Central Radio Propagation Laboratory

IONOSPHERIC PREDICTIONS

for September 1965

IMPORTANT NOTICE

SEE INTRODUCTION PAGE

TB 11–499–30/TO 31–3–28

U.S. DEPARTMENT of COMMERCE
National Bureau of Standards
Number 30/Issued June 1965

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

NATIONAL BUREAU OF STANDARDS
A. V. Astin, Director

Central Radio Propagation Laboratory

Ionospheric Predictions

for September 1965

Number 30

Issued

June 1965

[Formerly "Basic Radio Propagation Predictions," CRPL Series D.]

The CRPL Ionospheric Predictions are issued monthly as an aid in determining the best sky-wave frequencies over any transmission path, at any time of day, for average conditions for the month. Issued three months in advance, each issue provides tables of numerical coefficients that define the functions describing the predicted worldwide distribution of foF2 and M(3000)F2 and maps for each even hour of universal time of MUF(Zero)F2 and MUF(4000)F2.

NOTE: Department of Defense personnel see back cover.

Use of funds for printing this publication approved by the Director of the Bureau of the Budget (June 19, 1961).

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Price 25 cents.

Annual subscription (12 issues) $2.50 (75 cents additional for foreign mailing).

National Bureau of Standards

The National Bureau of Standards serves as a principal focal point within the Federal Government for assuring maximum application of the physical and engineering sciences to the advancement of technology in industry and commerce. The Bureau is organized into four institutes as follows: The Institute for Basic Standards provides the central basis within the United States for a complete and consistent system of physical measurement; its responsibilities include administration of the National Standard Reference Data System. The Institute for Materials Research conducts a broad range of programs to provide a better understanding of the basic properties and behavior of materials and to make available reliable quantitative data on their performance; it distributes a wide variety of carefully characterized reference materials to science and industry. The Institute for Applied Technology develops criteria for the evaluation of the performance of technological products and services, provides specialized information services to meet the needs of industry, and studies problems of technological innovation. The fourth institute, the Central Radio Propagation Laboratory, is described below.

The Central Radio Propagation Laboratory

The Central Radio Propagation Laboratory is the central agency of the Federal Government for obtaining and disseminating information on the propagation of electromagnetic waves, on the electromagnetic properties of man's environment, on the nature of electromagnetic noise and interference, and on methods for the more efficient use of the electromagnetic spectrum for telecommunication purposes. In carrying out these responsibilities, the Central Radio Propagation Laboratory:

1. Acts as the primary agency of the Federal Government for the conduct of *basic and applied research* in these fields;

2. *Acts as the central repository* for data, reports, and information in these fields;

3. *Furnishes advisory and consultative services* in these fields to industry and to other government and non-government organizations;

4. *Performs scientific liaison* with other countries to advance knowledge in these fields, including that liaison required by international responsibilities and agreements;

5. *Prepares and issues predictions* of electromagnetic wave propagation conditions, and warnings of disturbances in those conditions.

NOTICE

TRIAL PERIOD FOR POLAR MAPS EXTENDED

The trial period for the polar prediction maps has been extended six months in order to permit more time to evaluate their utility. Some favorable comments have been received, but the response has been insufficient to justify the expense and effort required to publish them. Therefore, please send your comments as soon as possible if you wish these to continue.

ANNOUNCEMENT OF PUBLICATION OF NBS MONOGRAPH 80

IONOSPHERIC RADIO PROPAGATION

By Kenneth Davies of the Central Radio Propagation Laboratory, Boulder, Colorado.

This new textbook provides an authoritative and comprehensive digest of current information on the ionosphere. Emphasis is placed on the physics of the ionosphere and theoretical developments required for an understanding of ionospheric radio propagation.

Orders, accompanied by $2.75 remittance, should be sent to: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402.

INTRODUCTION

Tables 1 and 2, presenting predicted coefficients defining the numerical map functions for the worldwide variation of foF2 and M(3000)F2, provide the basic prediction or F2-layer propagation. With additional auxiliary information, these coefficients may be used as input data for electronic computer programs solving specific high-frequency propagation problems. The graphical maps, which are derived from the basic predictions, are provided for those unable to make use of an electronic computer. Instructions for use of these maps, figures 1 through 24, may be found in National Bureau of Standards Handbook 90, "Handbook for CRPL Ionospheric Predictions Based on Numerical Methods of Mapping," which also includes required additional data, nomographs and graphical aids, and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington D.C., 20402, price 40 cents. The predicted sunspot number used for this month is shown in table A, which also lists previous observed and predicted Zurich smoothed relative sunspot numbers. Figure A shows the recent trend of solar activity, with both predicted and observed Zurich smoothed relative sunspot numbers.

The basic numerical mapping equations, their interpretation, and methods of using numerical maps are described in papers by W. B. Jones and R. M Gallet, "The Representation of Diurnal and Geographic Variations of Ionospheric Data by Numerical Mapping," vol. 66D, No. 4, July-Aug. 1962, pages 419-438, and "Methods for Applying Numerical Maps of Ionospheric Characteristics," vol. 66D, No. 6, Nov.-Dec. 1962, pages 649-662, both in the Journal of Research of the National Bureau of Standards, Section D. Radio Propagation. The predicted numerical map coefficients of tables 1 and 2 may be purchased in the form of a tested set of punched cards. Write to the Prediction Services Section, Central Radio Propagation Laboratory, National Bureau of Standards, Boulder, Colorado, 80301, to arrange for purchase of the punched cards, and for information and advice on the application of computer methods and numerical prediction maps to specific propagation problems.

Members of the U.S. Army, Navy, or Air Force desiring Handbook 90 and the monthly issues of Ionospheric Predictions should send requests to the proper service address; for Navy: The Director, Naval Communications, Department of the Navy, Washington, D.C., 20350; for Air Force: Directorate of Command Control and Communications, Headquarters, United States Air Force, Washington, D.C., 20330. ATTN: AFOCCAA. Army personnel should requisition these through normal publication channels, and should refer to Handbook 90 as TM 11–499 and to the monthly ionospheric predictions as TB 11–499–(   ), with the serial number of the desired monthly predictions booklet inserted in the parenthesis. (For example, for Ionospheric Predictions Number 30, issued June 1965 and containing predictions for September 1965, the Army number would be TB 11–499–(30).)

Information on the physics of the ionosphere and the theory of radio wave propagation, including such problems as absorption, field intensity, etc., may be found in National Bureau of Standards Monograph 80, "Ionospheric Radio Propagation," by Kenneth Davies, which may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402, price $2.75. Additional information on radio noise may be found in C.C.I.R. Report Number 322, "Revision of Atmospheric Noise Data," International Telecommunications Union, Geneva, 1964.

Reports to this Laboratory of experience with these predictions would be appreciated. Correspondence should be addressed to the Prediction Services Section, Central Radio Propagation Laboratory, National Bureau of Standards, Boulder, Colorado, 80301.

NOTE: The MUF(ZERO)F2 values of figures 1A through 12A were derived by adding one-half the gyrofrequency to the foF2 calculated by use of the predicted coefficients in table 1. The error introduced by this approximation is generally not important compared to other uncertainties in the predictions, and is significant only when the foF2 is near or below the gyrofrequency. If more precise values of predicted fxF2 are desired, the theoretical relationships should be applied to the foF2 values calculated by the coefficients in table 1.

Table A

Observed and Predicted Zurich Smoothed Relative
Sunspot Numbers

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1954	6	6	4	3	4	4	5	7	8	8	10	12
	(14)	(12)	(11)	(10)	(10)	(9)	(8)	(8)	(8)	(10)	(10)	(11)
1955	14	16	20	23	29	35	40	46	55	64	73	81
	(12)	(14)	(14)	(13)	(16)	(18)	(22)	(27)	(30)	(31)	(35)	(42)
1956	89	98	109	119	127	137	146	150	151	156	160	164
	(48)	(53)	(60)	(68)	(77)	(89)	(95)	(105)	(119)	(135)	(147)	(150)
1957	170	172	174	181	186	188	191	194	197	200	201	200
	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)
1958	199	201	201	197	191	187	185	185	184	182	181	180
	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)
1959	179	177	174	169	165	161	156	151	146	141	137	132
	(150)	(150)	(150)	(150)	(146)	(143)	(141)	(142)	(141)	(139)	(137)	(137)
1960	129	125	122	120	117	114	109	102	98	93	88	84
	(136)	(135)	(133)	(130)	(125)	(120)	(118)	(115)	(110)	(108)	(105)	(100)
1961	80	75	69	64	60	56	53	52	52	51	50	49
	(100)	(90)	(90)	(90)	(85)	(85)	(80)	(75)	(70)	(70)	(65)	(60)
1962	45	42	40	39	39	38	37	35	33	31	30	30
	(60)	(50)	(48)	(45)	(42)	(37)	(34)	(31)	(29)	(28)	(27)	(34)
1963	29	30	30	29	29	28	28	27	27	26	24	21
	(31)	(28)	(26)	(25)	(25)	(25)	(23)	(21)	(20)	(18)	(18)	(17)
1964	20	18	15	13	11	10	10	10	10			
	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17.5)	(17.3)	(17.0)	(17.0)
1965												
	(15.0)	(16.0)	(16.0)	(16.0)	(15.0)	(17.0)	(21.0)	(28.9)	(22.0)*			
1966												

Note: Final numbers are listed through June 1964, the succeeding values being based on provisional data. The predicted numbers are in parentheses.

* Number used for predictions in this issue.

