
D _ℓ																		6	8	12	10	8	8	8		
V _{dm}																										
L _{dm}																										
[113 kc]																										
F _{am}	*127	*126	*126	*123	*119	*115	*113	*110	*109	*103	*111	*121	*119	*123	*124	125	125	*128	127	129	127	129	127	127	127	
D _u																		10	12	10	8	8	4	4	4	
D _ℓ																		12	12	12	12	6	8	8	10	
V _{dm}																										
L _{dm}																										
[246 kc]																										
F _{am}	*112	*110	*109	*104	*100	*98	*92	*92	*91	*84	*96	*94	*109	*113	*112	114	112	*114	112	*116	114	112	112	112	112	
D _u																			8	12	12		8	8	4	4
D _ℓ																		20	22	20		10	6	8	8	
V _{dm}																										
L _{dm}																										
[545 kc]																										
F _{am}	*92	*90	*90	*80	*66	*68	*68	*66	*68	*68	*74	*84	*96	*94	*109	*113	*112	114	112	*114	112	*116	114	112	112	
D _u																										
D _ℓ																										
V _{dm}																										
L _{dm}																										
[2.5 Mc]																										
F _{am}	73	74	72	72	60	42	34	24	21	*21	*26	*36	*55	*61	*58	63	61	59	57	61	69	71	71	71	71	
D _u	4	3	7	5	7	16	14	9	10									14	15	8	17	13	4	6	6	
D _ℓ	7	11	7	9	9	15	12	5	4									38	40	28	17	12	10	8	8	
V _{dm}																										
L _{dm}																										
[5 Mc]																										
F _{am}	66	66	64	64	58	50	42	32	26	*23	*24	*31	*40	*40	*44	47	48	52	54	60	66	66	66	66	66	
D _u	4	4	6	4	2	4	6	10	12									13	8	4	8	2	2	4	4	
D _ℓ	4	4	4	6	6	15	16	10	6									23	28	18	14	10	8	4	4	
V _{dm}																										
L _{dm}																										
[10 Mc]																										
F _{am}	49	48	46	45	44	45	41	37	*33	*29	*33	*30	*37	*37	39	41	41	45	47	51	53	53	51	51	51	
D _u	6	5	7	4	5	4	6	4										8	6	6	5	4	2	2	4	
D _ℓ	6	4	3	2	3	8	10	8										10	8	4	6	4	5	6	4	
V _{dm}																										
L _{dm}																										
[20 Mc]																										
F _{am}	27	28	27	28	27	28	28	28	*27	*26	*26	*26	*28	*27	28	28	28	30	33	31	30	28	27	28	28	
D _u	4	3	4	3	4	6	6	5										6	6	7	6	3	3	4	5	
D _ℓ	3	4	3	4	3	4	3	4										3	4	3	5	8	6	4	3	
V _{dm}																										
L _{dm}																										

RADIO NOISE DATA

Station Boulder, Colorado Lat. 40.1° N Lang. 105.1° W Type Recorder ARN-2 Month July 19 57

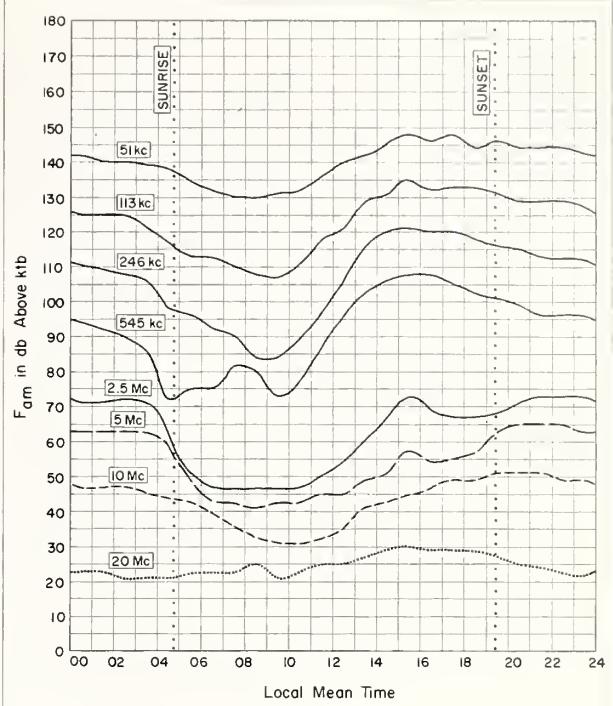
	Local Mean Time																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
[51 kc]																									
F _{am}	142	140	140	139	138	134	132	130	130	131	132	136	140	142	145	148	146	148	144	146	144	144	144	142	
D _u	4	4	4	3	2	4	4	4	0	6	4	4	8	8	8	6	8	4	8	3	4	4	4	3	
D _f	4	2	2	3	6	4	4	4	4	4	4	6	4	6	7	10	6	8	6	8	6	6	2	4	
V _{dm}	6.0	6.0	6.5	7.0	9.0	8.5	9.0	10.0	11.0	11.0	12.5	9.5	10.5	9.0	9.0	8.5	8.5	8.5	8.0	8.0	7.5	7.5	7.0	7.0	
L _{dm}	13.0	12.5	13.0	15.0	17.0	16.0	17.5	18.5	19.5	19.5	20.5	17.0	18.0	15.0	14.0	14.0	15.0	13.0	14.0	15.0	14.0	14.0	14.5	13.0	
[113 kc]																									
F _{am}	125	125	125	121	117	113	113	110	108	107	111	118	121	129	131	135	132	133	133	131	129	129	129	127	
D _u	6	4	4	6	6	8	5	8	5	7	8	9	4	11	12	7	13	5	6	7	8	6	4	4	
D _f	5	4	5	3	5	8	9	9	9	5	7	9	10	14	16	22	11	14	12	10	9	7	8	5	
V _{dm}	6.5	5.5	6.0	6.5	8.0	8.5	11.0	11.5	12.0	12.0	12.5	12.5	10.5	11.5	11.0	9.5	9.0	9.0	8.5	8.0	7.0	7.0	6.5	7.0	
L _{dm}	12.5	11.5	12.0	13.0	16.5	17.5	20.5	20.5	22.0	20.0	21.0	19.5	18.0	19.0	18.0	16.5	16.0	15.0	15.0	14.5	13.0	13.0	14.0	14.0	
[246 kc]																									
F _{am}	110	109	108	106	98	96	92	90	84	84	89	97	106	116	120	121	120	120	118	116	115	113	113	112	
D _u	6	5	6	4	6	7	6	8	10	10	20	18	17	12	10	9	8	8	8	8	7	6	5	5	
D _f	4	5	5	7	11	15	12	12	10	8	6	19	18	21	25	23	16	18	18	15	9	7	8	8	
V _{dm}	5.0	5.0	5.0	7.0	8.0	8.0	10.0	10.0	11.5	9.5	13.0	11.5	12.5	11.5	10.0	10.0	9.0	8.0	9.0	8.0	7.0	7.0	6.5	6.5	
L _{dm}	11.0	11.0	12.0	14.5	16.0	18.0	17.0	17.5	19.5	16.5	21.0	21.0	20.0	20.5	17.5	18.5	17.0	15.5	16.5	14.0	13.0	14.0	12.0	12.0	
[545 kc]																									
F _{am}	94	92	90	86	72	75	75	82	80	73	77	87	96	103	106	108	108	105	102	101	99	96	96	96	
D _u	6	6	6	6	8	5	6	6	8	10	22	18	16	11	11	11	6	9	8	9	5	9	6	6	
D _f	4	5	2	18	8	3	4	9	10	3	7	15	22	27	25	26	25	28	23	16	9	6	4	5	
V _{dm}	5.0	5.0	5.0	6.5	6.0	4.5	5.5	5.0	2.5*	7.0	15.0	11.0	11.0	10.0	10.0	9.0	9.0	10.5	11.0	9.0	6.0	6.0	5.0	5.0	
L _{dm}	10.5	10.0	11.0	12.5	14.0	8.5	10.0	10.0	8.0*	13.0	20.5	20.0	21.0	20.5	18.5	17.5	18.0	17.0	21.5	15.0	13.0	11.5	10.5	11.0	
[2.5 Mc]																									
F _{am}	71	71	72	71	63	51	47	47	47	47	47	50	54	61	67	73	69	67	67	68	71	73	73	73	
D _u	4	4	3	6	4	2	4	2	1	2	2	13	19	16	12	8	12	10	8	7	8	4	4	2	
D _f	4	6	5	7	8	4	2	4	2	2	2	3	5	8	16	22	18	17	12	7	4	5	6	4	
V _{dm}	3.5	3.5*	4.0	4.0	3.0*	3.0*	2.0*	1.0*	1.0*	1.0*	1.0*	2.0	5.0	8.0	5.0	7.5	5.5	6.0	6.0	3.5	4.0	3.5	4.0	4.0	
L _{dm}	8.0	8.0*	9.0	8.0*	7.5*	5.0*	4.0*	3.0*	3.0*	3.0*	3.0*	3.0	8.0	15.0	16.5	15.0	13.5	14.5	10.5	9.0	8.0	8.0	9.0	8.0	
[5 Mc]																									
F _{am}	63	63	63	63	59	49	43	43	41	43	43	45	45	49	51	58	54	55	57	63	65	65	63		
D _u	2	4	2	2	2	4	4	2	4	2	5	4	4	17	16	18	14	8	6	2	4	2	2	4	
D _f	3	2	3	4	6	6	3	8	4	5	4	8	2	6	4	13	7	9	6	6	3	4	4	3	
V _{dm}	3.5	3.5	4.0	4.0	4.0	4.0*	4.5*	4.0*	1.5*	1.5*	1.0*	1.0*	1.0	3.0	9.0	6.0	7.5	5.0	4.0	3.0	2.5	3.0	3.5	4.0	4.0
L _{dm}	8.0	8.0	8.0	8.5	8.5*	8.0*	7.0*	3.5*	3.5*	3.0*	3.0*	3.0	5.0	14.0	14.0	15.5	8.0	9.0	6.0	6.0	7.0	7.5	8.0	8.0	
[10 Mc]																									
F _{am}	47	47	47	45	44	43	39	35	33	31	31	33	35	41	43	45	47	49	49	51	51	51	49	49	
D _u	4	2	2	1	3	2	6	6	6	6	5	6	10	9	9	8	5	3	4	4	5	2	4	2	
D _f	4	3	4	3	3	4	4	5	4	5	6	7	6	8	11	7	5	6	2	3	3	4	3	6	
V _{dm}	4.0	3.0	2.5	2.5	3.0*	3.0*	4.5*	4.0*	4.5*	4.0*	3.0*	4.5	4.5	5.0	5.0	4.5	3.0	3.0	3.0	2.5	3.0	3.5	3.5	3.0	
L _{dm}	7.5	7.0	6.5	6.0	7.0*	7.5*	8.0*	8.0*	11.5	6.0*	6.0*	8.0	9.0	10.0	10.0	10.0	6.5	6.5	7.0	6.0	6.5	6.0	7.5	7.0	
[20 Mc]																									
F _{am}	23	23	21	21	21	23	23	23	25	21	23	25	25	27	27	29	30	29	29	27	25	24	23	22	
D _u	1	0	2	1	2	3	3	4	4	6	12	7	6	7	10	16	7	4	4	7	10	4	3	3	
D _f	2	2	0	0	2	2	2	4	2	2	4	4	6	8	7	7	6	4	4	3	3	2	1		
V _{dm}	1.0*	1.0*	.5	.5*	1.0*	2.0*	3.0*	2.0*	3.0*	3.0*	2.5	2.5	2.0	2.0	3.0	4.0	3.0	3.0	3.0	2.5	1.0*	1.0*	1.5*	1.5*	
L _{dm}	3.0*	3.0*	3.0	2.5*	2.5*	3.5*	5.0*	4.0*	7.0*	4.5*	4.0	5.0	5.0	6.0	7.5	6.0	6.0	5.0	4.5	4.5*	3.0*	4.0*	3.0*	3.0*	

GRAPHS OF RADIO NOISE DATA



BILL, WYOMING

JULY 1957



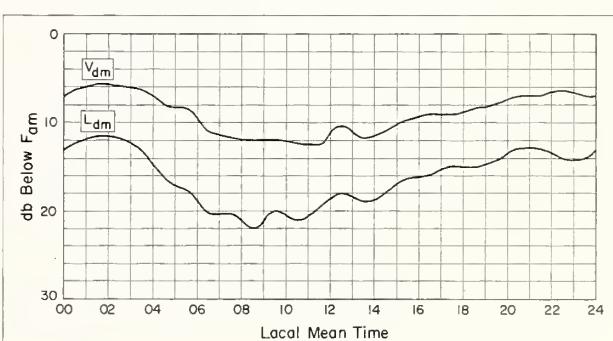
BOULDER, COLORADO

JULY 1957



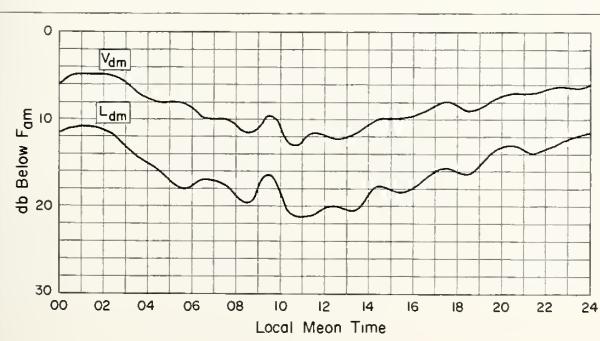
BOULDER, COLORADO

JULY 1957



BOULDER, COLORADO

JULY 1957



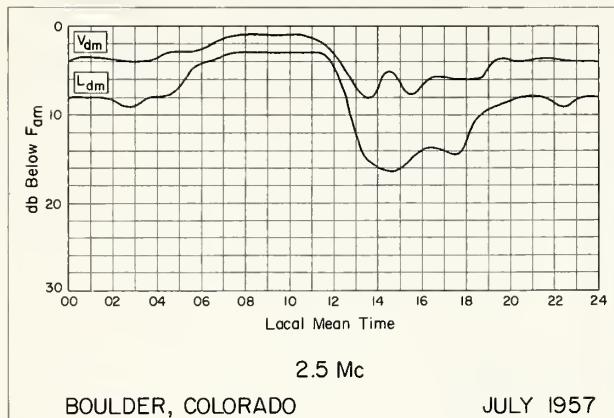
BOULDER, COLORADO

JULY 1957



BOULDER, COLORADO

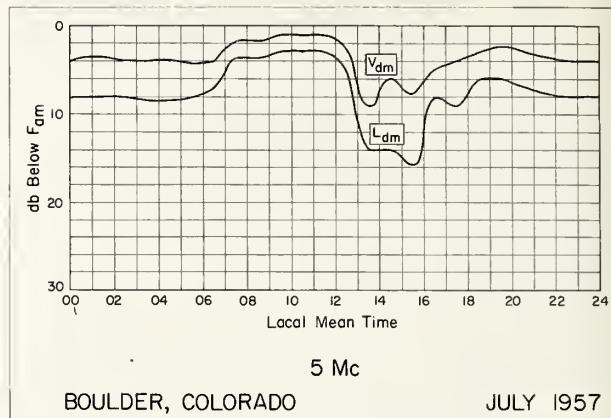
JULY 1957



2.5 Mc

BOULDER, COLORADO

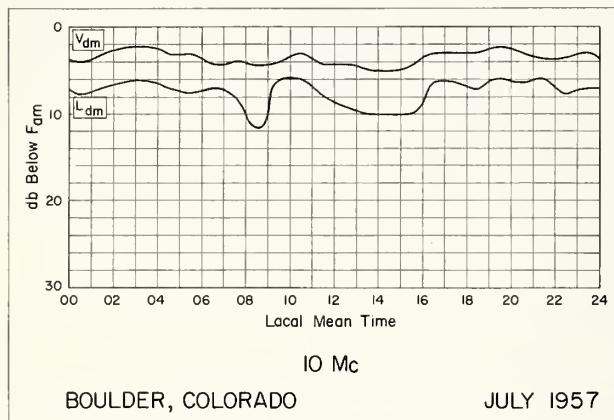
JULY 1957



5 Mc

BOULDER, COLORADO

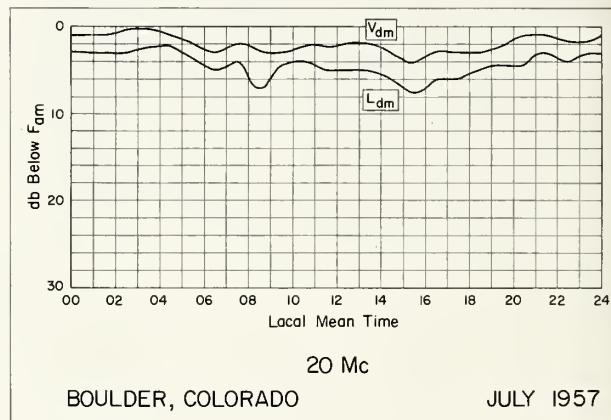
JULY 1957



10 Mc

BOULDER, COLORADO

JULY 1957



20 Mc

BOULDER, COLORADO

JULY 1957

TABLES OF IONOSPHERIC DATA

17

Table 1

Time	July 1957					
	h'F2	foF2	h'F	foF1	h'E	foE
	(M3000)F2					
00	13.7	280			2.6	2.70
01	13.3	260			3.4	2.90
02	11.4	240			2.5	2.90
03	9.2	240			4.0	2.85
04	7.8	250			4.2	2.75
05	7.9	260			3.4	2.85
06	8.5	240	(2.4)		3.0	3.00
07	9.2	230		(3.1)	4.0	3.00
08	9.3	220	---		3.7	2.85
09	9.6	220	(6.6)		5.6	2.60
10	(420)	10.7	210	(6.6)	(4.4)	5.8
11	390	11.6	220	(6.4)	---	5.6
12	390	12.4	210	6.3	---	<5.8
13	400	12.8	220	6.3	---	5.8
14	400	13.3	220	6.2	---	5.2
15	380	13.7	220	(6.1)	---	5.0
16	360	13.8	220	5.8	3.8	5.2
17	(320)	13.8	240	---	3.3	4.4
18		13.3	250	---	4.2	2.65
19		12.9	280		3.7	2.60
20		12.2	300		3.7	2.50
21		13.2	320		2.9	2.40
22		14.1	320		2.6	2.50
23		14.3	300		2.7	2.55

Time: 120.0°E.

Sweep: 1.1 Mc to 19.5 Mc in 15 minutes, manual operation.

Table 2

Time	June 1957					
	h'F2	foF2	h'F	foF1	h'E	foE
	(M3000)F2					
00			(5.0)		310	
01			(4.6)		(6.0)	(320)
02			(5.8)		---	4.2
03			(5.2)		(5.7)	<330
04			5.6		---	4.4
05			6.0		(5.6)	<310
06			6.0		(450)	(265)
07			5.9		450	(6.0)
08			6.4		470	(6.2)
09			6.4		470	6.2
10			6.6		480	6.6
11			5.5		505	6.2
12			5.3		530	6.4
13			5.2		520	6.4
14			5.4		515	6.4
15			5.2		515	6.2
16			5.0		515	6.2
17			4.8		480	6.2
18			4.4		430	(6.4)
19			4.2		(430)	(6.2)
20			3.7		270	---
21			3.7		295	---
22			3.7		290	---
23			3.7		305	---

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 3

Time	June 1957					
	h'F2	foF2	h'F	foF1	h'E	foE
	(M3000)F2					
00			(5.0)		3.2	(2.60)
01			(4.6)		3.2	(2.40)
02			(5.8)		3.7	(2.50)
03			(5.2)		3.9	(2.55)
04			5.6		3.3	2.55
05			6.0		2.8	2.55
06			6.0		4.4	2.55
07			5.9		4.7	2.55
08			6.4		5.0	(3.50)
09			6.4		2.60	
10			6.7		5.2	
11			6.5		2.50	
12			6.8		5.4	
13			6.8		5.6	
14			6.7		5.5	103
15			6.6		5.4	
16			6.0		5.3	
17			6.7		(5.0)	109
18			6.7		(4.9)	107
19			6.3		4.5	131
20			6.2		2.8	(2.60)
21			(5.7)		2.8	(2.60)
22			(5.3)		2.8	(2.50)
23			(5.4)		2.8	(2.55)

Time: 15.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 16.2 seconds.

Table 4

Time	June 1957					
	h'F2	foF2	h'F	foF1	h'E	foE
	(M3000)F2					
00			(6.6)		300	
01			6.2		300	
02			5.2		300	
03			4.6		310	
04			5.0		280	
05			5.4		250	
06			(400)		109	2.00
07			425		2.70	2.75
08			465		2.70	2.70
09			470		3.70	2.70
10			510		3.80	2.70
11			485		4.0	2.70
12			520		4.1	2.50
13			490		4.2	2.50
14			450		3.90	2.50
15			450		3.80	2.50
16			410		3.80	2.60
17			390		3.15	2.65
18			8.0		2.70	2.70
19			8.0		2.70	2.70
20			7.0		2.80	2.80
21			8.1		2.80	2.80
22			7.3		2.95	3.1
23			7.0		300	2.50

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 5

Time	June 1957					
	h'F2	foF2	h'F	foF1	h'E	foE
	(M3000)F2					
00			6.6		<285	
01			6.2		290	
02			5.7		290	
03			5.5		280	
04			5.0		300	
05			5.4		275	(2.15)
06			(395)		109	2.00
07			450		3.30	3.4
08			520		3.60	3.9
09			525		3.05	4.2
10			550		4.00	4.3
11			520		5.4	4.3
12			505		5.5	4.15
13			525		5.6	4.10
14			500		5.4	4.00
15			405		5.4	3.90
16			460		5.2	3.65
17			420		4.7	3.30
18			---		111	(2.75)
19			7.2		121	2.05
20			7.7			(3.4)
21			7.9			3.0
22			7.5			2.65
23			7.0			2.65

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 6

Time	June 1957					
	h'F2	foF2	h'F	foF1	h'E	foE
	(M3000)F2					
00			10.8		320	
01			11.0		290	
02			10.2		280	
03			9.0		265	
04			8.2		270	
05			7.7		275	
06			8.3		260	
07			8.8		240	
08			8.9		230	
09			---		109	(3.40)
10			---		107	(3.05)
11			430		6.4	(4.20)
12			420		6.4	(4.30)
13			410		6.1	(4.20)
14			400		6.0	(4.15)
15			390		6.0	4.00
16			390		6.0	4.8
17			355		240	3.40
18			330		12.5	2.50
19					12.1	2.75
20					11.4	300
21					11.3	330
22					>11.2	<340
23					10.7	330

Time: 135.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 7

Thule, Greenland (76.6°N, 68.7°W)								May 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		6.0	260	---	119	2.20		2.65
01	---	6.1	265	---	117	2.20		2.65
02	---	5.7	250	---	113	2.30		2.65
03	---	5.6	245	---	111	2.45		2.80
04	(470)	5.4	250	3.9	109	2.60		2.70
05	460	5.4	240	4.1	109	2.80		2.65
06	400	5.4	240	4.3	109	3.00		2.65
07	445	5.8	230	4.4	109	3.10		2.55
08	500	5.6	235	4.5	109	3.30		2.35
09	530	5.4	230	4.7	109	3.30		2.30
10	510	5.6	230	4.7	107	3.30		2.45
11	540	5.6	230	4.7	107	3.35		2.40
12	490	6.2	230	4.8	107	3.35		2.45
13	470	6.2	225	4.8	109	3.30		2.50
14	470	6.3	230	4.7	107	3.20		2.50
15	450	6.2	230	4.6	107	3.20		2.50
16	450	6.4	235	4.5	109	3.00		2.50
17	430	6.4	230	4.5	109	2.95	3.1	2.60
18	415	6.2	240	4.2	109	2.85		2.65
19	420	6.0	250	4.1	113	2.65		2.55
20	(410)	6.2	255	---	113	2.50		2.70
21	---	6.2	260	---	115	2.35		2.60
22	---	6.0	260	---	115	(2.20)		2.70
23	---	6.0	270	---	119	2.20		2.70

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

Table 9

Reykjavik, Iceland (64.1°N, 21.0°W)								May 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		---					3.4	
01		(4.5)					3.4	(2.50)
02		(4.8)					3.5	(2.50)
03		(5.4)		---	---	---	3.6	(2.50)
04		5.6		---			2.55	
05		5.9		---			2.70	
06		6.0		---			2.70	
07		6.2		---			2.75	
08		6.4		5.0			2.65	
09		6.7		(5.2)			2.60	
10		7.0		5.2			2.60	
11		7.0		5.4			2.55	
12		7.0		5.6			2.55	
13		7.3		5.4			2.60	
14		7.4		(5.4)			2.60	
15		7.2		5.2			2.60	
16		7.3		(5.0)			2.60	
17		7.2		4.9			2.65	
18		6.8		(4.6)	<121	3.15	2.70	
19		6.8		---	111	3.10	2.70	
20		(6.4)		---			(2.70)	
21		(6.0)		---			(2.60)	
22		(5.8)		---			(2.60)	
23		(6.0)		---			3.1	(2.55)
							3.4	(2.55)

Time: 15.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 16.2 seconds.

Table 11

Watheroo, W. Australia (30.3°S, 115.9°E)								May 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00			5.2	250			3.00	
01			5.0	250			<3.00	
02			4.6	250			<2.90	
03			4.5	250			<2.95	
04			4.2	<250			2.90	
05			4.2	240			<2.95	
06			4.0	220			3.05	
07			6.5	230	1.65		3.20	
08			9.2	220	2.60	2.6	3.50	
09			11.5	220	3.15	3.5	3.35	
10			11.8	220	3.40	3.8	3.35	
11			11.8	220	3.50	3.9	<3.25	
12			(250)	>11.8	3.70	3.8	3.10	
13			11.8	220	3.65	3.8	3.05	
14			(250)	11.7	3.55	3.8	<3.05	
15			11.6	220	3.30	3.5	3.05	
16			11.5	220	2.90	3.2	3.10	
17			(11.4)	230	2.20	2.2	(2.95)	
18			---	210	2.0	----		
19			>7.0	210			(3.05)	
20			7.0	220			3.15	
21			6.0	230			<3.00	
22			5.8	240			3.05	
23			5.6	<250			2.95	

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

Table 8

Fairbanks, Alaska (64.9°N, 147.8°W)								May 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00					(5.6)	370		3.6 (2.55)
01					(5.2)	(330)		4.0 (2.50)
02					(5.5)	(330)		3.7 (2.50)
03					(5.5)	365		4.2 (2.55)
04					(440)	(6.0) (315)	----	4.0 (2.50)
05					460	(6.0) (250)	(4.2) 109	(2.60) 4.0 (2.50)
06					435	(6.4) 240	(4.3) 105	(2.80) 4.0 (2.50)
07					470	(6.6) 240	4.5 103	3.10 3.3 (2.45)
08					470	(6.4) 220	4.7 101	3.40 (2.45)
09					480	(6.4) 220	(4.9) 103	3.50 2.45
10					495	6.4 220	5.0 103	3.60 2.50
11					495	6.5 220	5.1 103	3.60 2.50
12					505	6.4 220	5.2 105	3.70 2.50
13					500	6.4 220	5.1 105	(3.60) 2.50
14					480	6.4 220	5.2 109	3.55 2.50
15					485	6.6 220	5.0 107	3.45 2.50
16					460	6.6 230	5.0 106	(3.25) 2.60
17					420	6.6 240	4.6 103	3.10 2.65
18					(400)	(6.4) 250	(4.5) 110	2.75 (2.70)
19					(410)	(6.4) 270	---	114 2.45 3.2 (2.75)
20					---	(6.3) 280	---	---
21					5.7	300	---	---
22					5.8	305	---	3.3 (2.70)
23					(5.4)	(310)	---	3.4 (2.60)

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

Table 10

St. Johns, Newfoundland (47.6°N, 52.7°W)								May 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00					(6.6)	300		(2.55)
01					6.1	300		2.55
02					5.6	300		2.55
03					5.2	300		2.55
04					5.2	290	127 1.80	2.70
05					5.8	255	119 2.40	2.85
06					6.4	240	109 2.95 3.0	2.90
07					(415)	6.5 230	5.1 107 3.25 3.4	2.85
08					425	6.9 220	5.4 109 3.55	2.80
09					450	7.0 220	5.4 106 (3.70)	2.65
10					455	7.4 215	5.8 105 (3.95)	2.70
11					430	7.6 215	5.8 105 (3.95)	2.60
12					440	7.6 220	5.8 107 (4.00)	2.60
13					430	7.8 220	5.8 105 (3.90)	2.55
14					400	7.9 225	5.6 105 (3.80)	2.60
15					400	8.4 230	5.5 109 3.55	2.60
16					(400)	8.6 235	5.2 111 3.30	2.65
17					8.0	240	113 2.95 3.2	2.65
18					9.0	265	119 2.45 2.6	2.70
19					8.6	270	---	2.8
20					8.4	270	---	2.60
21					0.2	280	---	2.55
22					(7.5)	290	---	(2.55)
23					(7.0)	300	---	(2.2)

Time: 60.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 12

Tromso, Norway (69.7°N, 19.0°E)								April 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00					5.5 (355)			(3.1) 2.30
01					(5.6) ---			(3.3) (2.30)
02					5.4 ---			2.30
03					5.8 (350)			(3.3) 2.45
04					5.9 (310)			(3.2) 2.55
05					6.1 (290)		2.30 2.6	(2.55) (2.55)
06					6.4 275		120 2.70	
07					(605) 6.8 250	4.45 115	2.80	2.40
08					(520) 7.0 250	4.80 110	3.15	2.45
09					(420) 7.8 245	5.10 110	3.20	2.45
10					(470) 8.0 245	5.10 110	3.20	2.40

Table 13

Lycksele, Sweden (64.6°N, 18.8°E)								April 1957
Time	h°F2	foF2	h°F	foF1	h°E	foE	fEs	(M3000)F2
00	5.8	360			3.1	2.3		
01	5.9	390			2.6	2.3		
02	5.7	355			1.9	2.4		
03	5.6	320		---	E	2.4		
04	---	5.6	300	---	---	1.50	2.5	
05	(320)	5.7	265	3.55	110	1.95	2.6	
06	325	6.3	250	3.80	110	2.30	2.7	
07	340	6.4	240	4.40	110	2.90	2.6	
08	380	7.2	230	4.95	105	3.05	2.6	
09	370	7.5	230	5.20	105	3.25	2.6	
10	380	7.9	220	5.35	105	3.30	2.6	
11	385	8.0	220	5.45	105	3.30	2.6	
12	370	8.5	220	5.40	105	3.40	2.7	
13	400	8.3	225	5.50	105	3.40	2.6	
14	380	8.8	230	5.30	105	3.40	2.65	
15	410	8.2	230	5.05	105	3.20	2.7	
16	350	8.1	230	5.00	105	3.05	2.7	
17	---	7.4	250	---	110	2.60	2.8	
18		7.5	250		110	2.25	2.7	
19		7.1	270		130	1.85	2.7	
20		6.2	275	---	E	2.1	2.6	
21		6.0	310	---	E	2.7	2.4	
22		6.0	325			3.0	2.3	
23		6.0	350			4.0	2.4	

Time: 15.0°E.

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

Table 15

Oslo, Norway (60.0°N, 11.1°E)								April 1957
Time	h°F2	foF2	h°F	foF1	h°E	foE	fEs	(M3000)F2
00	(6.0)	350				(2.3)	----	
01	(5.3)	360				1.8	----	
02	(5.3)	345				(1.6)	----	
03	(4.8)	345				1.4	(2.40)	
04	(4.8)	315		---	---	1.4	2.40	
05	5.1	290		120	(1.85)		2.55	
06	---	5.8	260	---	110	2.15	2.75	
07	---	6.3	250	---	110	2.70	2.70	
08	(470)	6.9	245	---	110	3.00	2.60	
09	---	8.0	245	---	110	3.25	2.60	
10	(495)	8.4	235	---	110	3.45	2.55	
11	(440)	8.8	240	5.20	105	3.60	2.55	
12	(455)	9.4	235	5.50	105	3.65	2.55	
13	(450)	9.8	240	5.40	105	3.70	2.55	
14	(450)	9.6	245	5.70	110	3.60	2.60	
15	(440)	9.6	240	---	110	3.40	2.65	
16	---	9.7	245		110	3.20	2.60	
17	9.6	250		115	2.90	2.70		
18	9.4	250		115	2.50	2.75		
19	9.0	255		110	2.10	2.80		
20	8.2	255	---	---	1.6	2.70		
21	8.0	260				1.6	2.70	
22	(7.2)	300				(2.4)	(2.55)	
23	(7.0)	325				(2.6)	----	

Time: 15.0°E.

Sweep: 0.7 Mc to 25.0 Mc in 5 minutes, automatic operation.

Table 17

Winnipeg, Canada (49.9°N, 97.4°W)								April 1957
Time	h°F2	foF2	h°F	foF1	h°E	foE	fEs	(M3000)F2
00	4.8	330				3.0	(2.5)	
01	5.0	380				3.5	(2.5)	
02	5.0	360				3.4	2.5	
03	5.0	360				3.0	(2.5)	
04	5.0	340		---	---	2.1	2.5	
05	5.0	330		---	---		2.6	
06	---	5.4	290		120	2.0	2.7	
07	330	6.1	280	---	120	2.8	2.7	
08	400	6.5	240	4.6	110	3.0	2.7	
09	420	6.9	240	5.0	110	3.3	2.55	
10	480	7.0	220	5.1	110	3.6	2.5	
11	500	7.0	230	5.2	110	3.8	2.5	
12	480	7.0	240	5.2	110	3.9	2.45	
13	500	7.2	240	5.3	110	3.9	2.45	
14	500	7.5	240	5.3	110	3.8	2.5	
15	480	7.8	240	5.1	110	3.7	2.5	
16	430	7.8	240	5.0	110	3.3	2.5	
17	400	7.7	250	4.8	110	3.0	2.5	
18	340	7.2	280	---	115	2.8	2.6	
19	---	7.2	280	---	130	2.0	2.7	
20	7.0	280	---	---	---	<1.6	2.7	
21	6.0	290				<1.6	2.7	
22	5.0	320				2.6	2.6	
23	5.0	320				3.0	2.6	

Time: 90.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 14

Baker Lake, Canada (64.3°N, 96.0°W)								April 1957
Time	h°F2	foF2	h°F	foF1	h°E	foE	fEs	(M3000)F2
00			6.4	290			3.8	
01			6.2	290			<1.6	
02			5.8	290			<2.0	
03			5.0	300		1.2	<2.0	
04			5.0	300		1.0		
05			5.6	290		115	2.0	
06			(470)	5.3	200	3.9	115	2.3
07			420	5.5	240	4.2	110	2.7
08			480	5.8	220	4.5	110	3.0
09			670	5.9	220	4.8	105	3.3
10			500	5.8	240	4.7	105	3.5
11			570	5.8	240	4.0	110	3.7
12			440	6.1	230	4.9	110	3.7
13			460	7.5	240	5.0	105	3.6
14			440	7.4	240	4.9	105	3.5
15			420	7.0	230	4.8	105	3.4
16			460	6.6	240	4.7	110	3.2
17			460	6.4	250	4.7	110	3.0
18			(440)	6.5	260	4.4	110	2.7
19				6.4	280	---	110	2.3
20				6.1	290		120	2.0
21				6.0	300		125	1.8
22				5.8	290		120	1.2
23				6.2	200	---	3.4	---

Time: 90.0°W.

Sweep: 1.0 Mc to 16.0 Mc in 16 seconds.

Table 16

Lindau/Harz, Germany (51.6°N, 10.1°E)								April 1957
Time	h°F2	foF2	h°F	foF1	h°E	foE	fEs	(M3000)F2
00			310	6.60				2.45
01			330	6.30				2.30
02			320	6.10				2.35
03			310	5.70		E	2.3	2.40
04			295	5.40		E	2.6	2.50
05			290	5.35	---	---	1.20	3.1
06			255	6.30	250	115	2.10	3.5
07			235	6.90	235	100	2.70	3.8
08			320	7.70	230	5.35	100	3.10
09			385	8.90	225	5.20	100	3.40
10			320	10.20	220	5.80	100	3.60
11			345	10.20	220	5.90	100	3.80
12			345	10.85	215	6.20	100	3.75
13			375	10.95	220	6.30	100	3.80
14			350	10.90	230	6.20	100	3.75
15			(275)	10.75	230	6.20	100	3.60
16			(340)	10.35	235	6.20	100	3.40
17			(240)	10.25	240	6.20	100	3.6
18			245	10.35	250	6.20	110	2.45
19			250	10.00			130	1.75
20			240	9.10				3.1
21			250	8.40				2.6
22			275	7.50				2.4
23			300	7.15				2.4

Time: 15.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 18

Schwarzenburg, Switzerland (46.8°N, 7.3°E)								April 1957
Time	h°F2	foF2	h°F	foF1	h°E	foE	fEs	(M3000)F2
00			300	7.7				2.8
01			300	7.4				2.8
02			300	7.2				2.8
03			300	6.8				2.85
04			300	6.4				3.0
05			280	6.3				3.3
06			240	6.5	---	---	100	1.9
07			210	7.5	---	---	100	2.5
08			210	8.3	200	5.0	100	3.0
09			200	9.3	200	5.4	100	3.2
10			260	10.0	200	6.0	100	3.5

Table 19

Ottawa, Canada (45.4°N, 75.9°W)							April 1957	
Time	h'F2	foF2	h'F	foFl	h'E	foE	fEs	(M3000)F2
00	5.0	320			<1.6		2.5	
01	5.0	350			<1.6		2.5	
02	4.8	360			<1.5		2.4	
03	4.8	330			<1.5		2.5	
04	4.7	330			<1.5		2.5	
05	4.9	310	120	1.5			2.6	
06	5.8	270	---	110	2.2		2.8	
07	350	6.3	250	---	110	3.0	2.8	
08	340	6.6	230	4.9	110	3.3	2.7	
09	380	6.8	230	5.2	105	3.5	2.55	
10	430	7.0	210	5.3	105	3.8	2.5	
11	400	7.2	220	5.4	105	3.9	2.5	
12	430	7.7	220	5.6	105	3.9	2.5	
13	430	7.8	220	5.6	105	3.9	2.5	
14	420	8.0	230	5.5	105	3.8	2.5	
15	380	8.3	230	5.3	105	3.6	2.5	
16	380	8.6	240	5.2	110	3.3	2.6	
17	360	8.8	250	4.6	110	3.0	2.55	
18	330	8.6	260	---	120	2.4	2.6	
19	---	7.6	300		130	1.5	2.6	
20		7.0	280		<1.5		2.55	
21		6.7	290		<1.5		2.6	
22		6.1	290		<1.6		2.45	
23		5.4	300		<1.6		2.4	

Time: 75.0°W.

Sweep: 1.0 Mc to 20.0 Mc in 15 seconds.

Table 21

Akita, Japan (39.7°N, 140.1°E)							April 1957	
Time	h'F2	foF2	h'F	foFl	h'E	foE	fEs	(M3000)F2
00	8.4	310			(1.2)		2.55	
01	8.2	300					2.60	
02	8.1	290			(1.4)		2.60	
03	7.5	280			(1.4)		2.50	
04	7.1	300			(1.5)		2.45	
05	7.7	295			1.4		2.55	
06	9.6	245					2.90	
07	---	11.3	240				3.00	
08	(245)	12.0	240				2.90	
09	250	12.5	240		4.2		2.80	
10	250	13.0	230		4.2		2.80	
11	250	13.2	235		4.4		2.70	
12	250	13.1	225		4.3		2.70	
13	250	13.0	230		3.8		2.65	
14	250	12.8	240				2.65	
15	250	12.1	245				2.65	
16	(250)	11.6	245		3.5		2.70	
17	---	11.6	250		3.5		2.75	
18		11.5	255		(2.6)		2.85	
19		10.4	250		(2.4)		2.80	
20		9.0	250				2.70	
21		8.5	290				2.55	
22		8.4	300				2.55	
23		8.5	310				2.55	

Time: 135.0°E.

Sweep: 0.85 Mc to 22.0 Mc in 2 minutes.

Table 23

Yamagawa, Japan (31.2°N, 130.6°E)							April 1957	
Time	h'F2	foF2	h'F	foFl	h'E	foE	fEs	(M3000)F2
00	11.1	300			(2.6)		2.65	
01	10.4	300			(2.3)		2.65	
02	9.8	290			(2.4)		2.70	
03	9.0	260			(1.9)		2.70	
04	8.3	275			(1.6)		2.55	
05	7.8	290			(1.7)		2.50	
06	8.7	275			(2.0)		2.65	
07	10.9	245			3.0		2.95	
08	---	12.1	240		3.7		2.85	
09	(250)	12.7	240		4.2		2.75	
10	250	13.6	230		4.4		2.70	
11	<250	14.0	230		4.4		2.65	
12	250	14.4	230		4.4		2.65	
13	250	14.6	240		4.5		2.60	
14	250	14.4	230		4.0		2.60	
15	250	14.4	245		4.0		2.60	
16	(260)	14.0	250		4.0		2.60	
17	---	13.9	250		3.5		2.65	
18		13.8	270		3.0		2.70	
19		13.0	270		(3.0)		2.75	
20		11.6	260		(2.9)		2.60	
21		11.2	290		(2.2)		2.50	
22		11.1	305		(3.0)		2.55	
23		11.2	300		(2.6)		2.60	

Time: 135.0°E.

Sweep: 1.0 Mc to 20.0 Mc in 1 minute.

Table 20

Wakkanai, Japan (45.4°N, 141.7°E)							April 1957	
Time	h'F2	foF2	h'F	foFl	h'E	foE	fEs	(M3000)F2
00			8.0	310				2.50
01			7.8	300				2.50
02			7.3	285				2.55
03			6.8	290				2.50
04			6.7	300				2.50
05			7.4	270				2.60
06			9.4	235				2.85
07			10.9	235				2.85
08	(250)	11.3	230					3.6
09	240	12.0	230					2.85
10	240	12.0	225					4.0
11	240	12.1	225					4.0
12	240	12.2	225					4.1
13	250	12.0	230					3.7
14	250	11.8	235					2.65
15	---	11.3	235					2.65
16	---	11.0	240					2.2
17		10.8	250					2.75
18		10.7	255					2.3
19		10.0	245					2.0
20		9.0	250					2.70
21		8.2	260					2.60
22		8.2	285					2.60
23		8.0	300					2.55

Time: 135.0°E.

Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 22

Tokyo, Japan (35.7°N, 139.5°E)							April 1957	
Time	h'F2	foF2	h'F	foFl	h'E	foE	fEs	(M3000)F2
00			9.3	320				2.50
01			9.0	300				2.60
02			8.7	300				2.65
03			7.9	265				2.50
04			7.4	300				2.50
05			8.0	300				2.50
06			10.3	250				2.90
07			11.9	240				2.85
08	(250)	12.6	245					3.7
09	250	13.1	240					2.70
10	250	13.5	240					3.80
11	250	13.8	240					4.3
12	255	13.9	240					2.65
13	260	13.8	245					2.60
14	(275)	13.6	245					3.75
15	---	13.2	250					2.60
16	(300)	12.9	255					3.25
17	(295)	12.8	260					3.2
18		12.5	275					2.75
19		10.9	260					2.6
20		9.5	270					2.60
21		9.3	300					2.45
22		9.4	315					2.55
23		9.4	320					2.60

Time: 135.0°E.

Sweep: 1.0 Mc to 17.2 Mc in 2 minutes.

Table 24

Formosa, China (25.0°N, 121.5°E)							April 1957	
Time	h'F2	foF2	h'F1	foFl	h'E	foE	fEs	(M3000)F2
00			280	>15.5				2.8
01			260	14.1				2.85
02			260	12.4				2.8
03			250	11.3				2.8
04			260	9.7				2.8
05			260	8.4				2.8
06			250	9.7				2.6
07			240	11.5				2.8
08			240	12.7				2.7
09			230	13.6				2.7
10			14.6	220				2.6
11			15.4	220				2.6
12			>16.4	---				2.6
13			16.5	230				2.5
14			>17.0	240				2.5
15			(17.5)	240				2.6
16			17.6	240				3.6
17	(260)	17.5	240	---				2.55
18		280	17.2	---				3.1
19		280	>16.9	---				3.6
20		310	17.2	---		</		

Table 25

Nairobi, Kenya (1.3°S, 36.8°E)								April 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		>14.0	220					
01		>14.1	220					
02		(13.4)	220					
03		>10.8	230					
04		11.1	240					
05		9.9	220					
06		>6.6	220					
07		8.8	250					
08		>11.0	240					
09		>13.4	240					
10		(13.8)	220					
11		14.6	(220)					
12		>15.4	---					
13		---	---					
14		---	---					
15	420	>15.4	(230)					
16	430	(15.3)	240					
17	(400)	(15.3)	250					
18		270	---					
19		310	---					
20		350	---					
21		280	---					
22		240	---					
23		>12.5	220					

Time: 45.0°E.

Sweep: 1.0 Mc to 16.0 Mc in 7 seconds.

Table 27

Capetown, Union of S. Africa (34.1°S, 18.3°E)								April 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		4.4	250					2.8
01		4.1	<280					2.7
02		4.0	<300					2.7
03		4.0	<300					2.6
04		4.0	(260)					2.7
05		3.8	<260					2.75
06		3.6	250					2.8
07		5.4	260					2.9
08		9.1	230		2.6			3.2
09		>11.6	230		3.1			(3.1)
10	250	>12.8	230		3.4	3.6		---
11	240	>13.0	230	---	3.6			---
12	240	>13.3	220	---	---			
13	---	>13.6	230		---			
14	---	>13.7	240		---			
15	(270)	>13.4	240		3.7			---
16	---	>13.3	240		3.4			
17	---	>13.0	240		2.9			
18	---	>12.8	240		2.2			---
19	---	>11.6	230		1.7			---
20		10.8	230					(2.9)
21		>9.4	230					(3.0)
22		7.6	230					3.1
23		5.8	230					3.0

Time: 30.0°E.

Sweep: 1.0 Mc to 15.0 Mc in 7 seconds.

Table 29

Yakutsk, U.S.S.R. (62.0°N, 129.4°E)								March 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		350	(5.0)					2.6
01		380	(4.3)					2.6
02		390	(4.2)					2.5
03		410	(4.0)					2.5
04		400	(3.8)					2.6
05		400	3.8					2.6
06		310	4.6					2.7
07		260	5.8					2.9
08		250	7.0	150	2.8			3.1
09		240	8.8	120	3.0			3.0
10		230	9.2					3.1
11		230	10.4	120	3.2			3.0
12		230	11.0	130	3.3			3.0
13		230	11.4	120	3.2			2.9
14		230	11.6	120	3.4			3.0
15		230	11.4	120	3.4			3.0
16		230	11.6	130	3.2			2.9
17		230	11.6	130	2.9			3.0
18		240	11.4					2.9
19		240	10.6					3.0
20		240	9.4					2.9
21		270	8.1					2.9
22		280	6.8					2.7
23		310	(5.6)					2.7

Time: 120.0°E.

Sweep: 2.2 Mc to 16.0 Mc in 1 minute.

Table 26

Johannesburg, Union of S. Africa (26.2°S, 28.0°E)								April 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00			5.2	250				2.4
01			5.0	250				2.6
02			4.8	260				2.1
03			4.5	250				2.8
04			4.3	250				2.8
05			4.1	<260				2.85
06			4.8	250				2.8
07			9.0	230				3.2
08			11.6	230				3.2
09			(250)	13.2	230			3.0
10			250	13.9	220			2.9
11			250	14.0	220			2.9
12			(300)	13.7	210			2.7
13			(310)	13.8	220			2.7
14			(310)	14.0	230			2.6
15			---	13.7	240			2.6
16			---	13.7	240			2.6
17			13.1	240				2.8
18			12.6	240				2.8
19			11.2	230				2.9
20			>10.1	240				2.9
21			9.2	240				3.0
22			7.9	240				2.6
23			6.4	240				3.0

Time: 30.0°E.

Sweep: 1.0 Mc to 15.0 Mc in 7 seconds.

Table 28

Buenos Aires, Argentina (34.5°S, 58.5°W)								April 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		260	11.1					2.95
01		260	11.2					3.0
02		240	10.4					3.0
03		250	8.8					3.0
04		250	7.4					2.9
05		280	7.2					2.7
06		280	7.6					2.9
07		220	11.2	---	---			3.1
08		210	13.4	---	---			3.1
09		220	14.9	210	(7.3)	---		4.4
10		220	15.0	210	(7.5)	---		5.3
11		270	15.2	210	(8.0)	---		5.3
12		280	15.2	(210)	(8.4)	---		6.1
13		300	15.5	210	(8.4)	---		5.5
14		300	15.6	220	(8.3)	---		5.5
15		290	15.6	220	(8.1)	---		5.2
16		250	15.9	220	(7.2)	---		4.4
17		220	15.5					3.0
18		210	14.4					3.0
19		220	(14.0)					(3.1)
20		240	(13.6)					(3.0)
21		220	(12.5)					(3.1)
22		240	12.0					3.0
23		260	11.5					3.0

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 27 seconds.

Table 30

Leningrad, U.S.S.R. (59.9°N, 30.7°E)								March 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		320	5.2					2.5
01		340	4.9					2.5
02		340	4.9					2.6
03		320	4.7					2.5
04		320	5.0					2.5
05		300	4.8					2.5
06		290	5.2					2.6
07		260	6.0					2.7
08		260	7.3	240	4.0	120	2.1	2.7
09		240	8.3	220	4.4	120	2.3	2.8
10		260	9.3	240	5.0	100	3.1	2.9
11		240	10.3	220	5.1	100	3.3	2.7
12		280	11.0	220	5.3	100	3.5	2.8
13		240	11.2	220	5.5	100	3.5	2.8
14		240	11.9	220	5.2	100	3.5	2.7
15		240	11.5	240	5.2	100	3.4	2.7
16		240	11.0	240	5.5	100	3.3	2.7
17		240	11.2	---	---	100	2.9	2.8
18		240	10.5	220	3.0	120	2.5	2.8
19		240	10.2			120	2.0	2.0
20		240	9.0					2.8
21		240	7.7					2.8
22		260	6.6					2.6
23		280	6.0					2.5

Time: 30.0°E.

Sweep: 1.0 Mc to 18.0 Mc in 10 minutes, semi-automatic operation

Table 31

Tomsk, U.S.S.R. (56.5°N, 84.9°E)							March 1957	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	5.7						2.4
01	320	5.3						2.4
02	340	5.1						2.4
03	340	4.9						2.4
04	340	4.6						2.4
05	310	4.5						2.4
06	300	5.0						2.5
07	280	6.4						2.6
08	270	8.0						2.7
09	240	9.6	240	---	130	2.9		2.9
10	240	11.6	220	4.7	120	3.2		2.8
11	240	12.3	220	5.0	120	3.3		2.8
12	250	13.1	230	5.2	120	3.5		2.7
13	250	12.7	220	4.9	120	3.5		2.7
14	240	13.1	220	---	120	3.3		2.7
15	230	12.7			120	3.2		2.7
16	240	12.7			120	2.9		2.7
17	260	11.8			130	2.6		2.7
18	260	11.4			130	2.0		2.7
19	250	10.5			---	1.5		2.7
20	260	9.2						2.7
21	260	8.0						2.7
22	280	7.2						2.5
23	290	6.4						2.5

Time: 90.0°E.

Sweep: 1.1 Mc to 16.0 Mc in 10 minutes, manual operation.

Table 33

Chita, U.S.S.R. (52.0°N, 113.3°E)							March 1957	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	7.0						2.5
01	300	6.7						2.5
02	320	6.3						2.6
03	320	6.3						2.5
04	310	5.9						2.5
05	320	5.7						2.5
06	320	5.4						2.5
07	300	5.7						2.6
08	260	7.1			---	(2.2)		2.9
09	250	9.3			120	(2.7)		3.0
10	240	10.7			120	(3.1)		3.1
11	240	10.8			120	(3.3)		3.1
12	240	10.9			120	(3.5)		3.1
13	240	10.9			120	(3.6)		3.1
14	240	10.9			120	(3.6)		3.1
15	240	11.0			120	(3.5)		3.0
16	240	10.8			120	(3.3)		3.0
17	240	10.9			120	(3.1)		3.0
18	250	10.8			120	(2.8)		3.0
19	250	10.6			120	(2.3)		3.0
20	250	9.9						3.0
21	250	9.3						2.8
22	260	8.5						2.8
23	260	7.7						2.7

Time: 120.0°E.

Sweep: 1.0 Mc to 18.0 Mc in 5 minutes, semi-automatic operation.

Table 35

Wakkanai, Japan (45.4°N, 141.7°E)							March 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00			6.6	305				2.50
01			6.4	300				2.55
02			6.4	280				2.55
03			6.1	280				2.50
04			5.9	275				2.50
05			5.8	295				2.55
06			7.3	240				3.00
07			---	10.2	230			3.05
08			---	11.8	225	3.3		3.00
09			(230)	12.6	225	3.3		2.95
10				235	13.2	220	3.2	2.95
11				230	13.3	225		2.90
12				230	13.2	225		2.85
13				235	13.0	220		2.85
14			(240)	12.7	230			2.75
15			---	12.2	235			2.75
16			---	12.0	240			2.75
17				11.5	240			2.85
18				10.6	230			2.85
19				9.3	240			2.80
20				(8.0)	245			2.75
21				7.2	260			2.70
22				6.8	270			2.65
23				6.8	280			2.50

Time: 135.0°E.

Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 32

Moscow, U.S.S.R. (55.5°N, 37.3°E)							March 1957	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	320	5.1						2.43
01	320	4.8						2.45
02	310	4.5						2.39
03	310	4.3						2.42
04	300	4.0						2.44
05	280	4.2					(120)	1.2
06	260	5.4					(120)	1.9
07	250	7.2	(250)	(3.7)	110	2.5		2.88
08	260	8.8	240	4.0	110	2.8		2.82
09	260	10.2	240	5.0	110	3.1		2.82
10	270	11.0	230	5.2	110	3.4		2.74
11	270	11.6	230	5.2	110	3.5		2.71
12	260	11.9	230	5.4	110	3.5		2.70
13	260	11.8	230	5.2	110	3.4		2.70
14	250	11.8	240	4.6	110	3.2		2.72
15	250	11.5	(240)	(4.3)	110	3.0		2.78
16	240	11.0			110	2.6		2.80
17	240	10.6			120	2.1		2.84
18	240	10.0			130	1.5		2.80
19	240	9.0						2.82
20	240	7.1						2.64
21	260	6.1						2.58
22	290	5.8						2.51
23	320	5.2						2.40

Time: 30.0°E.

Sweep: 0.5 Mc to 20.0 Mc in 10 to 30 seconds.

Table 34

Yuzhno-Sakhalinsk, U.S.S.R. (47.0°N, 143.0°E)							March 1957	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	7.0						2.0
01	300	7.0						2.6
02	340	6.8						2.4
03	330	6.6						2.5
04	320	6.3						2.4
05	320	6.1						2.5
06	320	5.9						2.5
07	290	6.0						2.5
08	240	9.2	230	3.8	120	2.8		3.2
09	240	10.3	230	4.6	120	3.0		3.3
10	240	11.4	230	4.8	120	3.4		3.1
11	240	12.0	220	4.6	120	3.4		3.2
12	240	11.5	230	4.6	120	3.5		3.1
13	240	10.7	230	4.8				3.3
14	240	10.6						3.4
15	240	10.5						3.2
16	250	10.5						3.2
17	240	10.5						3.2
18	250	10.3						3.2
19	250	9.0						3.4
20	250	8.0						3.2
21	250	7.8						3.0
22	250	7.6						2.9
23	260	7.4						2.5

Time: 30.0°E.

Sweep: 0.5 Mc to 16.0 Mc in 15 seconds.

Table 36

Simferopol, U.S.S.R. (44.4°N, 34.0°E)							March 1957	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00			6.1					2.6
01			5.8					3.1
02			6.1					3.3
03			6.1					3.5
04			5.4					3.6
05			5.3					3.6
06			5.0					3.3
07			6.0					3.3
08			8.8					2.5
09			10.5					2.6
10			12.8					3.1
11			13.3					3.3
12			13.5					3.6
13			13.8					3.6
14			13.8					3.7
15			13.0					3.6
16			12.8					3.3
17			12.8					3.0
18			12.0					2.5
19			11.3					2.6
20			9.0					2.4
21			8.7					2.4
22			9.0					2.4

Table 37

Alma-Ata, U.S.S.R. (43°29'N, 76°09'E)	March 1957							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	6.5						2.6
01	300	6.3						2.6
02	300	6.0						2.6
03	300	5.9						2.6
04	280	5.7						2.6
05	270	5.6				E		2.7
06	250	6.8			100	1.5		2.9
07	240	9.0			100	2.3		3.0
08	230	11.6	230	(3.7)	100	2.9		3.0
09	240	12.8	220	4.3	100	3.4		3.0
10	240	13.6	220	4.8	100	3.6		2.9
11	240	13.8	210	4.9	100	3.8		2.8
12	250	13.6	210	5.0	100	3.9		2.7
13	240	13.3	220	4.9	100	3.8		2.7
14	240	12.9	220	4.8	100	3.7		2.8
15	240	12.7	220	4.5	100	3.5		2.7
16	240	12.6	220	4.2	100	3.2		2.7
17	240	12.2			100	2.6		2.8
18	230	11.6			100	1.7		3.0
19	230	10.4				E		2.9
20	240	9.3						2.9
21	250	8.1						2.8
22	250	7.4						2.7
23	270	6.7						2.6

Time: 75.0°E.

Sweep: 1.6 Mc to 17.0 Mc in 10 to 15 minutes, manual operation.

Table 38

Akita, Japan (39.7°N, 140.1°E)	March 1957							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								7.2
01								300
02								6.9
03								280
04								6.5
05								260
06								6.5
07								270
08								6.3
09								295
10								8.0
11								250
12								10.7
13								240
14								3.05
15								2.90
16								2.90
17								3.05
18								2.95
19								2.90
20								2.90
21								2.75
22								2.75
23								2.75

Time: 135.0°E.

Sweep: 0.85 Mc to 22.0 Mc in 2 minutes.

Table 39

Tokyo, Japan (35.7°N, 139.5°E)	March 1957							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	8.0	305						2.60
01	7.5	300						2.60
02	7.5	280						2.65
03	7.0	270						2.65
04	6.7	270						2.55
05	6.6	300						2.50
06	8.4	255						2.85
07	11.0	240						3.00
08	---	12.7	235					2.95
09	250	13.5	230	---				2.85
10	250	14.0	230	---				2.75
11	250	14.5	230	---				2.70
12	250	14.6	230	---				2.65
13	250	14.4	240	---				2.60
14	(250)	13.8	240	---				2.60
15	(255)	13.5	250					2.65
16	---	13.0	250					2.65
17	---	12.7	260					2.75
18	12.0	255						2.85
19	10.2	250						2.75
20	9.3	265						2.65
21	9.2	280						2.65
22	9.1	290						2.70
23	8.7	300						2.65

Time: 135.0°E.

Sweep: 1.0 Mc to 17.2 Mc in 2 minutes.

Table 40

Yamagawa, Japan (31.2°N, 130.6°E)	March 1957							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								9.6
01								260
02								8.8
03								265
04								8.0
05								250
06								6.8
07								240
08								6.5
09								240
10								12.0
11								240
12								14.2
13								225
14								245
15								15.0
16								250
17								14.9
18								240
19								13.0
20								250
21								12.4
22								245
23								10.6

Time: 135.0°E.

Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 41

Leopoldville, Belgian Congo (4.4°S, 15.2°E)	March 1957							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	230	11.7						2.57
01	250	10.5						2.54
02	245	9.0						2.66
03	230	7.9						2.78
04	230	5.1						2.85
05	255	5.6	---	---	---	2.1		2.58
06	250	9.1	245	---	115	2.7	3.3	2.87
07	260	10.7	235	---	115	3.5	3.9	2.64
08	300	11.5	225	---	115	3.9	2.38	2.29
09	355	12.9	220	---	115	4.0	2.29	2.29
10	400	14.0	215	---	110	4.1	2.26	2.26
11	425	15.1	215	---	110	4.1	2.21	2.21
12	425	16.1	230	---	110	4.1	2.20	2.20
13	425	16.2	230	---	110	4.1	2.16	2.16
14	430	16.0	235	---	115	3.9	2.08	2.08
15	430	15.6	245	---	115	3.6	2.08	2.08
16	415	16.0	255	---	120	3.0	2.12	2.12
17	380	16.0	285	---	---	---	2.22	2.22
18	340	16.4						2.16
19	310	17.0						2.32
20	245	17.5						<2.57
21	220	17.7						2.55
22	225	16.8						2.59
23	230	14.6						2.64

Time: 0.0°.

Sweep: 1.0 Mc to 20.0 Mc in 7 seconds.

Table 42

Elisabethville, Belgian Congo (11.6°S, 27.5°E)	March 1957							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								7.0
01								6.0
02								5.6
03								4.7
04								4.7
05								4.9
06								250
07								11.5
08								220
09								13.0
10								230
11								14.0
12								14.1
13								230
14								14.0
15								240
16								13.5
17								245
18								13.0
19								240
20								13.1
21								240
22								11.7
23								235

Time: 0.0°.

Sweep: 1.0 Mc to 16.0 Mc in 7 seconds.

Table 43

Huancayo, Peru (12.0°S, 75.3°W)								March 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00	9.1	225						2.95
01	6.6	230						2.95
02	7.9	245			(3.0)			3.00
03	7.2	250						3.00
04	6.7	230						3.10
05	5.8	235						3.10
06	6.3	260						2.90
07	10.5	250	119	2.60	3.2			3.05
08	13.0	235	113	3.20	(7.0)			2.85
09	14.2	220	---	---	(8.1)			2.55
10	14.3	215	---	---	(10.2)			2.30
11	13.2	210	---	---	(11.2)			2.25
12	12.7	205	---	---	(10.6)			2.15
13	12.2	200	---	---	(10.6)			2.15
14	>11.4	205	---	---	(8.2)			2.10
15	>11.5	210	---	---	(8.0)			2.10
16	11.3	220	---	---	(7.6)			2.10
17	>11.2	255	---	---	(6.8)			2.15
18	>11.2	295	---	---				2.20
19	>10.6	400			(2.15)			
20	>9.2	440			(2.20)			
21	>9.0	375			(2.50)			
22	9.1	270						2.65
23	9.2	235						2.00

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 45

Johannesburg, Union of S. Africa (26.2°S, 28.0°E)								March 1957
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00	6.0	260						2.8
01	5.7	260						2.8
02	5.2	250						2.85
03	4.7	240						2.65
04	4.3	<260						2.7
05	4.0	<270						2.6
06	5.6	270	1.7					2.8
07	---	9.1	230	2.6	2.7			3.2
08	250	11.0	230	3.2	3.4			3.1
09	(250)	12.0	220	3.6	4.0			2.9
10	280	12.3	210	3.8	4.2			2.8
11	(280)	12.6	210	4.0	4.3			2.7
12	330	13.0	220	4.1	4.4			2.6
13	350	13.1	220	4.1	4.4			2.6
14	350	13.0	220	4.0	4.2			2.6
15	350	12.9	230	3.8	4.2			2.6
16	---	12.4	240	3.5	4.0			2.6
17	---	12.0	240	3.0	3.7			2.7
18	11.7	250			2.9			2.8
19	11.0	240			2.1			2.9
20	9.9	240			2.0			2.8
21	8.8	250			1.8			2.9
22	7.7	250			1.7			2.9
23	6.5	260			1.4			2.9

Time: 30.0°E.

Sweep: 1.0 Mc to 16.0 Mc in 7 seconds.

Table 47*

Slough, England (51.5°N, 0.6°W)								February 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	315	4.5						2.5
01	320	4.4			2.3			2.5
02	320	4.2			2.3			2.45
03	325	4.0			2.1			2.45
04	310	3.6			2.2			2.55
05	295	3.4			2.2			2.55
06	285	3.3			2.0			2.65
07	260	4.8	(130)	(1.7)	3.1			2.85
08	240	8.5	130	2.1	3.5			3.05
09	245	10.8	125	2.7	3.5			3.05
10	245	12.4	125	3.0	3.5			2.95
11	245	13.0	125	3.2	3.2			2.85
12	235	13.3	120	3.3				2.85
13	235	13.2	120	3.3	3.3			2.85
14	235	12.8	120	3.1	3.2			2.05
15	235	12.2	125	2.9	3.5			2.85
16	225	12.0	130	2.4	3.4			2.95
17	235	11.2	140	1.9	3.0			2.95
18	230	9.6			2.6			2.95
19	235	7.8			2.4			2.9
20	255	6.6						2.7
21	275	5.9						2.6
22	295	5.2						2.55
23	310	5.0						2.5

Time: 0.0°.

Sweep: 0.55 Mc to 16.5 Mc in 5 minutes.

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

Table 44

Rarotonga I. (21.2°S, 159.8°W)								March 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	250	(11.1)						(2.7)
01	250	(10.0)						(2.7)
02	<250	(8.6)						(2.6)
03	<250	(8.6)						(2.4)
04	300	(8.8)						(2.4)
05	300	(8.8)						(2.5)
06	300	(9.5)	---	---	---	---	---	1.8
07	250	(12.3)	250	---	(120)	2.5		(3.0)
08	250	13.3	250	---	115	3.2		3.0
09	250	13.5	240	---	115	3.6		2.9
10	300	14.2	240	---	110	(3.9)		2.7
11	(360)	14.8	240	7.5	110	4.0		2.7
12	370	15.0	240	---	110	4.0		2.65
13	380	15.1	240	8.0	110	4.2		2.6
14	390	14.9	250	7.5	110	(4.3)		2.6
15	380	(15.0)	250	7.4	110	3.8		2.6
16	370	(14.7)	250	7.0	110	3.5		2.7
17	350	(14.1)	260	---	110	2.9		2.7
18	280	(13.6)	260	---	(2.1)	3.8		(2.7)
19	300	(13.5)						2.9
20	300	(12.2)						(2.6)
21	<300	(11.6)						(2.65)
22	300	(11.8)						(2.6)
23	260	(12.0)						(2.8)

Time: 157.5°W.

Sweep: 1.5 Mc to 20.0 Mc in 5 minutes, manual operation.

Table 46

Yakutsk, U.S.S.R. (62.0°N, 129.4°E)								February 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	370	(4.0)						2.7
01	400	(3.6)						2.6
02	430	(3.2)						2.5
03	430	(3.2)						2.6
04	400	(3.6)						2.6
05	380	(3.6)						2.7
06	360	(3.2)						2.7
07	330	(3.9)						2.8
08	250	(5.6)						3.0
09	230	7.8						3.1
10	230	10.8						3.2
11	230	(11.8)						3.1
12	230	(12.4)						3.2
13	230	(12.8)						3.1
14	230	(13.0)						3.1
15	220	(12.8)						3.1
16	230	(12.6)						3.1
17	415	13.6	225	---	110	4.1		(2.21)
18	430	14.0	215	---	110	4.0		2.20
19	425	14.4	215	---	110	4.0		2.21
20	405	14.0	235	---	110	3.9		2.23
21	385	14.0	240	---	115	3.5		2.29
22	375	14.0	250	---	115	3.0	3.6	2.30
23	350	14.0	285	---	---	---	2.6	2.30
18	335	15.0						2.0
19	295	16.0						2.42
20	240	16.6						2.64
21	230	14.8						2.67
22	220	12.5						2.63
23	230	10.1						2.54

Time: 0.0°.

Sweep: 1.0 Mc to 20.0 Mc in 7 seconds.

Table 49

Time	February 1957						
	h'F2	foF2	h'F1	foF1	h'E	foE	fEs
	(M3000)F2						
00	250	6.4					2.48
01	260	5.6					
02	270	5.3					1.6
03	275	4.8					2.42
04	280	5.2			130	1.6	2.2
05	250	8.4	245	---	110	2.6	3.2
06	260	10.0	235	---	100	3.3	4.1
07	280	10.8	225	---	100	3.7	4.3
08	310	11.4	220	---	100	4.0	4.8
09	350	11.8	220	---	100	4.1	4.8
10	365	12.4	215	---	100	4.2	4.8
11	370	12.8	220	---	100	4.2	4.6
12	370	12.7	225	---	105	4.1	2.28
13	375	12.4	230	---	105	4.0	2.28
14	360	11.9	230	---	105	3.7	3.8
15	335	11.6	245	---	105	3.1	4.0
16	280	11.5	265	---	110	2.4	3.6
17	280	11.6					2.7
18	270	11.5					2.3
19	260	11.2					2.52
20	250	10.6					2.3
21	245	9.5					2.59
22	240	8.8					2.4
23	240	7.6					2.54

Time: 0.0°W.

Sweep: 1.0 Mc to 16.0 Mc in 7 seconds.

Table 51

Time	January 1957						
	h'F2	foF2	h'F1	foF1	h'E	foE	fEs
	(M3000)F2						
00		4.0					
01		4.0					
02		4.2					
03		4.4					
04		4.4					
05		4.2					
06		3.8					
07		3.5					
08		5.4					
09		8.7					
10		11.4					
11		12.9					
12		12.8					
13		12.1					
14		11.8					
15		11.9					
16		11.6					
17		11.0					
18		0.2					
19		8.3					
20		5.6					
21		4.5					
22		4.1					
23		4.3					

Time: 30.0°E.

Sweep: 0.5 Mc to 16.0 Mc in 15 seconds.

Table 53*

Time	December 1956						
	h'F2	foF2	h'F1	foF1	h'E	foE	fEs
	(M3000)F2						
00	350	---			175	1.5	2.0
01	355	11.6	(335)		150	1.4	1.4
02	370	(12.2)	335		150	1.6	2.5
03	375	12.0	315	3.8	130	1.8	2.0
04	390	(12.0)	285	4.1	120	2.1	3.3
05	390	(11.6)	265	4.6	120	2.6	4.9
06	390	11.2	255	4.9	115	3.0	5.0
07	405	10.2	255	5.3	110	3.2	5.2
08	415	9.7	245	5.4	110	3.4	5.2
09	415	9.2	245	5.7	110	5.8	---
10	460	8.5	240	5.8	110	(3.7)	5.7
11	490	(8.0)	240	5.9	110	(3.7)	5.8
12	505	7.5	250	5.9	110	(3.9)	5.5
13	485	7.3	245	5.9	(110)	5.4	---
14	485	7.2	245	5.8	(110)	(3.8)	5.3
15	480	7.3	255	5.7	110	(3.8)	5.4
16	460	7.2	255	5.6	115	3.6	5.4
17	445	7.3	255	5.5	115	3.3	5.4
18	420	7.7	260	5.2	115	3.1	4.7
19	380	(8.0)	270		120	2.8	4.0
20	365	(8.4)	275		120	2.4	3.6
21	350	---	290		125	1.7	2.9
22	(320)	---	(310)		(125)	1.5	2.3
23	335	---	(330)			1.4	2.2

Time: 60.0°W.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

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

Table 50

Time	February 1957						
	h'F2	foF2	h'F1	foF1	h'E	foE	fEs
	(M3000)F2						
00					7.5	300	
01					6.2	300	
02					6.4	300	
03					6.0	300	
04					5.8	300	
05					6.5	250	
06					7.3	250	
07					8.5	240	
08					(330)	230	
09					(350)	220	
10					(310)	200	
11						100	
12						100	
13						100	
14						100	
15						100	
16						100	
17						100	
18						100	
19						100	
20						100	
21						100	
22						100	
23						100	

Time: 172.5°E.

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

Table 52*

Time	January 1957						
	h'F2	foF2	h'F1	foF1	h'E	foE	fEs
	(M3000)F2						
00	340	9.5					3.4
01	345	9.5					3.1
02	335	9.4					2.3
03	345	9.4					2.3
04	(365)	9.4	330		(135)	(1.8)	2.2
05	10.2	275			120	2.2	3.8
06	(450)	10.7	255		105	2.9	4.5
07	(455)	11.4	250	(5.3)	105	3.3	5.3
08	445	11.2	245	5.7	100	3.6	5.3
09	430	11.0	240	6.1	100	3.8	5.3
10	445	10.8	225	(6.1)	100	4.0	5.2
11	440	10.7	230	6.1	100	4.1	5.3
12	430	10.3	230	6.2	100	4.1	5.4
13	420	10.0	235	6.0	100	4.1	5.0
14	425	9.6	235	6.1	100	4.1	5.3
15	415	9.2	245	6.0	100	3.9	5.6
16	405	8.7	(255)		100	3.7	5.0
17	(385)	8.6			105	3.4	6.0
18		8.8			110	2.8	5.7
19		8.7	280		120	2.1	5.2
20	300	8.4			(1.6)	4.8	2.4
21	325	8.7				3.8	2.3
22	340	9.2				5.5	2.2
23	350	9.4				4.5	2.3

Time: 60.0°W.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

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

Table 54

Time	November 1956						
	h'F2	foF2	h'F1	foF1	h'E	foE	fEs
	(M3000)F2						
00					(5.7)		(2.60)
01					(5.5)		(2.80)
02					(3.9)		(2.65)
03					4.4		(2.00)
04					(3.7)		(2.60)
05					(4.5)		(2.45)
06					(4.9)		(2.70)
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							

Time: 45.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 16.2 seconds.

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

Table 55*

Port Lockroy (64.8°S, 63.5°W)									November 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2		
00	350	(10.4)			(175)	(1.2)	2.3	---		
01	340	(10.7)			(135)	(1.3)	1.2	---		
02	365	(10.8)			(150)	(1.1)	2.1	---		
03	385	(10.7)	(335)		(140)	1.4	2.0	---		
04	445	10.6	300	(3.7)	130	1.9	2.8	---		
05	395	(11.1)	275	4.3	120	2.4	3.2	---		
06	415	10.2	265	(4.6)	115	2.8	3.6	---		
07	390	9.2	250	5.0	115	3.1	3.8	---		
08	435	9.7	255	5.4	(110)	(3.4)	4.4	---		
09	430	8.8	250	5.5	110	(3.5)	4.6	---		
10	445	8.6	250	5.5	115	3.7	4.8	---		
11	450	8.4	240	5.4	(110)	3.8	4.6	(2.4)		
12	495	8.1	250	5.6	(115)	3.7	5.0	(2.4)		
13	530	7.6	245	5.6	(115)	3.8	4.8	(2.4)		
14	485	8.3	250	5.5	(115)	(3.5)	4.7	(2.4)		
15	470	7.8	250	5.4	(115)	(3.5)	4.8	2.4		
16	(440)	8.4	250	(5.3)	(115)	(3.2)	4.2	(2.5)		
17	(415)	8.0	255		120	3.1	3.8	(2.4)		
18	(295)	7.8	265	(4.7)	115	2.8	4.0	---		
19	300	(8.4)	275		120	2.4	2.8	---		
20	305	(8.4)			125	2.0	2.9	---		
21	305	(8.7)			(135)	1.4	2.4	---		
22	315	(8.2)			(165)	(1.2)	1.9	---		
23	345	---			(170)	(1.3)	---			

Time: 60.0°W.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

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

Table 57*

Port Lockroy (64.8°S, 63.5°W)									October 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2		
00	---	---						---		
01	(330)	---						---		
02	(340)	---						---		
03	(335)	(8.9)				(1.9)		---		
04	(310)	(9.0)				(2.3)		---		
05	---	(9.2)				(3.2)		---		
06	---	(9.3)				(2.0)	(3.0)	---		
07	---	---	(250)			(120)	(2.5)	(4.0)	---	
08	---	9.0	240			(115)	3.0	4.8	---	
09	(315)	10.2	235	(4.9)		(115)	3.2	5.4	---	
10	(280)	11.3	235	(5.3)		110	3.3	5.2	(2.7)	
11	(325)	11.7	240	(5.2)		110	3.4	5.0	(2.7)	
12	12.0	240	(5.7)			110	3.5	4.2	(2.7)	
13	12.1	240	(5.6)			110	3.5	2.8		
14	(280)	11.6	240			110	3.4	4.0	2.8	
15	10.9	240	(5.4)			110	3.2	4.4	(2.8)	
16	(260)	10.1	245			115	2.9	1.5	---	
17	250	(9.6)	255			120	2.7	---		
18	255	9.2				125	2.2	---		
19	260	(9.1)				135	1.8	2.2	---	
20	270	(9.4)				130	1.4	2.0	---	
21	270	(8.7)				150	(1.1)	1.1	---	
22	285	(9.0)						---		
23	285	---						---		

Time: 60.0°W.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

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

Table 59*

Ibadan, Nigeria (7.4°N, 4.0°E)									September 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2		
00	275	(10.2)					4.9	---		
01	265	(10.6)					5.9	---		
02	240	(10.2)					6.0	(3.2)		
03	230	8.5					5.0	(3.3)		
04	220	(7.4)					5.4	(3.4)		
05	225	(5.8)					5.8	(3.2)		
06	250	(8.2)					132	2.1	>7.7	(3.1)
07	(11.0)	235					116	3.1	(10.2)	3.1
08	12.8	225					3.6	13.6	2.9	
09	13.8	215					3.9	15.2	2.4	
10	13.6	210					4.1	15.4	2.1	
11	12.6	205					4.2	15.4	2.1	
12	12.0	205					4.2	15.4	2.2	
13	12.2	205					4.2	15.4	2.2	
14	12.4	205					4.0	15.3	2.1	
15	12.2	210					3.5	15.0	2.1	
16	11.6	225					3.2	>13.5	2.1	
17	260	(12.2)					131	2.5	7.0	2.1
18	325	11.1					162	1.4	(6.7)	2.0
19	425	(9.2)							---	
20	410	---							---	
21	370	---						3.8	---	
22	340	---						3.8	---	
23	290	(9.8)						4.6	---	

Time: 0.0°W.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

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

Table 56*

Ibadan, Nigeria (7.4°N, 4.0°E)									October 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2		
00	275	(10.0)							4.2	---
01	265	(10.9)							5.3	---
02	250	(10.3)							6.0	---
03	250	(8.8)							5.2	(3.0)
04	240	7.7							4.3	(3.2)
05	235	5.6							4.7	3.2
06	265	8.2							4.7	3.2
07	11.4	250							137	2.2
08	13.0	240							125	3.1
09	13.6	230							122	2.2
10	13.2	225							12.6	2.1
11	12.6	220							12.7	2.1
12	12.7	215							13.1	2.0
13	13.1	220							13.8	2.0
14	13.2	215							13.8	2.0
15	13.2	230							13.8	2.0
16	13.2	255							13.8	2.0
17	295	---							3.1	10.8
18	400	(9.6)							1.4	---
19	460	(8.6)								---
20	435	(9.0)								---
21	355	(9.6)								---
22	320	(10.0)								2.5
23	285	(9.4)								---

Time: 0.0°W.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

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

Table 60*

Falkland Is. (51.7°S, 57.8°W)									September 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2		
00	340	6.2							2.3	
01	335	6.2							2.3	
02	330	5.8							2.4	
03	325	5.8							2.4	
04	310	5.4							2.4	
05	320	5.3							2.4	
06	255	6.7							2.7	
07	235	>8.6							2.9	
08	235	>10.6	(250)						115	2.9
09	245	12.2	235						110	3.2
10	(240)	13.0	230						105	3.5
11	(245)	13.1	230						105	3.4
12	--	13.1	230						105	3.6
13	(250)	12.6	230						105	3.5
14	(245)	12.0	230						105	3.4
15	(245)	11.8	240						110	3.1
16	245	10.7	(240)						125	2.7
17	245	9.1							(135)	2.9
18	235	8.8							3.0	3.0
19	235	7.2							2.4	2.9
20	250	6.4								2.7
21	270	6.0								2.6
22	295	>6.6								2.5
23	335	6.6								2.3

Time: 60.0°W.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

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

Table 61

Lulea, Sweden (65.6°N, 22.1°E)								July 1956
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	---					2.5	
01	300	---					2.8	
02	---	(5.0)	280	---	---	1.7	2.9	
03	(360)	(5.6)	260	---	---	2.2	2.8	
04	400	5.4	250	3.7	100	2.3	2.8	
05	360	5.7	240	4.0	110	2.7		
06	385	5.6	---	4.4	100	---		
07	410	6.0	---	4.6	100	---		
08	405	6.2	230	4.8	100	---		
09	400	6.2	220	4.9	100	---	3.7	(2.5)
10	405	6.4	210	5.0	100	---	4.0	(2.6)
11	400	6.5	210	5.0	---	4.0	(2.6)	
12	375	6.8	210	5.0	100	---		
13	400	6.4	210	5.0	100	---		(2.65)
14	400	6.4	210	5.0	100	---		(2.7)
15	385	6.3	210	5.0	100	---		(2.7)
16	360	6.0	---	4.8	100	---		
17	(330)	6.0	---	4.6	110	---		
18	---	6.0	---	---	110	2.8	3.5	---
19	---	6.0	250	---	120	2.5	3.0	
20	---	6.0	260	---	140	2.2	2.5	
21	(250)	---	265	---	---	1.8	2.5	
22	280	---	---	---	---	1.6	2.4	
23	290	---	---	---	---	2.4		

Time: 15.0°E.

Sweep: 1.5 Mc to 10.0 Mc in 9 minutes, automatic operation.

Table 63

Ahmedabad, India (23.0°N, 72.6°E)								July 1956
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	305	7.4					3.2	2.65
01	285	7.2					3.2	2.75
02	280	6.8					3.2	2.70
03	275	6.7					3.2	2.75
04	275	6.3					3.2	2.75
05	260	6.0					3.2	2.85
06	250	6.9	250	3.9	120	2.0	3.7	3.05
07	260	0.1	230	4.4	110	2.8	4.0	3.05
08	280	8.4	225	4.8	107	3.3	4.2	2.90
09	315	9.0	225	5.2	105	3.6	4.3	2.65
10	370	10.2	225	5.5	105	3.9	4.6	2.50
11	400	11.3	225	5.7	105	4.0	4.2	2.50
12	380	12.7	240	5.6	105	4.0	4.3	2.60
13	400	13.4	240	5.8	105	4.0	4.0	2.60
14	375	14.3	230	5.5	105	4.0	4.8	2.60
15	360	14.5	250	5.5	105	3.7	5.2	2.65
16	340	14.4	230	5.2	107	3.4	4.2	2.80
17	310	13.6	250	4.8	110	3.0	4.1	2.75
18	280	13.1	250	4.0	120	2.4	4.0	2.80
19	275	12.2					3.8	2.80
20	285	10.5					3.5	2.65
21	310	8.5					3.2	2.50
22	325	7.8					3.2	2.50
23	325	7.3					3.2	2.55

Time: 75.0°E.

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

Table 65

Madras, India (13.0°N, 80.2°E)								July 1956
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05								
06	280	7.8					3.20	
07	360	9.2					2.80	
08	420	10.1					2.55	
09	440	10.2					2.50	
10	480	10.1					2.30	
11	480	9.9					2.30	
12	480	9.8					2.30	
13	480	10.2					2.30	
14	520	10.3					2.20	
15	480	10.8					2.30	
16	480	11.2					2.30	
17	440	11.2					2.50	
18	480	11.2					2.30	
19	460	10.3					2.40	
20	440	9.8					2.50	
21	440	9.0					2.50	
22	460	8.6					2.40	

Time: 75.0°E.

Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.

*Height at 0.83 foF2.

Table 62

Delhi, India (28.6°N, 77.1°E)								July 1956
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		360	7.9					2.80
01		360	7.8					2.80
02		---	---					---
03								
04		320	7.1					3.00
05		320	6.8					3.00
06		290	7.6					3.20
07		300	8.3					3.25
08		320	8.5					3.00
09		360	8.9					2.80
10		360	9.6					2.80
11		390	10.6					2.65
12		380	11.6					2.70
13		360	12.3					2.80
14		360	12.6					2.80
15		360	12.6					2.00
16		320	12.4					3.00
17		320	11.7					3.00
18		320	11.0					3.00
19		320	9.6					3.00
20		360	8.7					2.80
21		360	8.4					2.80
22		360	8.2					2.80
23		360	8.2					2.80

Time: 75.0°E.

Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.

*Height at 0.83 foF2.

Table 64

Bombay, India (19.0°N, 73.0°E)								July 1956
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05								
06	320	7.2						3.00
07	360	9.3						2.80
08	400	10.2						2.60
09	480	10.4						2.30
10	480	10.4						2.30
11	520	10.4						2.20
12	520	10.4						2.20
13	520	10.4						2.20
14	520	10.5						2.20
15	520	10.1						2.20
16	520	10.2						2.20
17	400	10.2						2.30
18	480	9.8						2.30
19	480	9.4						2.30
20	(480)	(9.1)						(2.30)
21:30	440	9.0						2.50
22	(400)	(8.9)						(2.60)
23								

Time: 75.0°E.

Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.

*Height at 0.83 foF2.

Table 66

Tiruchy, India (10.0°N, 78.0°E)								July 1956
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05								
06	320	7.2						
07	360	9.3						
08	400	10.2						
09	480	10.4						
10	480	10.4						
11	520	10.4						
12	520	10.4						
13	520	10.4						
14	520	10.5						
15	520	10.1						
16	520	10.2						
17	400	10.2						
18	480	9.8						
19	480	9.4						
20	(480)	(9.1)						
21:30	440	9.0						
22	(400)	(8.9)						
23								

Time: 75.0°E.

Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.

*Height at 0.83 foF2.

Table 67

Kodaikanal, India (10.2°N, 77.5°E)							July 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	330	8.1						2.75
01	305	7.2						2.80
02	295	6.6						2.90
03	270	6.0						3.00
04	260	5.3						3.20
05	250	4.2						3.30
06	270	6.8						3.00
07	255	9.0	250	---	---	---		2.85
08	—	10.2	235	---	---	115	3.5	2.60
09	325	10.2	220	---	---	---	7.7	2.35
10	(395)	9.7	220	---	---	---	9.0	2.25
11	360	9.5	220	---	---	---	9.6	2.25
12	400	9.4	215	---	---	---	10.0	2.20
13	(400)	9.5	215	---	---	---	10.1	2.20
14	(430)	9.6	215	---	---	---	10.0	2.20
15	(410)	10.1	220	---	---	115	9.0	2.30
16	—	10.4	235	---	---	120	7.6	2.30
17	260	10.8	—	---	---	120	2.9	2.40
18	295	11.0					3.8	2.45
19	350	10.3						2.35
20	400	9.1						2.40
21	400	8.9						2.40
22	380	8.8						2.50
23	340	8.6						2.65

Time: 75.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 27 seconds.

Table 69*

Ibadan, Nigeria (7.4°N, 4.0°E)							May 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	345	---						---
01	330	(6.9)						---
02	305	(6.5)						2.5
03	280	(6.0)						3.9
04	250	(5.7)						(3.1)
05	240	(3.9)						3.2
06	240	(8.1)						3.3
07	235	11.2	240	130	2.2	(6.6)		3.0
08	12.6	225	117	3.1	8.8			3.1
09	13.4	220	116	3.5	10.3			3.0
10	13.7	210	112	3.8	13.6			2.7
11	13.2	205	110	4.1	14.0			2.2
12	12.2	200	110	4.1	14.0			2.2
13	11.8	200	110	4.0	14.0			2.2
14	11.7	200	110	3.8	13.8			2.2
15	11.9	205	109	3.5	11.4			2.2
16	12.2	220	110	3.2	10.8			2.2
17	12.3	255	121	2.6	6.0			2.2
18	300	>11.9	145	1.7	4.6			2.3
19	365	10.4						2.0
20	385	(9.8)						---
21	390	(8.9)						---
22	390	(9.5)						---
23	365	(8.9)						---

Time: 0.0°.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

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

Table 71

Casablanca, Morocco (33.6°N, 7.6°W)							April 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	<300	8.40						2.50
01	<300	8.35						2.50
02	<295	8.40						2.60
03	<275	7.90						2.70
04	<280	7.20						2.60
05	<275	6.60						2.60
06	265	6.70	—	---	---	---		2.85
07	250	8.00	250	2.90	120	2.40		3.10
08	250	8.85	235	4.30	115	3.00		3.05
09	250	9.45	230	4.70	110	3.35		2.90
10	295	10.50	225	(5.30)	110	3.60		2.80
11	330	>11.00	230	—	110	3.80		2.70
12	335	>12.00	235	6.55	110	(3.90)		2.75
13	320	12.30	230	(5.90)	115	(3.90)		2.75
14	320	12.60	235	(6.10)	115	(3.80)		2.80
15	320	>12.50	240	5.65	110	3.70		2.80
16	305	12.10	240	(5.50)	110	3.40		(2.80)
17	265	12.10	245	—	115	3.00	4.0	2.90
18	260	>11.00	260	(3.70)	125	2.30	3.6	(2.90)
19	250	10.90	—	---	---	2.6	(2.95)	
20	<245	>8.60	—	---	---	1.9	2.70	
21	<290	8.50	—	---	---	2.1	2.50	
22	<315	8.65	—	---	---	2.2	2.55	
23	<310	8.50	—	---	---	2.0	2.50	

Time: 0.0°.

Sweep: 1.6 Mc to 16.0 Mc in 1 minute 15 seconds.

Table 68*

Ibadan, Nigeria (7.4°N, 4.0°E)							June 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	400	---						1.6
01	400	---						1.4
02	380	---						3.2
03	370	---						5.6
04	305	(4.4)						4.5
05	255	(4.0)						5.7
06	250	(7.7)						3.0
07	10.0	230						3.1
08	11.6	225						3.0
09	12.2	215						2.8
10	12.2	210						2.4
11	11.8	200						2.3
12	10.6	205						2.3
13	10.4	200						2.3
14	10.5	200						2.3
15	11.0	205						2.3
16	11.2	225						2.3
17	11.2	250						2.3
18	275	11.2	260					2.3
19	335	10.4						2.2
20	370	9.0						(2.0)
21	410	—						—
22	430	—						1.6
23	400	—						1.4

Time: 0.0°.

Sweep: 0.67 Mc to 25.0 Mc in 5 minutes.

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

Table 70

Poitiers, France (46.6°N, 0.3°E)							April 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	310	6.5						(2.55)
01	305	6.4						—
02	305	6.2						2.55
03	<300	5.7						2.60
04	305	5.2						2.60
05	290	4.8	—	---	1.8	—	—	2.70
06	255	5.9	255	2.6	120	2.2	2.6	3.00
07	265	6.5	240	4.0	110	2.8		3.00
08	300	7.2	230	4.6	105	3.2	3.2	2.90
09	310	8.3	235	4.8	105	3.4	3.6	(2.80)
10	305	8.8	230	5.2	100	3.5	3.8	(2.70)
11	320	10.0	230	5.3	100	3.6	3.7	(2.80)
12	315	9.8	225	5.3	100	3.6	3.7	—
13	300	9.9	225	5.4	105	3.6	3.6	(2.75)
14	300	10.0	235	5.1	105	3.5	3.6	—
15	295	8.7	235	5.0	110	3.4	3.5	(2.85)
16	265	9.0	240	4.5	110	3.2	3.4	(2.80)
17	260	8.6	250	4.0	115	2.8	3.0	—
18	255	(8.4)	250	2.4	<120	2.1	2.6	—
19	250	(8.2)	—	1.6	—	E	2.2	—
20	250	(7.2)	—	—	—	—	2.2	—
21	260	6.8					2.0	—
22	290	6.6					—	—
23	300	6.4						(2.45)

Time: 0.0°.

Sweep: 1.6 Mc to 16.8 Mc in 1 minute.

Table 72

Poitiers, France (46.6°N, 0.3°E)							March 1956	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	320	5.2						(2.50)
01	300	5.2						(2.55)
02	290	4.9						2.65
03	285	4.9						—
04	275	4.8						2.60
05	270	4.3						2.70
06	265	4.8	225	1.8	—	E	2.0	2.90
07	245	6.6	220	2.4	115	2.2		3.10
08	245	7.3	230	3.6	110	2.8		(2.85)
09	245	8.9	225	4.2	105	3.1	3.3	(3.10)
10	250	(9.1)	225	4.8	100	3.3	3.5	—
11	250	9.9	215	4.8	100	3.4		—
12	250	(10.6)	220	5.0	100	3.5		—

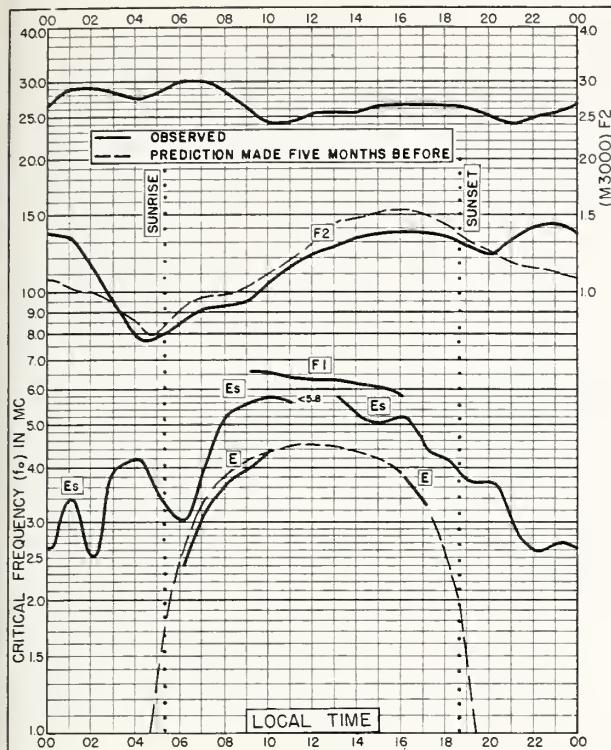


Fig. 1. FORMOSA, CHINA
25.0°N, 121.5°E JULY 1957

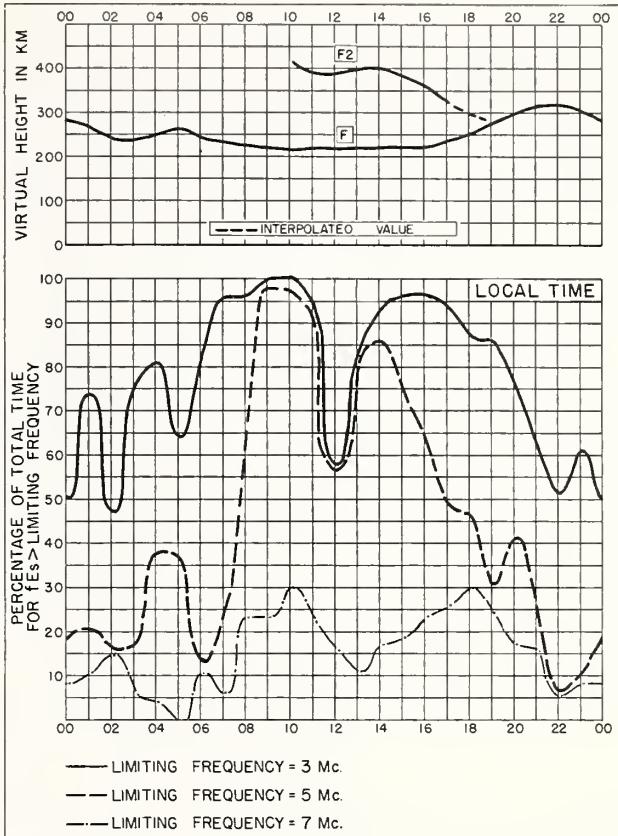


Fig. 2. FORMOSA, CHINA JULY 1957

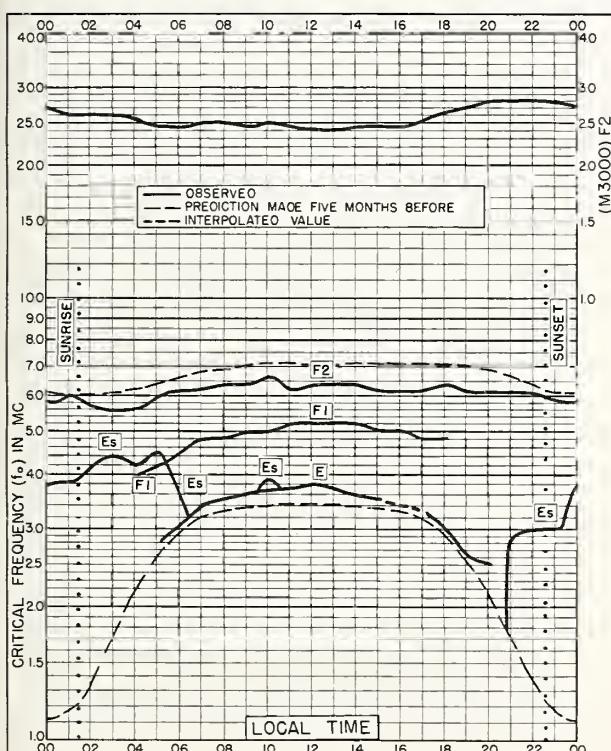


Fig. 3. FAIRBANKS, ALASKA
64.9°N, 147.8°W JUNE 1957

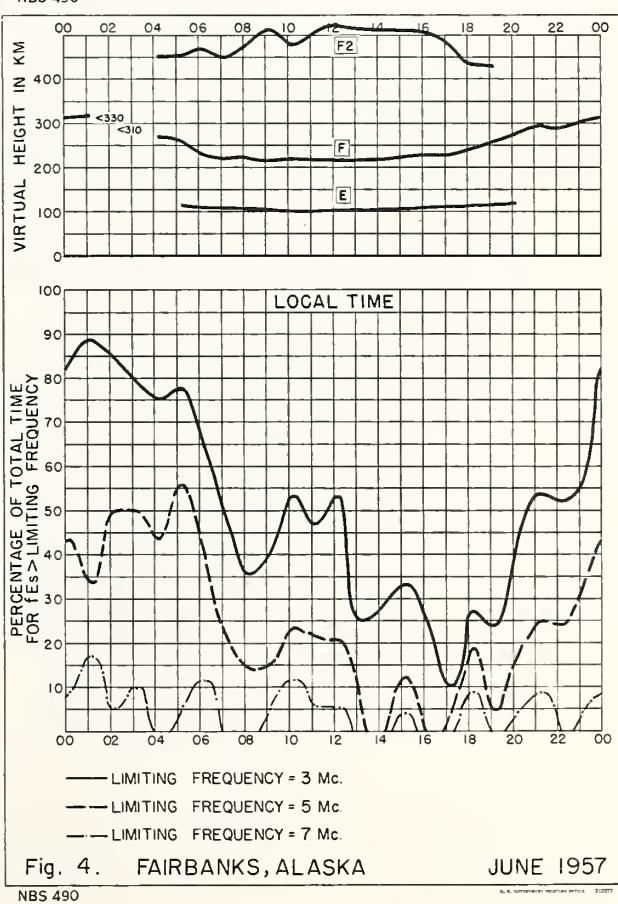


Fig. 4. FAIRBANKS, ALASKA JUNE 1957

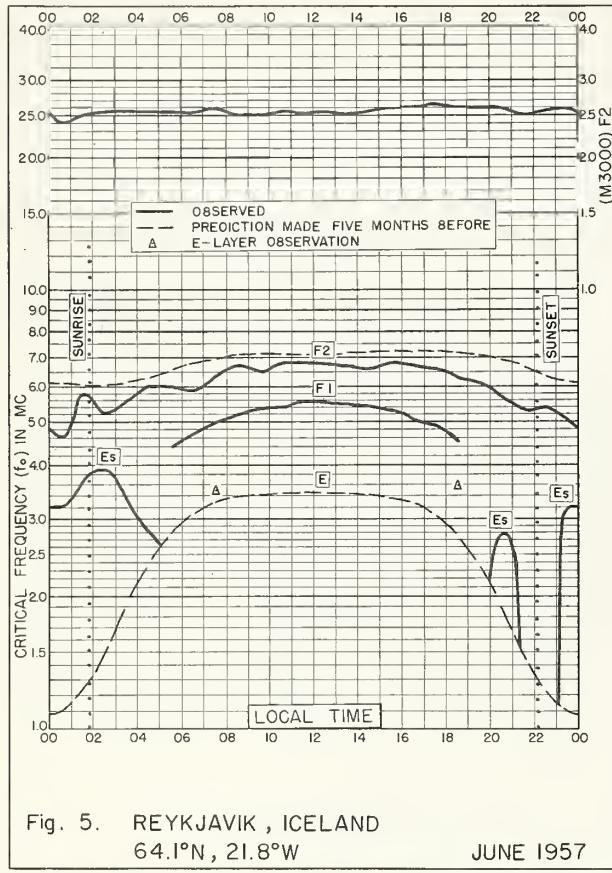


Fig. 5. REYKJAVIK, ICELAND

64.1°N, 21.8°W

JUNE 1957

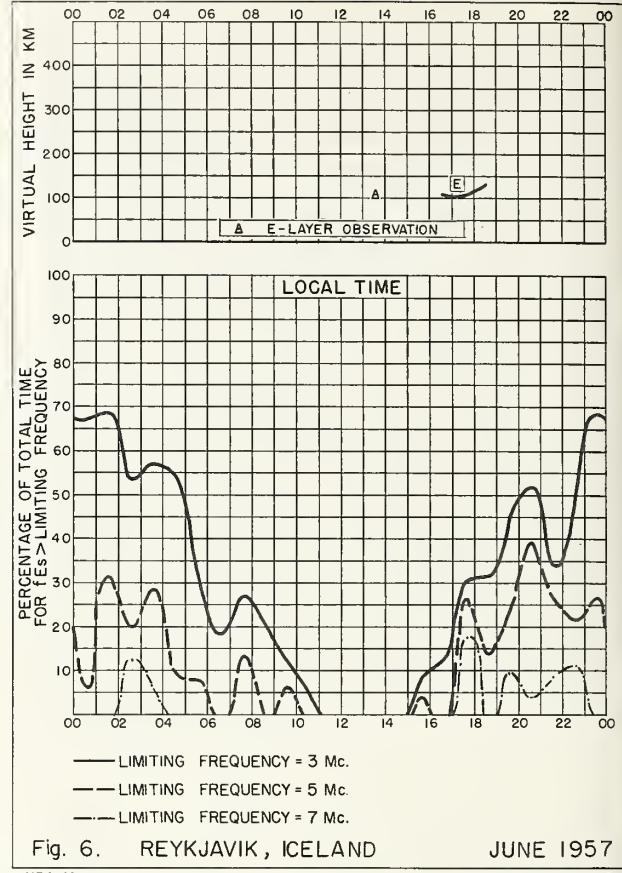


Fig. 6. REYKJAVIK, ICELAND

JUNE 1957

NBS 490

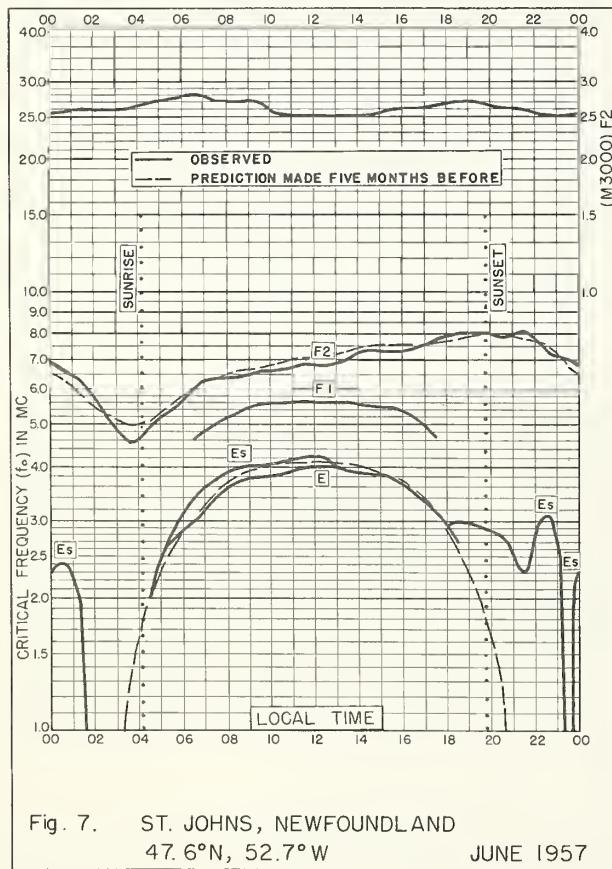


Fig. 7. ST. JOHNS, NEWFOUNDLAND

47.6°N, 52.7°W

JUNE 1957

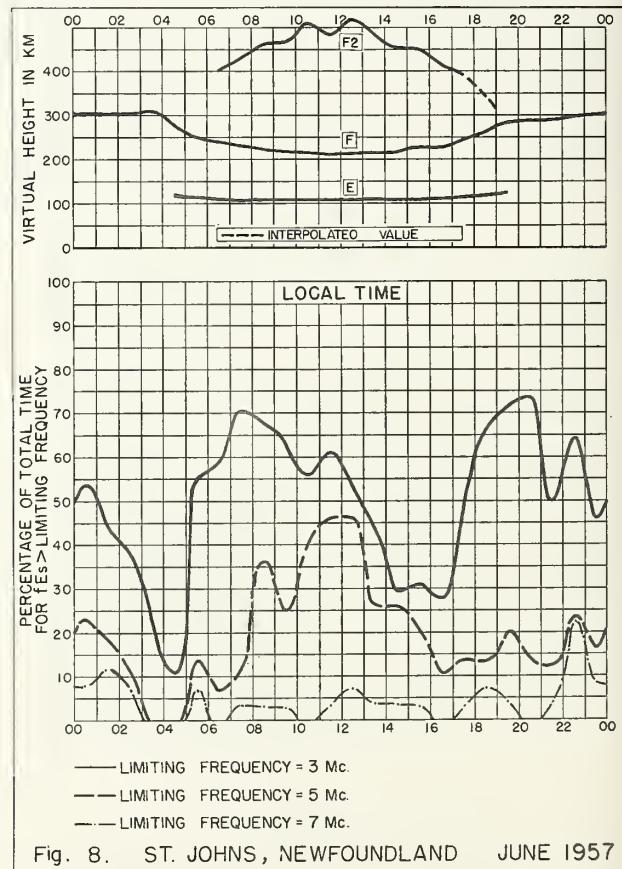
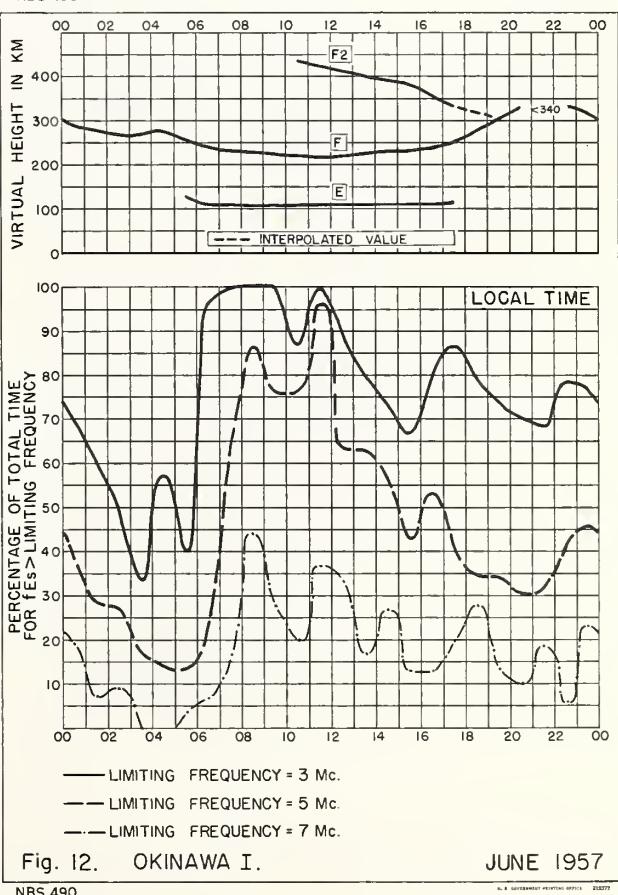
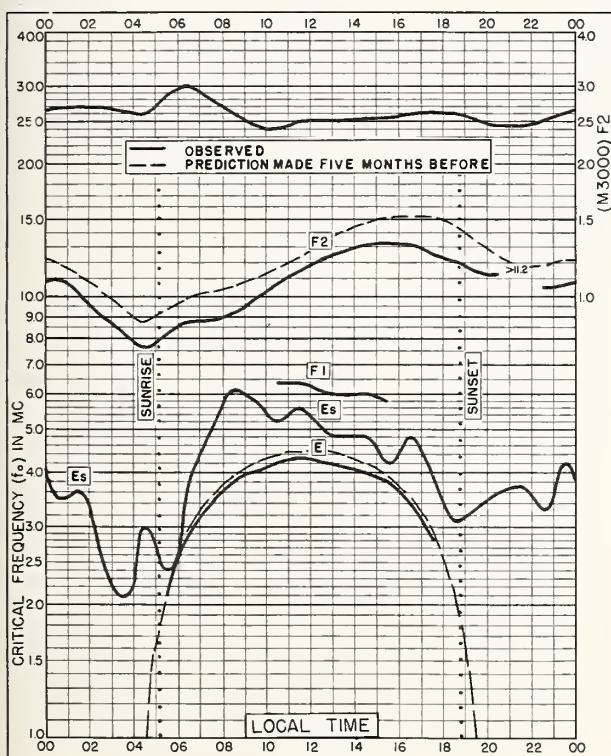
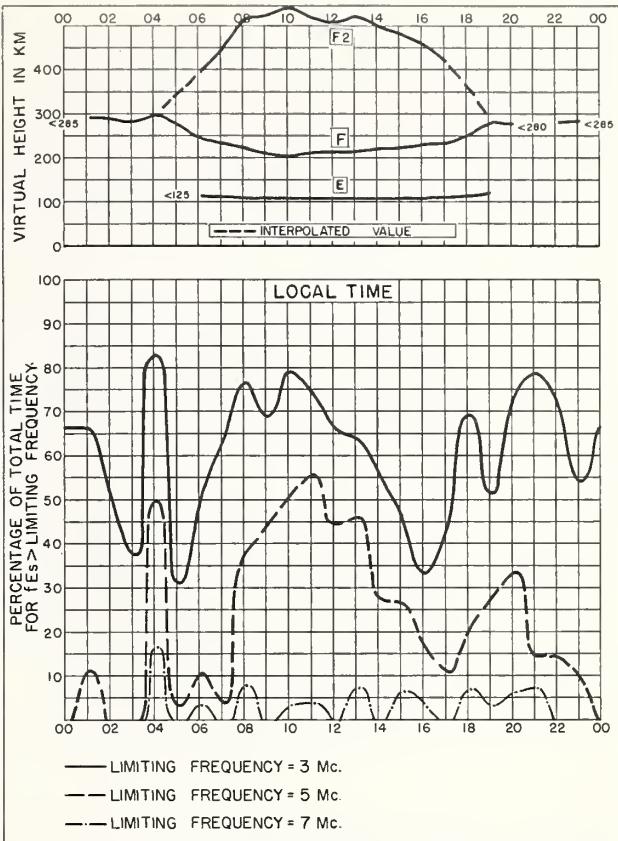
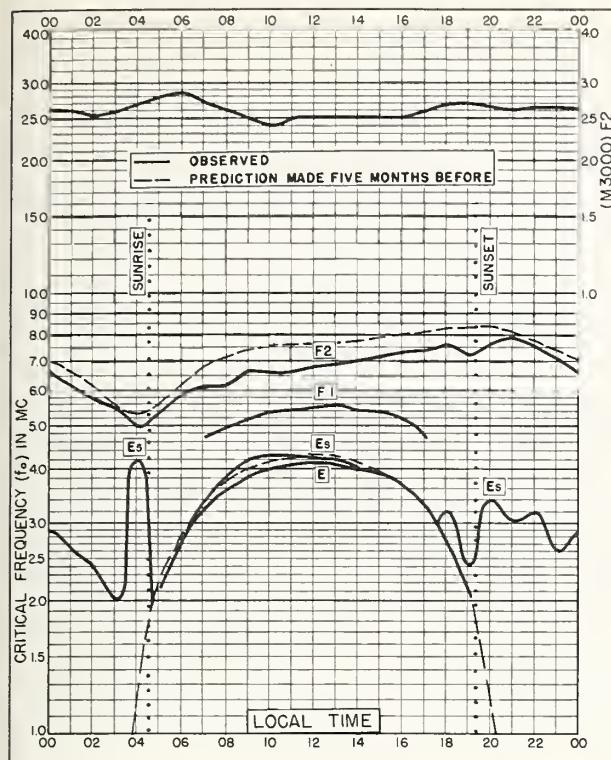
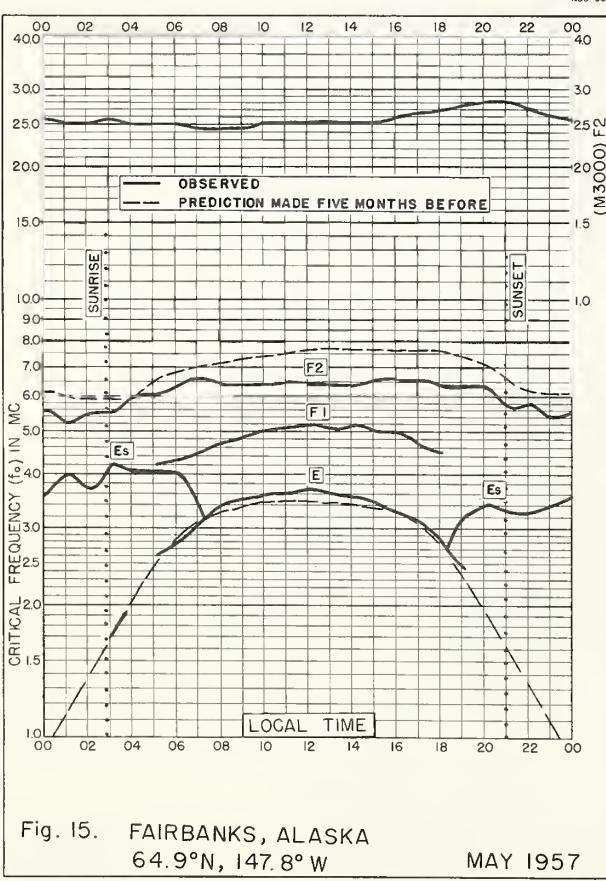
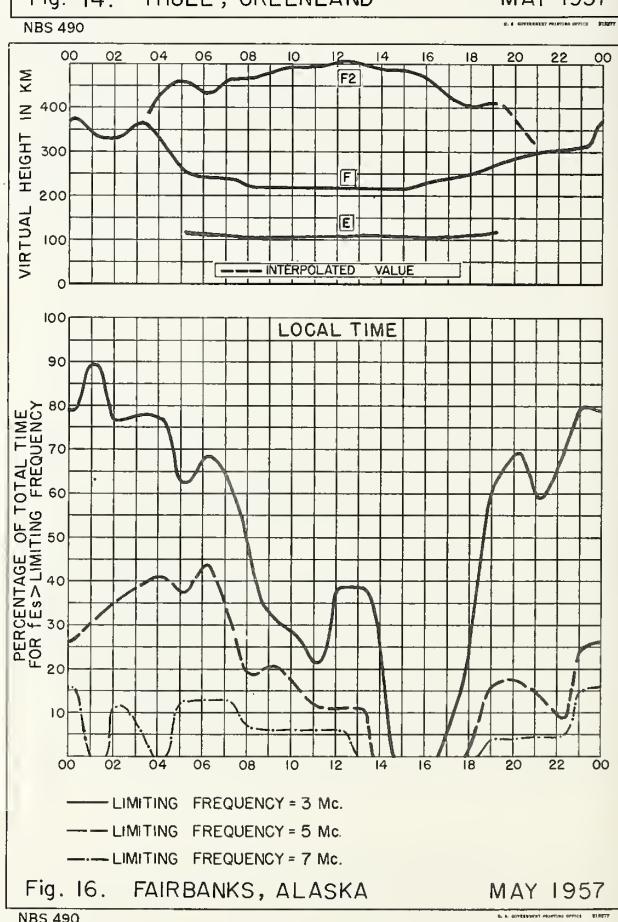
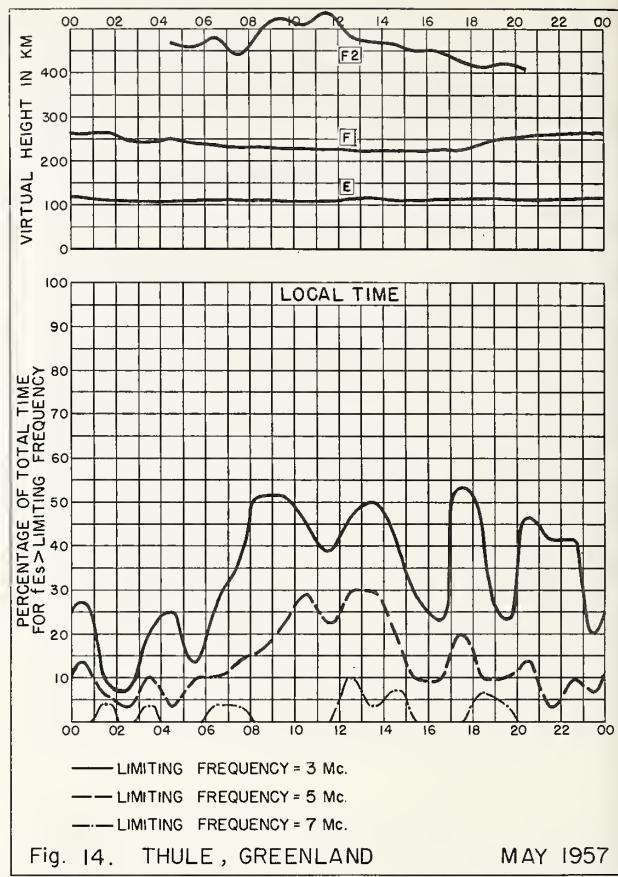
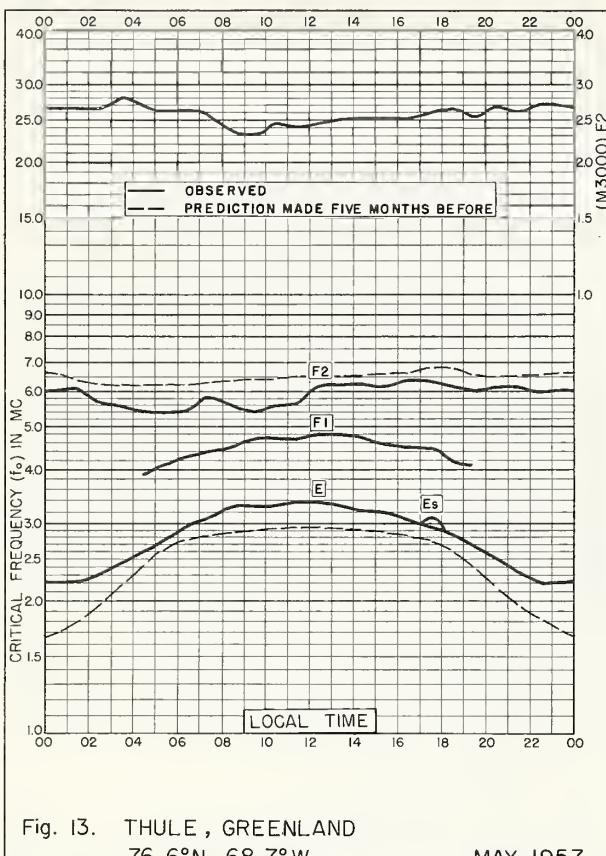


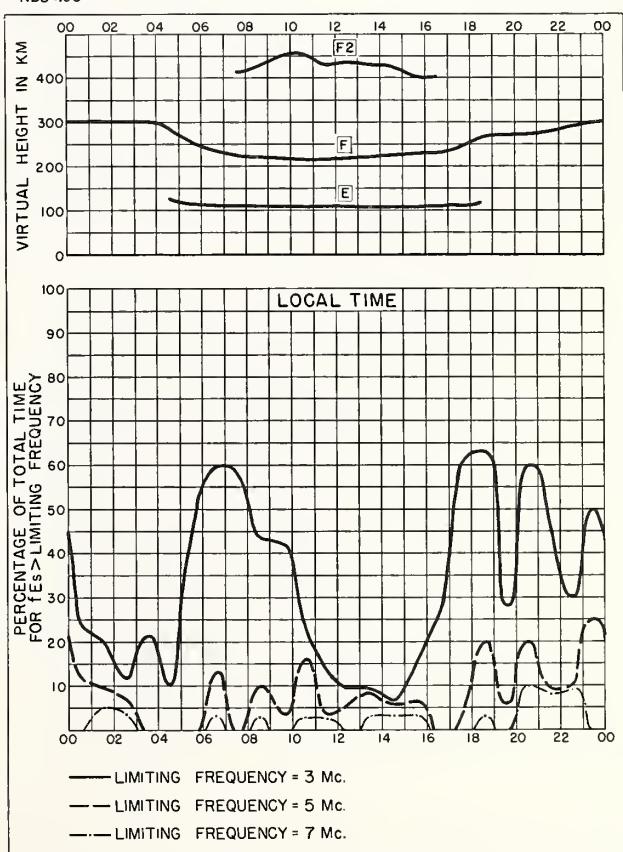
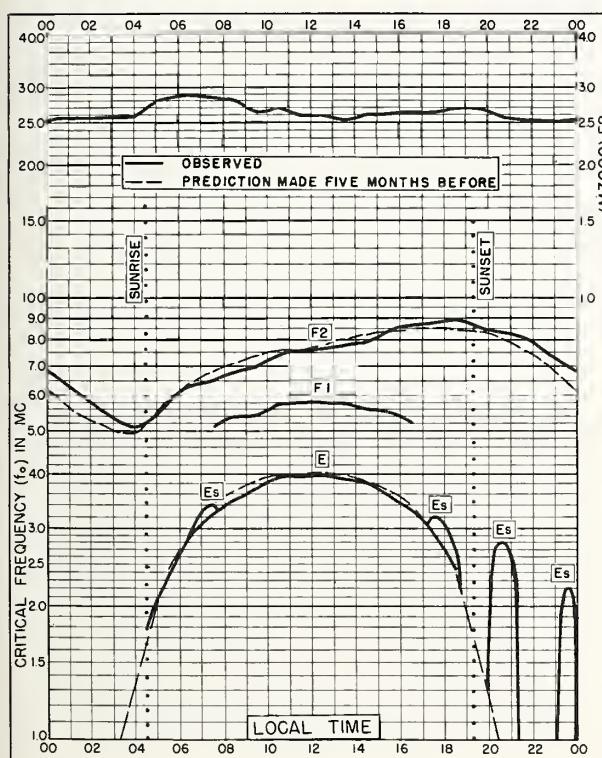
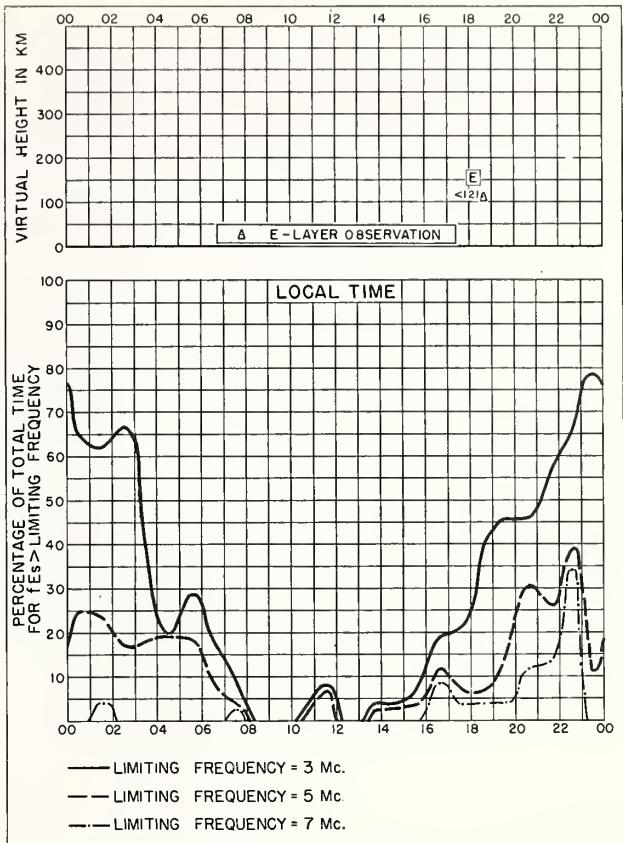
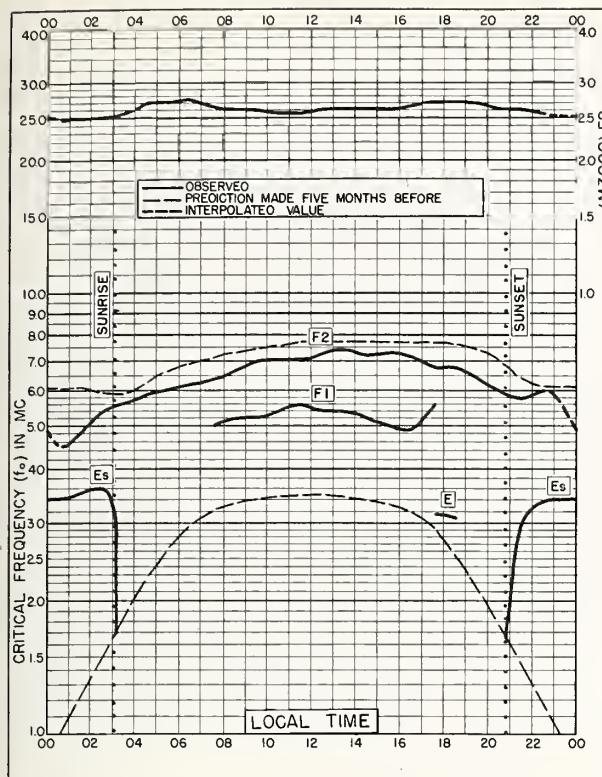
Fig. 8. ST. JOHNS, NEWFOUNDLAND