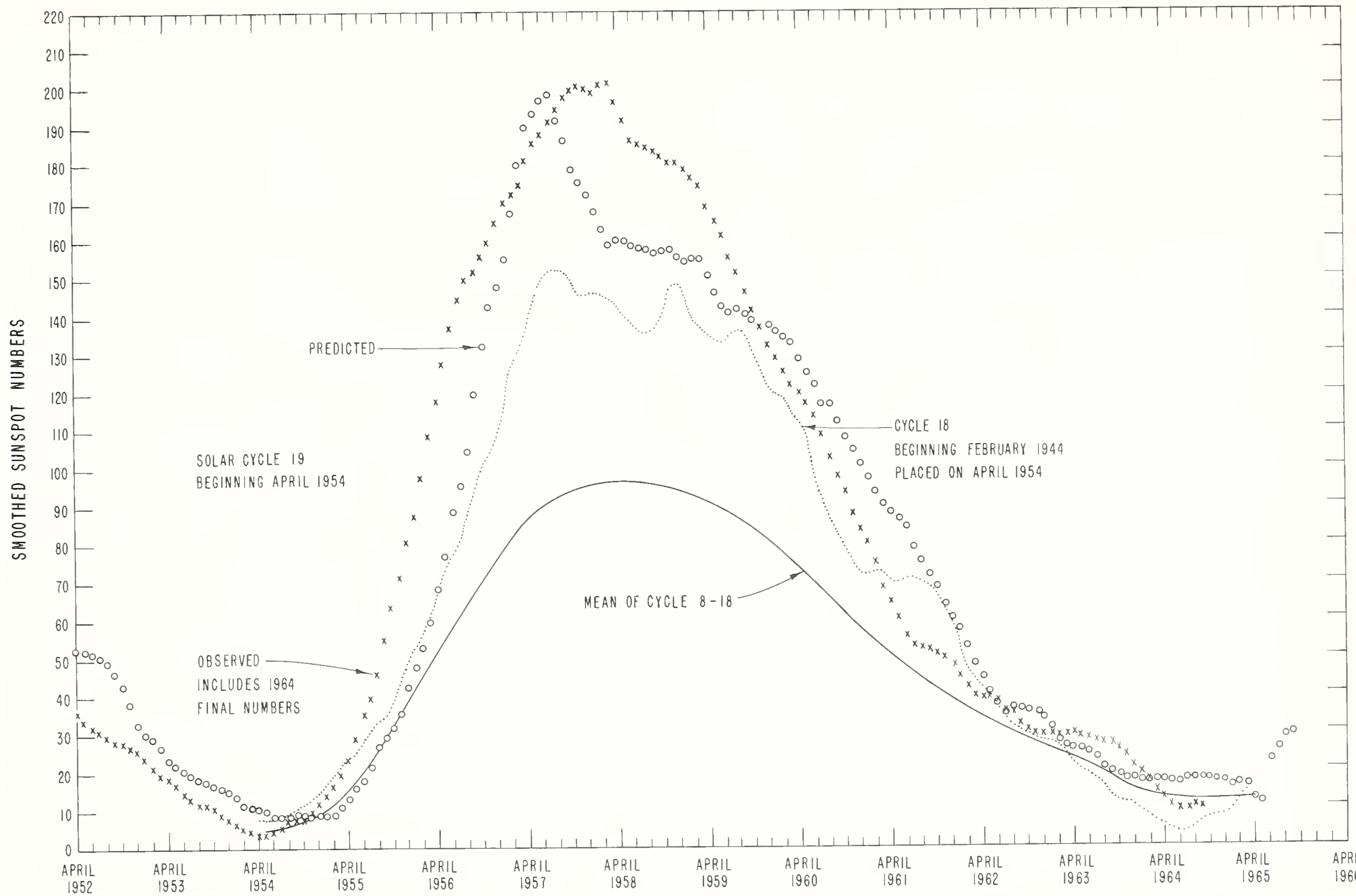

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FIG. A PREDICTED AND OBSERVED SUNSPOT NUMBERS

TABLE I

TIME VARIATION

GEOGRAPHICAL VARIATION	Harmonic	0	1		2		3		4	
	K \ S	0	1	2	3	4	5	6	7	8
I	0	7.2947530E 00	2.3471851E 00	1.8588096E 00	-7.8717819E-01	1.4724523E-01	-2.1339822E-01	-5.3614737E-01	2.7026756E-01	-1.8569901E-01
	1	8.6214943E-01	1.0057676E 00	-1.0079053E 00	1.8659395E 00	-3.8495470E-01	-2.1116172E-01	-9.2882265E-01	-6.1668630E-02	1.2986072E-01
	2	-9.2541296E 00	-5.7445366E 00	1.5791896E 01	9.2989867E 00	1.8007109E 00	-1.9901086E 00	-1.2307985E 00	-2.1589835E 00	3.4880060E 00
	3	4.6903983E 00	1.1710993E 01	3.3737730E 01	-3.8699282E 00	-2.9623854E 00	4.0587168E 00	7.6840587E 00	1.1466228E 00	3.3651404E 00
	4	1.9569053E 01	-2.4861349E 00	-1.2343945E 02	-2.6989677E 01	-5.4144354E 00	2.2899732E 01	1.4668750E 01	1.7648751E 01	-1.8424691E 01
	5	-3.9487582E 01	-1.0598336E 02	-1.9785376E 02	-2.6681508E 01	2.3392901E 01	-2.3934421E 01	-2.7285892E 01	-3.8868694E 00	-2.3790486E 01
	6	-7.3689049E 01	3.3336549E 01	3.7503896E 02	-8.0895838E 00	-1.0094439E 01	-9.1622838E 01	-3.5179212E 01	-6.2432972E 01	4.3491156E 01
	7	9.4920228E 01	2.7282358E 02	4.3651311E 02	9.5184458E 01	-5.7496065E 01	5.4922613E 01	5.2401066E 01	5.4963067E 00	5.4016988E 01
	8	1.6349815E 02	-5.2014847E 01	-5.7386134E 02	1.2265570E 02	4.8890421E 01	1.6928965E 02	3.3193629E 01	1.0412910E 02	-5.2614111E 01
	9	-1.0049111E 02	-2.8498481E 02	-4.1415227E 02	-1.0642247E 02	5.9585312E 01	-5.3313122E 01	-5.0401323E 01	-3.4447927E 00	-5.1000783E 01
	10	-1.6340888E 02	3.2630725E 01	4.4059923E 02	-1.5850327E 02	-5.5780059E 01	-1.4586860E 02	-1.0658492E 01	-8.2192800E 01	3.2528804E 01
	11	3.9839338E 01	1.0541530E 02	1.4244042E 02	3.9562123E 01	-2.2099567E 01	1.8491293E 01	1.8635011E 01	7.1369757E-01	1.7286049E 01
	12	5.9916037E 01	-7.8328043E 00	-1.3547955E 02	6.2512840E 01	2.0405579E 01	4.7484924E 01	-3.3553453E-01	2.4753470E 01	-8.2971207E 00
II	13	7.3005960E-02	1.3042782E-01	1.8446714E-01	-7.3117445E-02	-5.1944620E-02	4.3348505E-02	1.6835128E-01	-2.7947396E-02	-6.3911780E-02
	14	1.2218679E-01	-3.9469637E-02	1.7056073E-01	-4.3010854E-01	-7.5618317E-02	9.5707786E-02	1.5177466E-01	8.5910609E-02	-1.3967958E-01
	15	4.1919366E-01	-6.6491304E-01	5.1559359E-01	6.1797716E-02	3.2583129E-01	-4.1413886E-02	-2.0645549E-01	3.3057871E-01	-2.0788893E-01
	16	-1.3494530E 00	-1.7136933E 00	-7.8029093E 00	-4.5965012E 00	-2.0501538E 00	-7.5541327E-01	-1.4203676E 00	5.9559878E-01	-1.0230999E 00
	17	-7.0509403E 00	-4.4329330E 00	-8.9594281E 00	4.3820444E 00	-5.5850524E-01	-4.3798739E-01	-3.1233793E 00	9.0859300E-01	3.8551461E 00
	18	-1.0074789E 01	-2.9075893E 00	-8.1579697E 00	5.2990751E 00	5.3827409E-02	-5.1657107E 00	-3.9258043E 00	-1.0700607E 00	4.3814728E 00
	19	2.2215611E 00	8.2773029E 00	-1.7659504E 01	-6.6794859E 00	-7.1806180E 00	-7.9624199E-01	6.2144082E-01	-3.6592250E 00	2.2205559E 00
	20	7.3913262E 01	6.3535194E 01	1.1378811E 02	5.5157646E 01	3.1163079E 01	5.9054275E 00	2.1360079E 01	-4.1802609E 00	1.2536408E 01
	21	1.0958857E 02	8.2300851E 01	9.7004175E 01	-4.0679013E 01	4.3083502E 00	-1.5510053E-01	2.4765988E 01	-1.0749809E 01	-3.7407808E 01
	22	6.7972875E 01	2.4927101E 01	1.0749629E 02	-2.5234464E 01	3.4502931E 00	5.0619210E 01	3.6175442E 01	6.4367170E 00	-3.1255327E 01
	23	-3.9040300E 01	-5.0517942E 01	9.4879410E 01	3.2651041E 01	4.7290323E 01	6.9221219E 00	6.8070206E 00	1.3842082E 01	-1.3634553E 01
	24	-4.1419845E 02	-3.5347111E 02	-4.9699555E 02	-2.3611298E 02	-1.5131769E 02	-1.6749664E 01	-1.1418391E 02	1.7760540E 01	-5.3128705E 01
	25	-5.4656495E 02	-4.4120558E 02	-3.9219144E 02	1.6875929E 02	-1.5965352E 01	7.0449051E 00	-9.7436872E 01	4.6772301E 01	1.4502069E 02
	26	-1.7125849E 02	-7.4079046E 01	-5.1006385E 02	8.3503048E 01	-3.1035965E 01	-1.9772253E 02	-1.4087895E 02	-2.0822995E 01	1.0137901E 02
	27	1.3396156E 02	1.4933039E 02	-2.0036817E 02	-6.6571835E 01	-1.2666172E 02	-2.2438272E 01	-2.8273568E 01	-2.1851809E 01	3.8817462E 01
	28	9.2109323E 02	7.5896947E 02	9.3372833E 02	4.5538873E 02	3.3668741E 02	1.9659964E 01	2.6427060E 02	-4.5771974E 01	9.9148611E 01
	29	1.2056467E 03	9.9995376E 02	7.4247848E 02	-3.4395383E 02	3.5387719E 01	-1.9257238E 01	1.9470176E 02	-8.9632685E 01	-2.6451084E 02
	30	1.7020429E 02	8.1145022E 01	1.0499605E 03	-1.8310787E 02	9.3230724E 01	3.6773307E 02	2.6307983E 02	3.3222530E 01	-1.7224953E 02
	31	-1.8569341E 02	-1.9272324E 02	1.8218934E 02	6.8553537E 01	1.4431103E 02	3.0715826E 01	3.6061377E 01	1.4906510E 01	-4.7932805E 01
	32	-9.0096558E 02	-7.1212141E 02	-7.9254578E 02	-4.1855478E 02	-3.4821690E 02	-7.7539157E 00	-2.7158167E 02	5.6668113E 01	-8.4006743E 01
	33	-1.2041158E 03	-1.0160964E 03	-6.6520056E 02	3.3020862E 02	-3.7142640E 01	2.0278574E 01	-1.8724031E 02	7.8814797E 01	2.2636124E 02
	34	-3.2088052E 01	-1.2465107E 01	-9.7599822E 02	2.0395937E 02	-1.1532058E 02	-3.2375864E 02	-2.3239243E 02	-2.4169069E 01	1.4733863E 02
	35	9.0606282E 01	8.7751961E 01	-5.9247716E 01	-3.0102403E 01	-5.8320253E 01	-1.4483518E 01	-1.4941943E 01	-3.5504041E 00	2.0842805E 01
	36	3.2182300E 02	2.4590783E 02	2.5004736E 02	1.4506632E 02	1.3471455E 02	-5.2441138E-01	1.0186449E 02	-2.5272042E 01	2.6509235E 01
	37	4.4402692E 02	3.8132556E 02	2.2835734E 02	-1.1847569E 02	1.4263247E 01	-7.7516140E 00	6.8455109E 01	-2.6196501E 01	-7.3056639E 01
	38	-2.6767966E 01	-1.7641218E 01	3.3821318E 02	-8.4598397E 01	5.0510769E 01	1.0844284E 02	7.7748742E 01	6.3388410E 00	-4.9534636E 01
III	39	1.4567396E-01	2.6047809E-02	-8.1067450E-02	-7.9540865E-02	-2.6330438E-02	-6.7705256E-02	4.3314524E-02	1.0157559E-02	-4.1632568E-02
	40	4.1809212E-02	3.1915964E-02	-1.0044289E-01	-1.0920803E-01	-6.1867698E-02	-3.7903283E-03	1.0316326E-01	-2.0371706E-02	-3.0685520E-02
	41	9.6691530E-01	2.2022609E-01	-7.6945018E-01	2.9934053E-01	8.7062879E-02	-7.1433546E-02	-9.0820578E-02	1.3763432E-03	7.8521562E-02
	42	3.5494604E-01	1.4724364E-01	3.6689287E-01	4.9052142E-01	1.2887228E-01	5.4904359E-03	-4.4365579E-02	-4.2378252E-02	3.8830812E-02
	43	-4.3743201E-01	3.6517237E-02	-1.1037785E-01	1.2222692E-01	-1.5419894E-02	5.0881909E-01	-8.6075963E-01	-1.9223413E-02	8.9912086E-01
	44	-3.7211007E-01	-4.1448549E-01	1.1985933E 00	5.3737661E-01	3.1653934E-01	2.8368025E-02	-1.1391833E 00	4.9960471E-03	1.1941044E-01
	45	-2.0605792E 00	-1.2836047E-01	3.3738706E 00	-3.9401207E-01	-2.2793819E-01	1.3698403E-01	4.1894016E-01	-3.8800865E-02	-3.0347270E-01
	46	-6.5188090E-03	-4.2934993E-02	-4.6905278E-01	-9.8167703E-01	-5.6123273E-02	5.8348641E-02	-1.3391198E-01	-6.4142222E-03	-5.7746975E-01
	47	-3.6334645E-02	1.9830082E-01	-1.2915463E-01	-2.4880295E-01	-2.5119252E-01	-9.5876931E-01	3.0357128E 00	6.9197370E-02	-2.5273587E 00
	48	4.0958500E-02	-1.9477462E-02	-1.0970224E 00	-4.5369273E-02	-5.8909480E-02	9.3846759E-04	3.4071180E 00	-1.1568383E-02	-1.0329821E-01
	49	1.3575281E-02	1.6565066E-01	-3.7556664E 00	-2.5344589E-02	-7.2449165E-02	-5.6549211E-02	-2.8326403E-01	4.5446610E-02	3.0686218E-01
	50		4.5714857E-02		-1.8503616E-02	7.9469694E-02		4.8244806E-01	1.4810451E-02	7.1145198E-01
	51		-2.3394342E-01		2.2081864E-01	2.4661342E-01		-2.5691454E 00	-6.3507414E-02	1.7863884E 00
	52							-2.9020533E 00		4.0499035E-02

GEOGRAPHICAL VARIATION	Harmonic	5		6		7		8	
	K \ S	9	10	11	12	13	14	15	16
I	0	7.3623931E-02	2.3840258E-01	-1.1794639E-01	1.3608066E-02	-2.5774217E-02	-1.0515756E-01	9.2002751E-02	-4.5762109E-04
	1	-2.3236065E-02	6.7351966E-02	-3.9025986E-02	-2.1515383E-02	1.8657861E-02	-9.1072567E-03	2.0246961E-02	3.2215830E-02
	2	-7.2922742E-02	-4.6794347E-01	1.1163581E-01	-4.1466133E-02	6.7180598E-02	1.8724787E-01	-1.7114973E-01	-7.9315272E-05
	3	1.4354473E-05	-9.7421676E-02	5.7508424E-02	8.4820150E-03	-9.6949793E-03	1.0490625E-02	-2.9820879E-02	-3.5033000E-02
	4	-2.7961980E-03	2.5043629E-01	1.6265416E-03	3.2620135E-02	-4.1758912E-02	-8.8249158E-02	8.6175154E-02	1.7940108E-03

I - Main latitudinal variation. Mixed latitudinal and longitudinal variation: II - First order in longitude, III - Second order in longitude

Notation: For each entry the number given by the first eight digits and sign is multiplied by the power of ten defined by the last two digits and sign.

PREDICTED COEFFICIENTS D_{SK} DEFINING THE FUNCTION $\Gamma(\lambda,\theta,t)$ FOR MONTHLY MEDIAN $f_o F2$ (Mc/s)

SEPTEMBER 1965

TABLE 2

TIME VARIATION

Harmonic	S / K	0	1	1	2	2	3	3
		0	1	2	3	4	5	6
GEOGRAPHICAL VARIATION I	0	3.0242804E 00	-1.3611721E-01	-2.5373186E-01	5.4657385E-03	-9.9573129E-02	4.3215998E-02	-3.5881069E-02
	1	-1.9843708E-01	1.5423248E-02	-3.1530088E-01	3.6842448E-01	-4.6204281E-01	-2.7561298E-02	4.2498661E-02
	2	1.4643703E 00	8.3375812E-01	2.7542583E 00	1.3936502E-01	-2.4448937E-01	-1.0071631E 00	-3.8950676E-01
	3	1.1925816E 00	-2.3329411E-01	1.7424969E 00	-2.3007706E 00	2.0363944E 00	6.2851816E-02	-1.5103041E-01
	4	-4.2021921E 00	-1.8723851E 00	-7.1106182E 00	-1.1832715E 00	1.3309169E 00	3.9596744E 00	1.4537638E 00
	5	-2.3272800E 00	7.4501656E-01	-2.8957054E 00	3.9783071E 00	-2.8777980E 00	5.7850901E-02	2.6922352E-01
	6	4.3159937E 00	2.0509684E 00	7.5789352E 00	2.0091073E 00	-1.9773233E 00	-5.3388507E 00	-1.8911140E 00
	7	1.3138729E 00	-5.1588360E-01	1.4218866E 00	-2.0522597E 00	1.2905427E 00	-9.4315716E-02	-1.4319129E-01
	8	-1.4826882E 00	-8.7341262E-01	-2.9534427E 00	-9.7555498E-01	9.6015388E-01	2.3655728E 00	8.4403629E-01
II	9	1.2091884E-02	2.1479862E-03	4.2583298E-02	-4.3778268E-02	9.0746307E-03	1.5372271E-02	-3.0334491E-03
	10	2.4034827E-03	3.8252496E-03	3.6679780E-02	-8.1710095E-02	3.9042341E-02	1.2821021E-02	3.2859465E-03
	11	1.2914392E-01	-1.7802433E-01	7.3403036E-02	-8.8335748E-02	5.1931994E-02	9.9087529E-03	4.0544608E-03
	12	-5.0771982E-01	-3.3634418E-01	-1.1015411E 00	9.1653926E-02	-1.1278558E-01	2.1986999E-01	1.7228614E-01
	13	-1.7374666E-01	-5.7220146E-01	-8.0666230E-01	4.3243572E-01	-5.5637107E-01	-6.0738502E-02	5.5020140E-02
	14	1.9612597E-01	4.8629342E-02	-4.2519080E-02	1.8199535E 00	-7.7452486E-01	-1.2746330E-01	1.4175006E-02
	15	-7.8804368E-01	1.2575919E 00	1.6542299E-01	6.7985473E-01	1.0228762E-01	-5.2847127E-02	-3.9636002E-02
	16	3.8532532E 00	1.6267405E 00	7.0161808E 00	-8.7789515E-01	6.4451124E-01	-1.7572671E 00	-1.0977476E 00
	17	1.5860121E 00	3.8410306E 00	3.2746111E 00	-1.5613454E 00	2.7237627E 00	1.3647854E-01	3.6498510E-02
	18	-1.9273911E 00	4.5759514E-01	-1.1902514E 00	-8.5415299E 00	3.5019879E 00	3.7214703E-01	-2.6840407E-01
	19	8.3781244E-01	-2.6096449E 00	-1.2432541E 00	-1.5070962E 00	-6.6831859E-01	1.4026054E-01	2.1835112E-01
	20	-7.2200864E 00	-2.6322742E 00	-1.2217187E 01	2.2123846E 00	-1.1571492E 00	3.6172041E 00	1.9962969E 00
	21	-3.3340414E 00	-7.7586668E 00	-4.4606924E 00	1.9384016E 00	-4.4265717E 00	-1.0421173E-01	-1.8958118E-01
	22	4.3915777E 00	-1.5171897E 00	3.1501360E 00	1.3536206E 01	-5.2899849E 00	-3.0643601E-01	5.0014315E-01
	23	-5.2624930E-02	1.4504701E 00	1.2040310E 00	8.9475031E-01	6.3117049E-01	-5.6448039E-02	-1.6950199E-01
	24	3.9910771E 00	1.4896333E 00	6.7281095E 00	-1.5145790E 00	6.5716027E-01	-2.1620173E 00	-1.0978047E 00
	25	2.1856799E 00	4.7741213E 00	2.1954547F 00	-7.6383959E-01	2.2759316E 00	-5.5286244E-03	6.1848767E-02
	26	-2.8878630E 00	1.0763440E 00	-2.1424882E 00	-6.8441789E 00	2.6333907E 00	3.2692956E-02	-2.5339555E-01
III	27	-9.1016104E-03	-1.8181529E-02	6.8396618E-03	-1.8191036E-02	1.0660473E-02	3.2468809E-04	-3.2849080E-03
	28	-2.2061395E-02	-1.6996236E-02	-4.4436215E-03	-3.3710913E-03	9.4829434E-03	6.9862080E-04	5.9643661E-03
	29	-1.1903516E-01	-1.0280972E-01	-1.5366110E-01	3.0611370E-03	-2.9015821E-02	-1.2206959E-03	1.9507224E-02
	30	-2.8381632E-02	1.7526817E-02	-1.3761457E-01	4.0188659E-02		-2.2908131E-03	4.3701742E-03
	31	-6.4034195E-03	5.4193662E-02	4.6546413E-02	6.7565519E-02			8.5284269E-03
	32	2.5639360E-02	1.9056273E-01	-4.7471184E-02	-6.3681709E-03			-4.9716911E-02
	33	3.0644661E-01	2.0302716E-01	3.3646499E-01				
	34			3.5619496E-01				
	35			4.1334772F-02				
	36							

Harmonic	S / K	4	4	5	5	6	6
		7	8	9	10	11	12
GEOGRAPHICAL VARIATION I	0	3.7689777E-02	1.4951981E-02	5.0057950E-03	3.5782671E-02	-1.7944883E-02	-3.6869019E-03
	1	2.9558896E-02	9.4141698E-03	-7.1438069E-03	8.9274088E-03	1.4489036E-05	-1.4474540E-03
	2	-3.0453580E-02	-1.0944431E-02	-8.4415112E-03	-3.0831338E-02	1.7747460E-02	-3.7857977E-03
	3	-4.6798478E-02			-1.6851657E-02	1.4079831E-03	8.6447066E-04

I - Main latitudinal variation. Mixed latitudinal and longitudinal variation: II - First order in longitude, III - Second order in longitude.