JUNE 1957

NBS 490







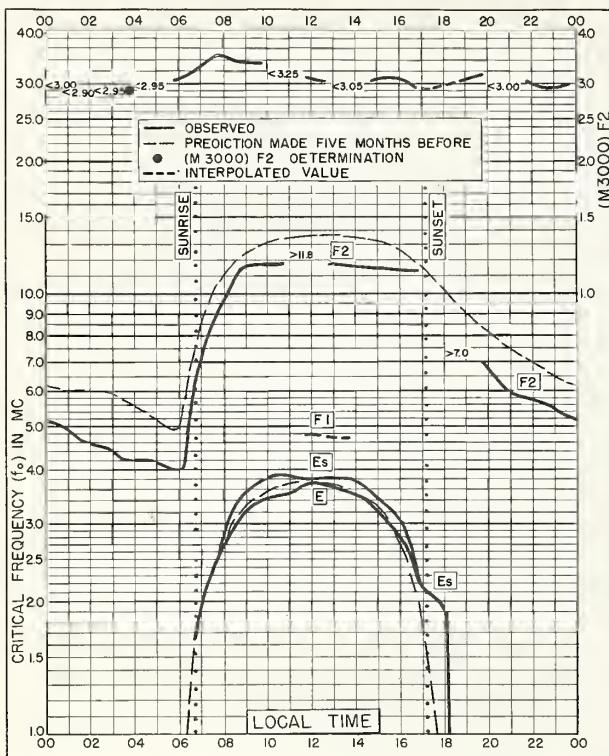


Fig. 21. WATHEROO, W. AUSTRALIA

30.3°S, 115.9°E

MAY 1957

NBS 503

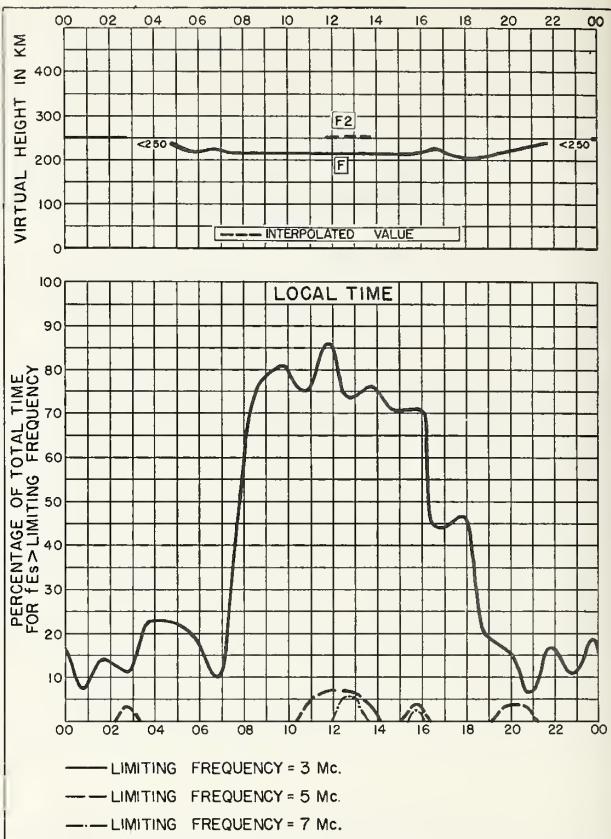


Fig. 22. WATHEROO, W. AUSTRALIA

MAY 1957

NBS 490

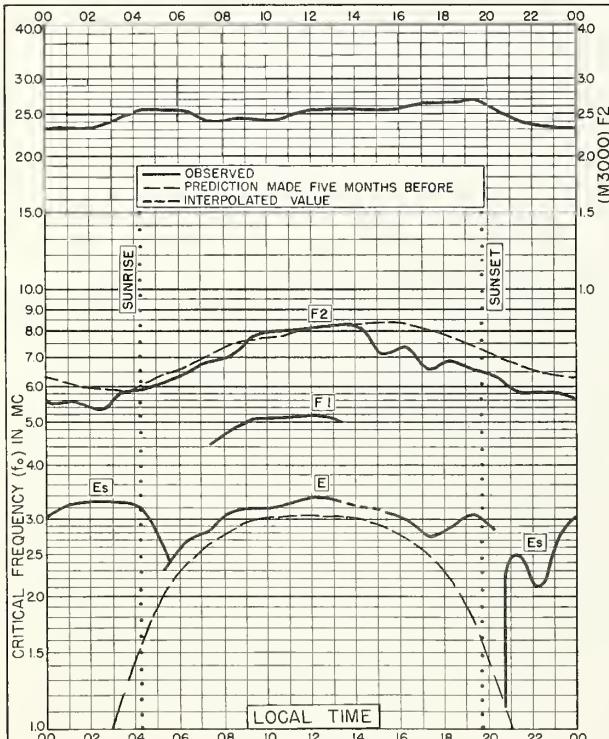


Fig. 23. TROMSO, NORWAY

69.7°N, 19.0°E

APRIL 1957

NBS 503

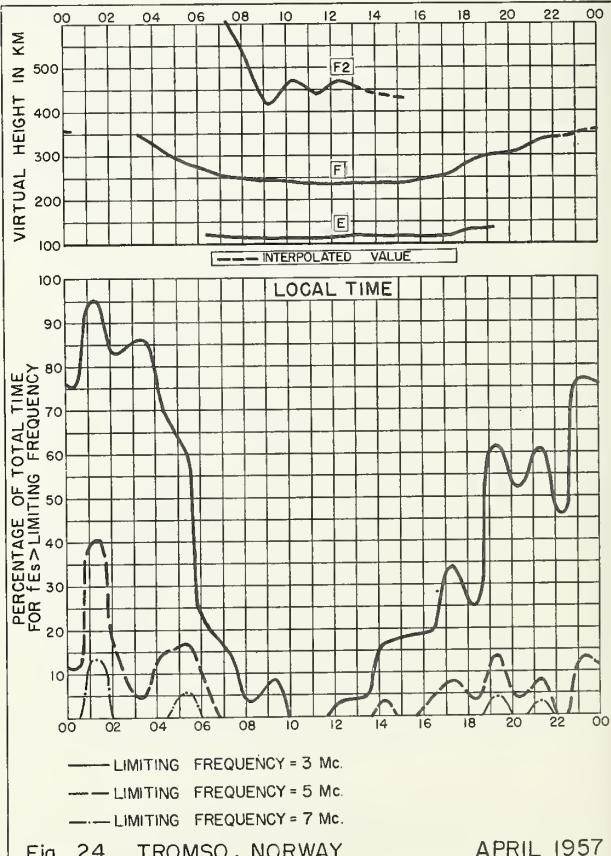


Fig. 24. TROMSO, NORWAY

APRIL 1957

NBS 490

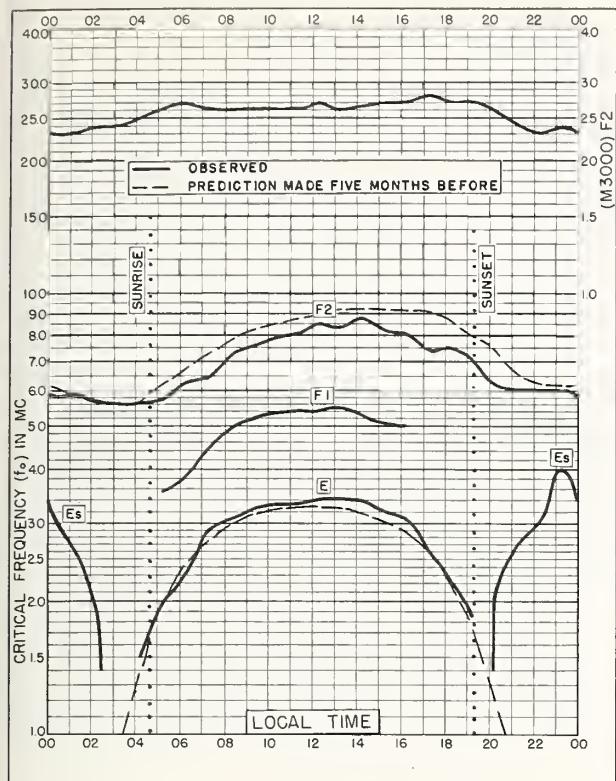


Fig. 25. LYCKSELE, SWEDEN
64.6°N, 18.8°E APRIL 1957

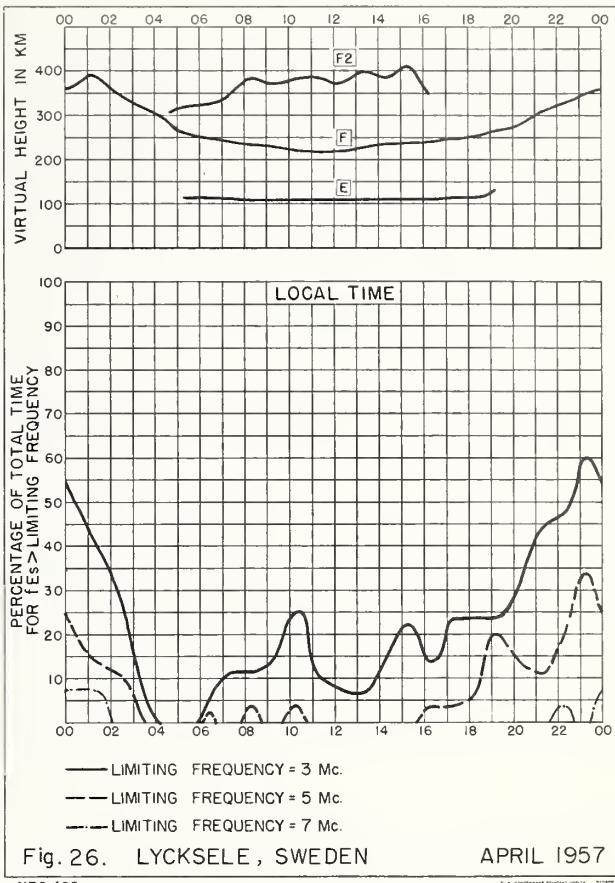


Fig. 26. LYCKSELE, SWEDEN APRIL 1957

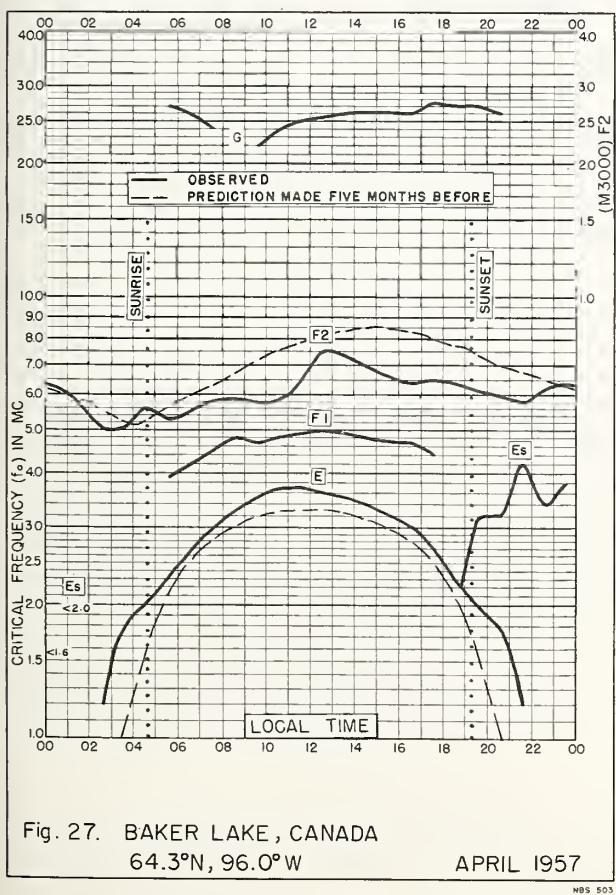


Fig. 27. BAKER LAKE, CANADA
64.3°N, 96.0°W APRIL 1957

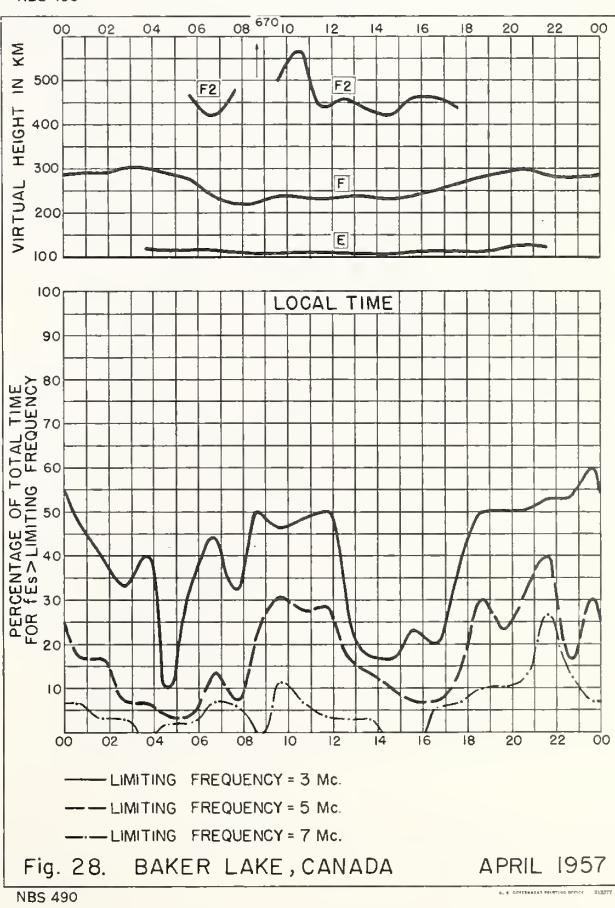
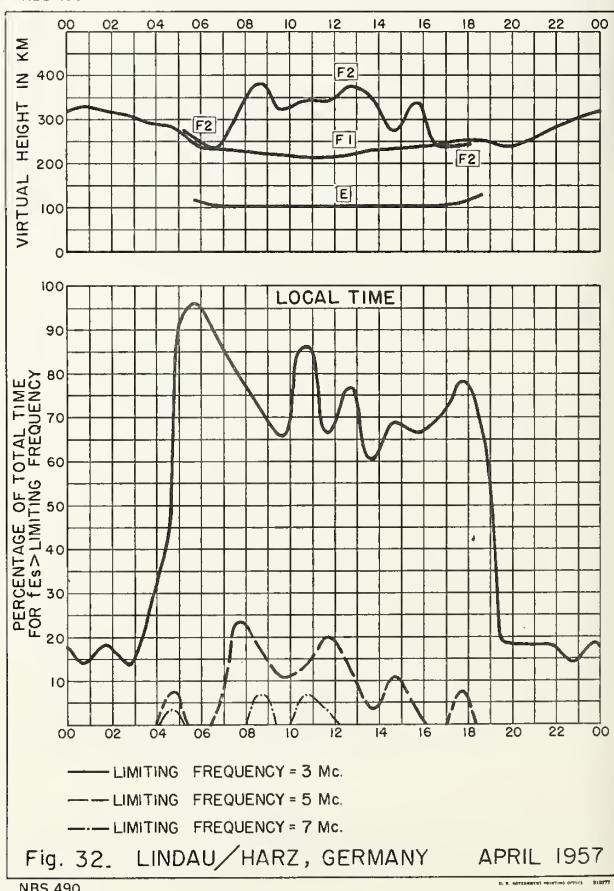
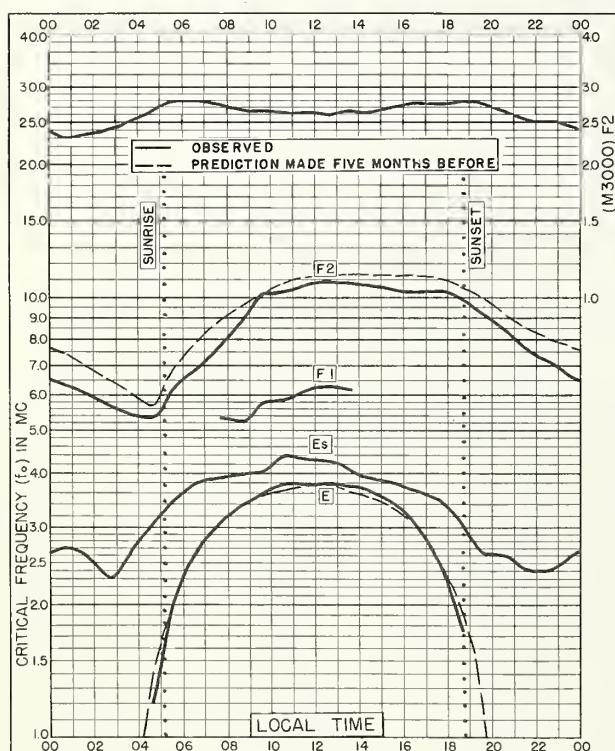
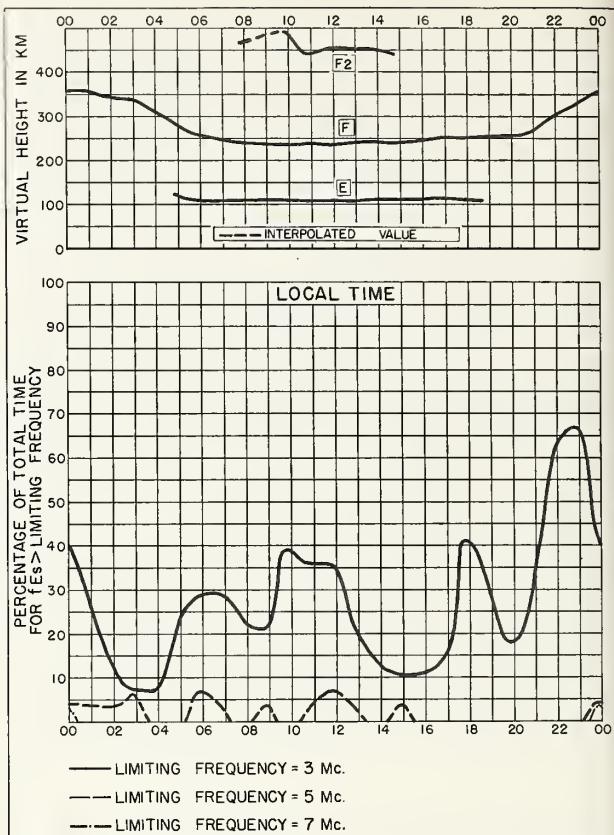
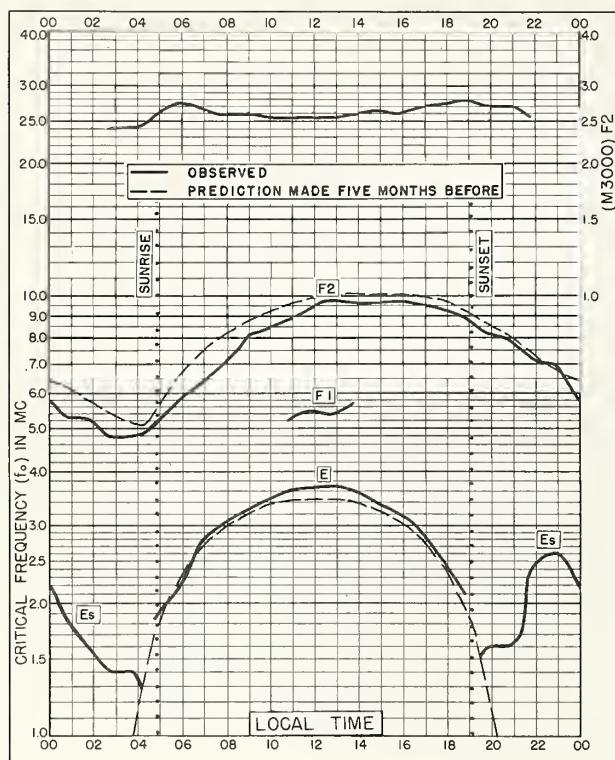


Fig. 28. BAKER LAKE, CANADA APRIL 1957

NBS 490



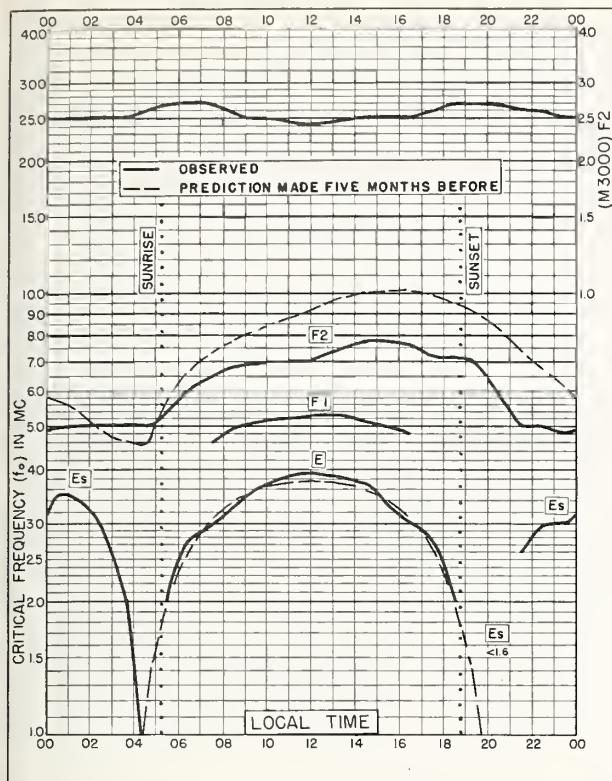


Fig. 33. WINNIPEG, CANADA
49.9°N, 97.4°W

APRIL 1957

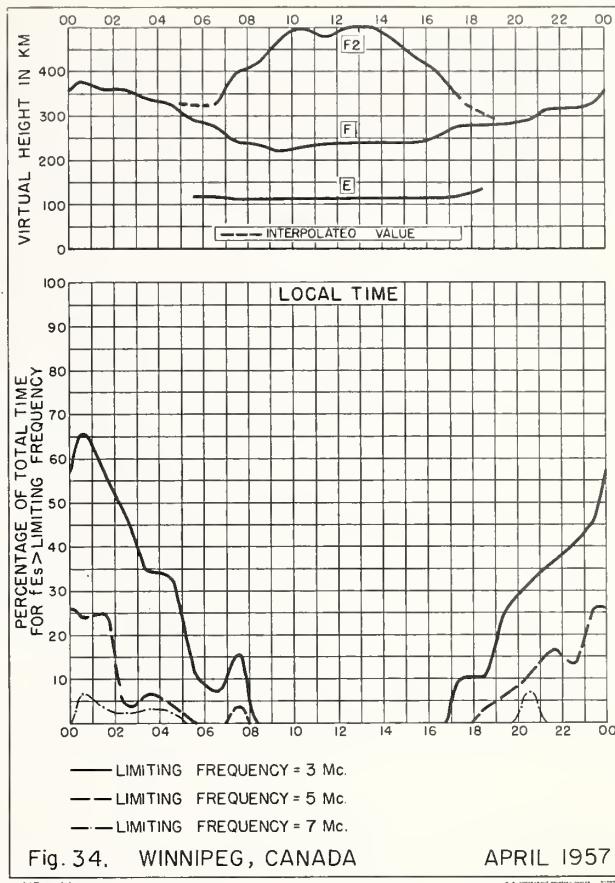


Fig. 34. WINNIPEG, CANADA

APRIL 1957

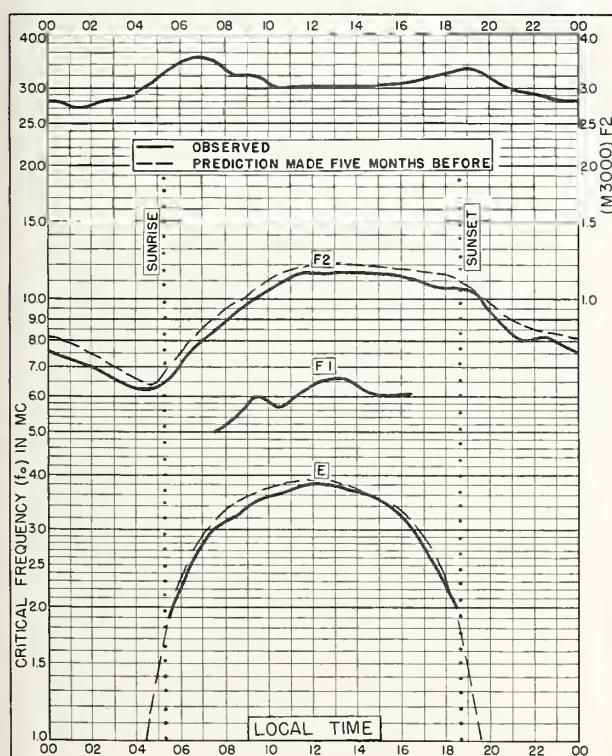


Fig. 35. SCHWARZENBURG, SWITZERLAND
46.8°N, 7.3°E

APRIL 1957

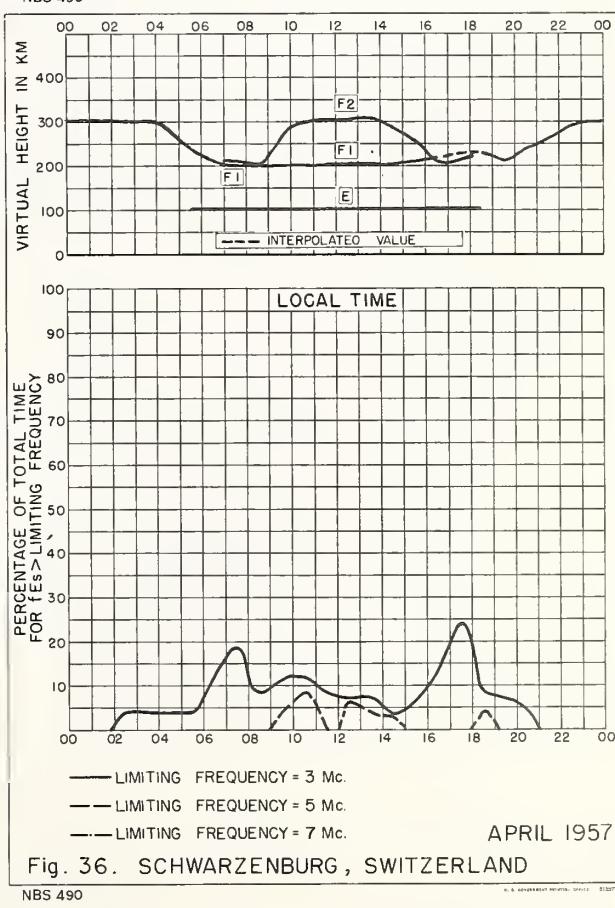
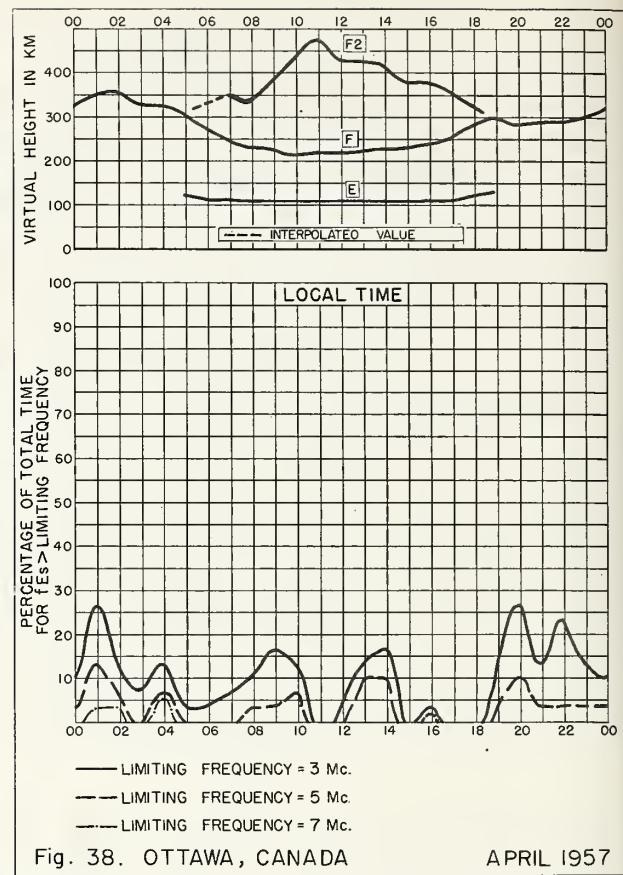
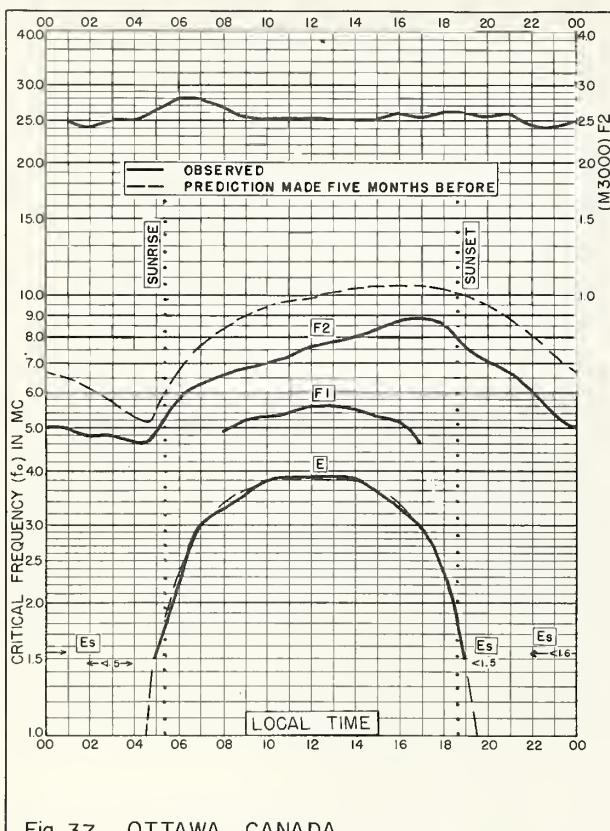
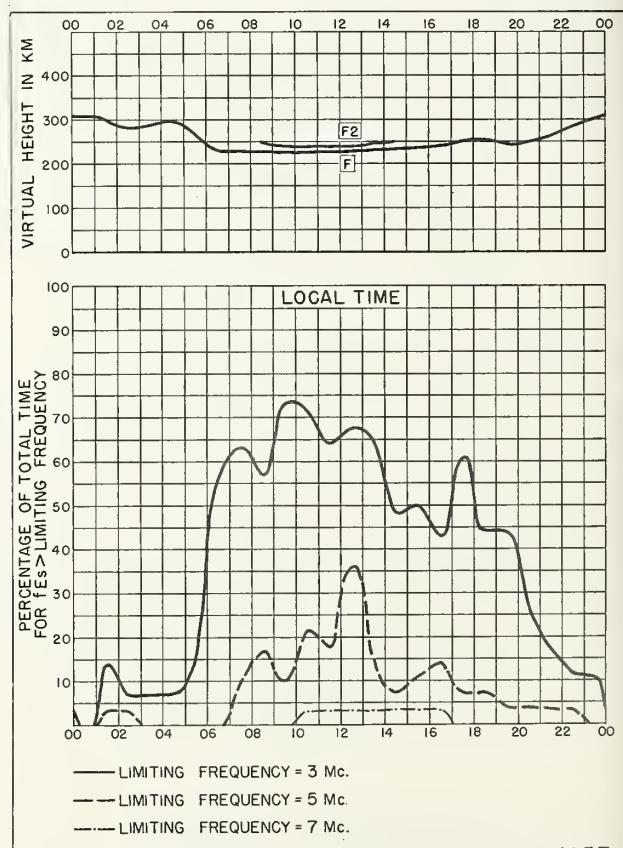
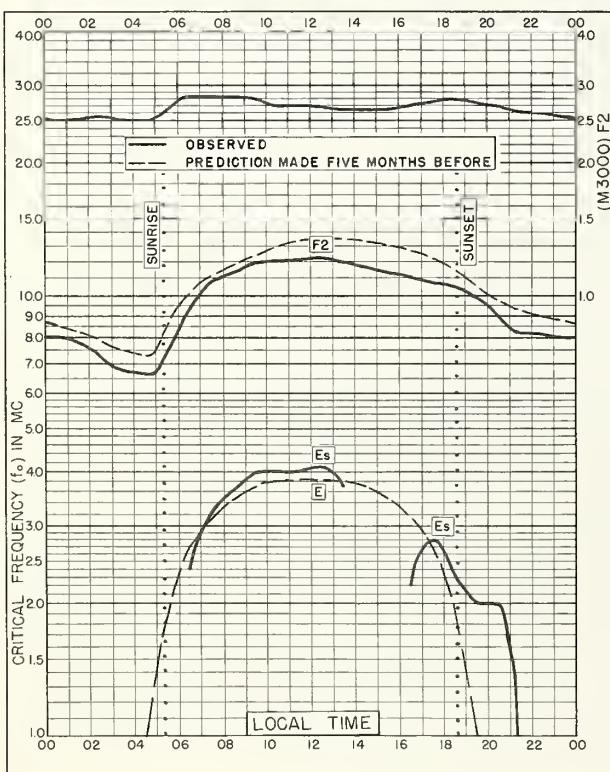


Fig. 36. SCHWARZENBURG, SWITZERLAND

APRIL 1957



NBS 490



NBS 490

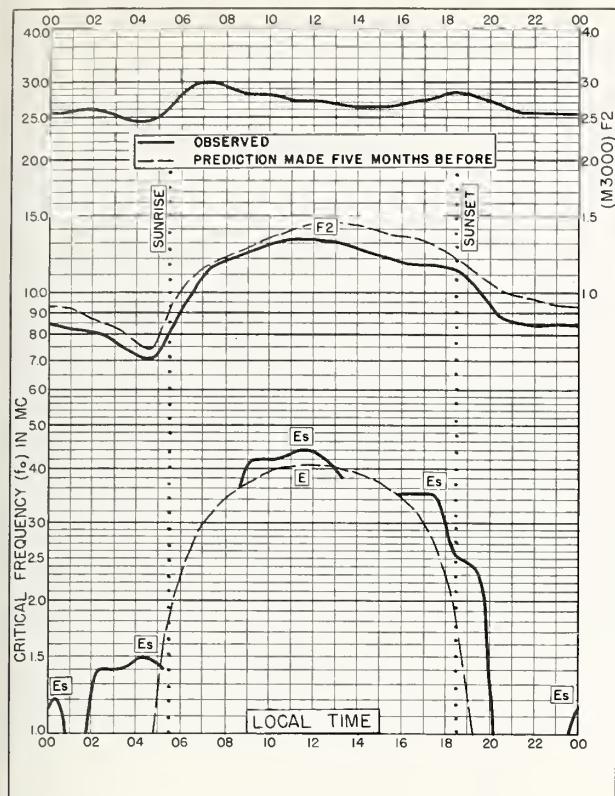


Fig. 41. AKITA, JAPAN
39.7°N, 140.1°E

APRIL 1957

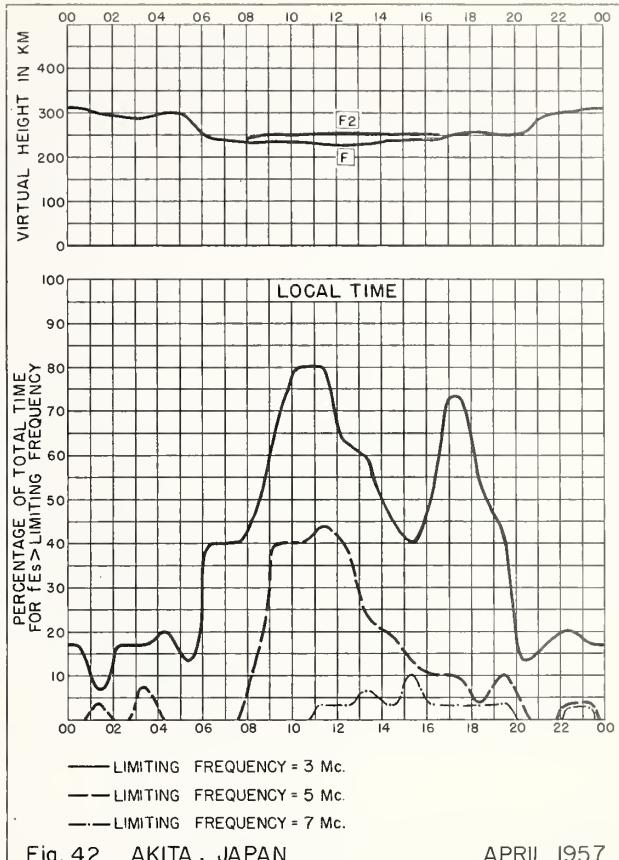


Fig. 42. AKITA, JAPAN

APRIL 1957

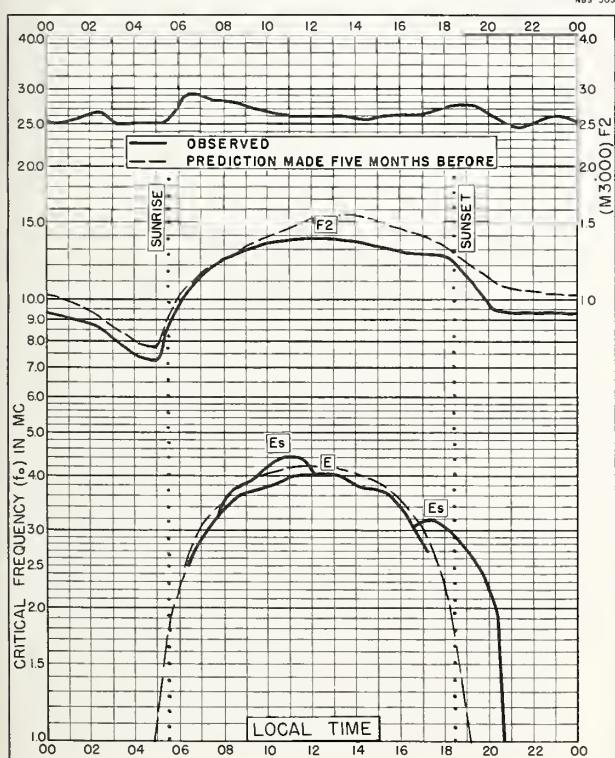


Fig. 43. TOKYO, JAPAN
35.7°N, 139.5°E

APRIL 1957

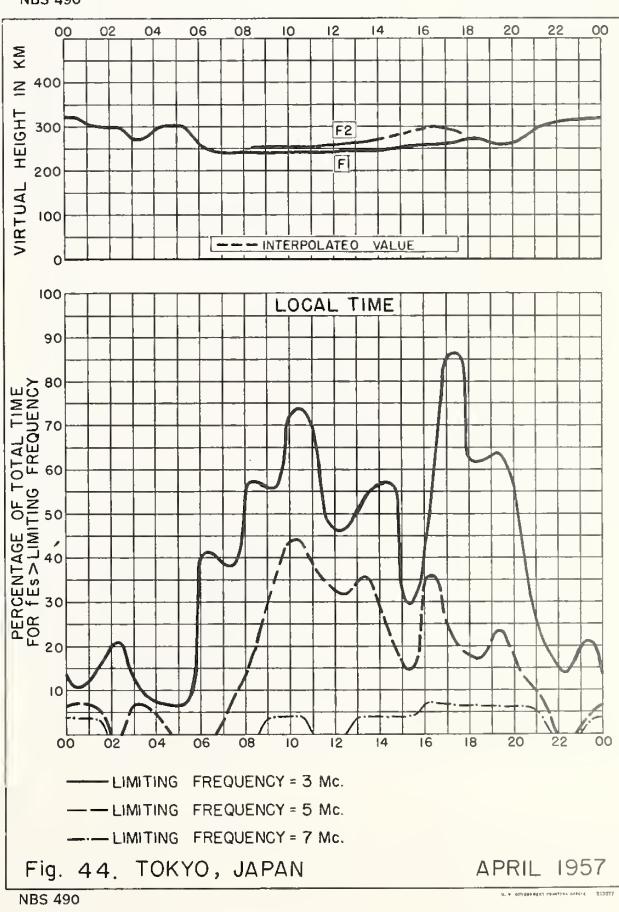


Fig. 44. TOKYO, JAPAN

APRIL 1957

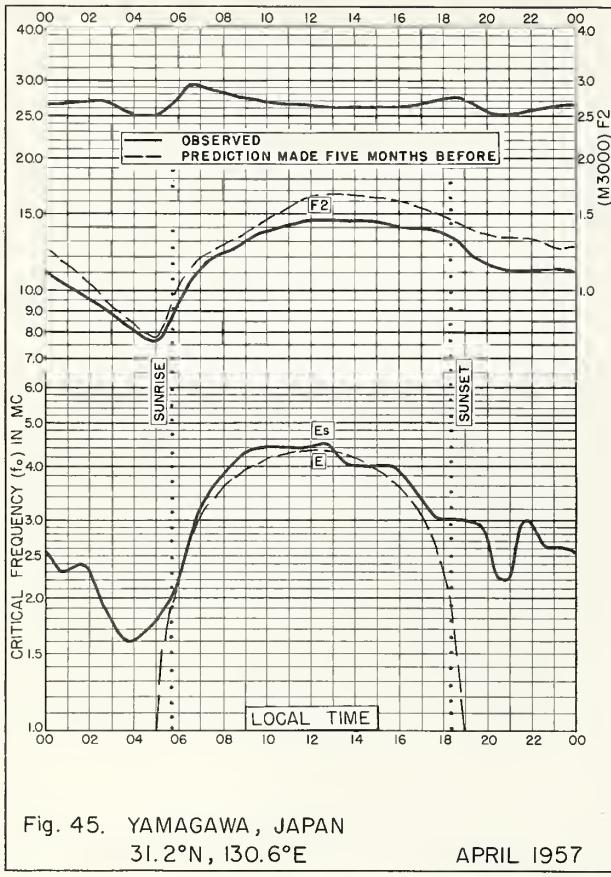


Fig. 45. YAMAGAWA, JAPAN
 31.2°N, 130.6°E APRIL 1957

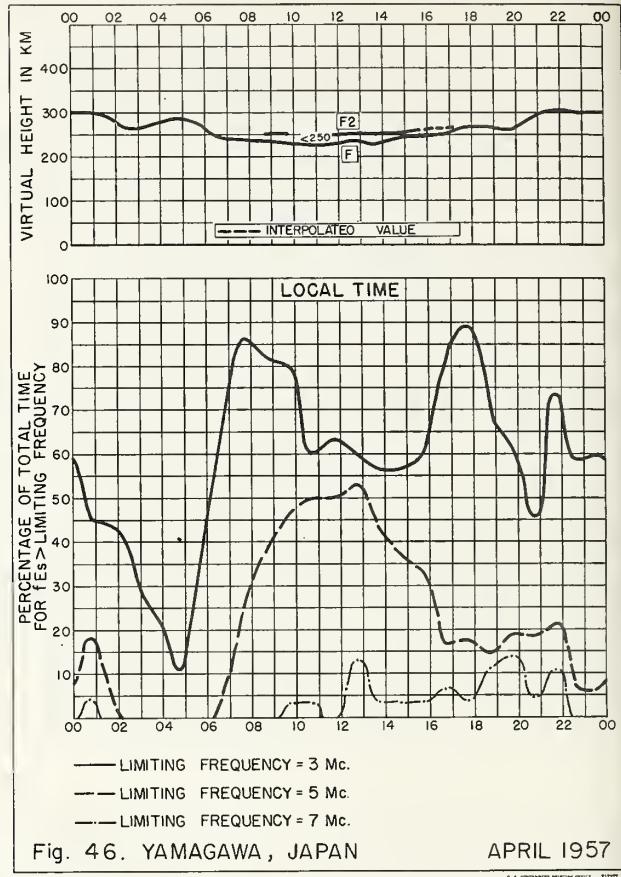


Fig. 46. YAMAGAWA, JAPAN APRIL 1957

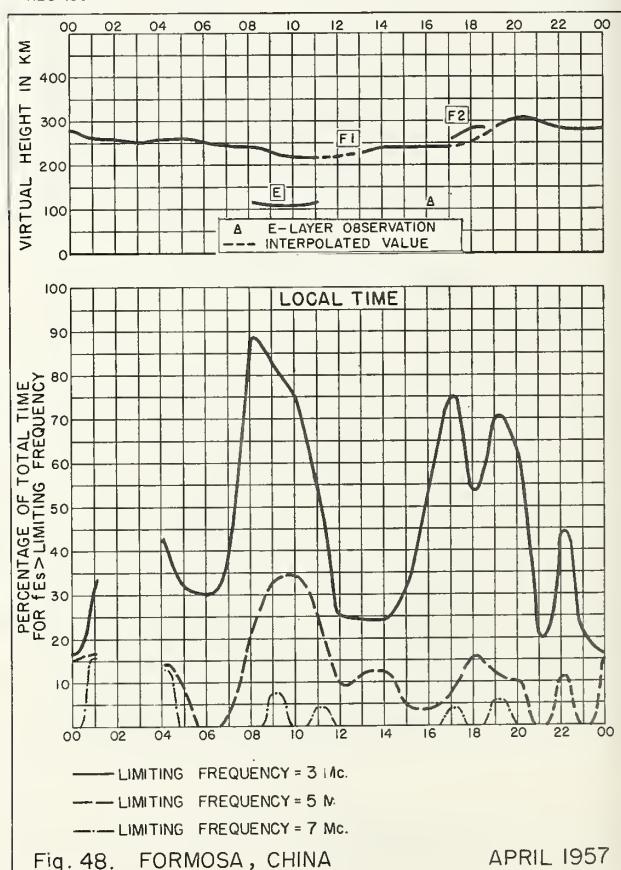
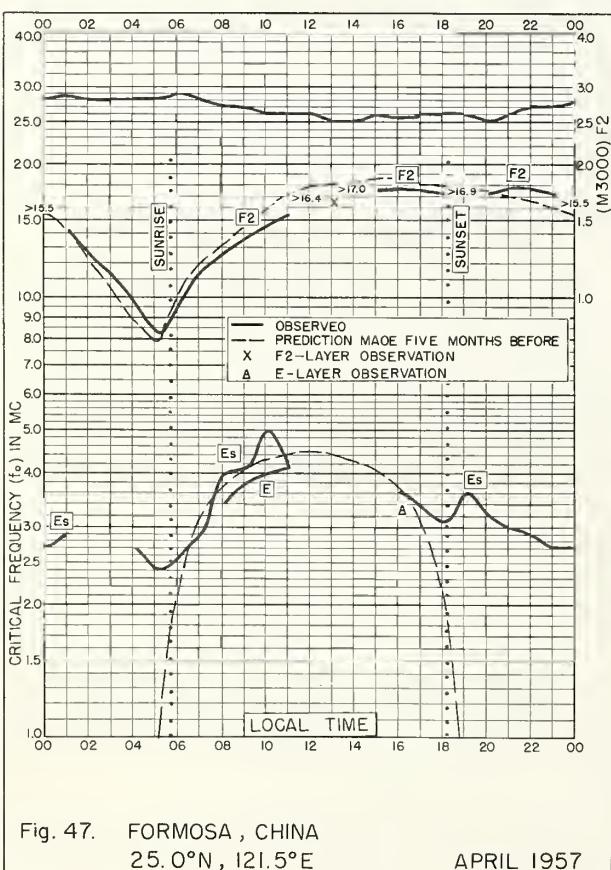


Fig. 48. FORMOSA, CHINA APRIL 1957

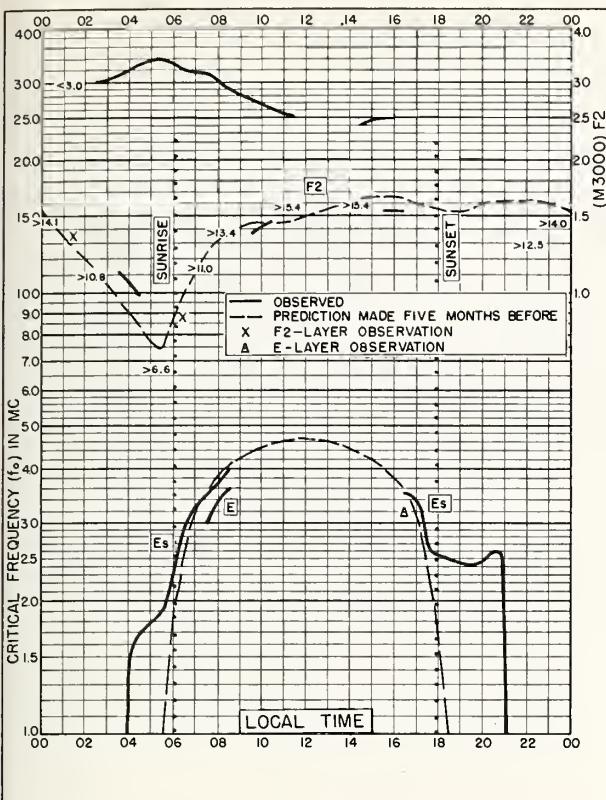


Fig. 49. NAIROBI, KENYA
1.3°S, 36.8°E

APRIL 1957

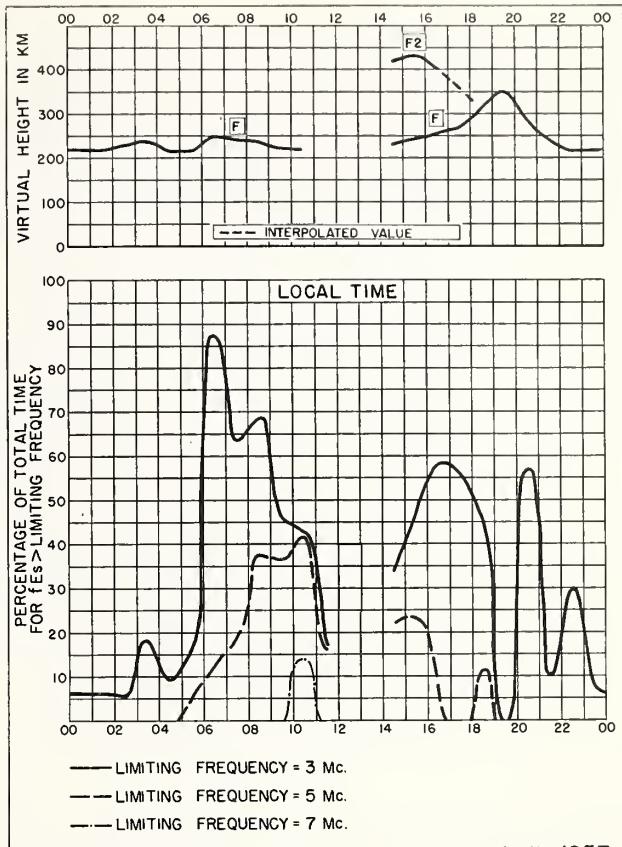


Fig. 50. NAIROBI, KENYA

APRIL 1957

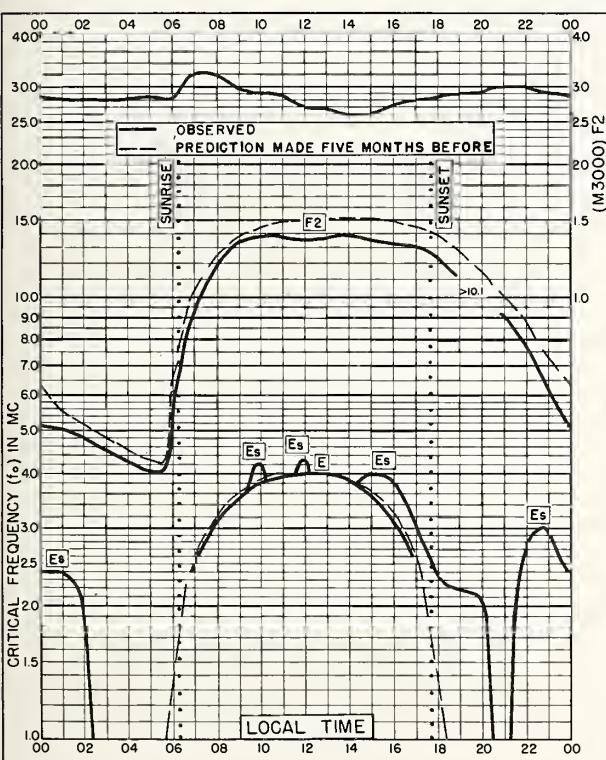


Fig. 51. JOHANNESBURG, UNION OF S. AFRICA
26.2°S, 28.0°E

APRIL 1957

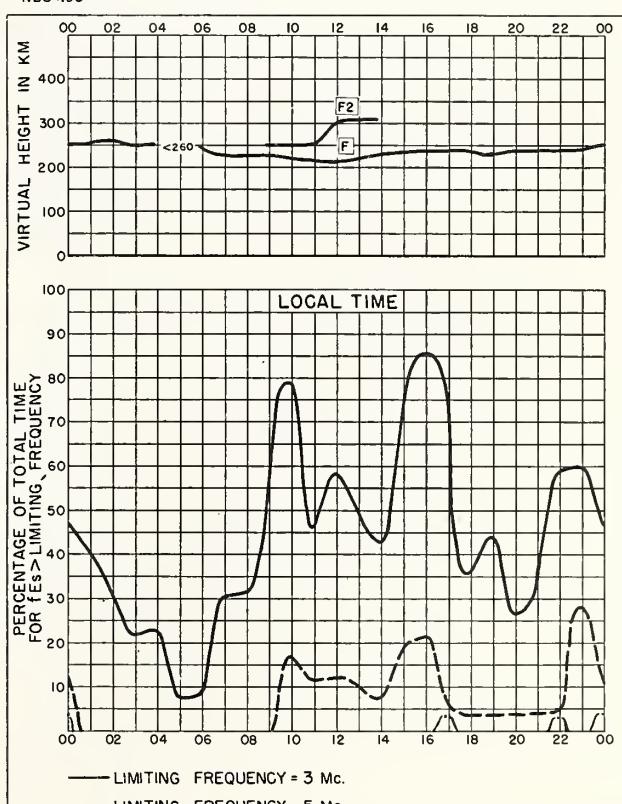


Fig. 52. JOHANNESBURG, UNION OF S. AFRICA

APRIL 1957

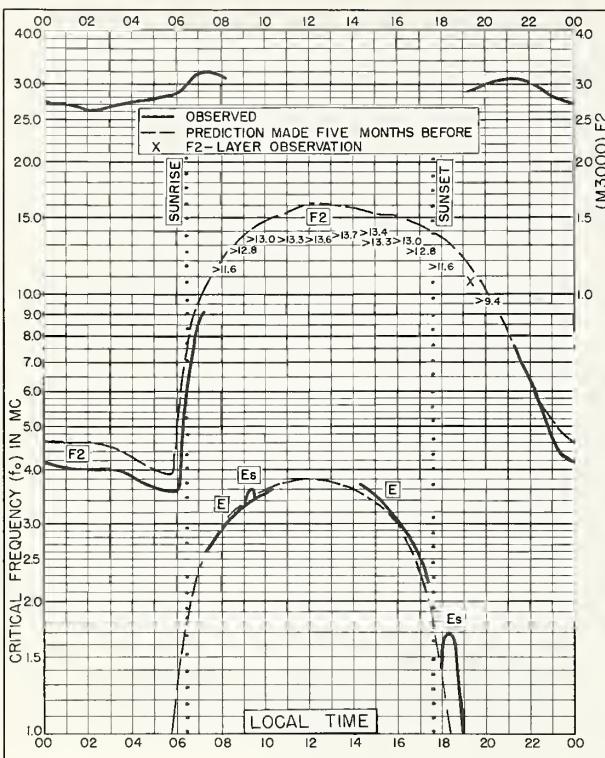


Fig. 53. CAPETOWN, UNION OF S. AFRICA
34.1°S, 18.3°E APRIL 1957

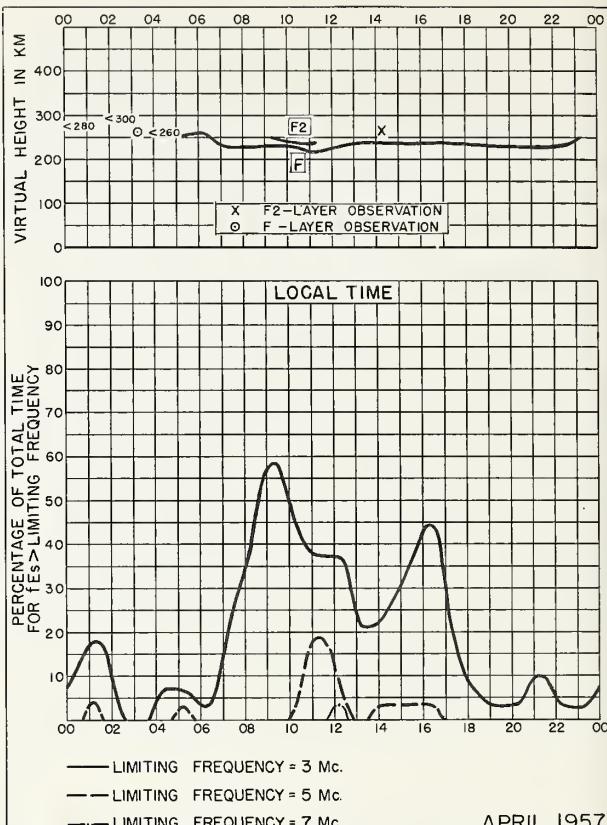


Fig. 54. CAPETOWN, UNION OF S. AFRICA APRIL 1957

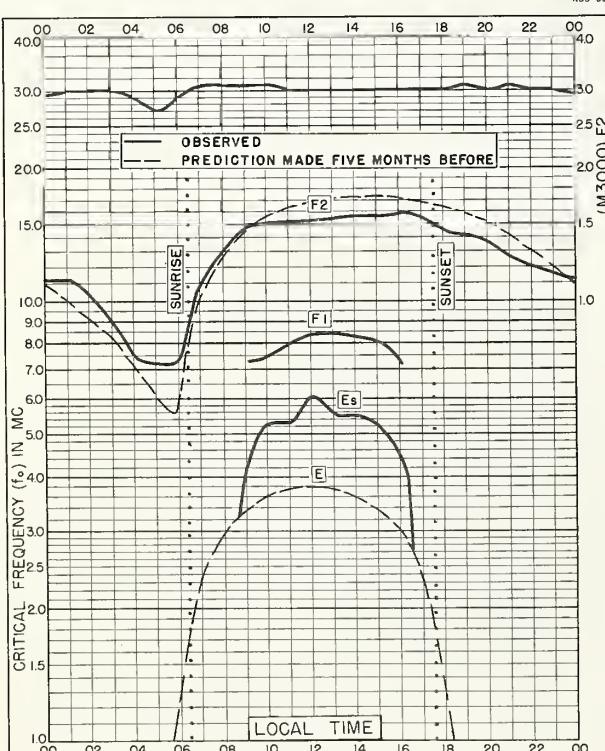


Fig. 55. BUENOS AIRES, ARGENTINA
34.5°S, 58.5°W APRIL 1957

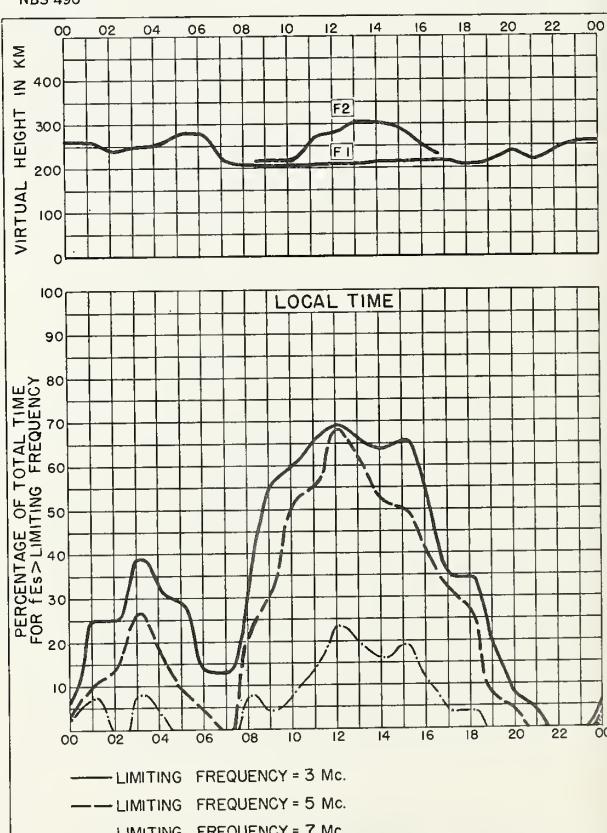


Fig. 56. BUENOS AIRES, ARGENTINA APRIL 1957

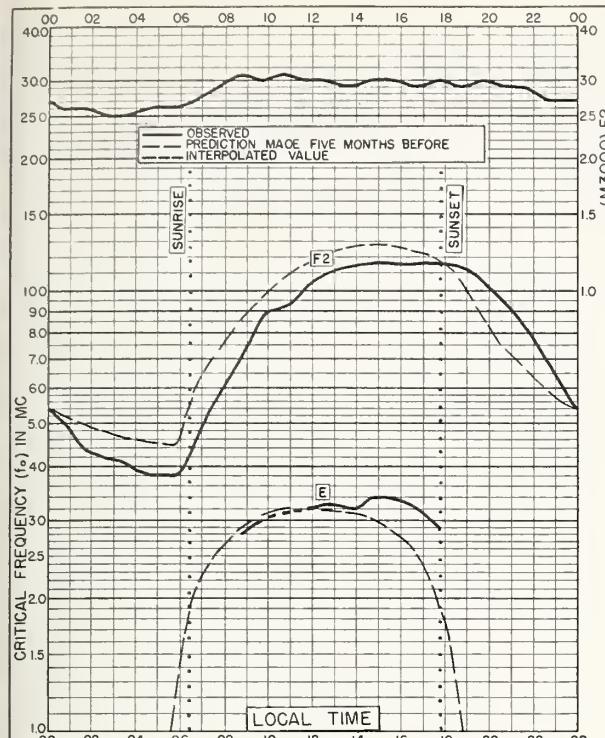


Fig. 57. YAKUTSK, U.S.S.R.
62.0°N, 129.4°E

MARCH 1957

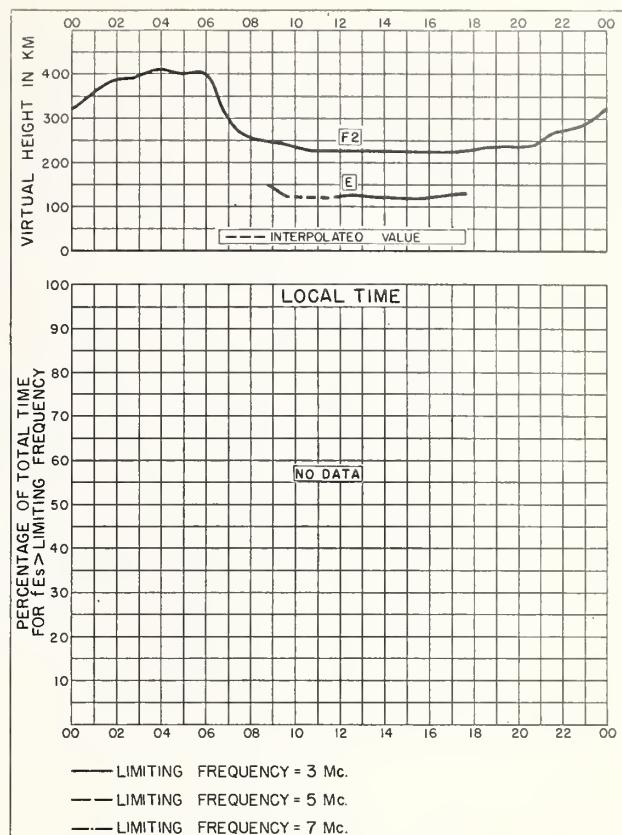


Fig. 58. YAKUTSK, U.S.S.R.

MARCH 1957

NBS 490

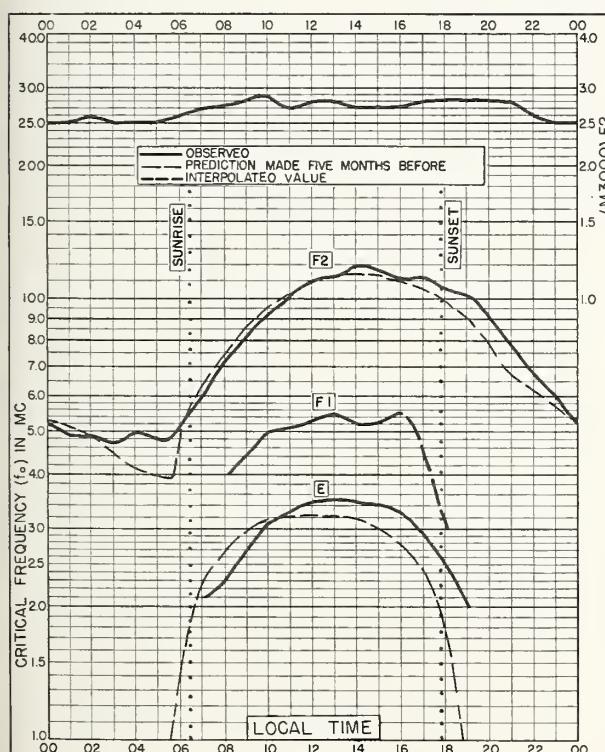


Fig. 59. LENINGRAD, U.S.S.R.
59.9°N, 30.7°E

MARCH 1957

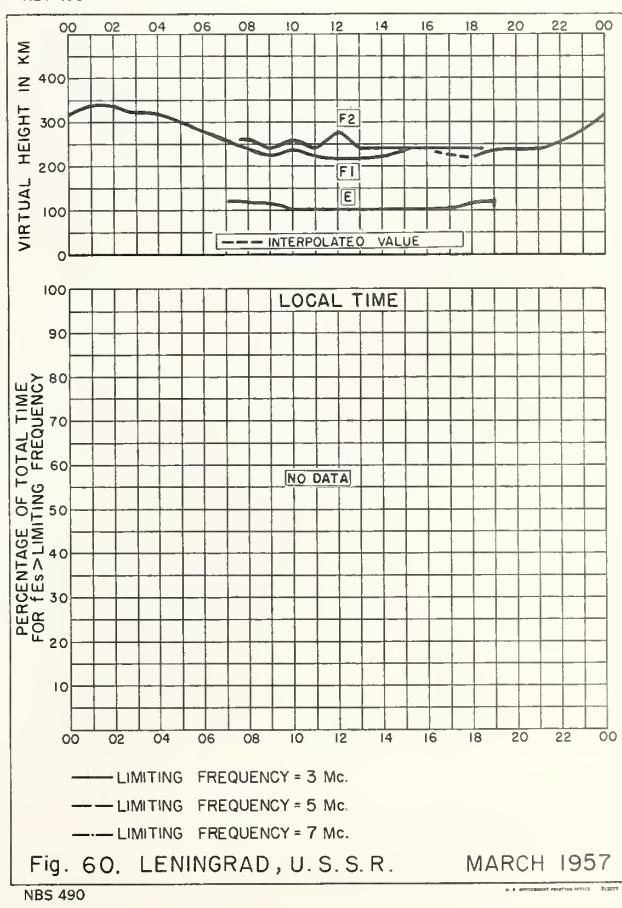
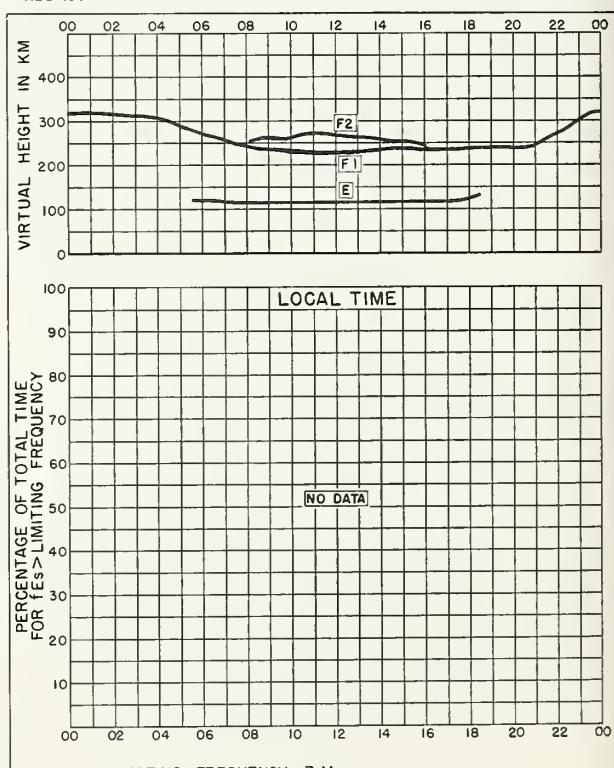
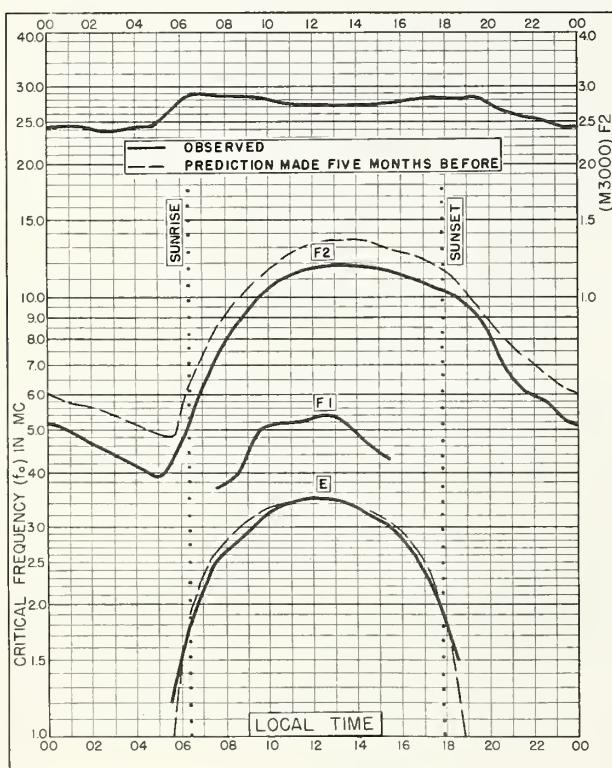
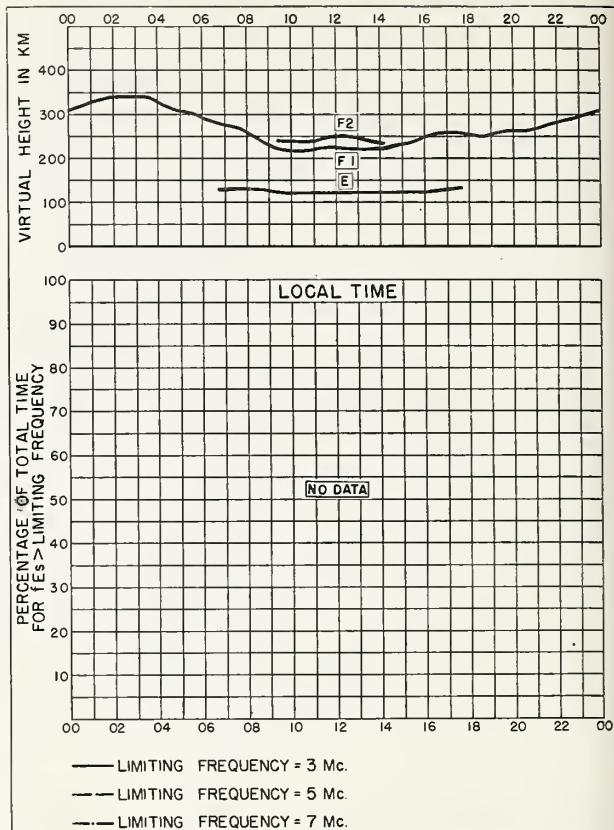
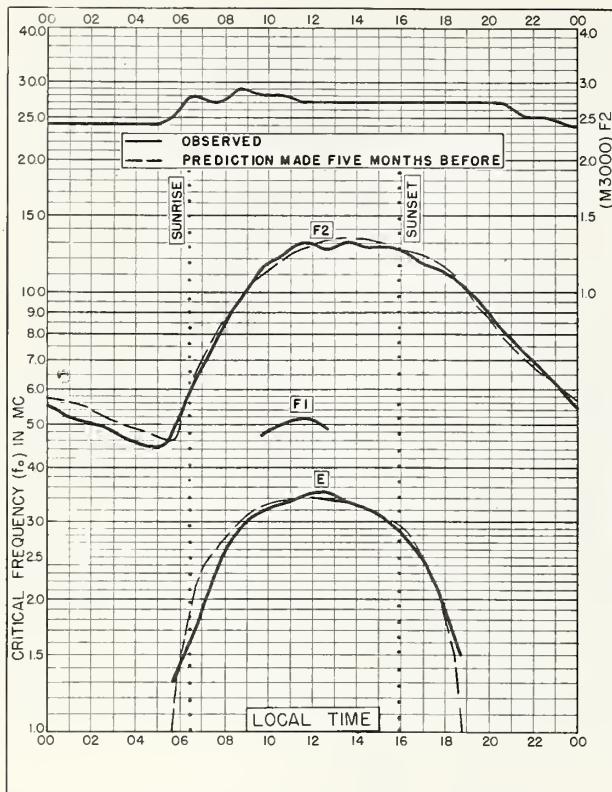


Fig. 60. LENINGRAD, U.S.S.R.