Notation: For each entry the number given by the first eight digits and sign is multiplied by the power of ten defined by the last two digits and sign.

PREDICTED COEFFICIENTS D_{SK} DEFINING THE FUNCTION $\Gamma(\lambda,\theta,t)$ FOR MONTHLY MEDIAN M(3000)F2

SEPTEMBER 1965

SEPTEMBER 1965 UT=00

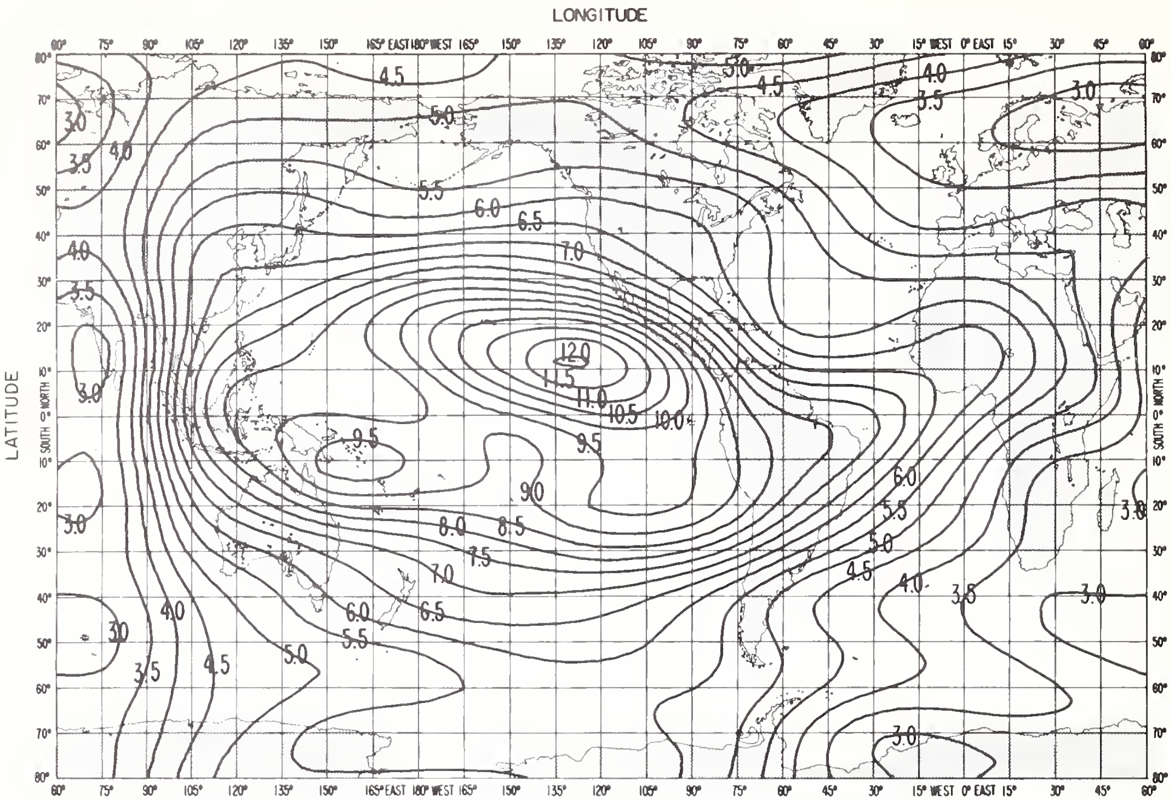

FIG. 1 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

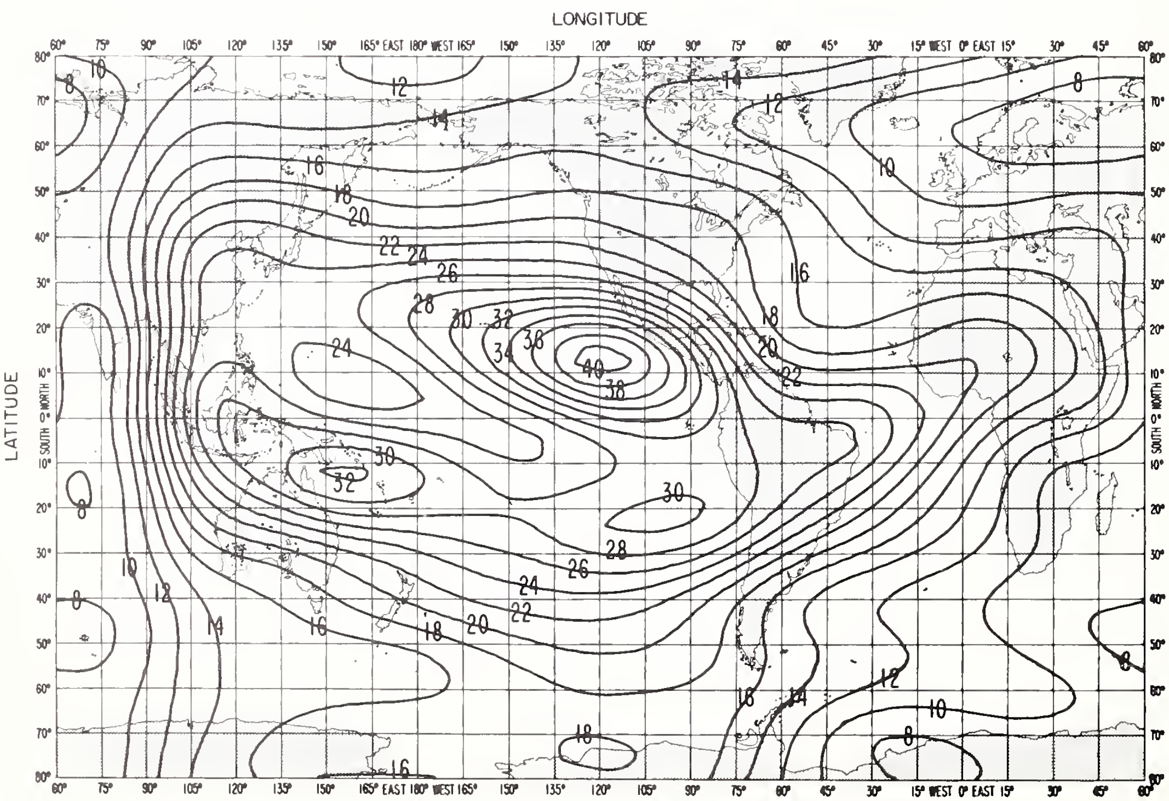

FIG. 1 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT = 02

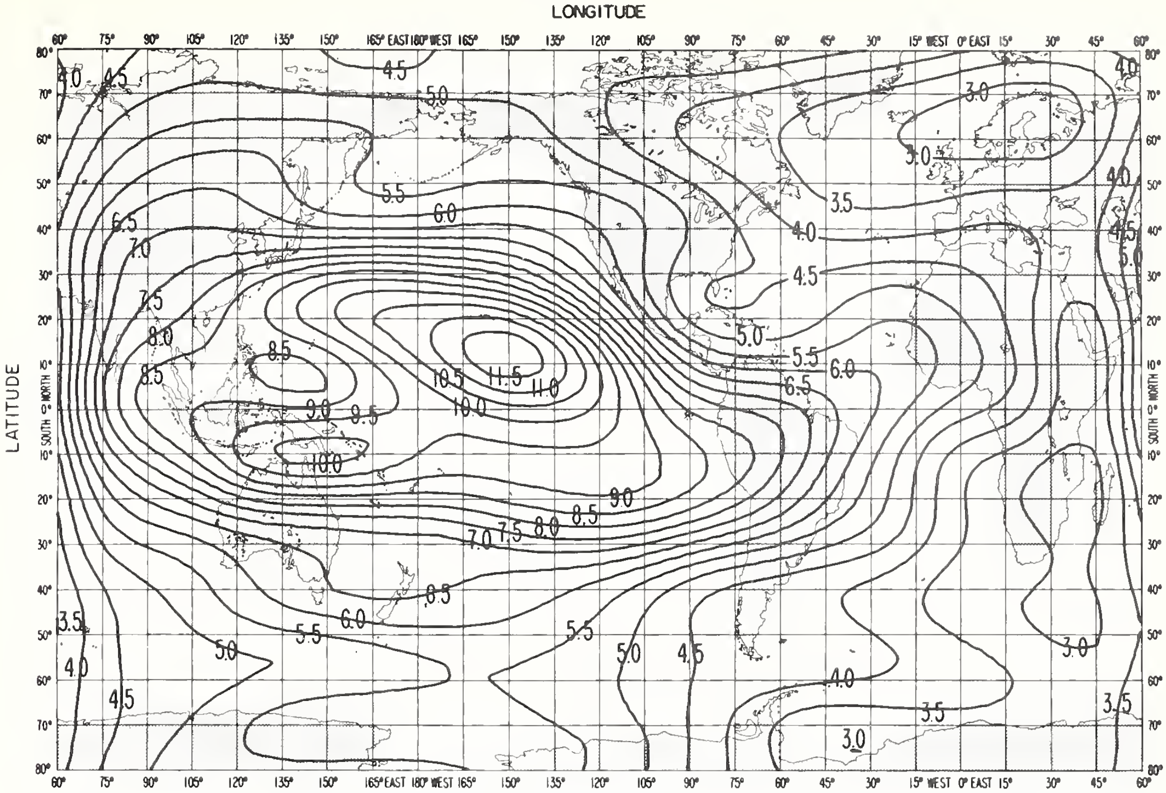

FIG. 2 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