MARCH 1957

NBS 490



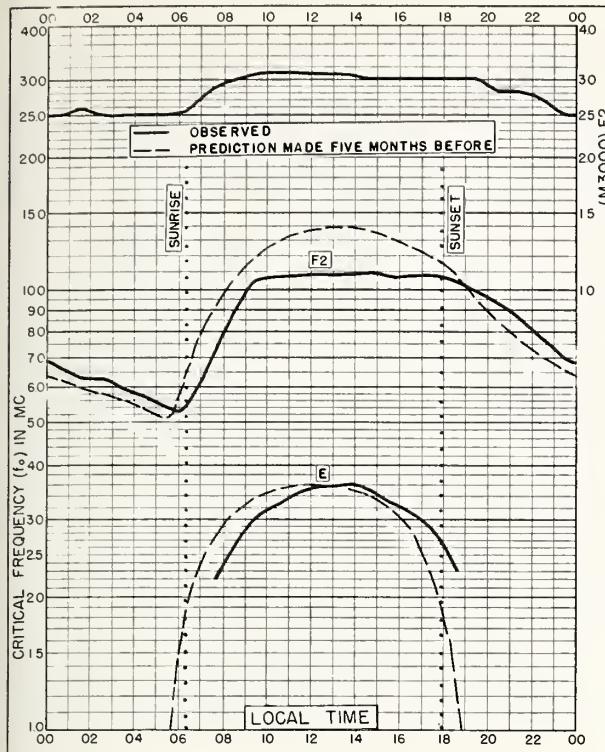


Fig. 65. CHITA, U.S.S.R.
52.0°N, 113.3°E MARCH 1957

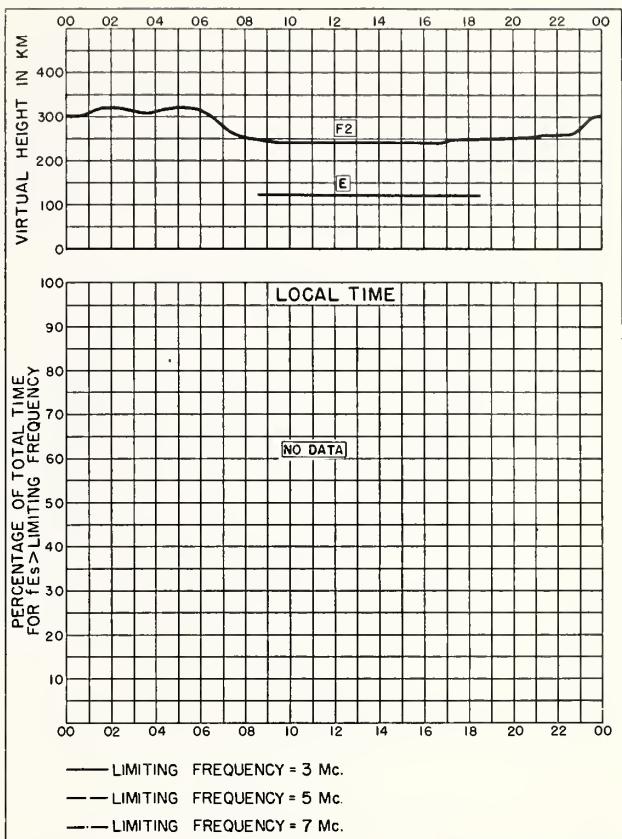


Fig. 66. CHITA, U.S.S.R. MARCH 1957

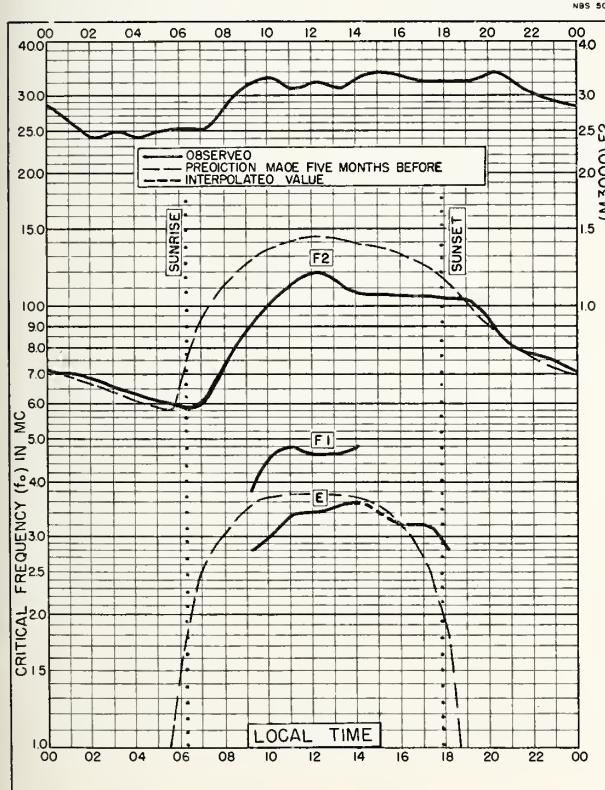


Fig. 67. YUZHNO-SAKHALINSK, U.S.S.R.
47.0°N, 143.0°E MARCH 1957

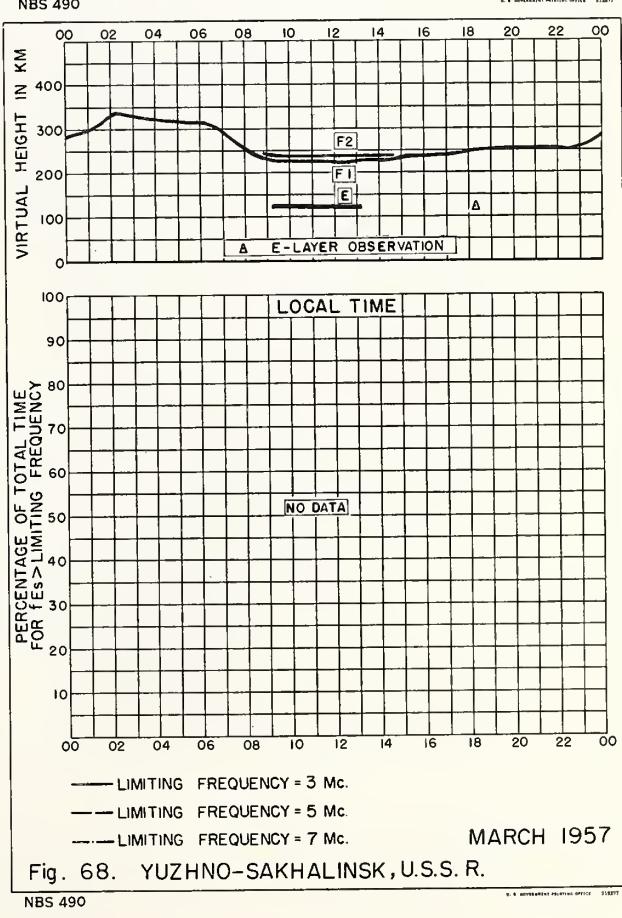
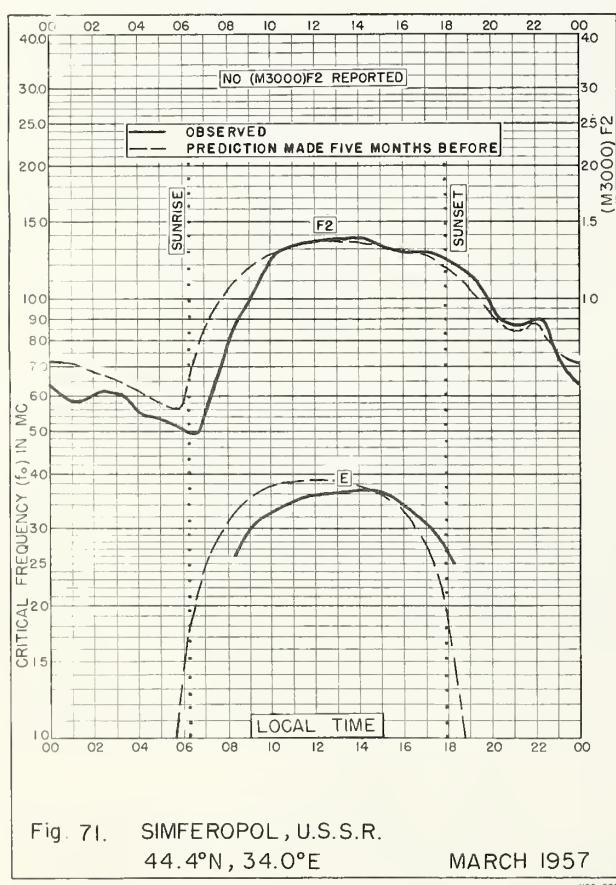
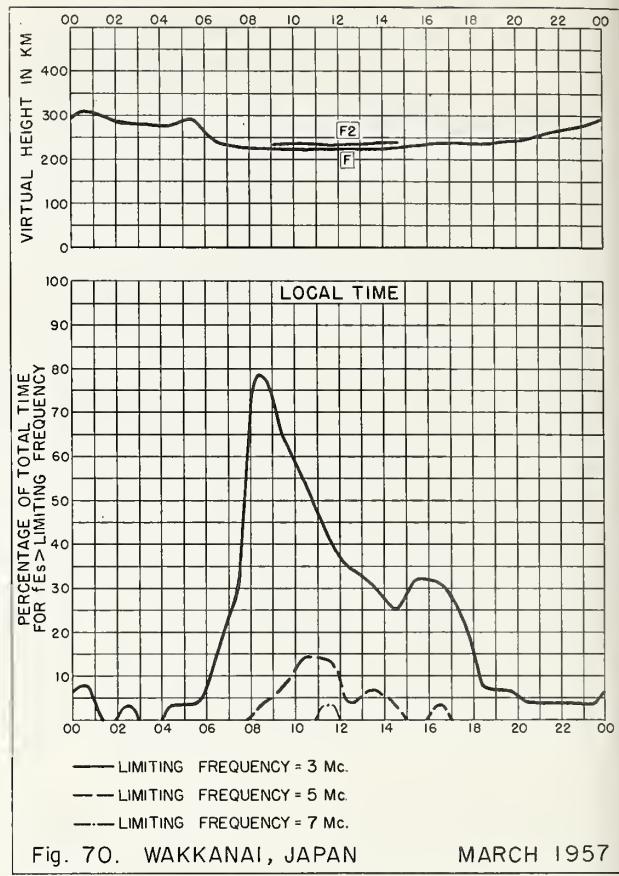
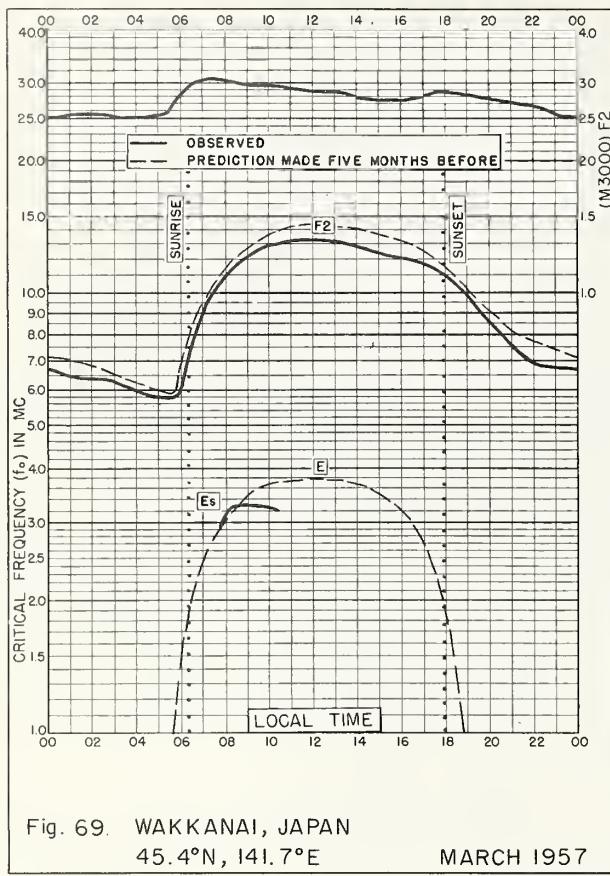
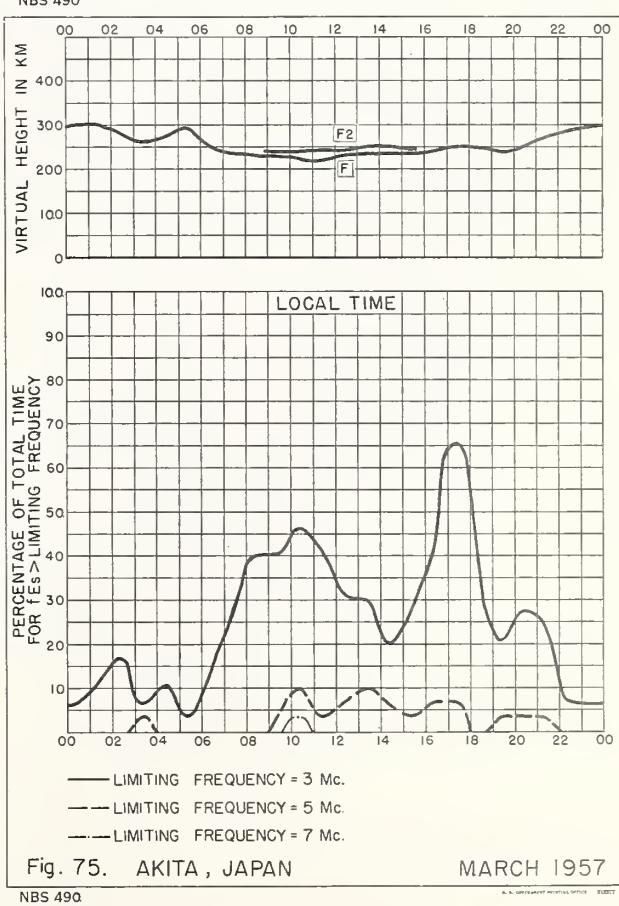
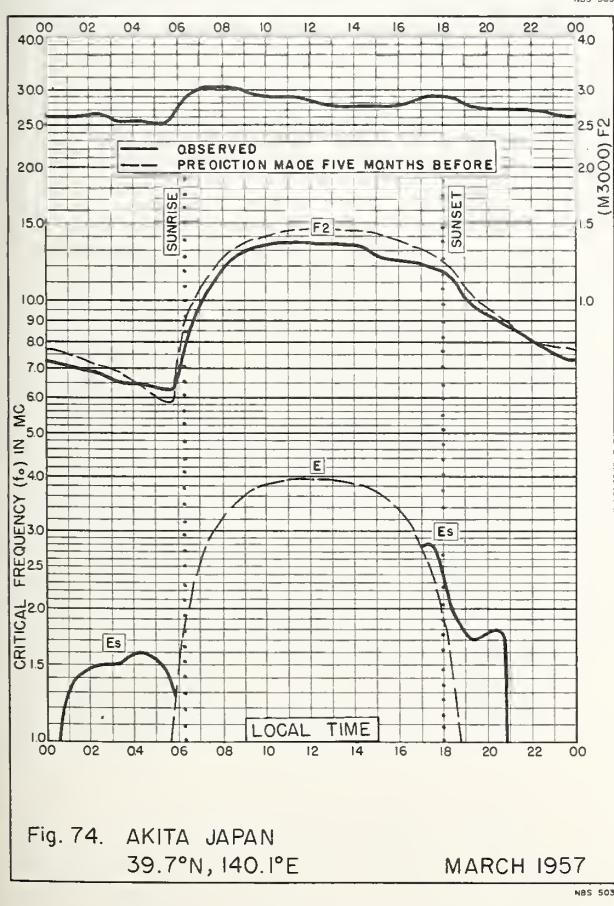
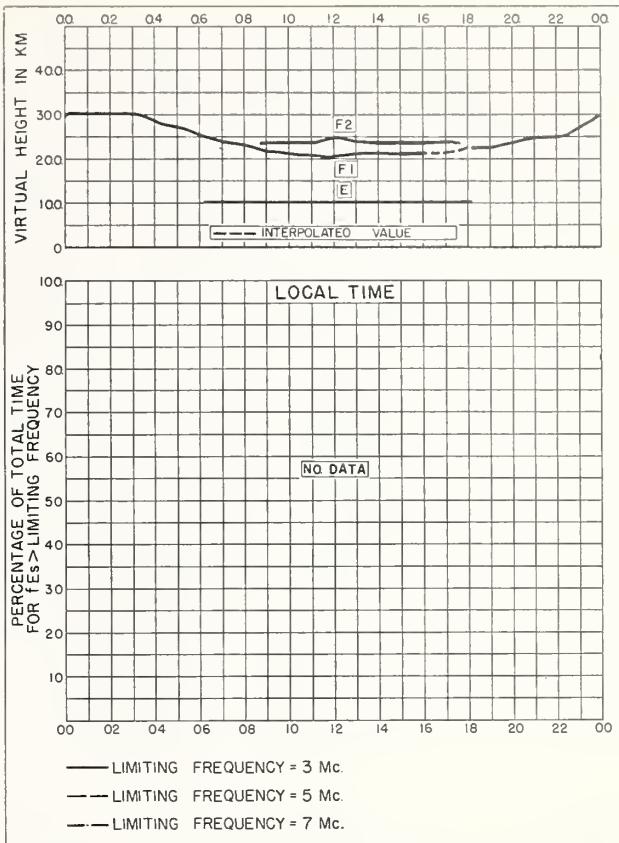
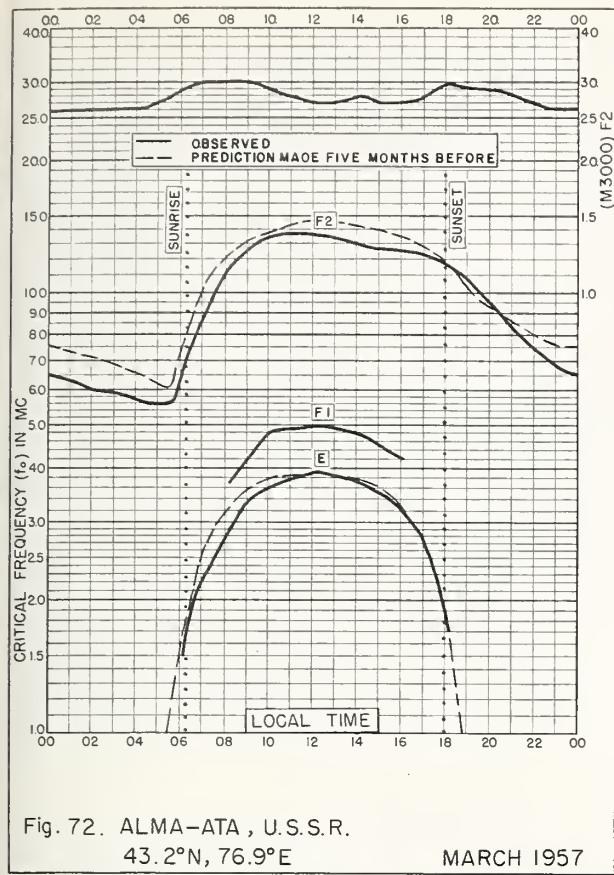
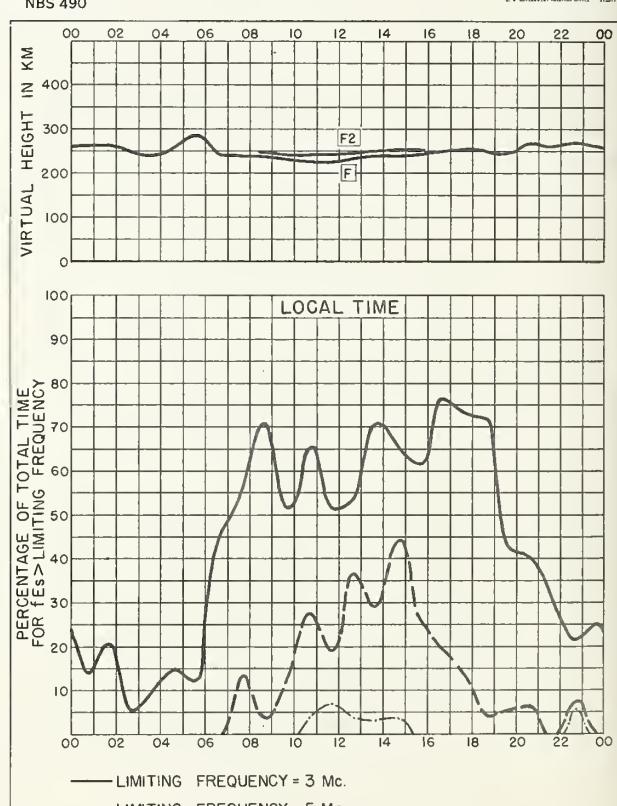
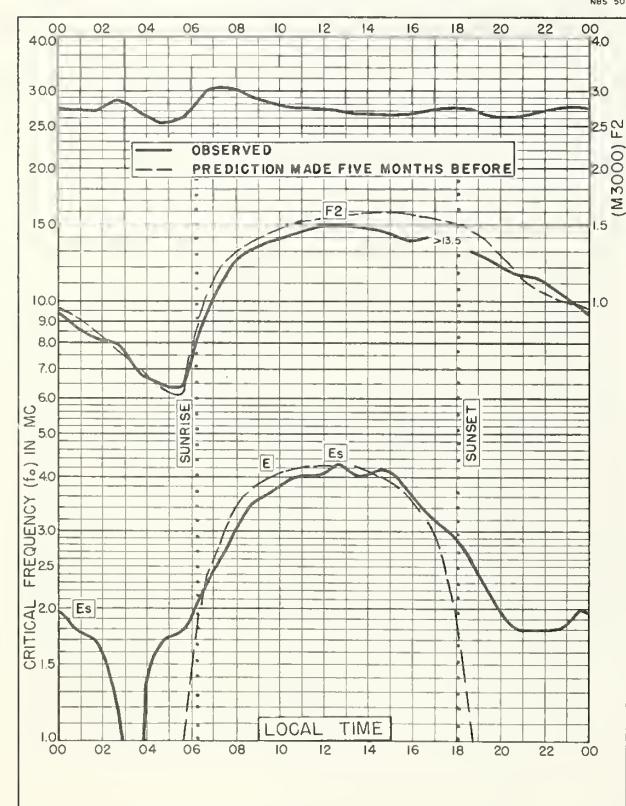
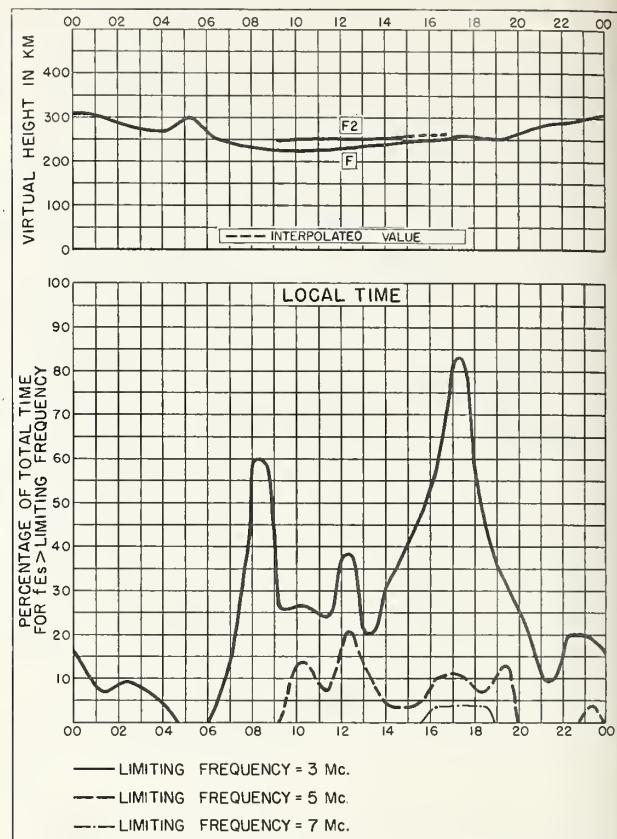
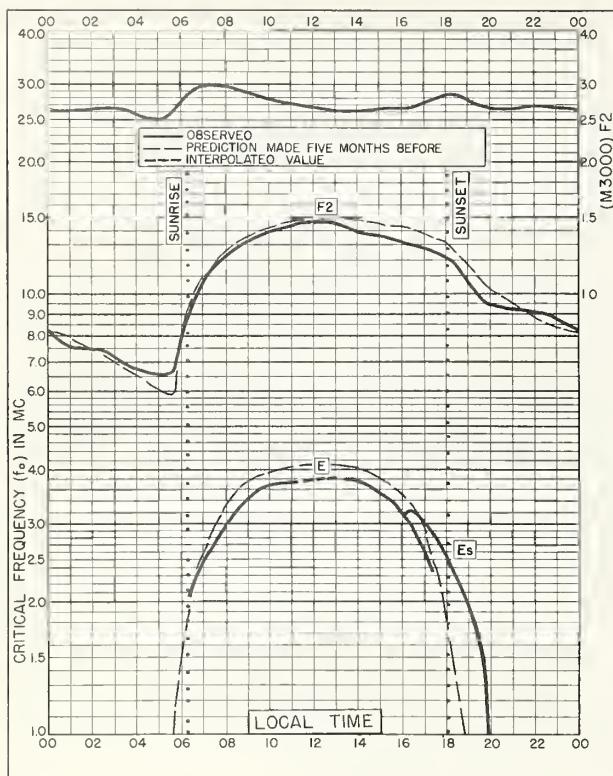


Fig. 68. YUZHNO-SAKHALINSK, U.S.S.R. MARCH 1957







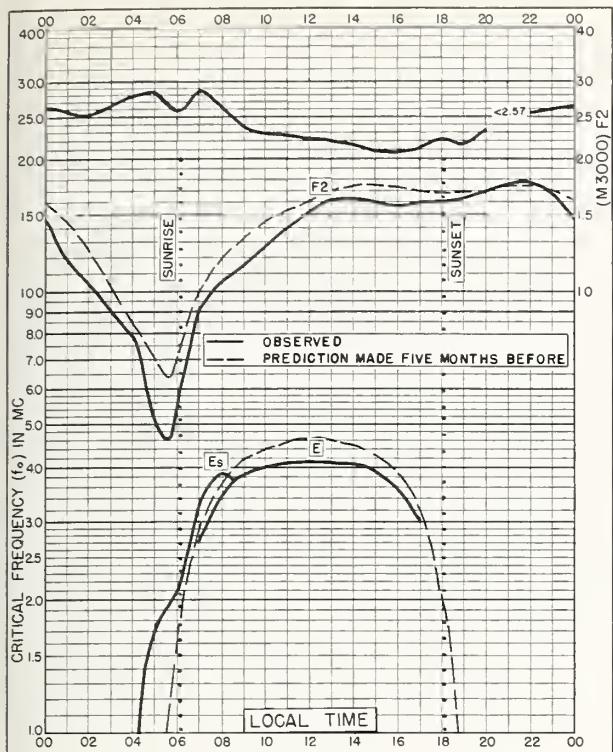


Fig. 80. LEOPOLDVILLE, BELGIAN CONGO
4.4°S, 15.2°E MARCH 1957

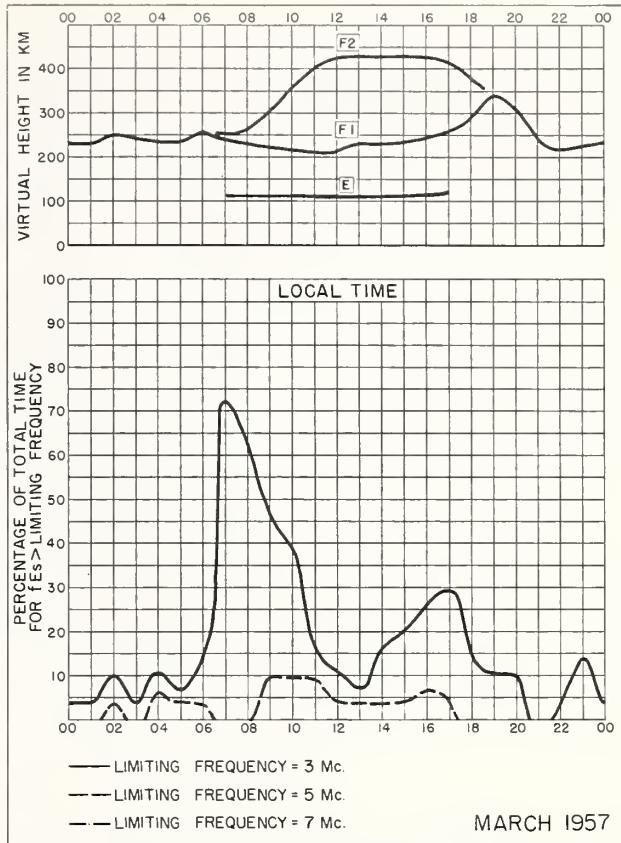


Fig. 81. LEOPOLDVILLE, BELGIAN CONGO

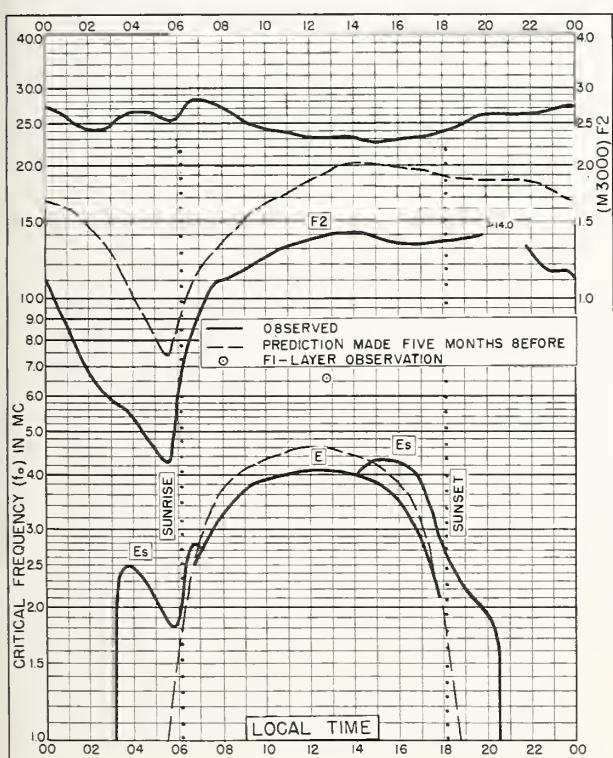


Fig. 82. ELISABETHVILLE, BELGIAN CONGO
11.6°S, 27.5°E MARCH 1957

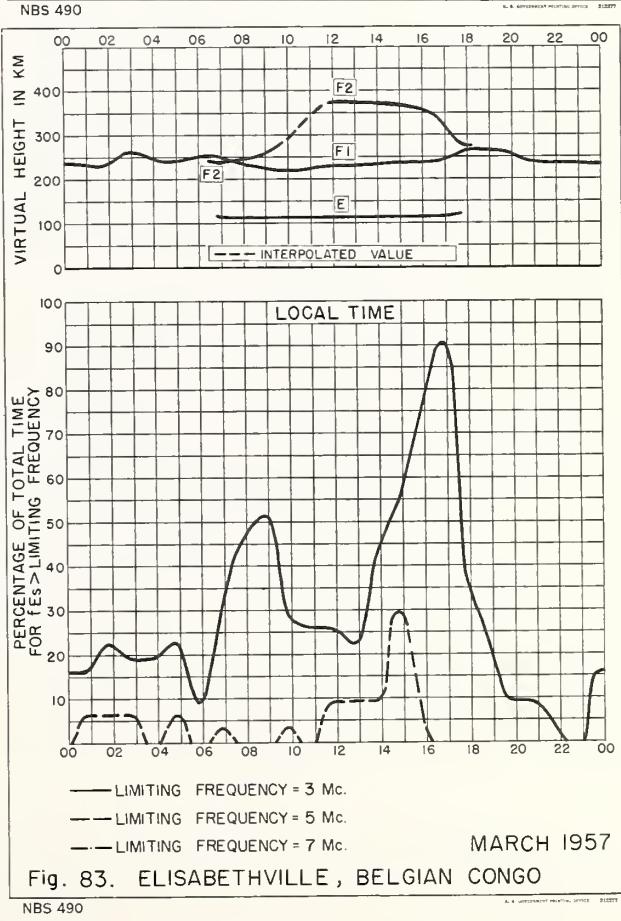
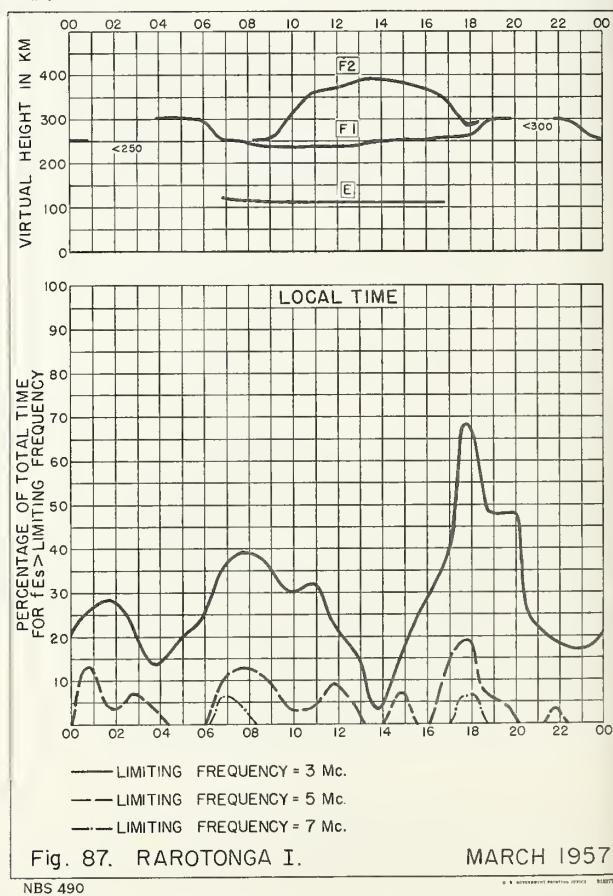
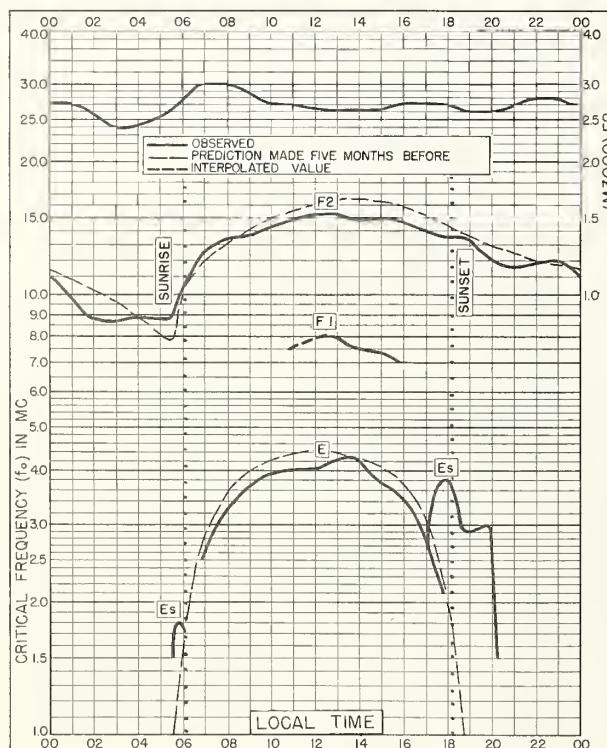
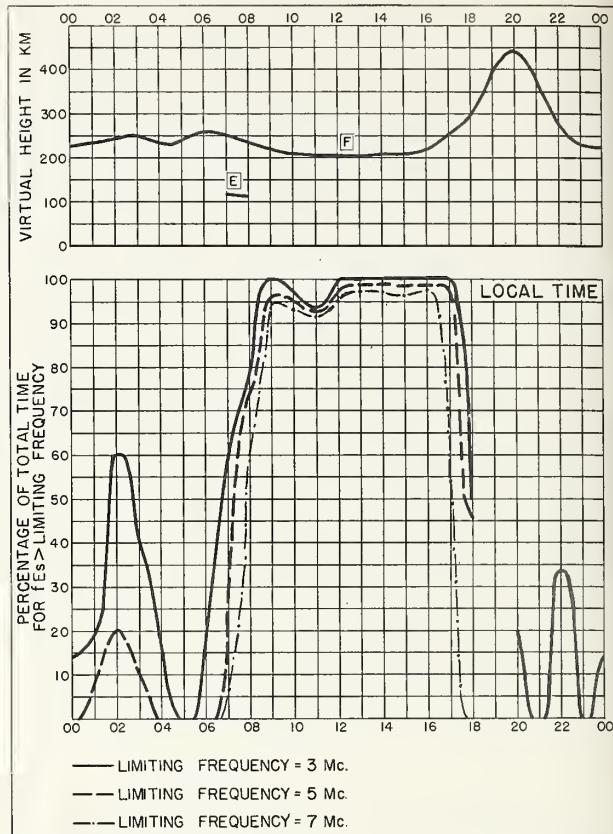
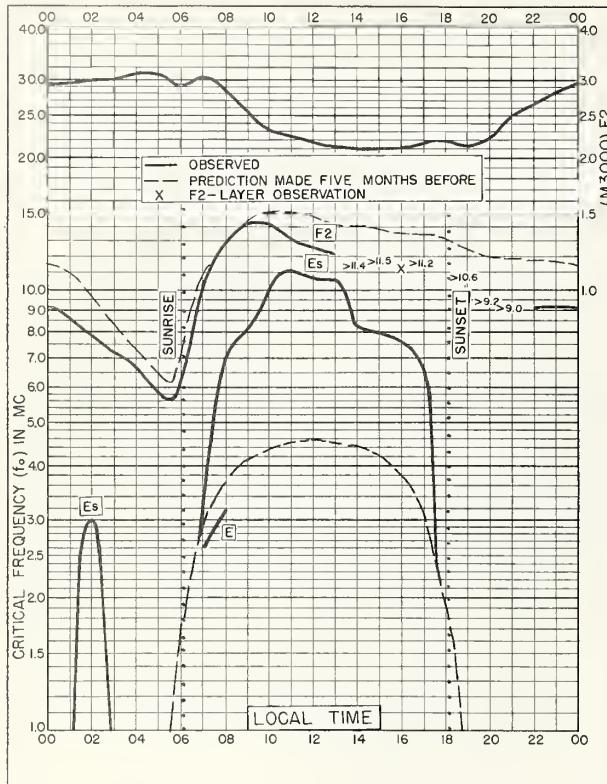


Fig. 83. ELISABETHVILLE, BELGIAN CONGO



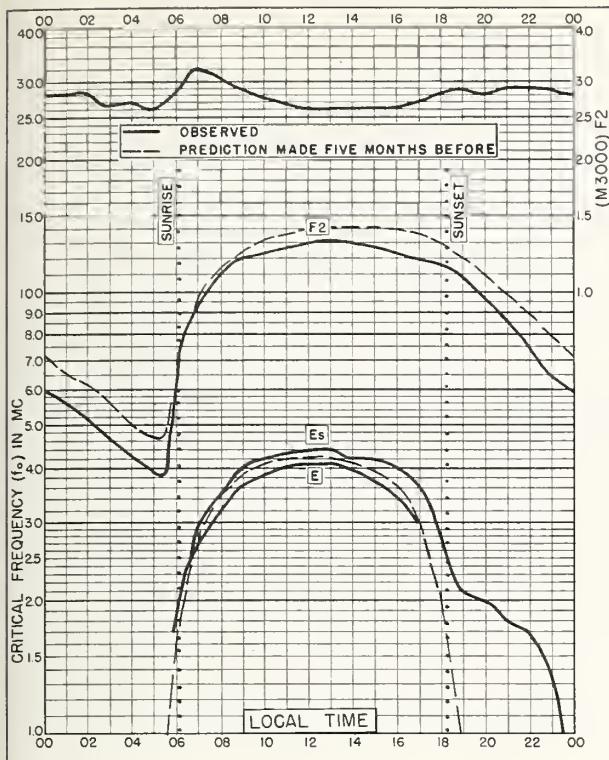


Fig. 88. JOHANNESBURG, UNION OF S. AFRICA
26.2°S, 28.0°E MARCH 1957

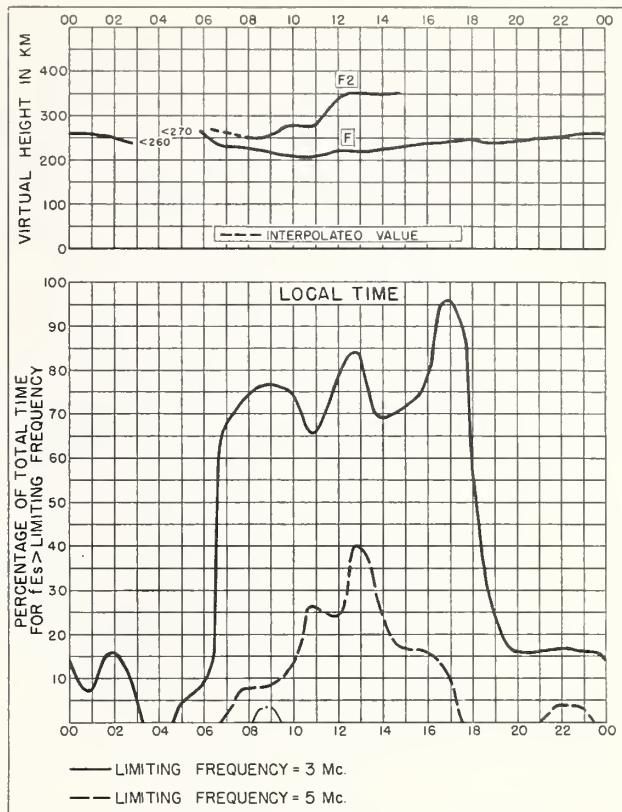


Fig. 89. JOHANNESBURG, UNION OF S. AFRICA

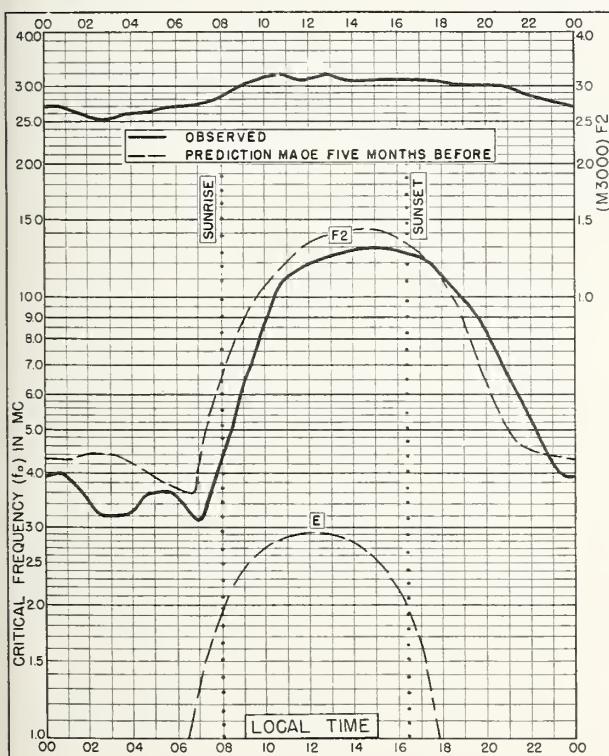


Fig. 90. YAKUTSK, U.S.S.R.
62.0°N, 129.4°E FEBRUARY 1957

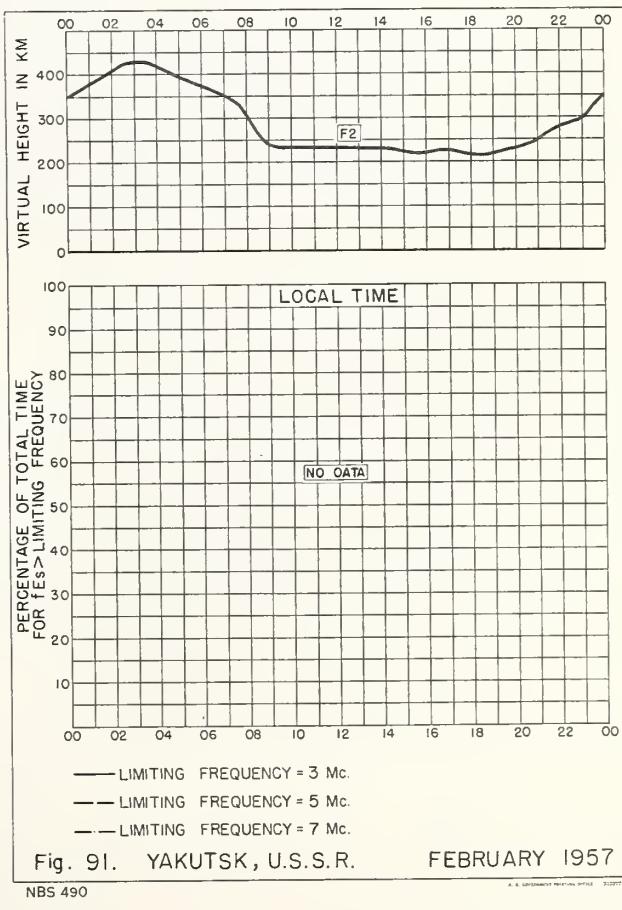


Fig. 91. YAKUTSK, U.S.S.R.

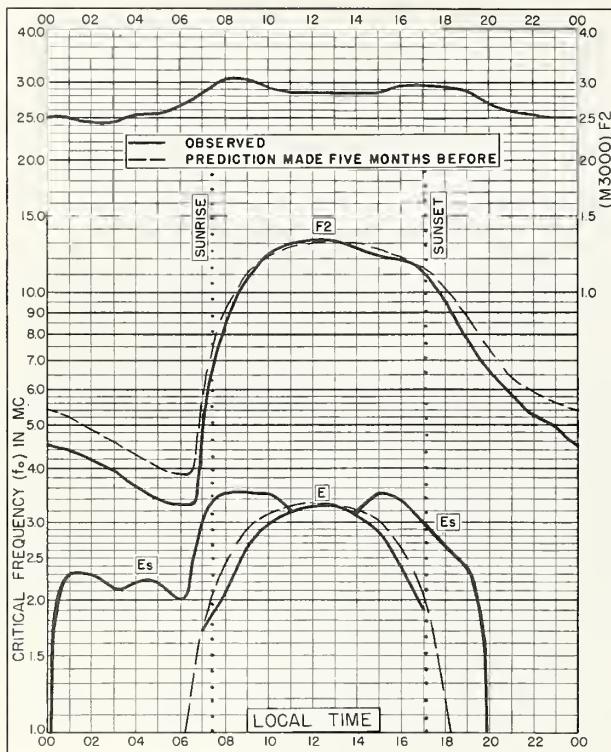


Fig. 92. SLOUGH, ENGLAND
51.5°N, 0.6°W FEBRUARY 1957

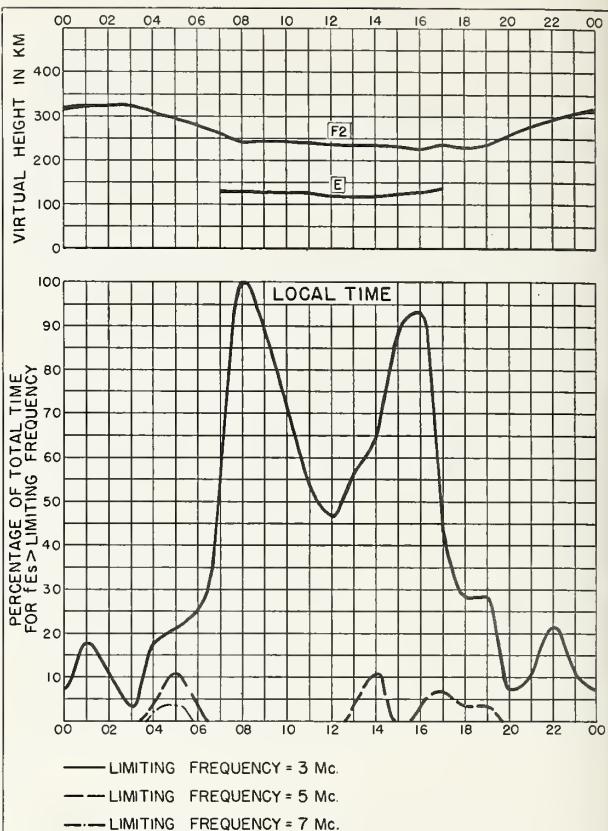


Fig. 93. SLOUGH, ENGLAND FEBRUARY 1957

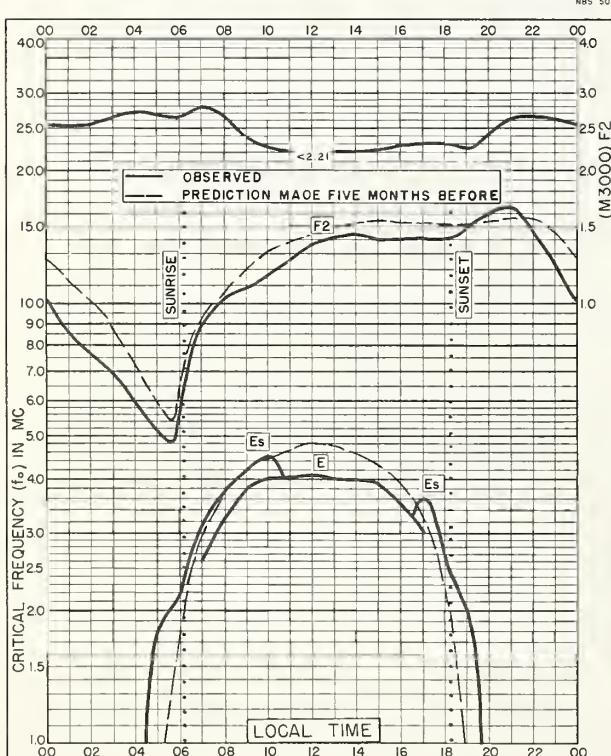


Fig. 94. LEOPOLDVILLE, BELGIAN CONGO
4.4°S, 15.2°E FEBRUARY 1957

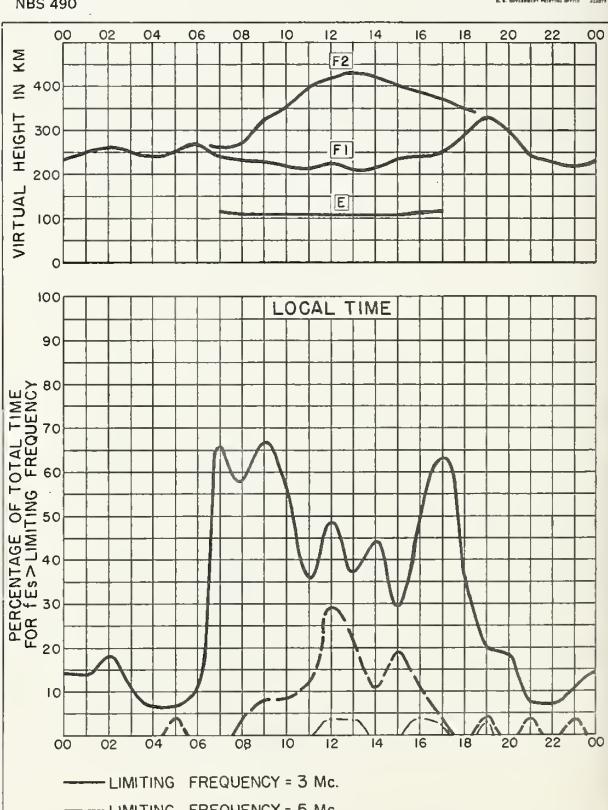
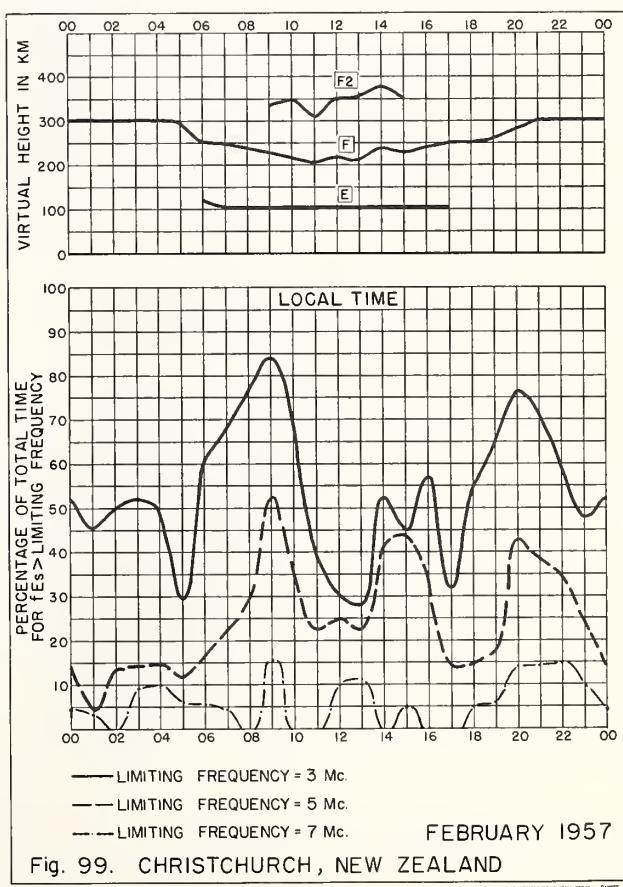
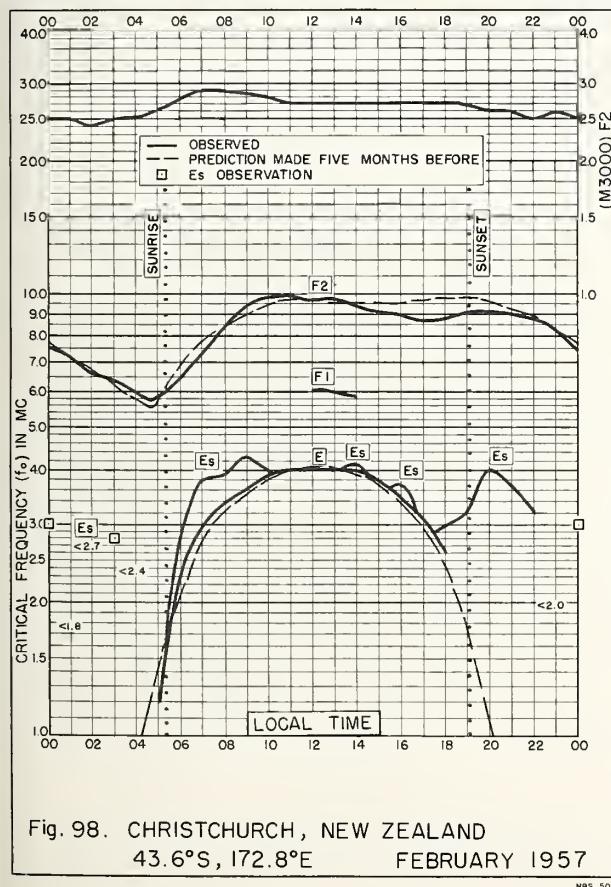
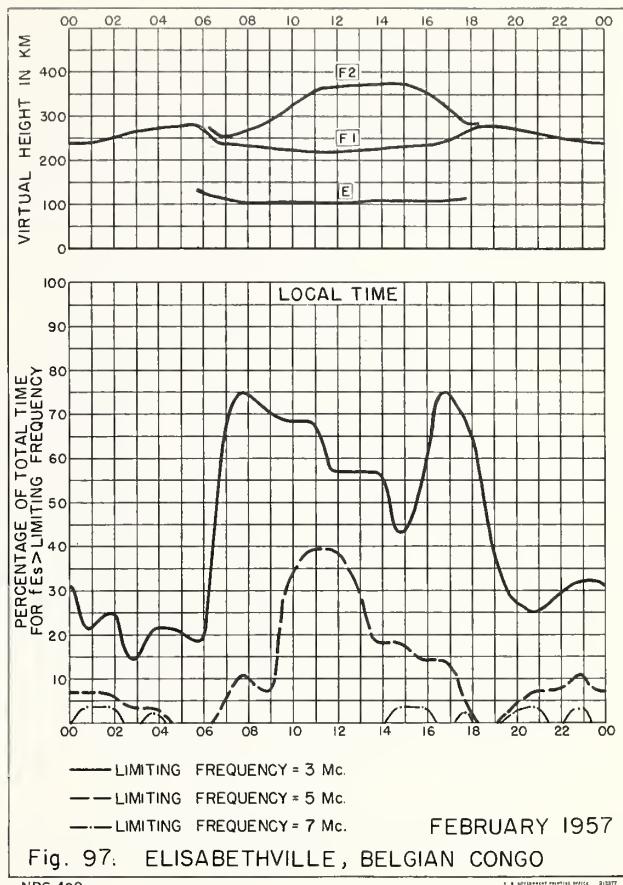
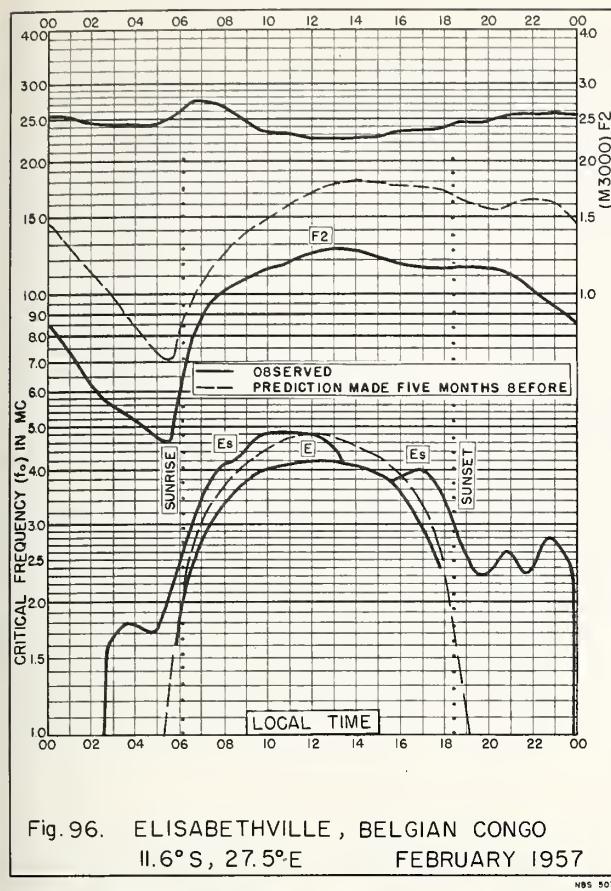