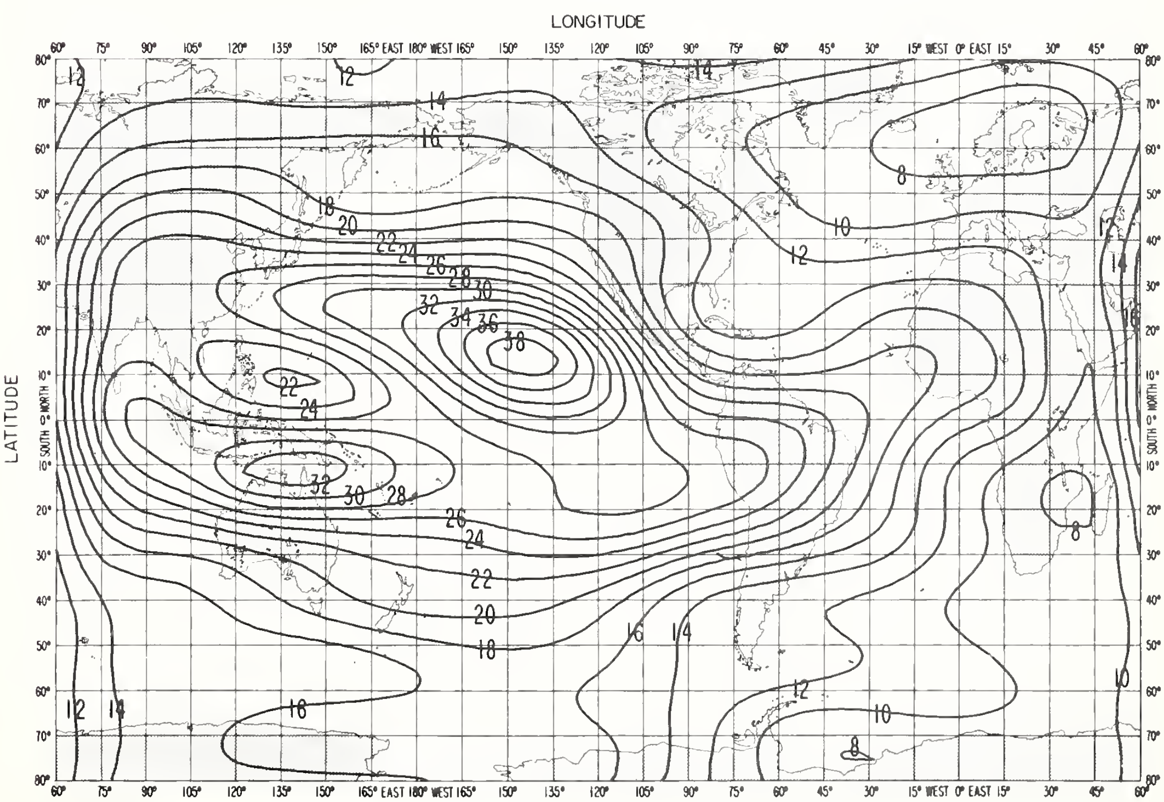

FIG. 2 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT = 04

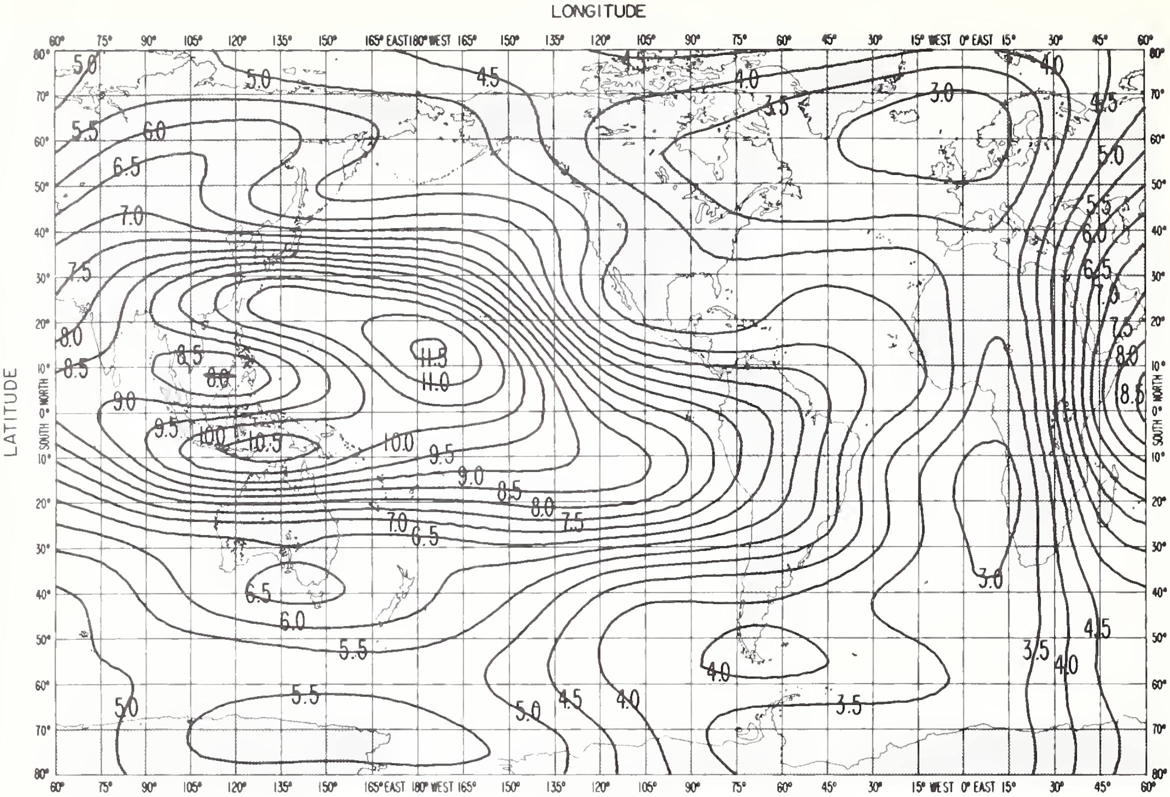

FIG. 3 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

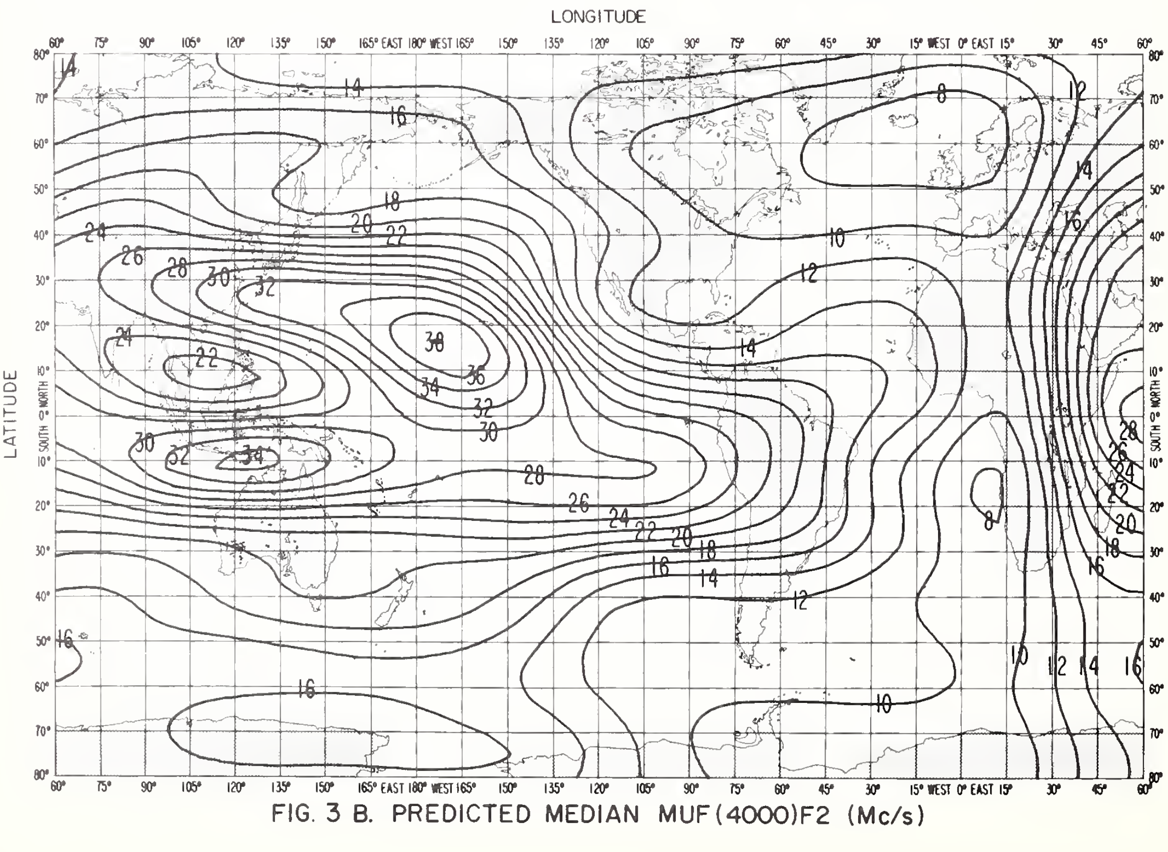

FIG. 3 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT=06

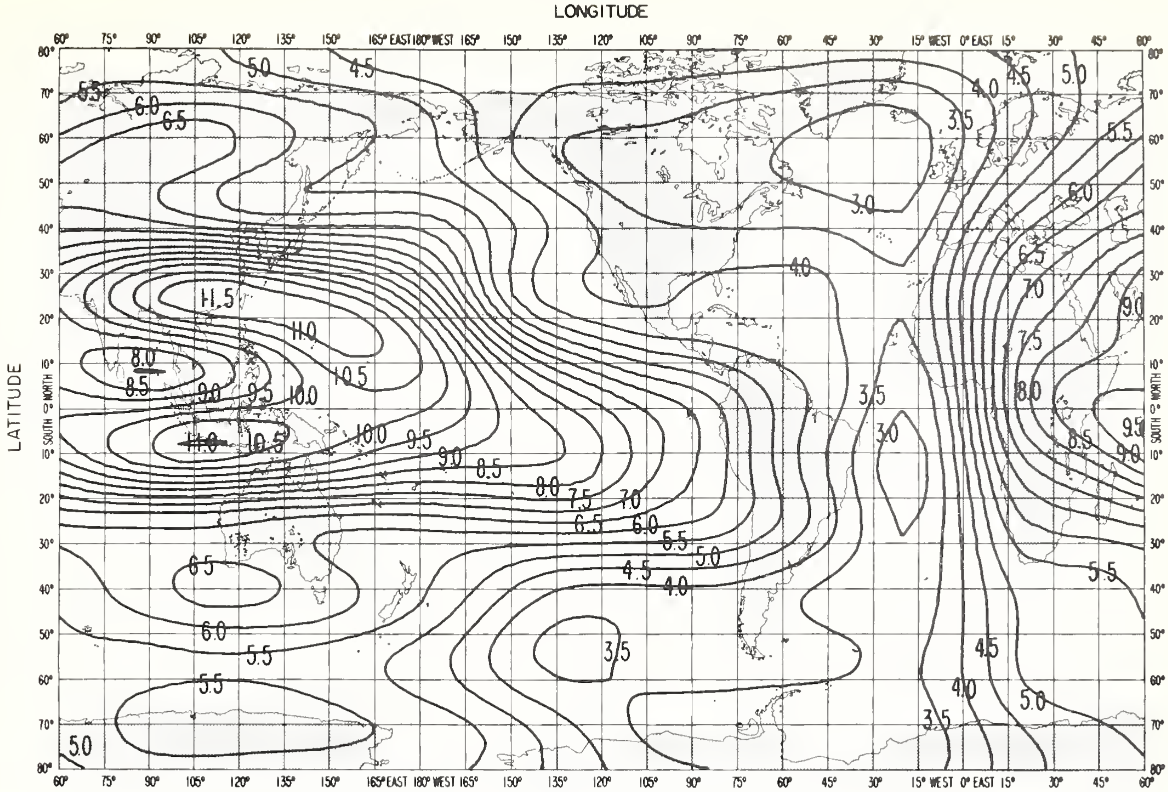

FIG. 4 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

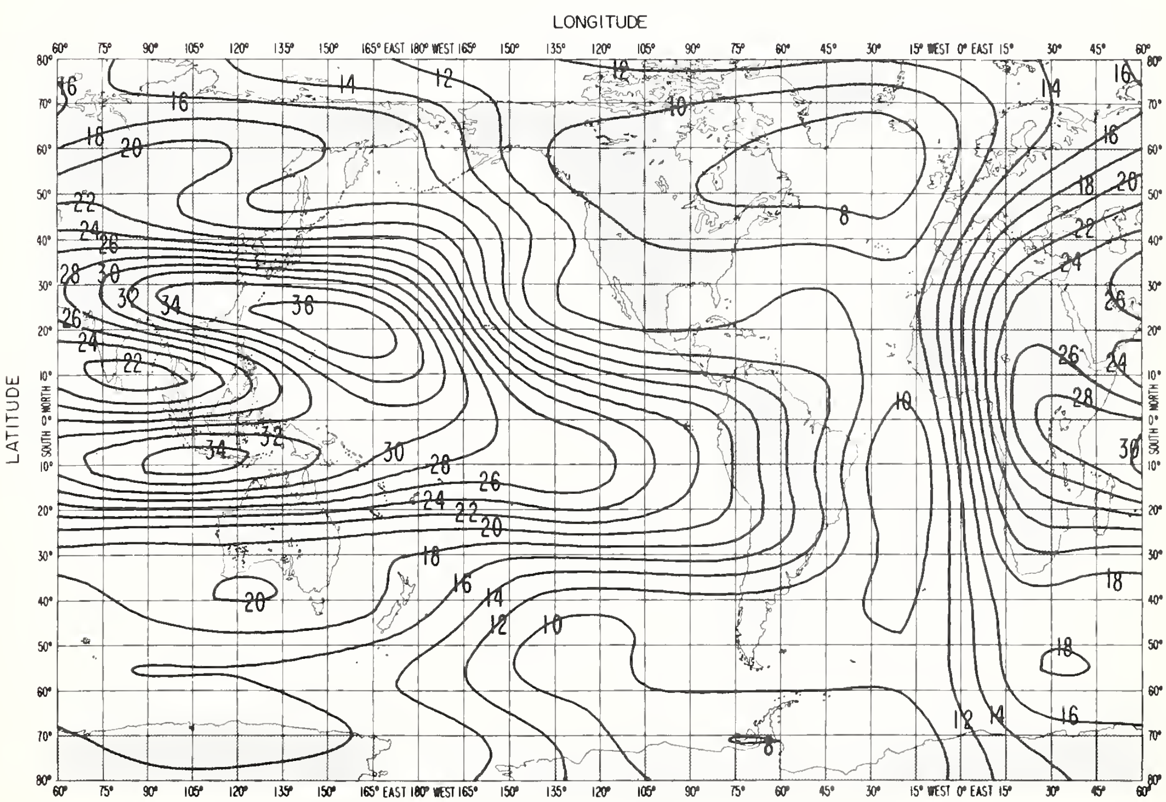

FIG. 4 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT=08

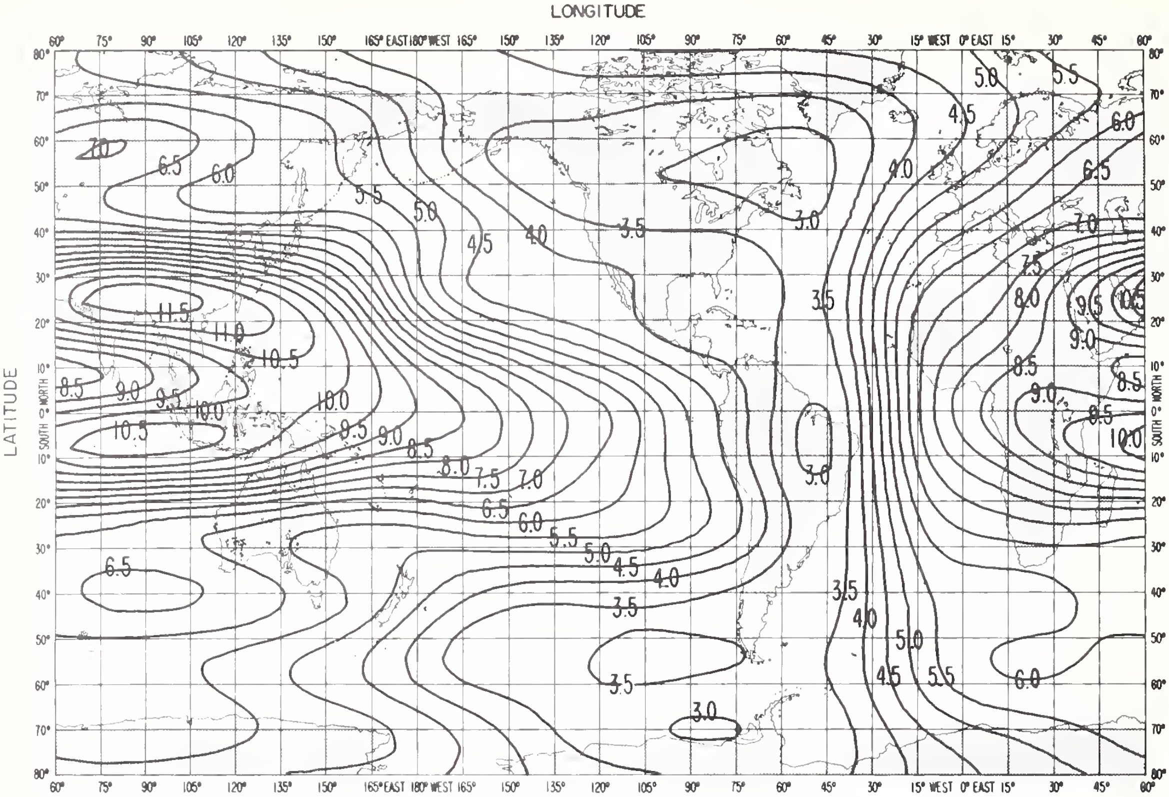

FIG. 5A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

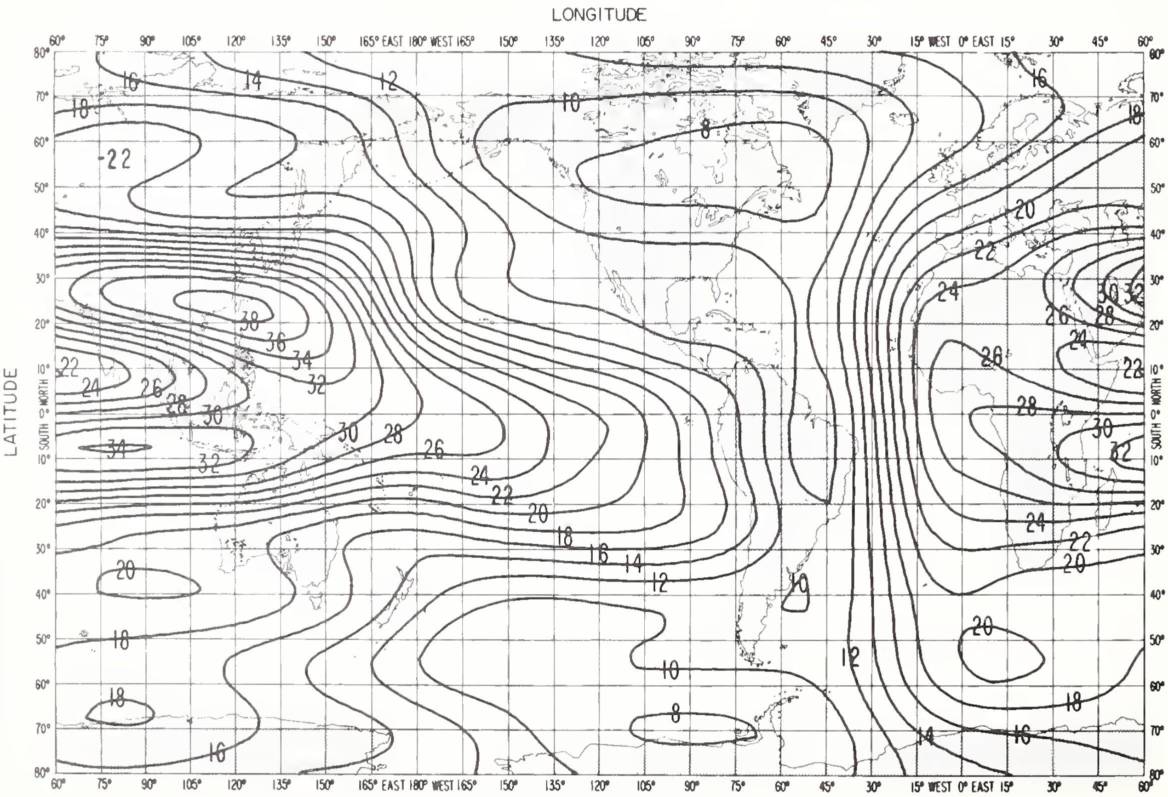

FIG. 5B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT = 10

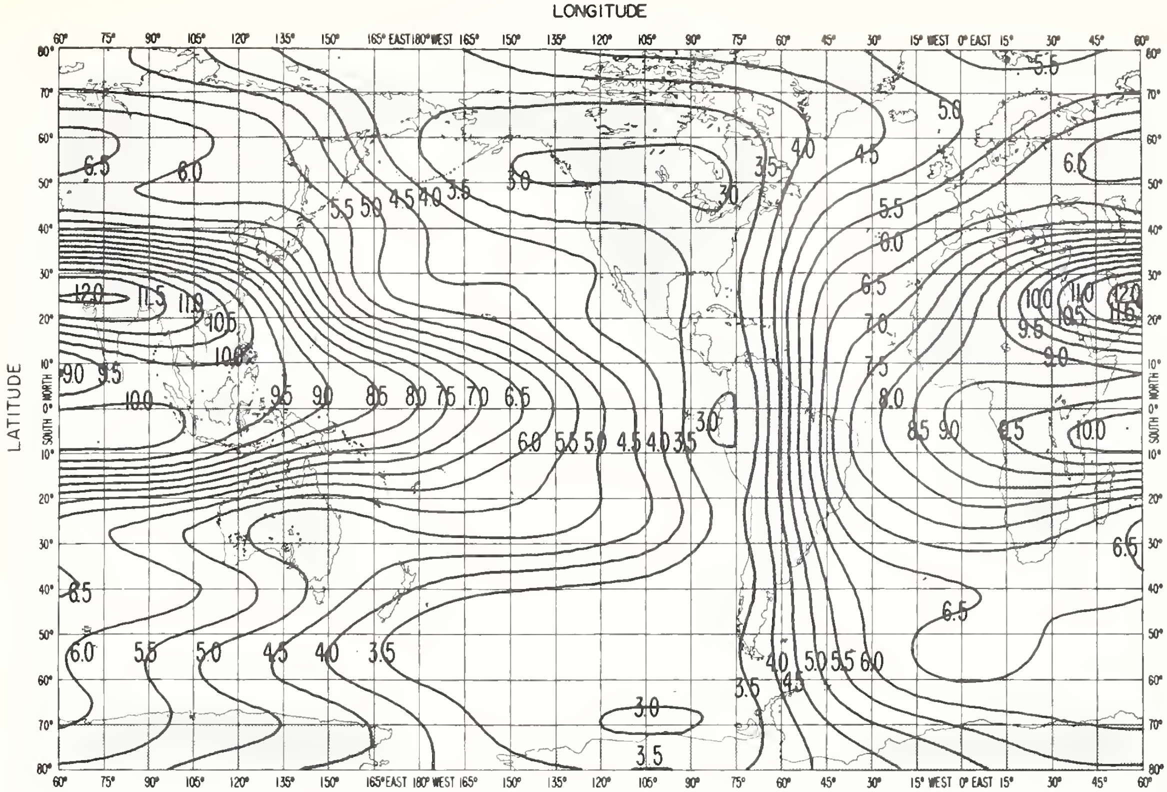

FIG. 6 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

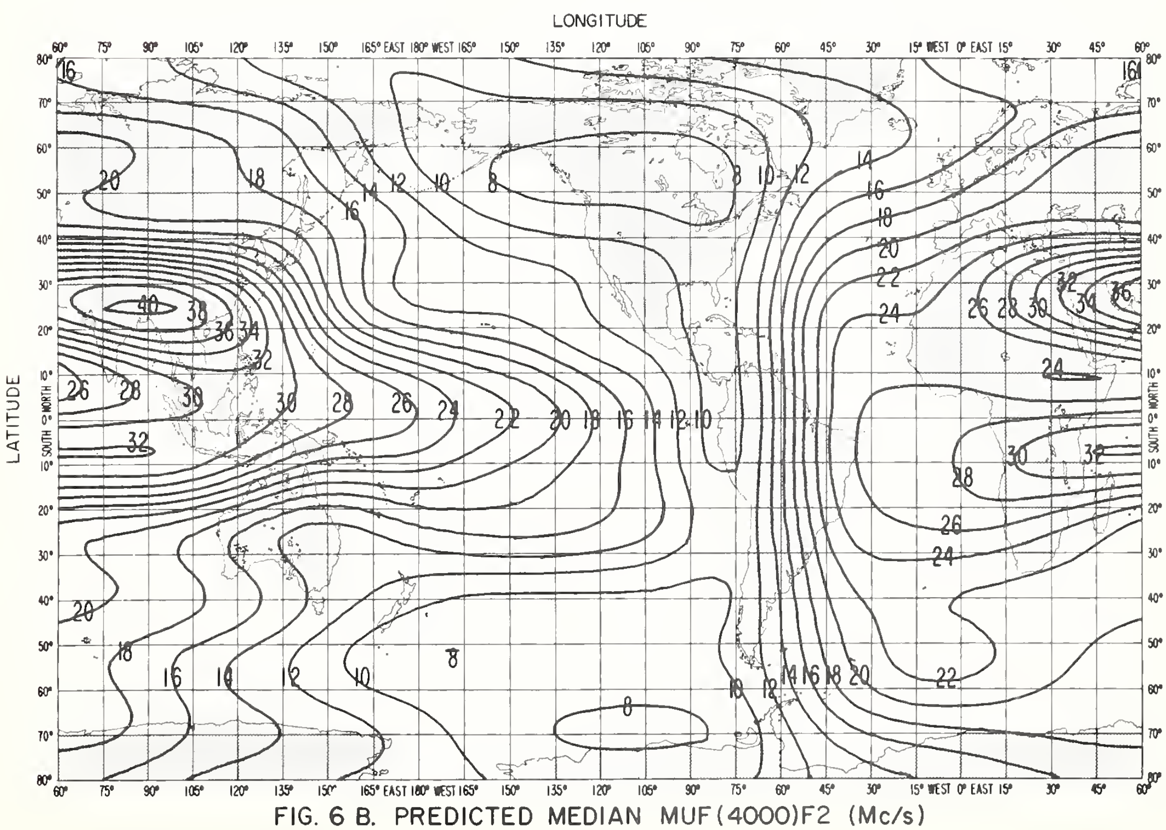

FIG. 6 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT=12

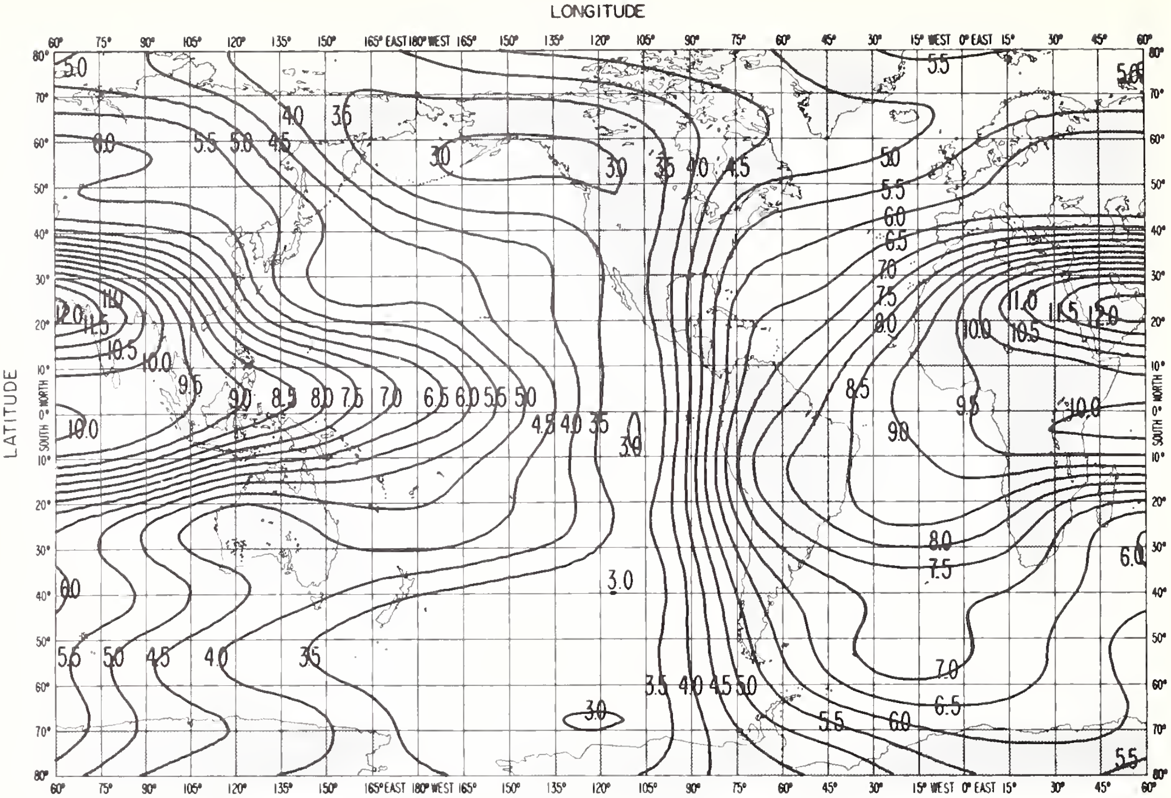

FIG. 7 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

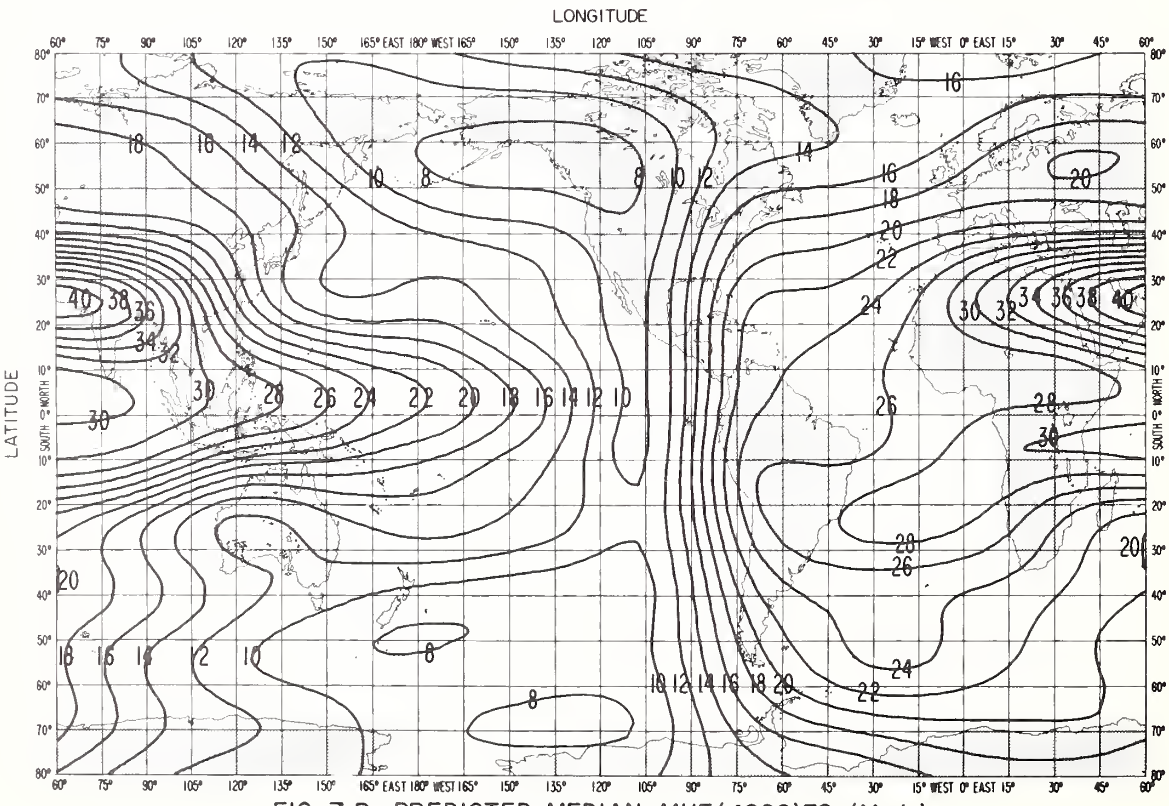

FIG. 7 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT = 14

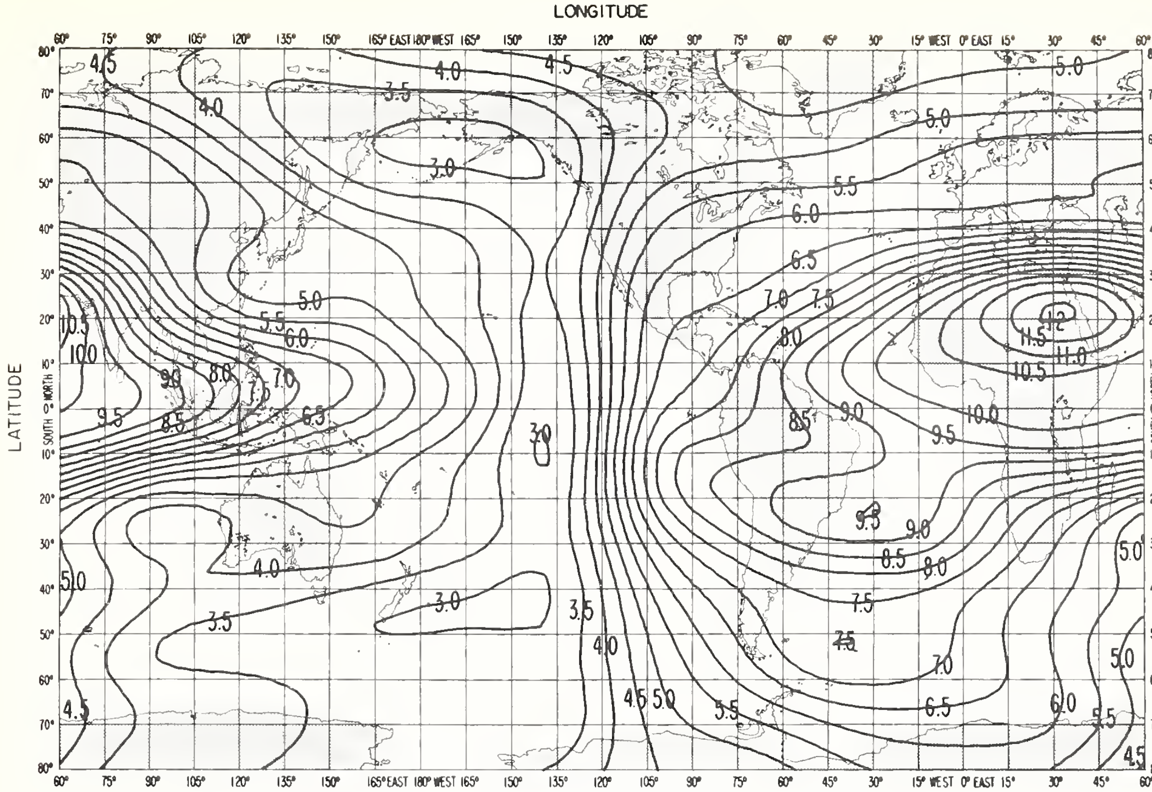

FIG. 8 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