Fig. 95. LEOPOLDVILLE, BELGIAN CONGO FEBRUARY 1957



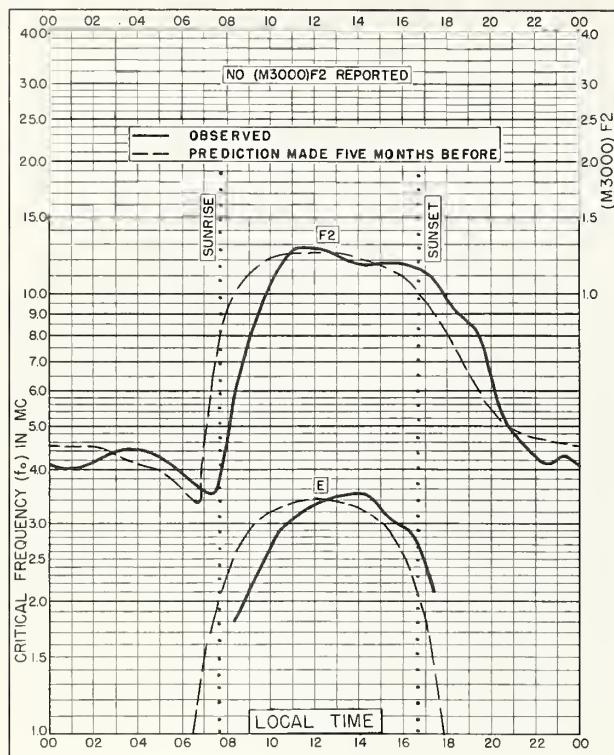


Fig. 100. SIMFEROPOL, U.S.S.R.
44.4°N, 34.0°E JANUARY 1957

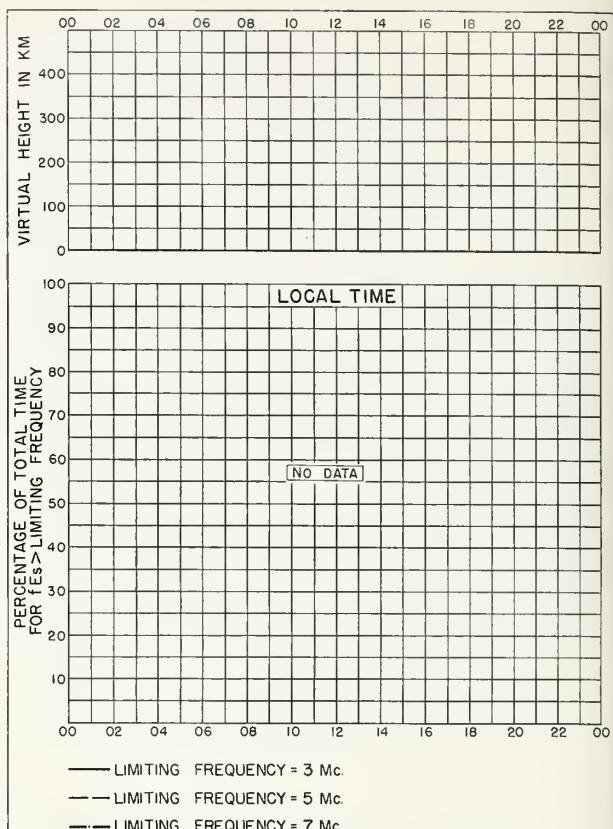


Fig. 101. SIMFEROPOL, U.S.S.R. JANUARY 1957

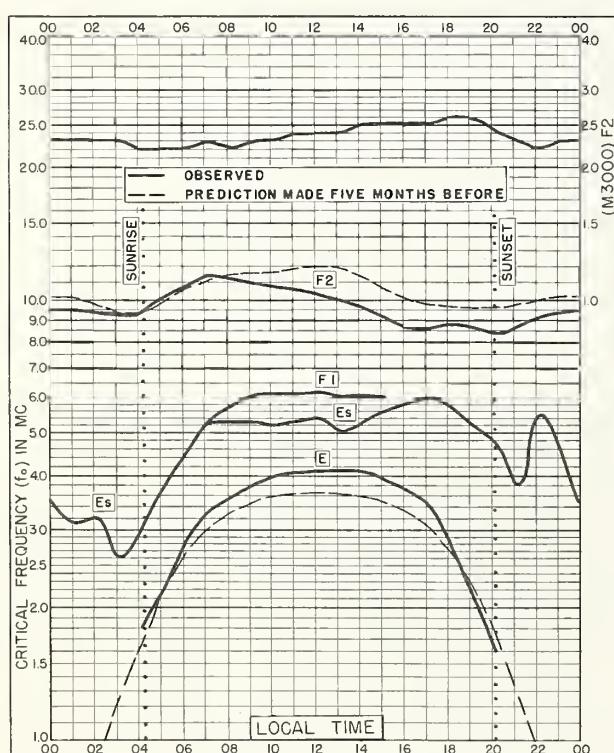


Fig. 102. FALKLAND IS.
51.7°S, 57.8°W JANUARY 1957

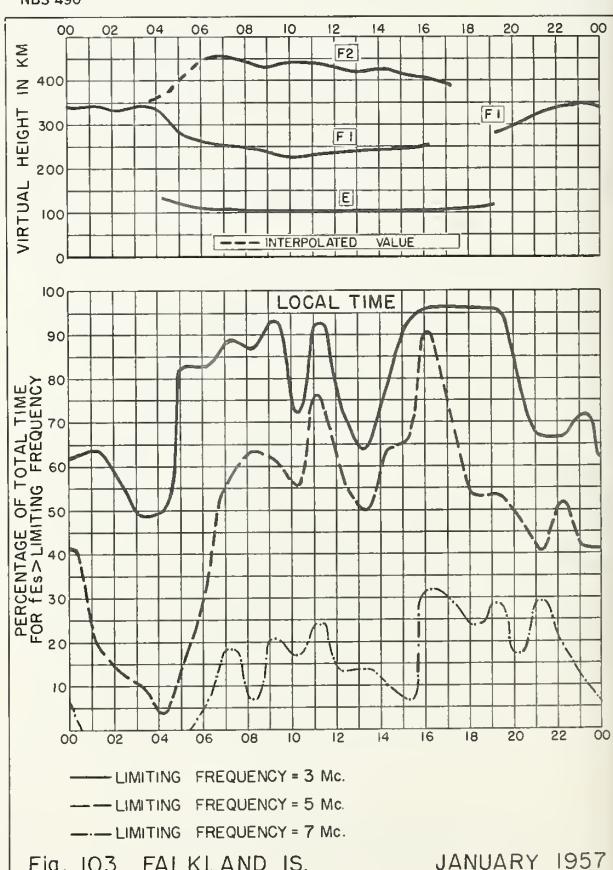


Fig. 103. FALKLAND IS. JANUARY 1957

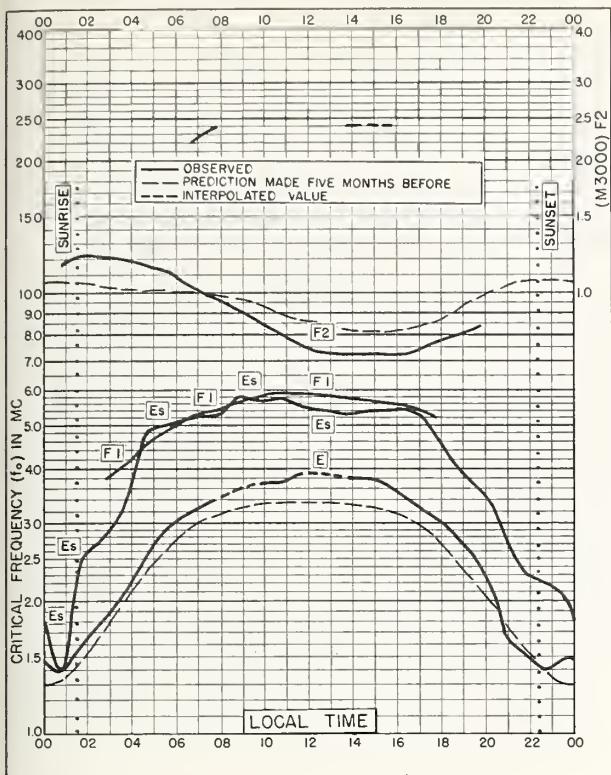


Fig. 104. PORT LOCKROY
64.8°S, 63.5°W DECEMBER 1956

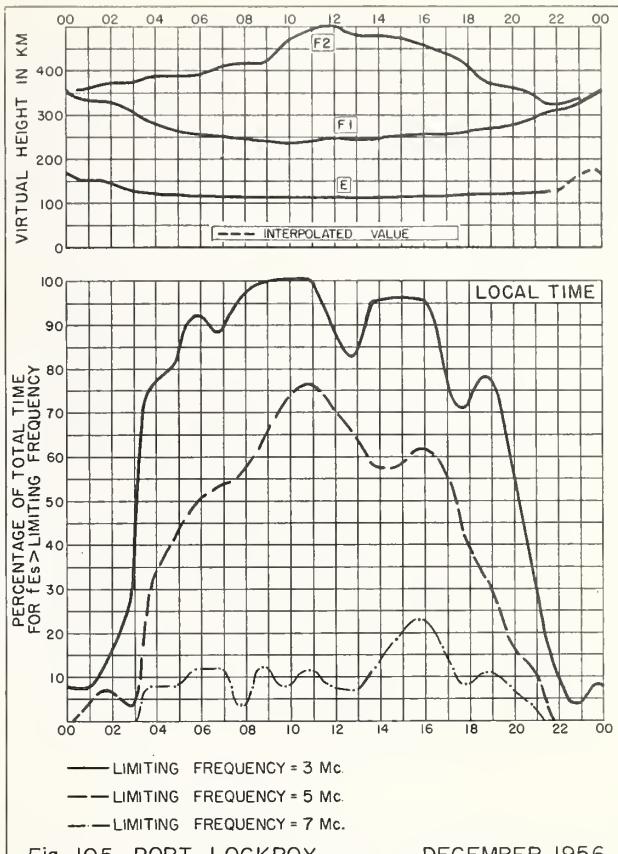


Fig. 105. PORT LOCKROY DECEMBER 1956

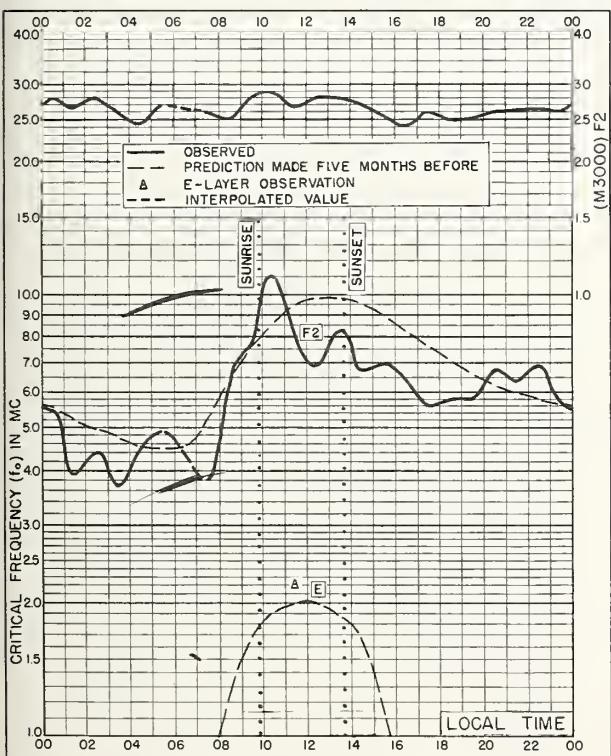


Fig. 106. GODHAVN, GREENLAND
69.2°N, 53.5°W NOVEMBER 1956

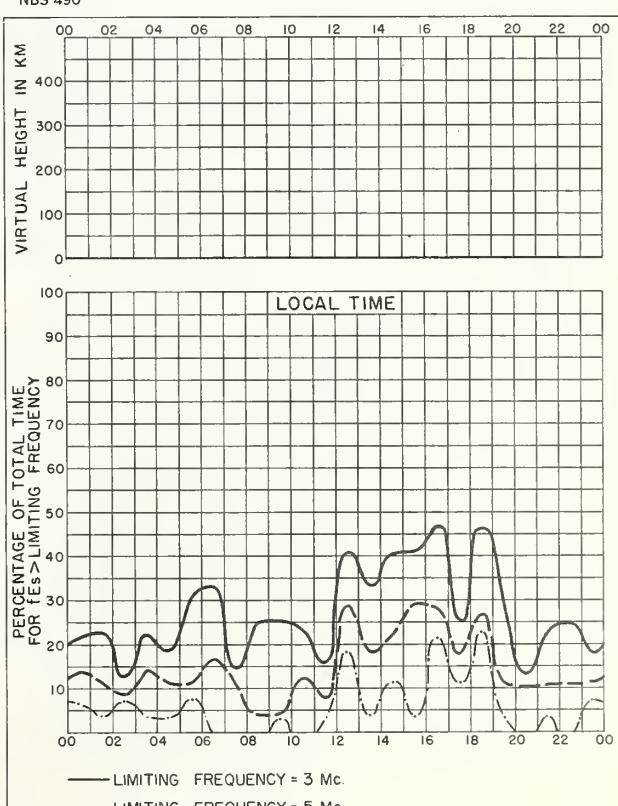


Fig. 107. GODHAVN, GREENLAND NOVEMBER 1956

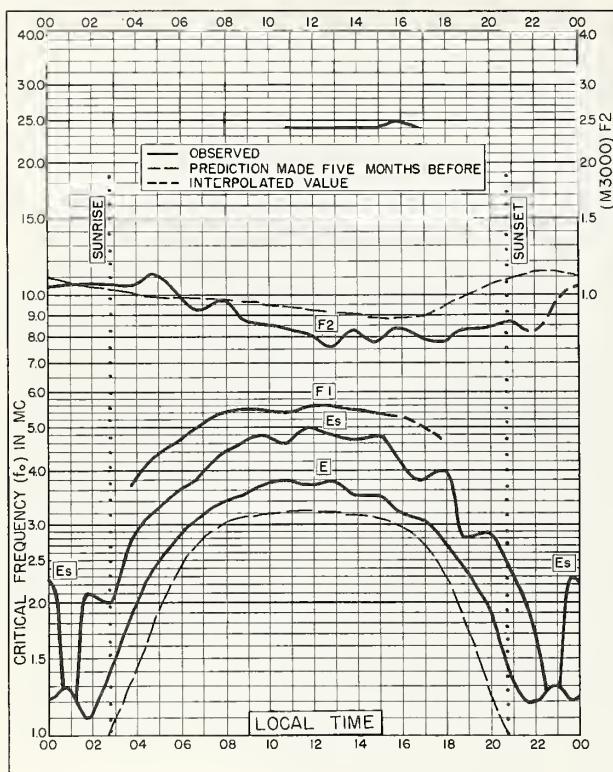


Fig. 108. PORT LOCKROY
64°.8'S, 63.5°W NOVEMBER 1956

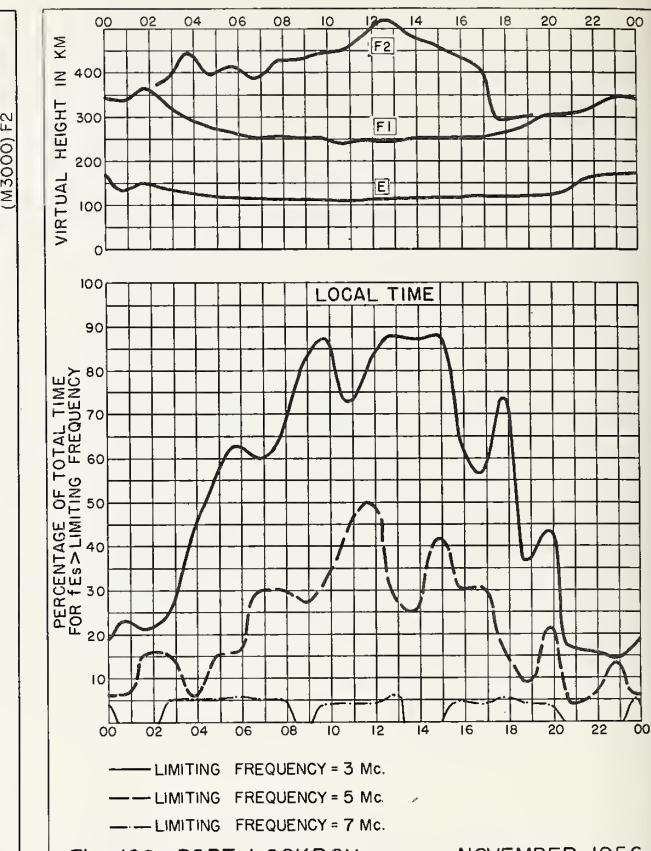


Fig. 109. PORT LOCKROY NOVEMBER 1956

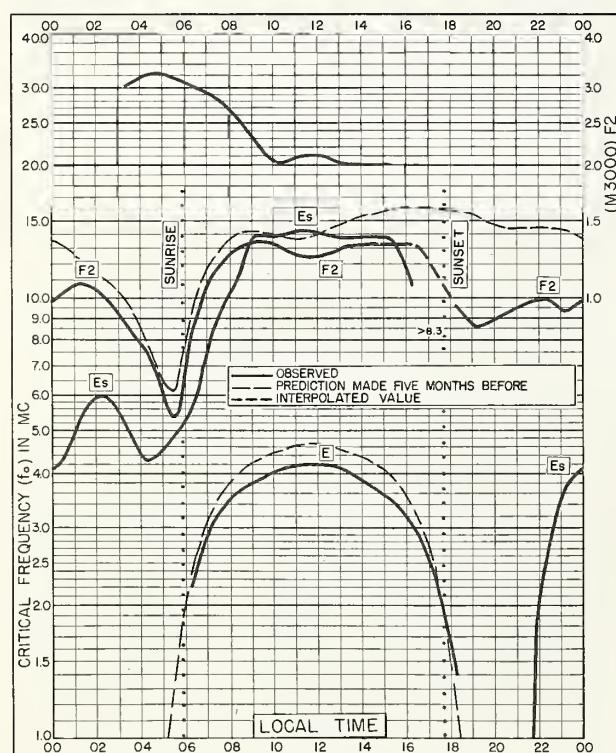


Fig. 110. IBADAN, NIGERIA
7.4°N, 4.0°E OCTOBER 1956

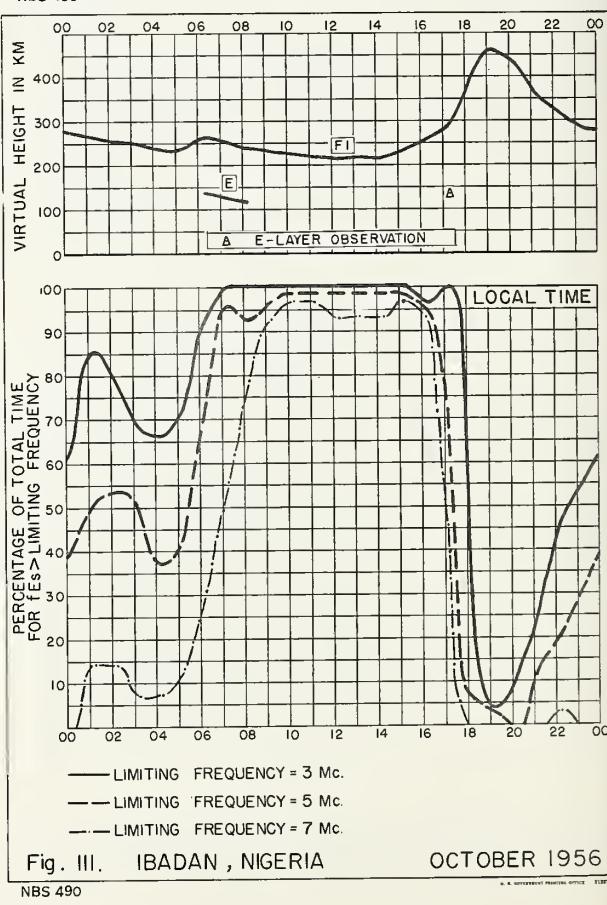


Fig. III. IBADAN, NIGERIA OCTOBER 1956

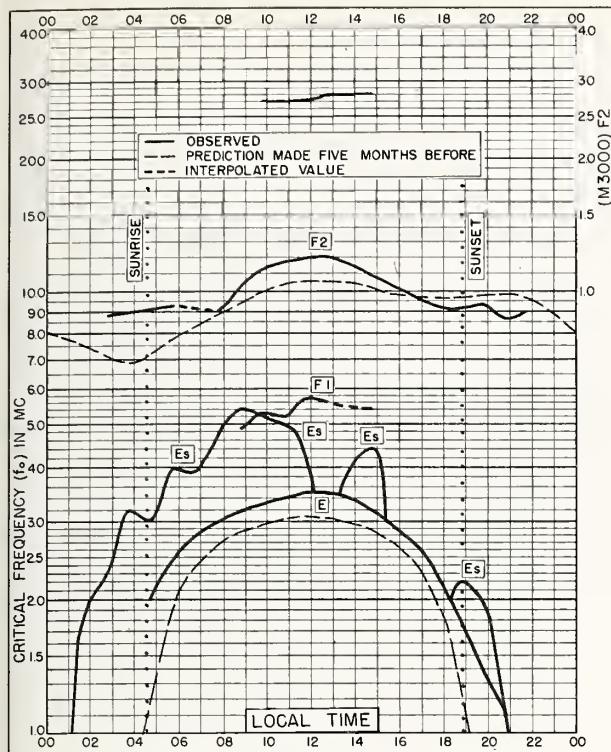


Fig. II2. PORT LOCKROY
64.8°S, 63.5°W OCTOBER 1956

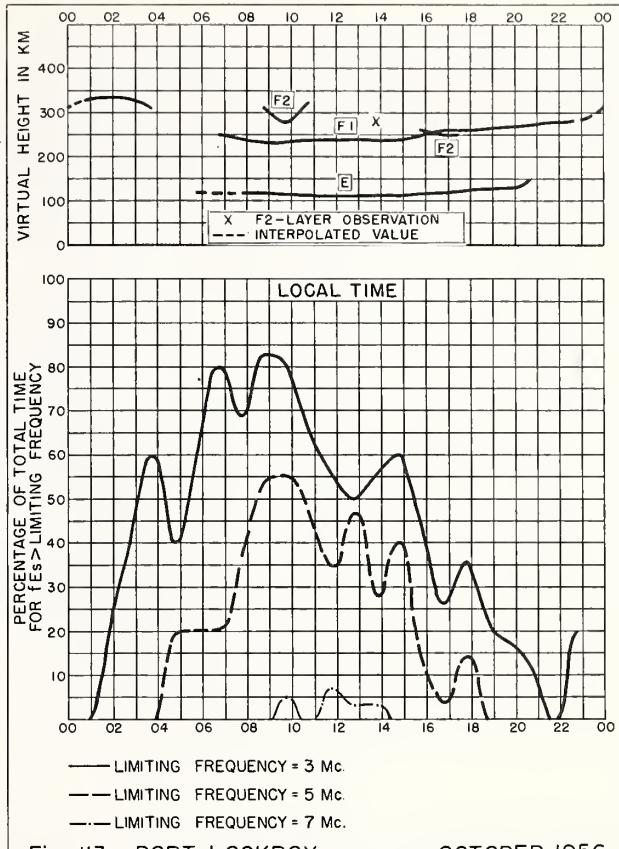


Fig. II3. PORT LOCKROY OCTOBER 1956

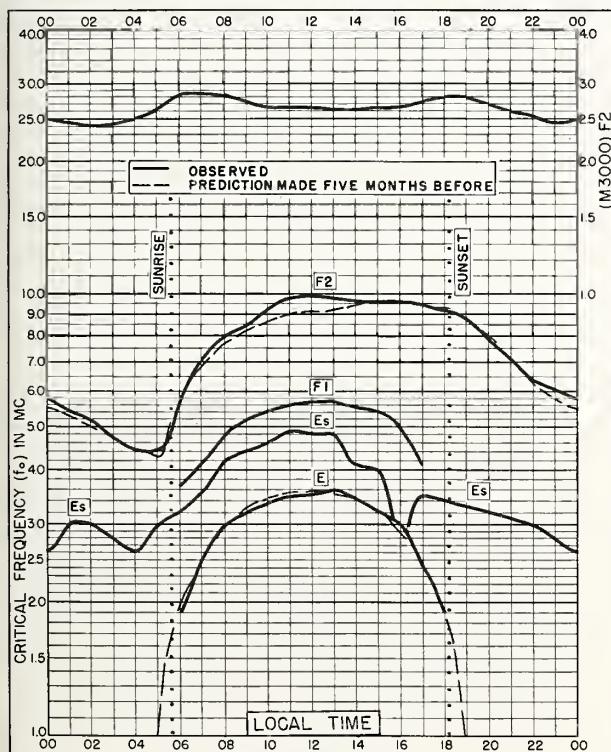


Fig. II4. SLOUGH, ENGLAND
51.5°N, 0.6°W SEPTEMBER 1956

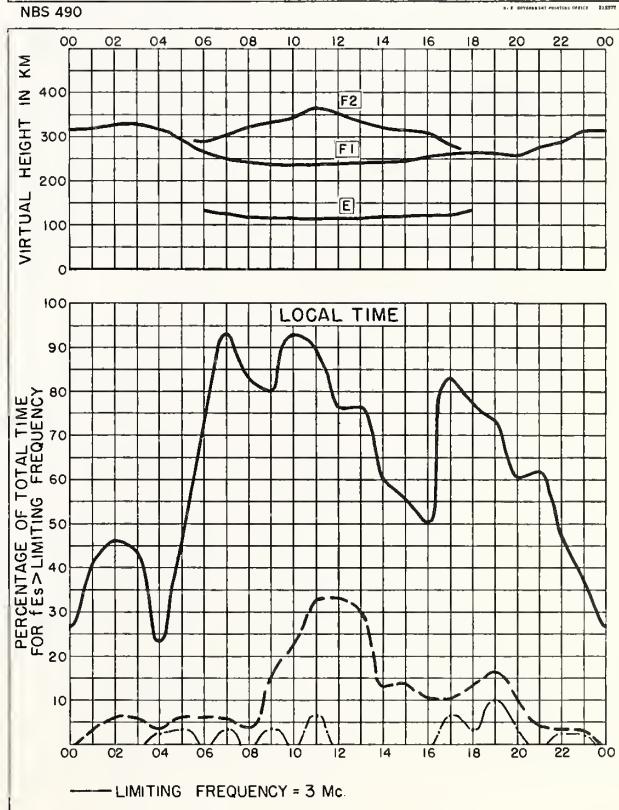


Fig. II5. SLOUGH, ENGLAND SEPTEMBER 1956

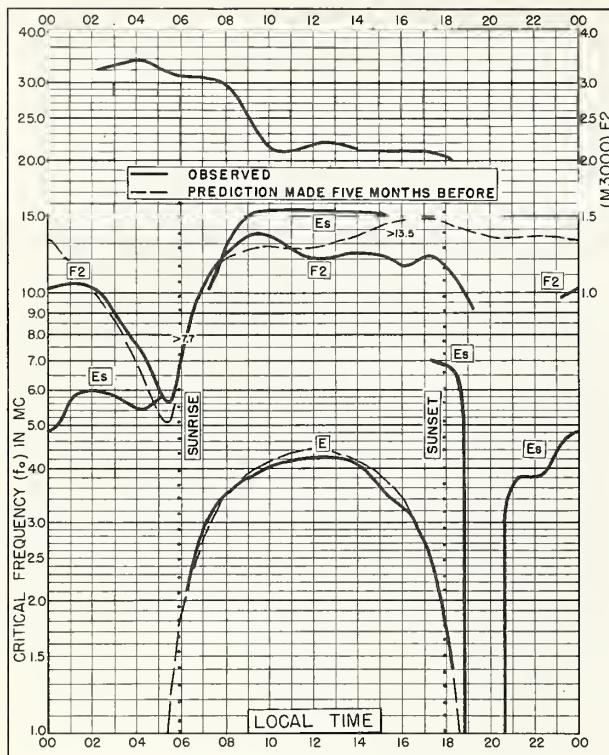


Fig. II6. IBADAN, NIGERIA
7.4°N, 4.0°E SEPTEMBER 1956

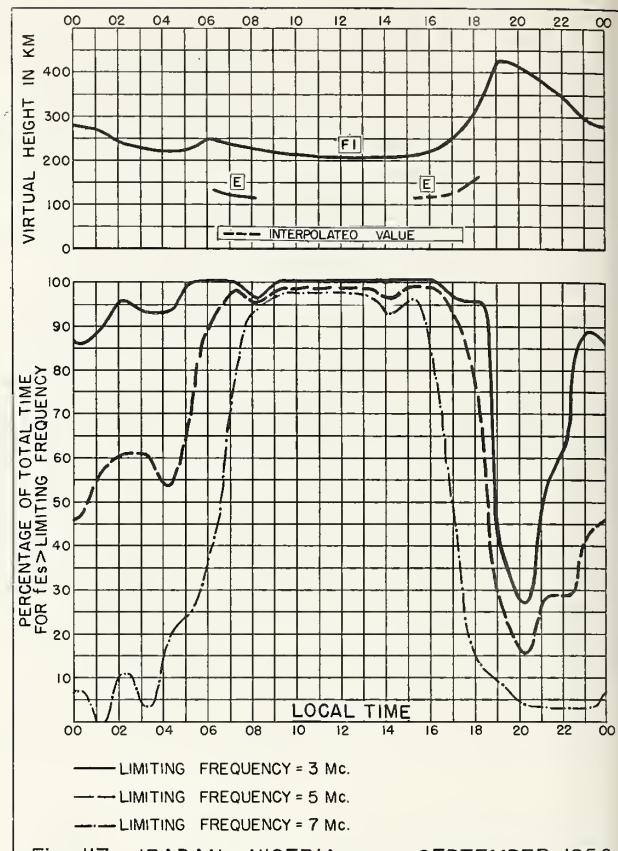


Fig. II7. IBADAN, NIGERIA SEPTEMBER 1956

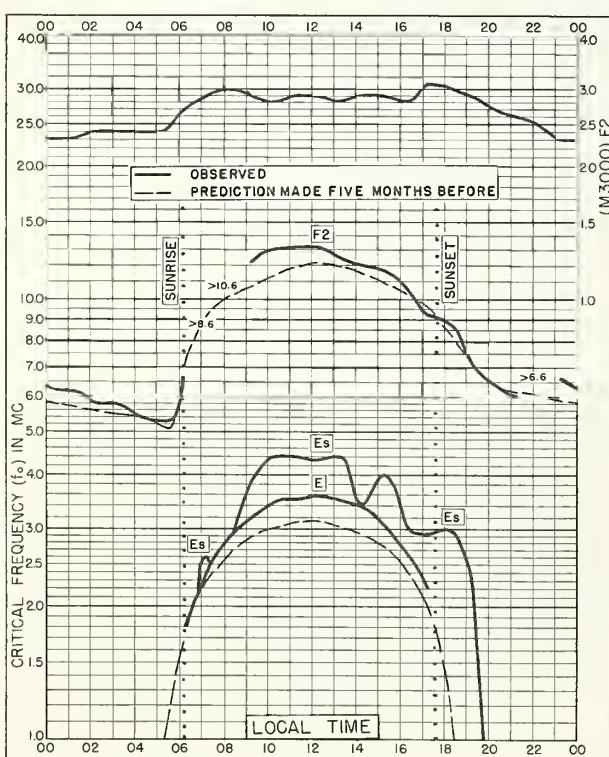


Fig. II8. FALKLAND IS.
51.7°S, 57.8°W SEPTEMBER 1956

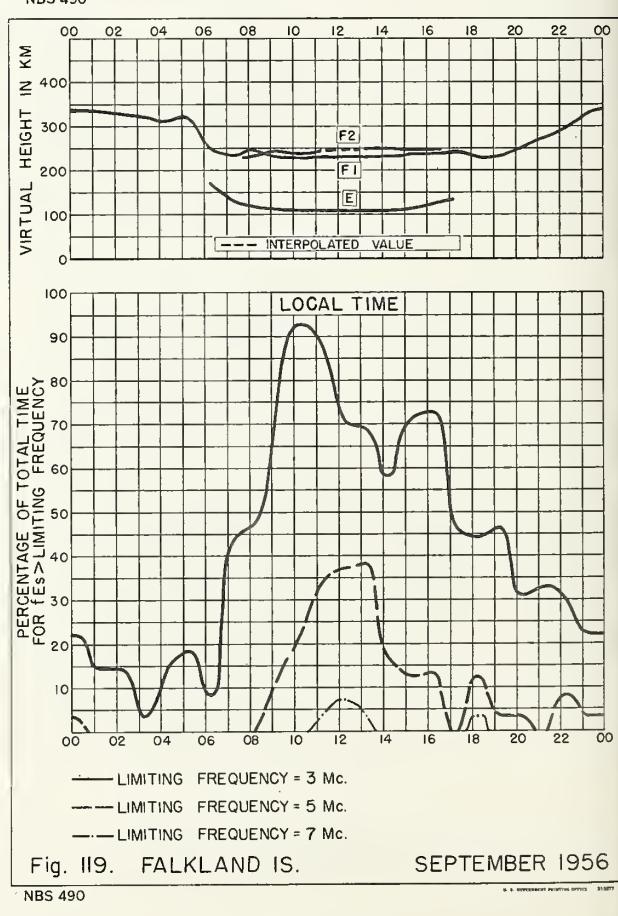


Fig. II9. FALKLAND IS. SEPTEMBER 1956

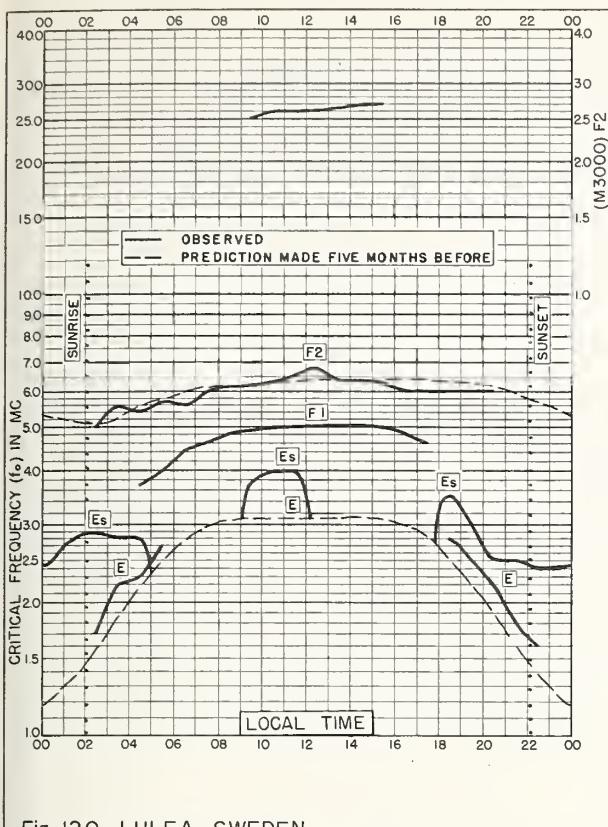


Fig. 120. LULEA, SWEDEN
65.6°N, 22.1°E

JULY 1956

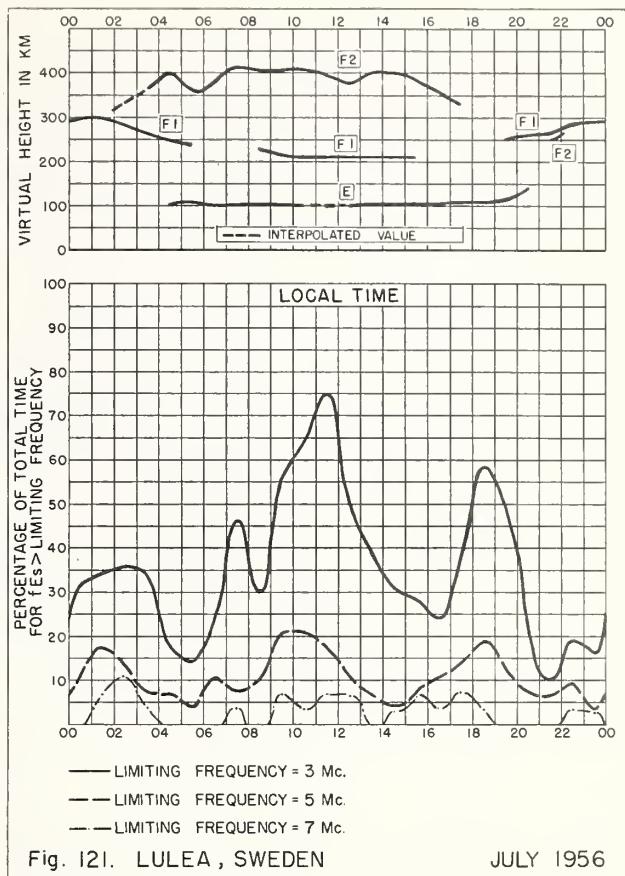


Fig. 121. LULEA, SWEDEN

JULY 1956

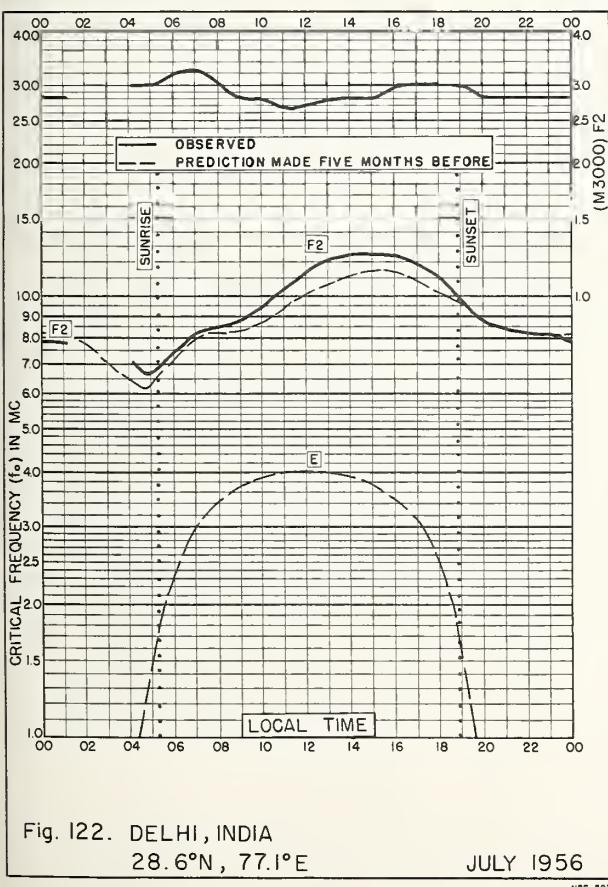


Fig. 122. DELHI, INDIA
28.6°N, 77.1°E

JULY 1956

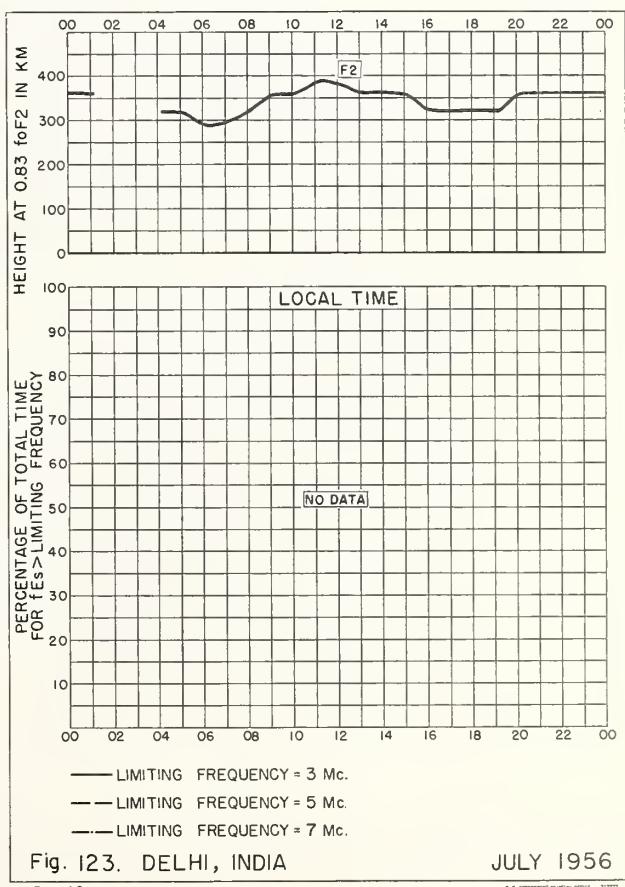
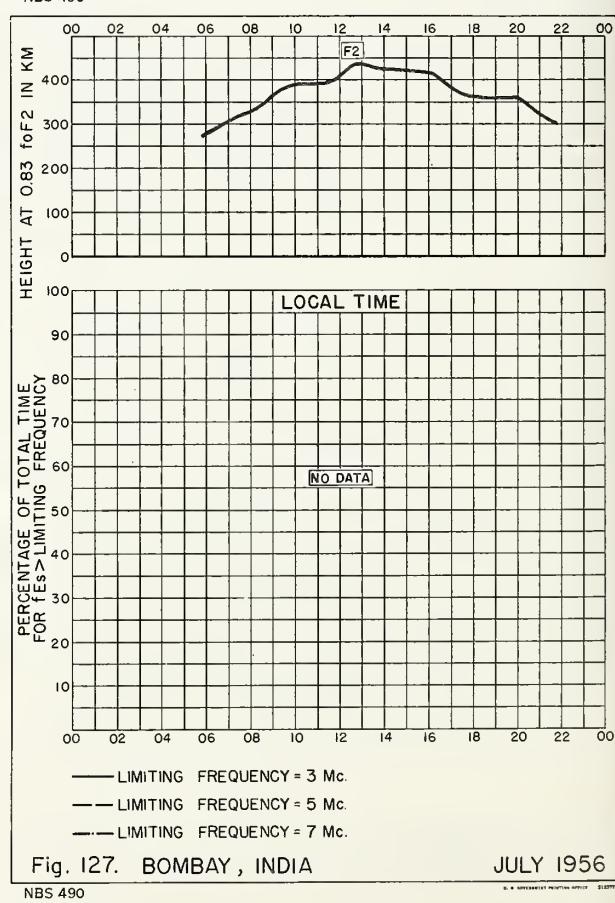
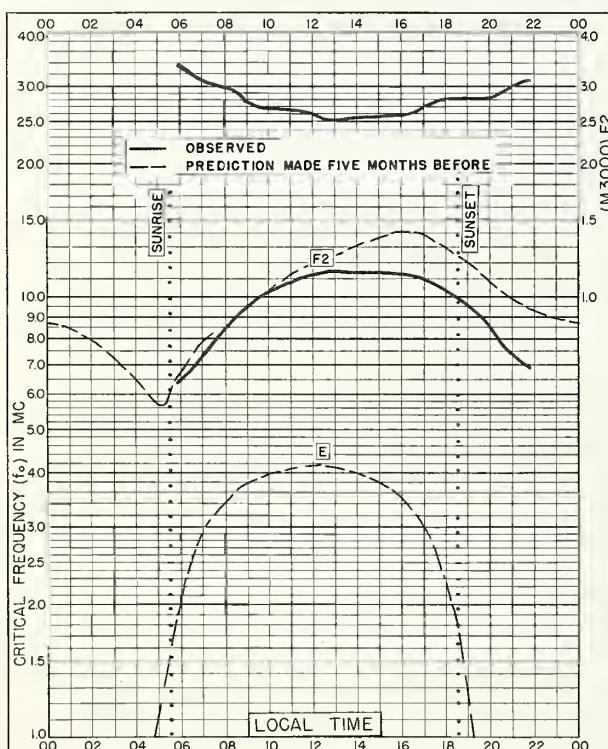
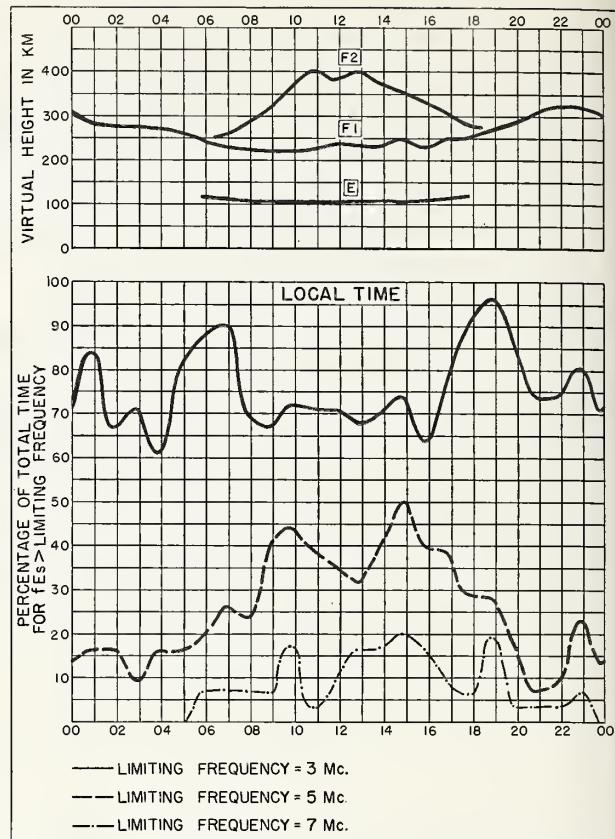
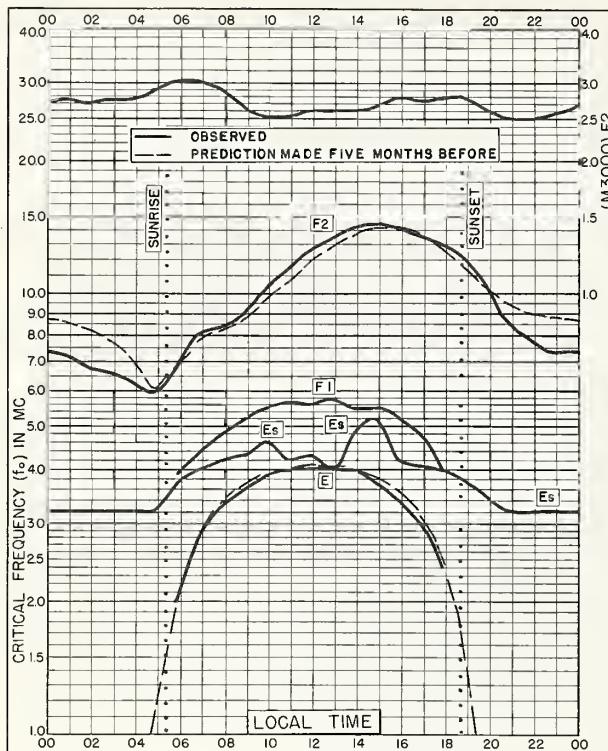


Fig. 123. DELHI, INDIA

JULY 1956



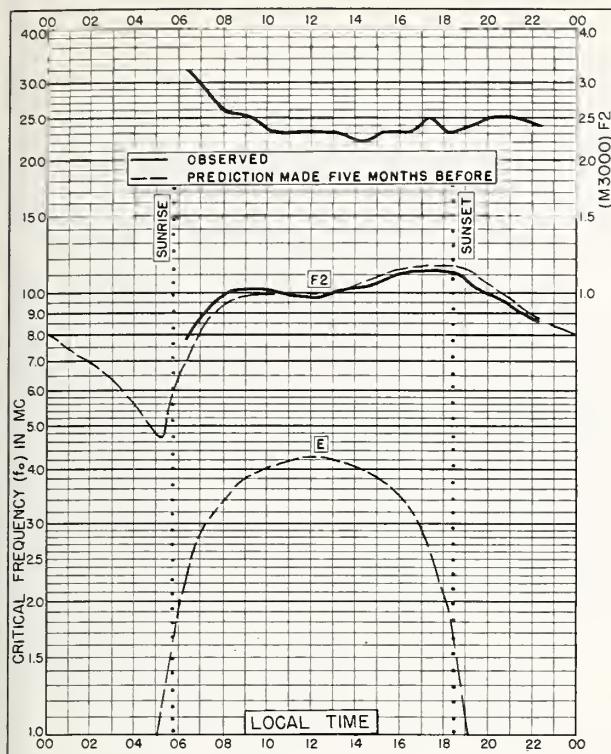


Fig. 128. MADRAS, INDIA

13.0°N, 80.2°E

JULY 1956

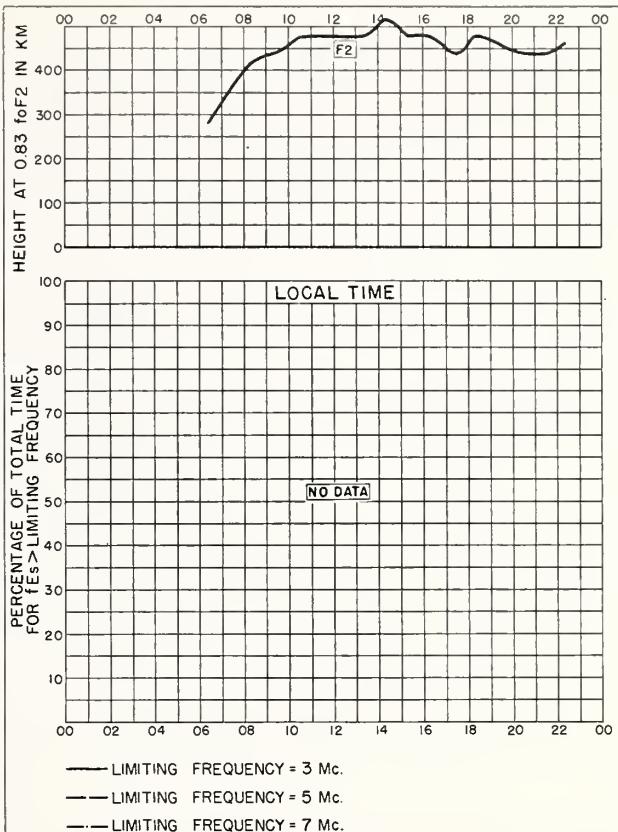


Fig. 129. MADRAS, INDIA

JULY 1956

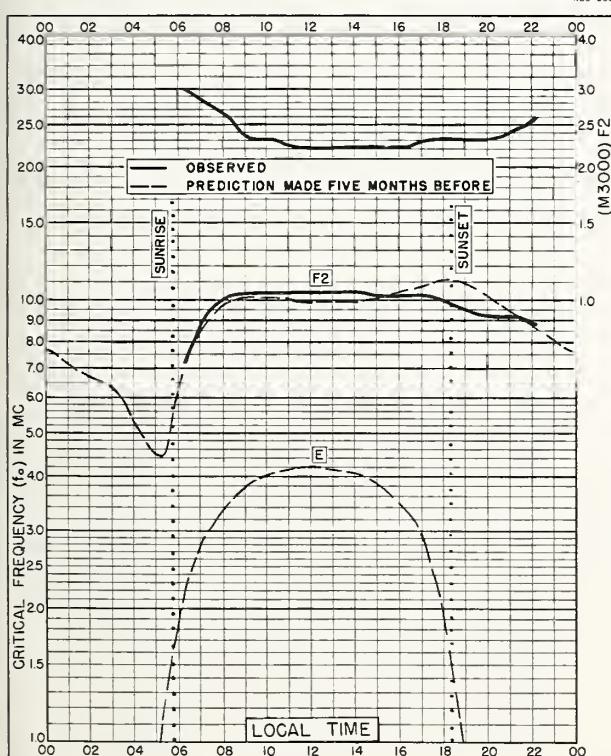


Fig. 130. TIRUCHY, INDIA

10.8°N, 78.8°E

JULY 1956

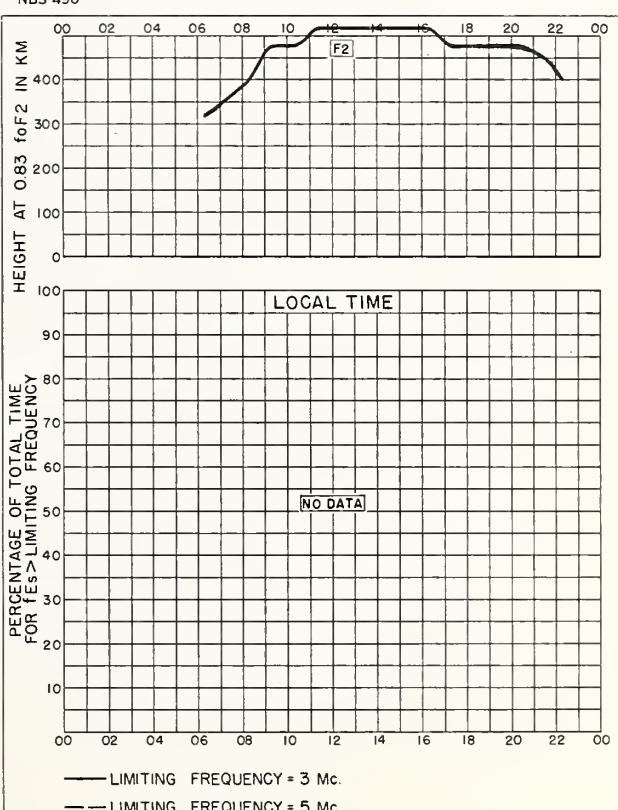
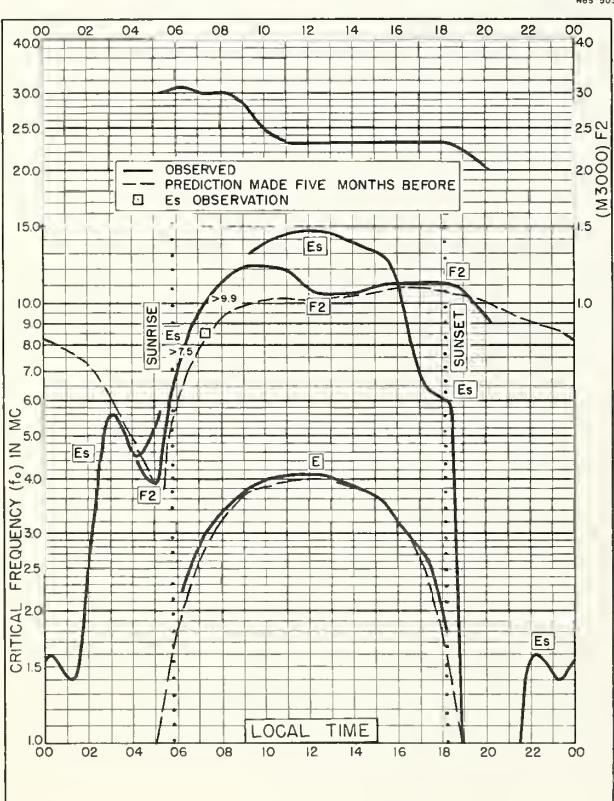
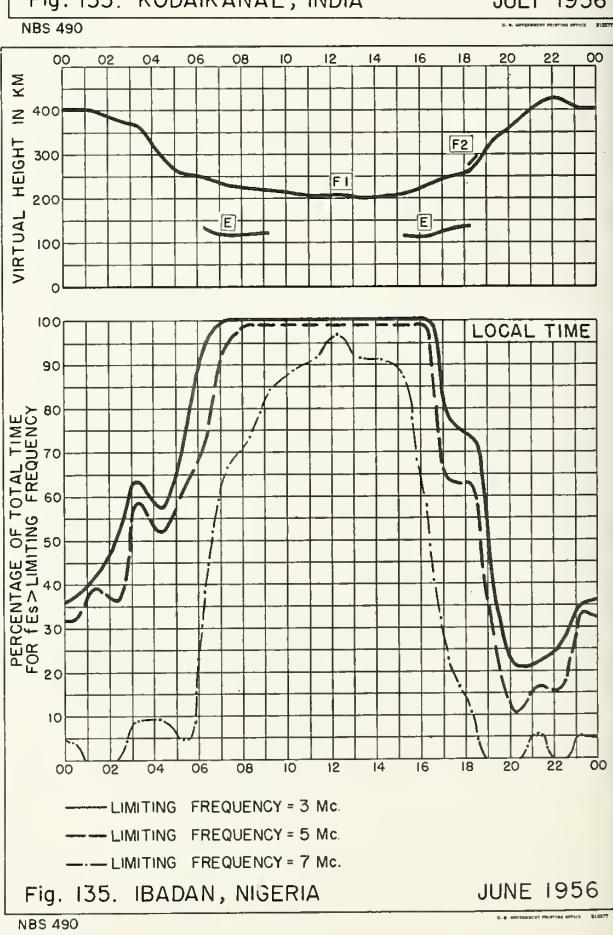
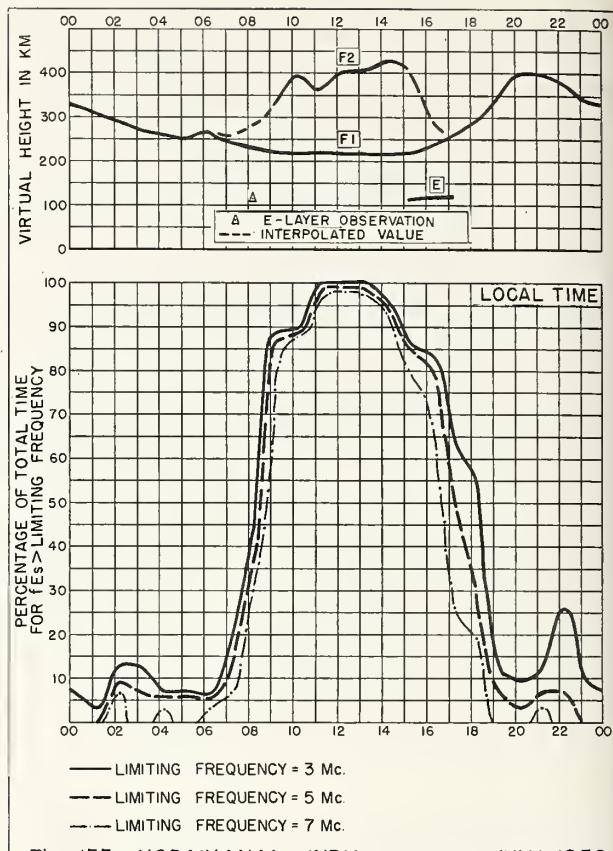
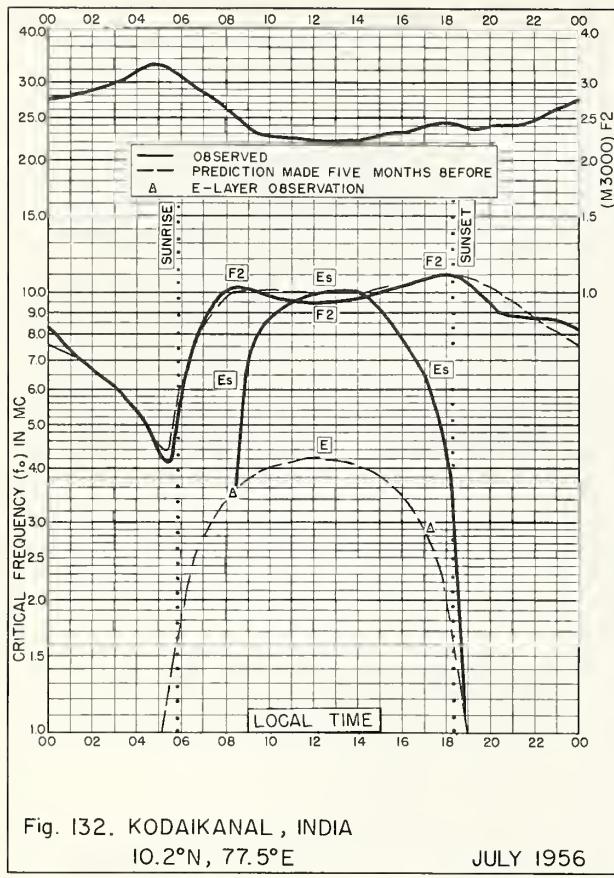


Fig. 131. TIRUCHY, INDIA

JULY 1956

NBS 490



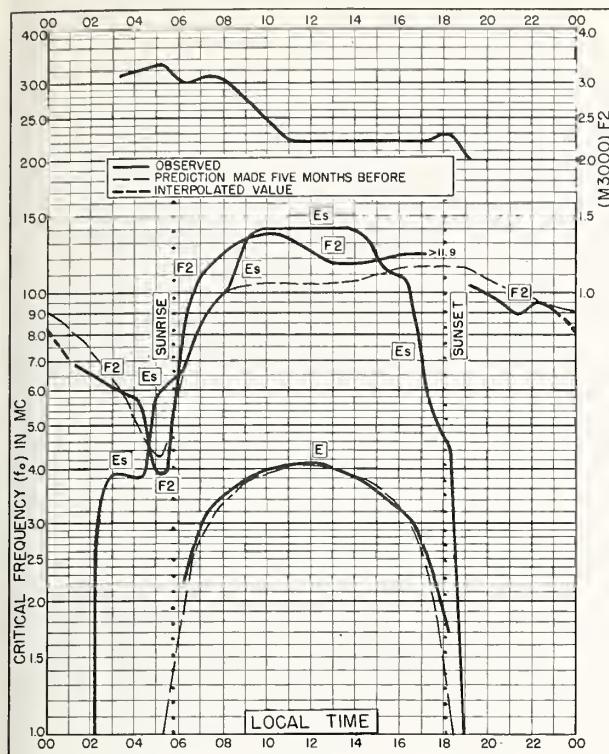


Fig. 136. IBADAN, NIGERIA
7.4°N, 4.0°E MAY 1956

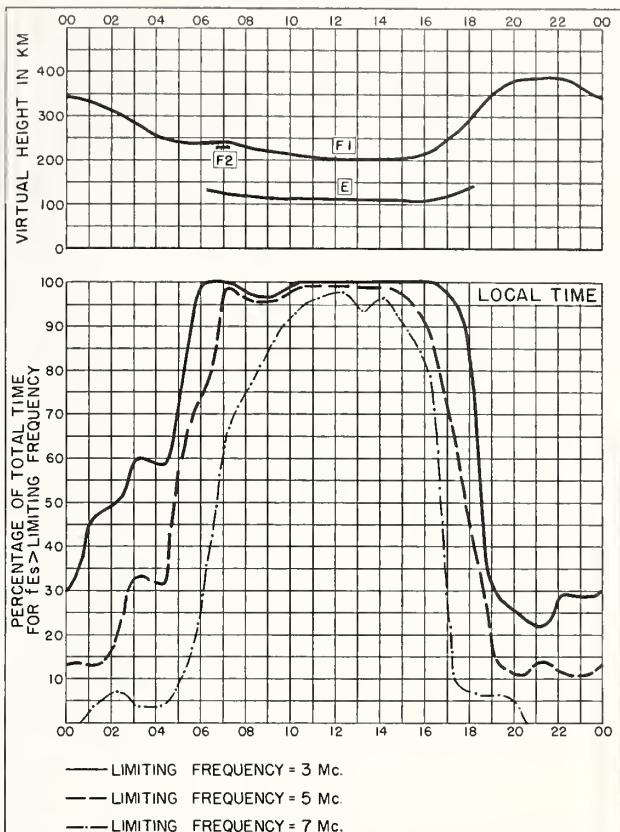