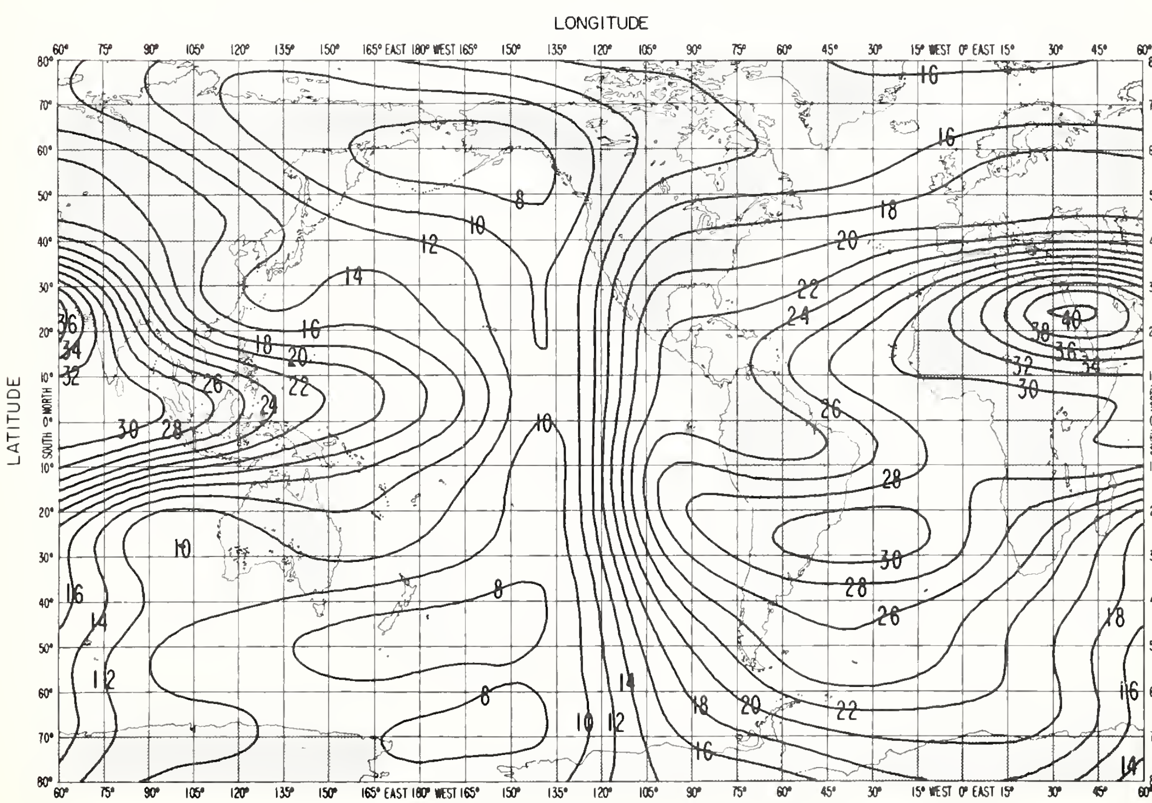

FIG. 8 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT = 16

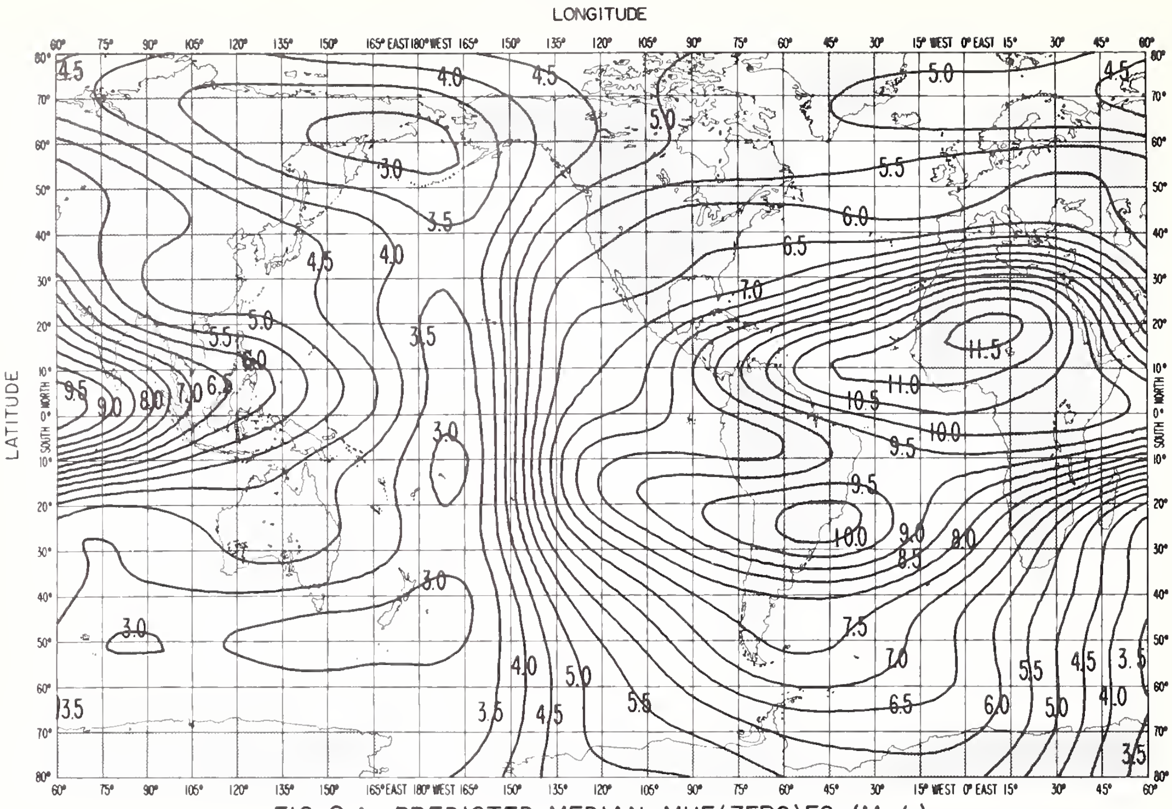

FIG. 9 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

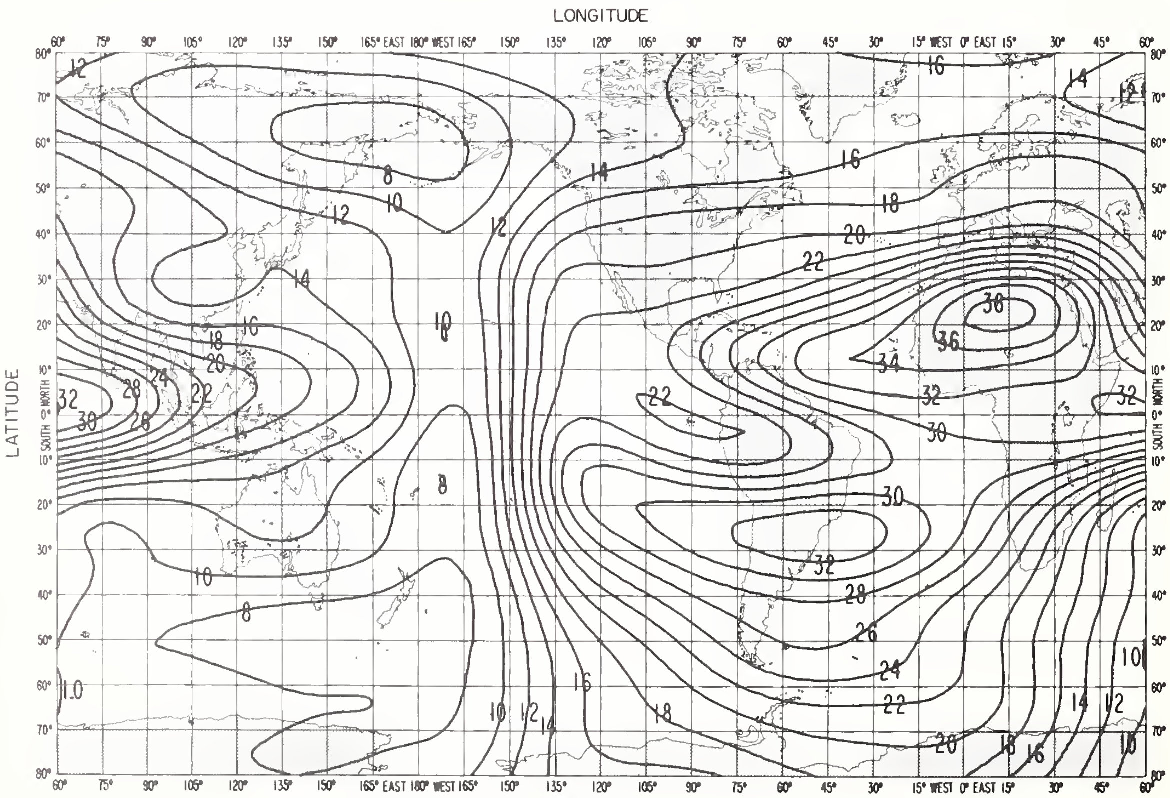

FIG. 9 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT=18

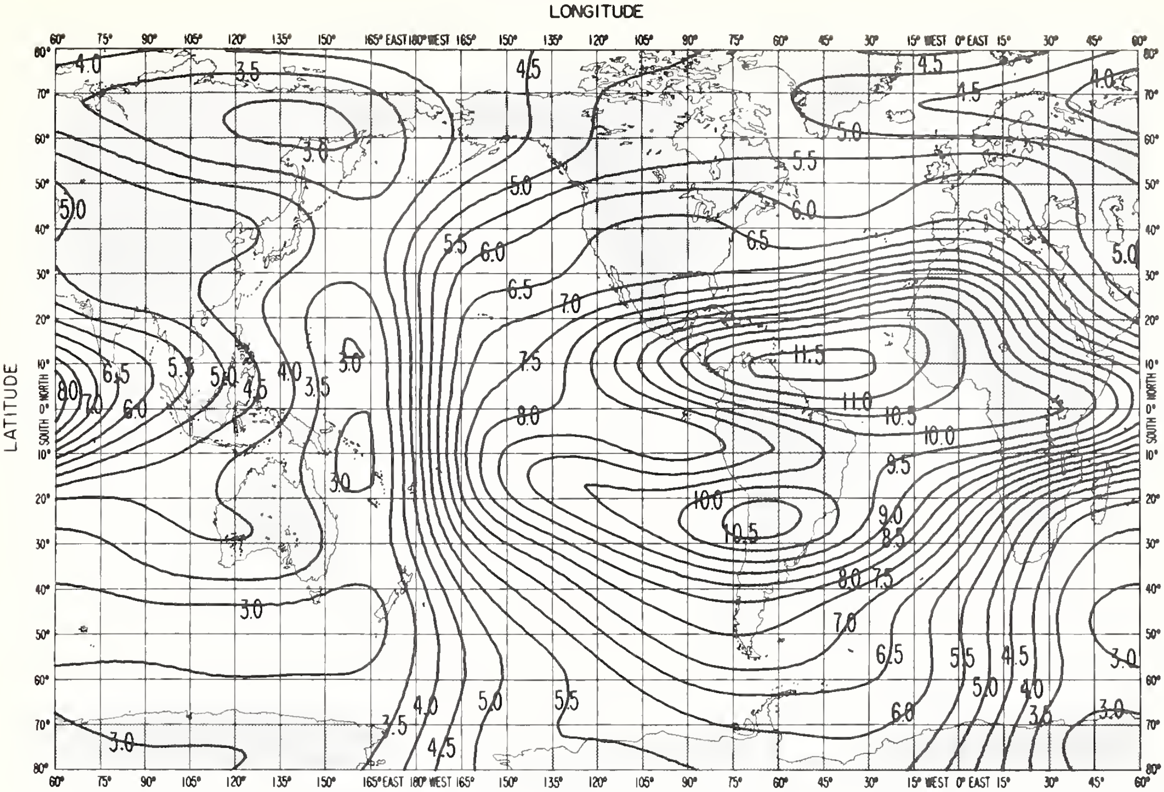

FIG. 10 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

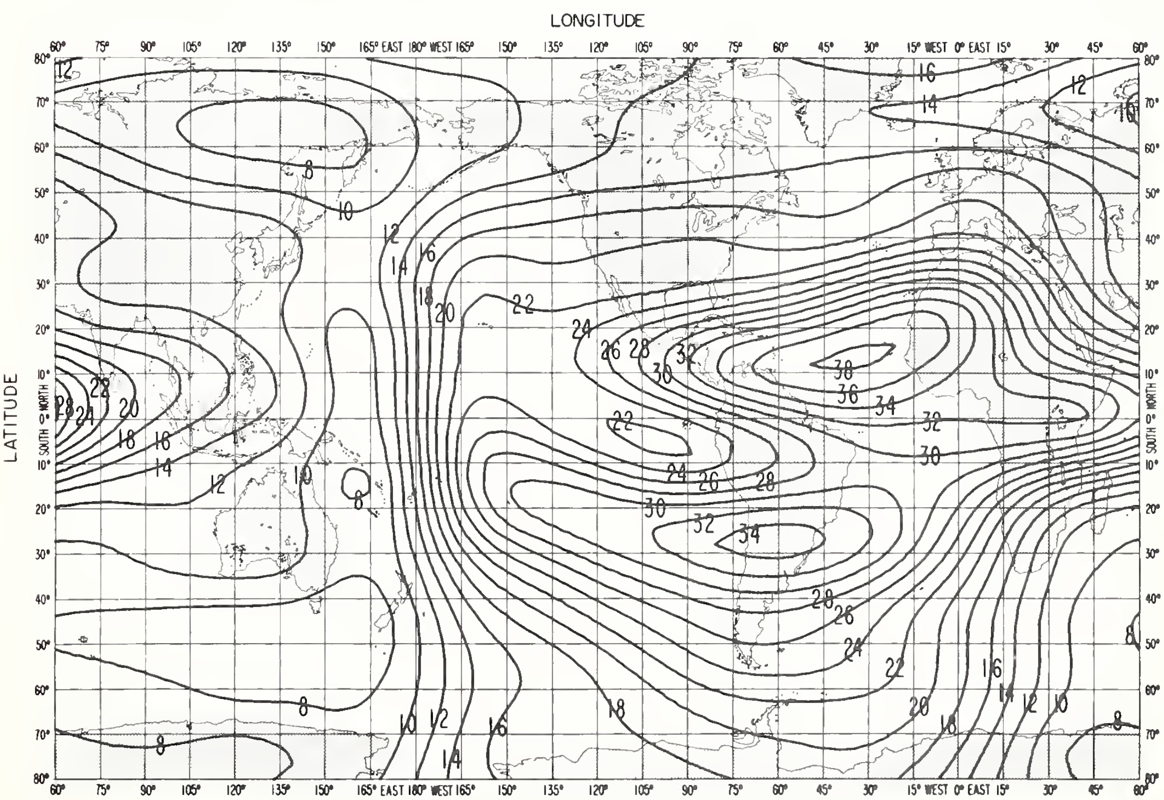

FIG. 10 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT=20

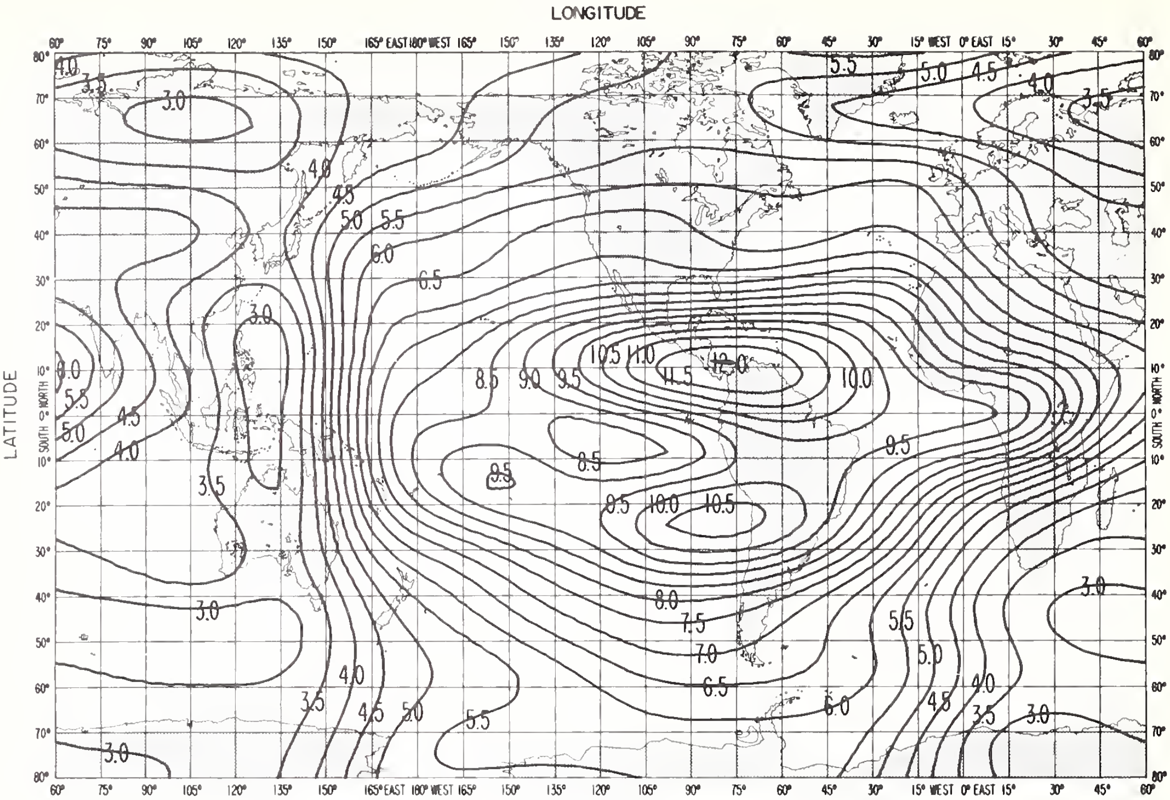

FIG. 11 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

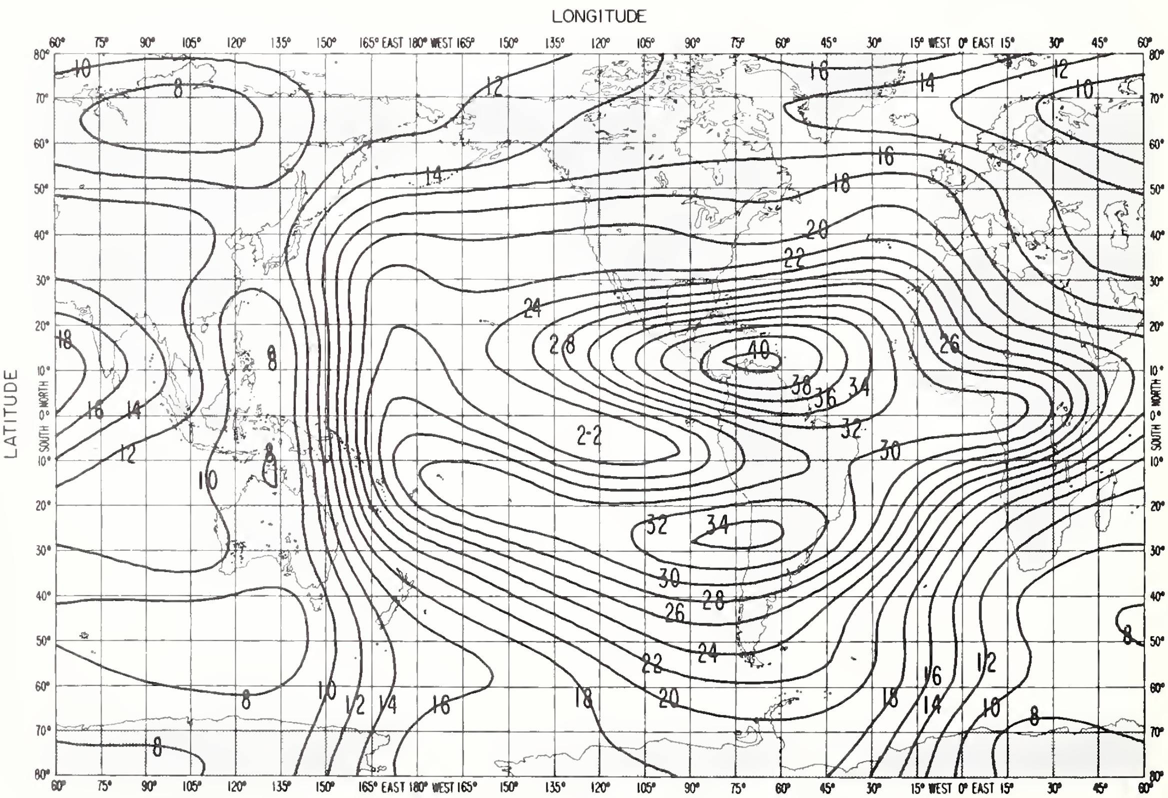

FIG. 11 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT = 22

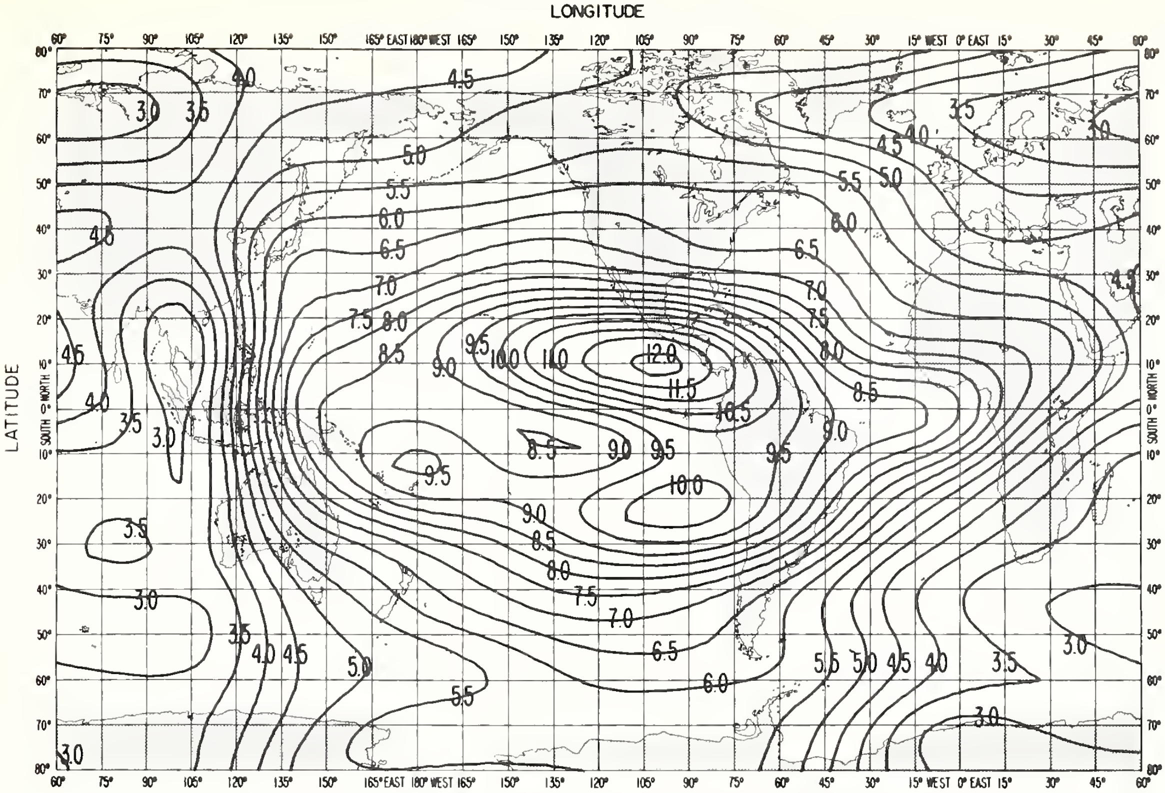

FIG. 12 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

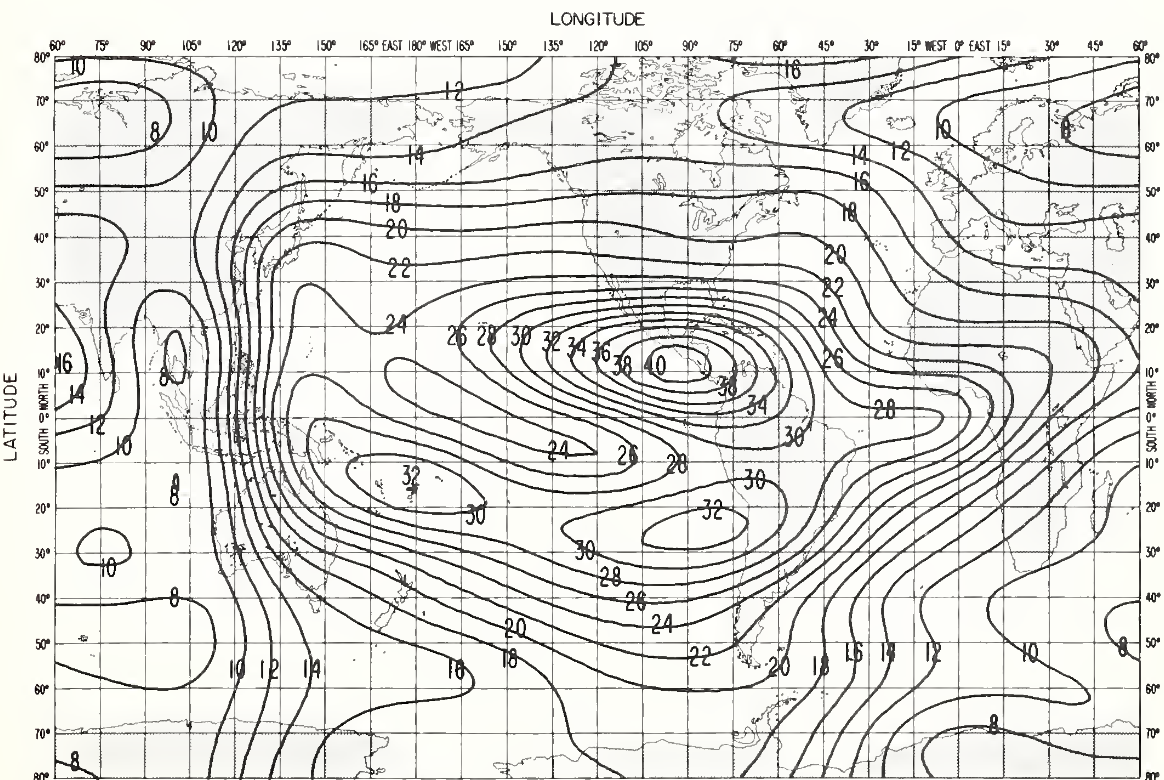

FIG. 12 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT=00

NORTH POLAR AREA SOUTH POLAR AREA

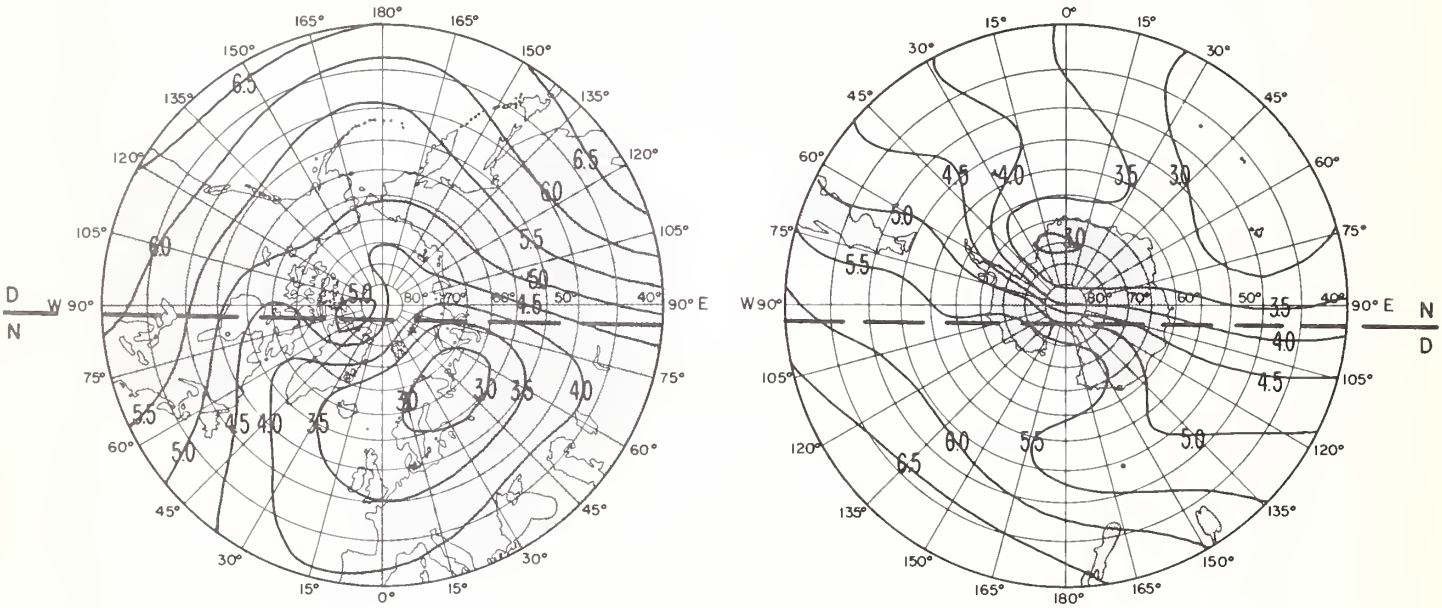

FIG. 13 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

NORTH POLAR AREA SOUTH POLAR AREA

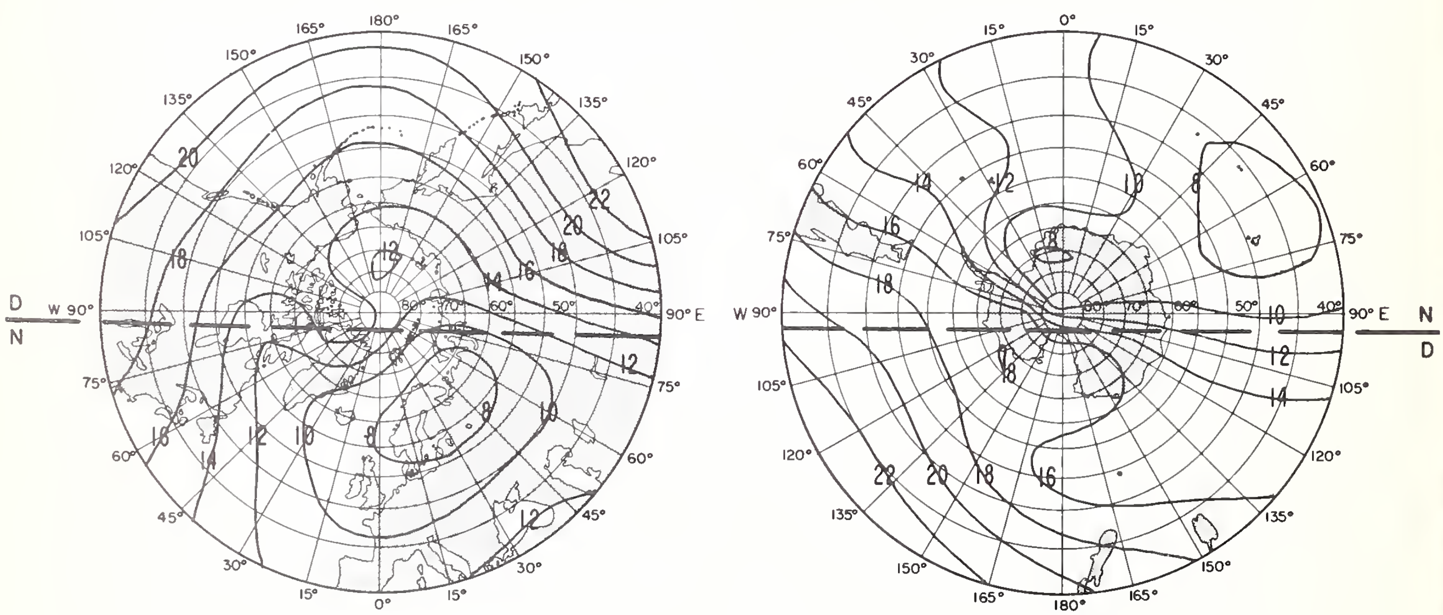

FIG. 13 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT = 02