Fig. 137. IBADAN, NIGERIA MAY 1956

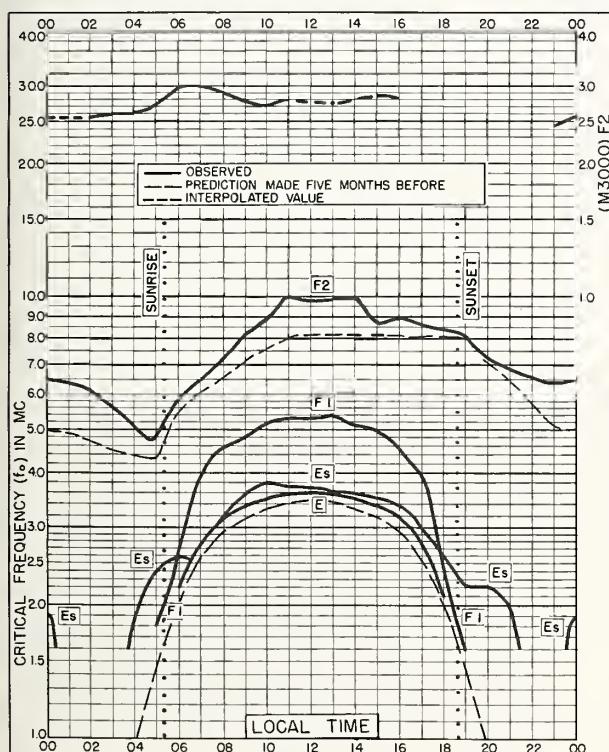


Fig. 138. POITIERS, FRANCE
46.6°N, 0.3°E APRIL 1956

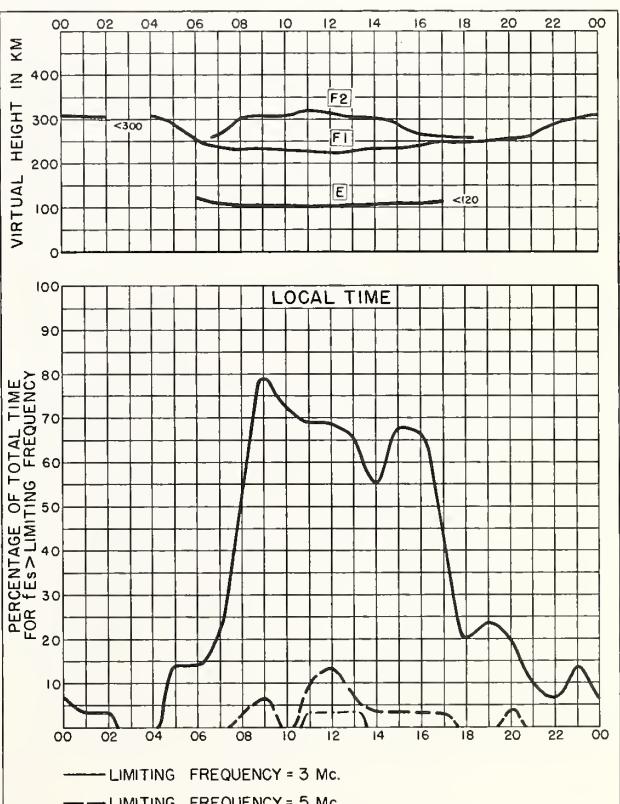
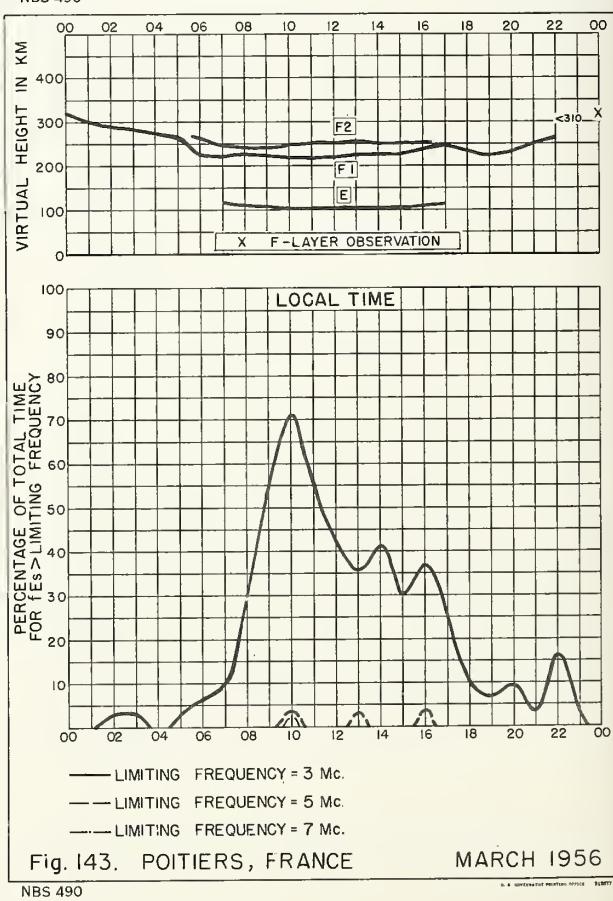
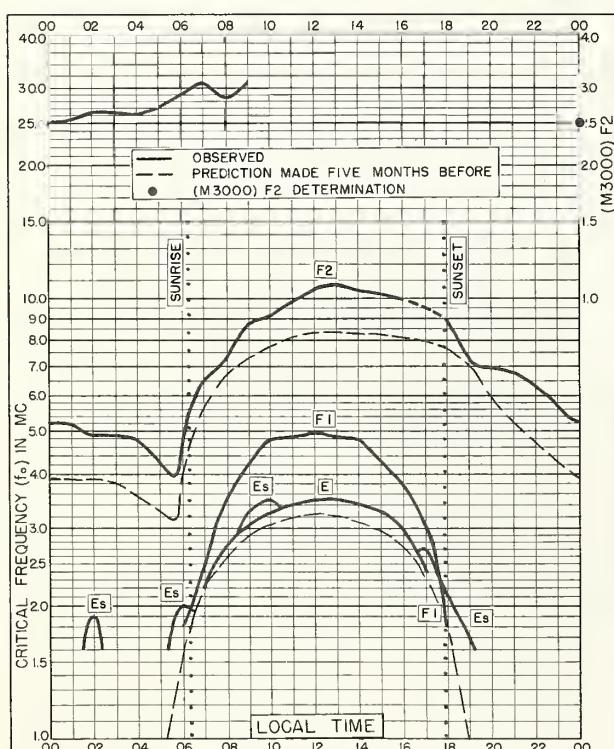
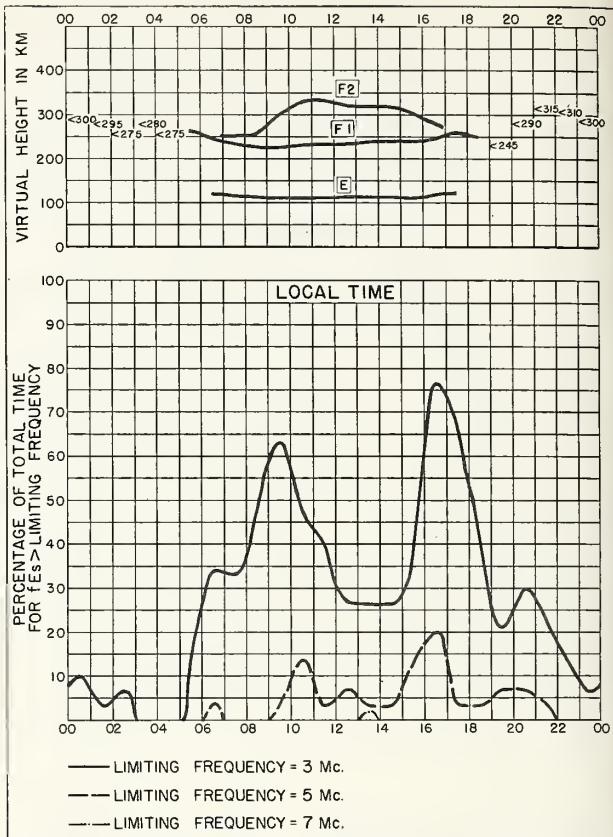
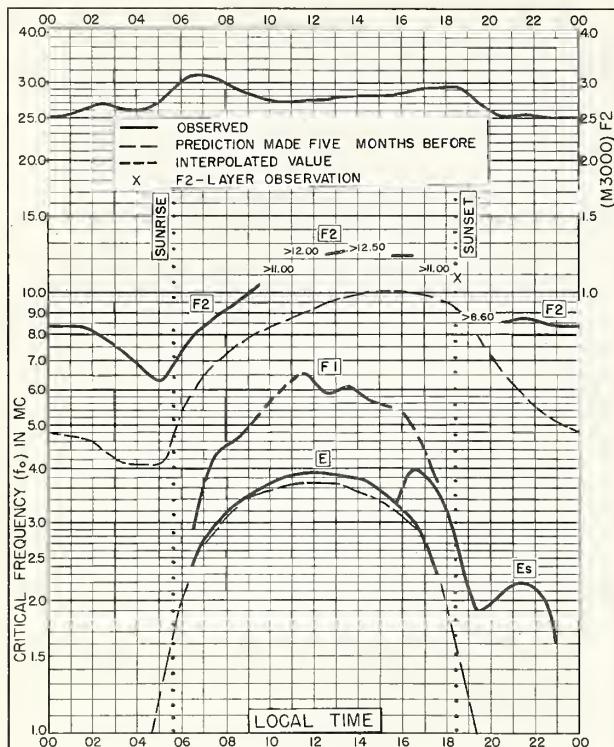


Fig. 139. POITIERS, FRANCE APRIL 1956



Index of Tables and Graphs of Ionospheric Datain CRPL-F157 (Part A)

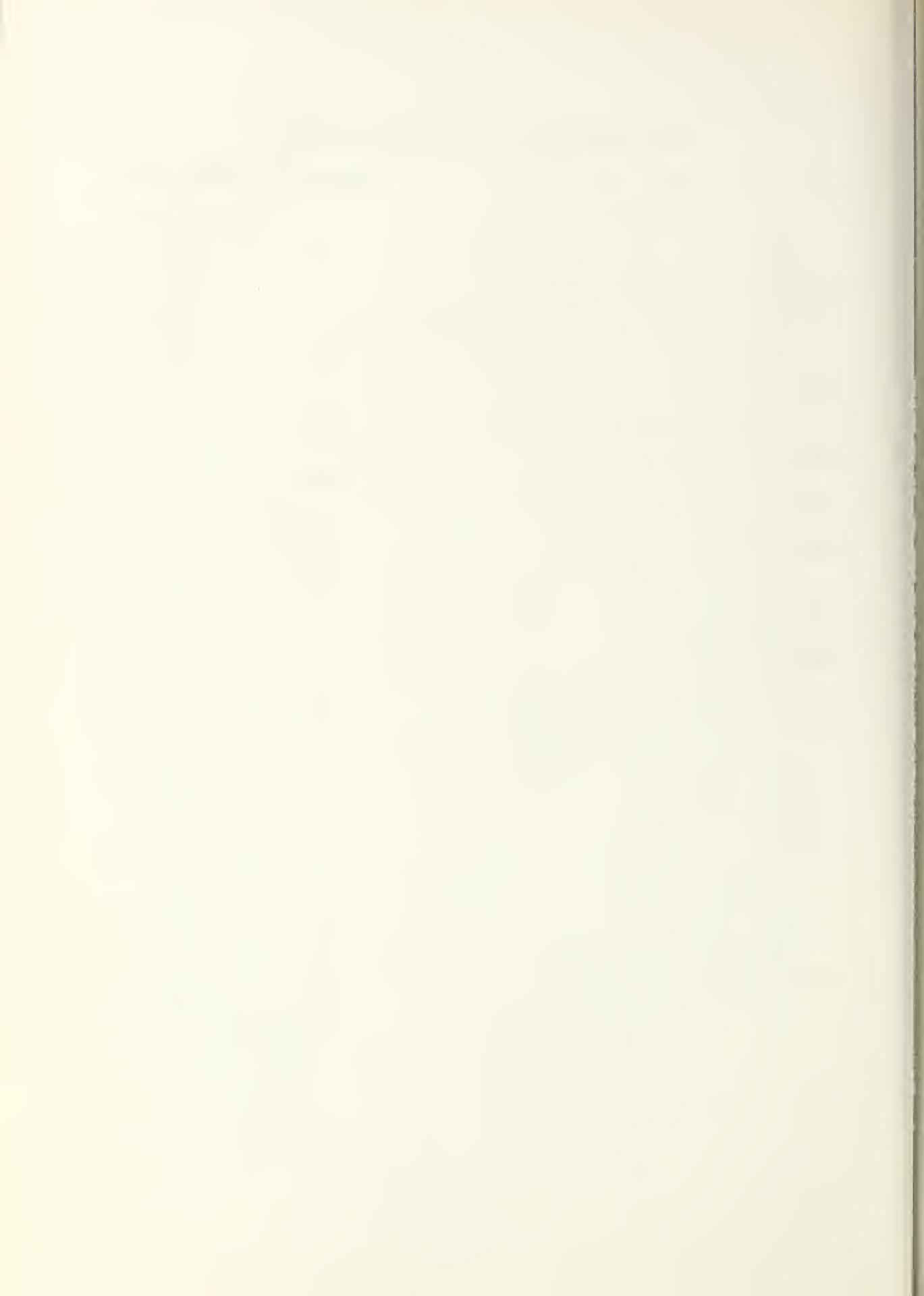
	<u>Table page</u>	<u>Figure page</u>
Ahmedabad, India		
July 1956	27	60
Akita, Japan		
April 1957.	20	39
March 1957.	23	47
Alma-Ata, U.S.S.R.		
March 1957.	23	47
Baker Lake, Canada		
April 1957.	19	35
Bombay, India		
July 1956	27	60
Buenos Aires, Argentina		
April 1957.	21	42
Capetown, Union of S. Africa		
April 1957.	21	42
Casablanca, Morocco		
April 1956.	28	64
Chita, U.S.S.R.		
March 1957.	22	45
Christchurch, New Zealand		
February 1957	25	53
Delhi, India		
July 1956	27	59
Elisabethville, Belgian Congo		
March 1957.	23	49
February 1957	25	53
Fairbanks, Alaska		
June 1957	17	29
May 1957.	18	32
Falkland Is.		
January 1957.	25	54
September 1956.	26	58
Formosa, China		
July 1957	17	29
April 1957.	20	40
Ft. Monmouth, New Jersey		
June 1957	17	31
Godhavn, Greenland		
November 1956	25	55
Huancayo, Peru		
March 1957.	24	50

Index (CRPL-F157 (Part A), continued)

	<u>Table page</u>	<u>Figure page</u>
Ibadan, Nigeria		
October 1956	26	56
September 1956	26	58
June 1956.	28	62
May 1956	28	63
Johannesburg, Union of S. Africa		
April 1957	21	41
March 1957	24	51
Kodaikanal, India		
July 1956.	28	62
Leningrad, U.S.S.R.		
March 1957	21	43
Leopoldville, Belgian Congo		
March 1957	23	49
February 1957.	24	52
Lindau/Harz, Germany		
April 1957	19	36
Lulea, Sweden		
July 1956	27	59
Lycksele, Sweden		
April 1957	19	35
Madras, India		
July 1956	27	61
Moscow, U.S.S.R.		
March 1957	22	44
Nairobi, Kenya		
April 1957	21	41
Okinawa I.		
June 1957.	17	31
Oslo, Norway		
April 1957	19	36
Ottawa, Canada		
April 1957	20	38
Poitiers, France		
April 1956	28	63
March 1956	28	64
Port Lockroy		
December 1956.	25	55
November 1956.	26	56
October 1956	26	57
Rarotonga I.		
March 1957	24	50
Reykjavik, Iceland		
June 1957.	17	30
May 1957	18	33

Index (CRPL-F157 (Part A), concluded)

	<u>Table page</u>	<u>Figure page</u>
St. Johns, Newfoundland		
June 1957	17	30
May 1957	18	33
Schwarzenburg, Switzerland		
April 1957	19	37
Simferopol, U.S.S.R.		
March 1957	22	46
January 1957	25	54
Slough, England		
February 1957	24	52
September 1956	26	57
Thule, Greenland		
May 1957	18	32
Tiruchi, India		
July 1956	27	61
Tokyo, Japan		
April 1957	20	39
March 1957	23	48
Tomsk, U.S.S.R.		
March 1957	22	44
Tromso, Norway		
April 1957	18	34
Wakkanaï, Japan		
April 1957	20	38
March 1957	22	46
Watheroo, W. Australia		
May 1957	18	34
Winnipeg, Canada		
April 1957	19	37
Yakutsk, U.S.S.R.		
March 1957	21	43
February 1957	24	51
Yamagawa, Japan		
April 1957	20	40
March 1957	23	48
Yuzhno-Sakhalinsk, U.S.S.R.		
March 1957	22	45



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