NORTH POLAR AREA SOUTH POLAR AREA

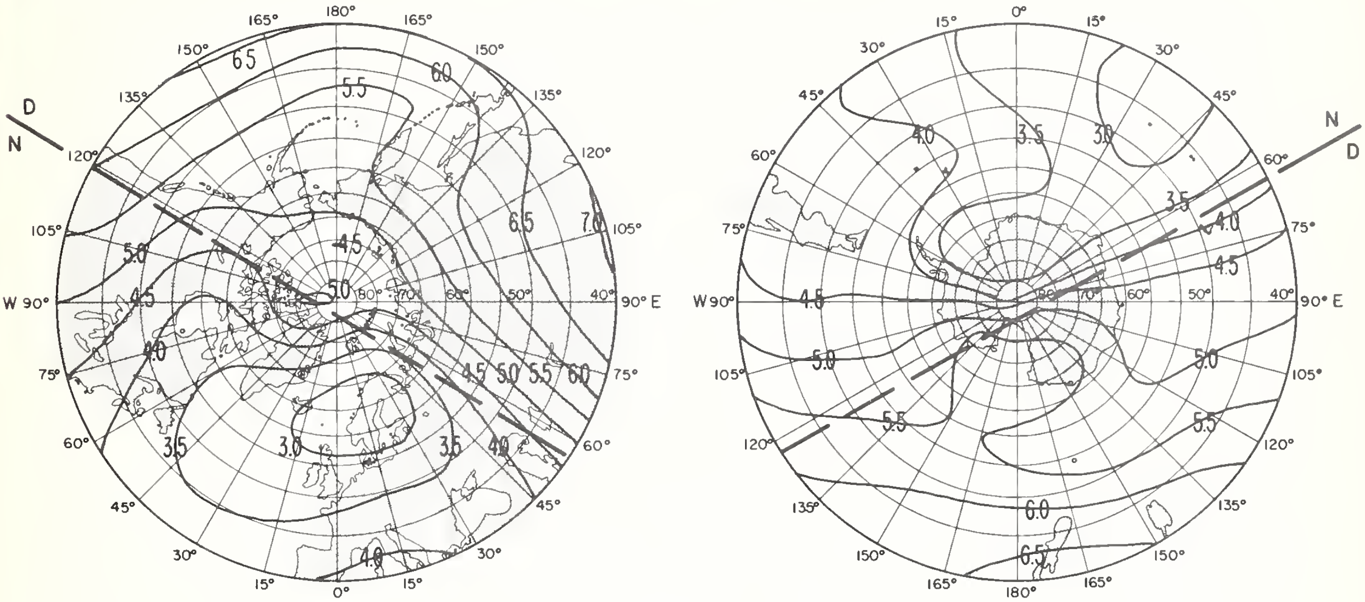

FIG. 14 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA SOUTH POLAR AREA

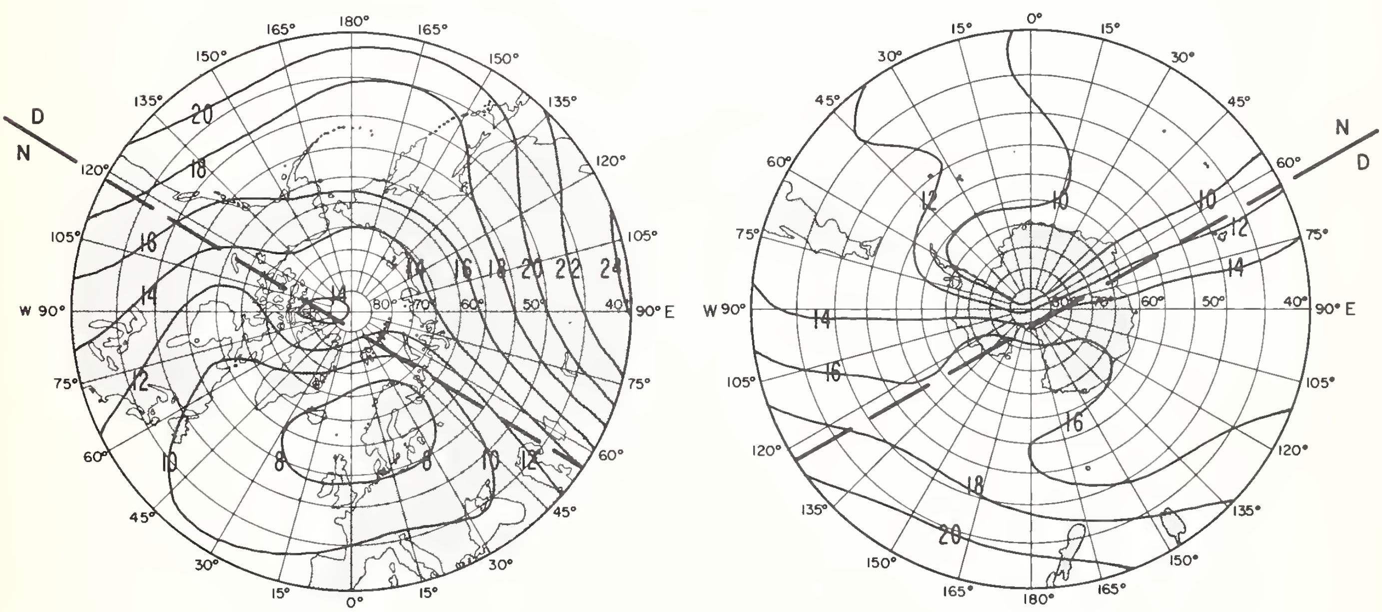

FIG. 14 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

SEPTEMBER 1965 UT = 04

NORTH POLAR AREA SOUTH POLAR AREA

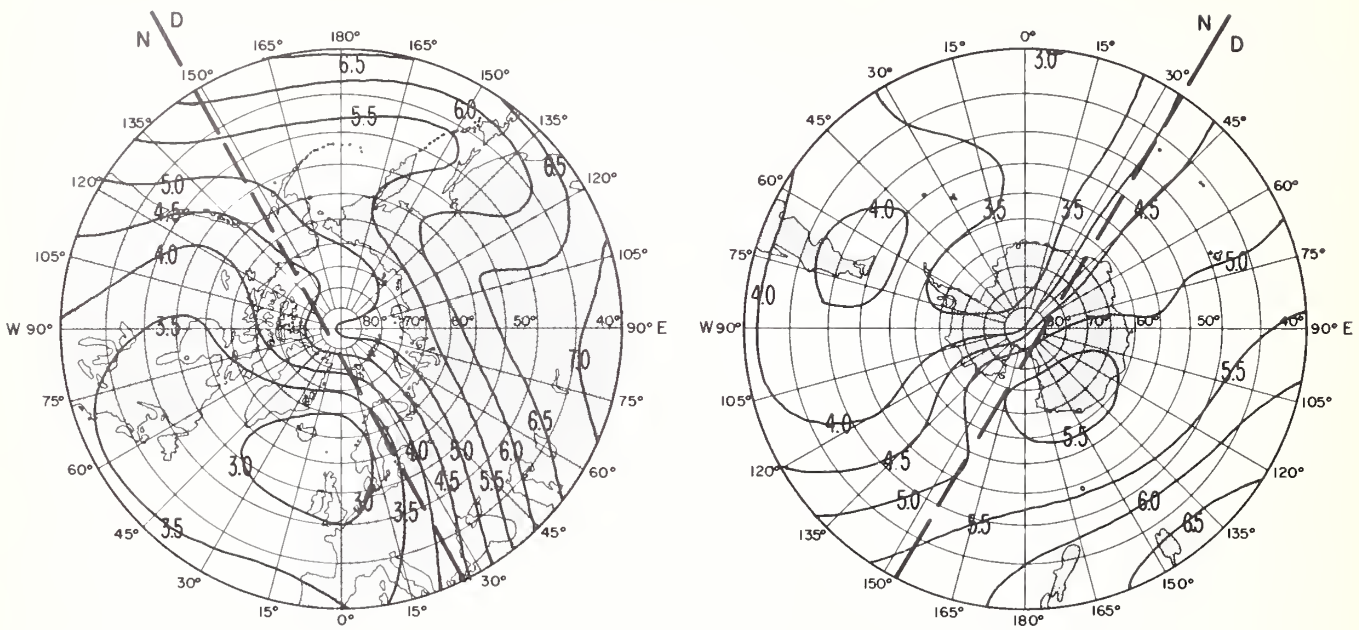

FIG. 15 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA SOUTH POLAR AREA

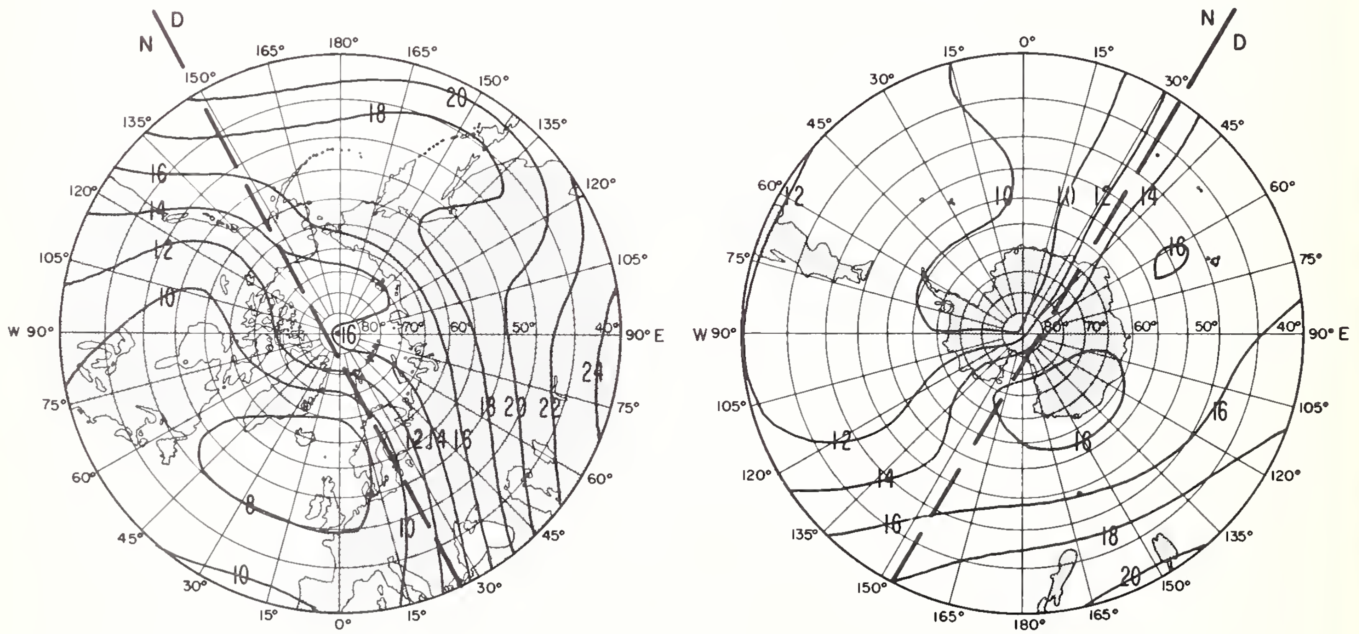

FIG. 15 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

SEPTEMBER 1965 UT=06

NORTH POLAR AREA

SOUTH POLAR AREA

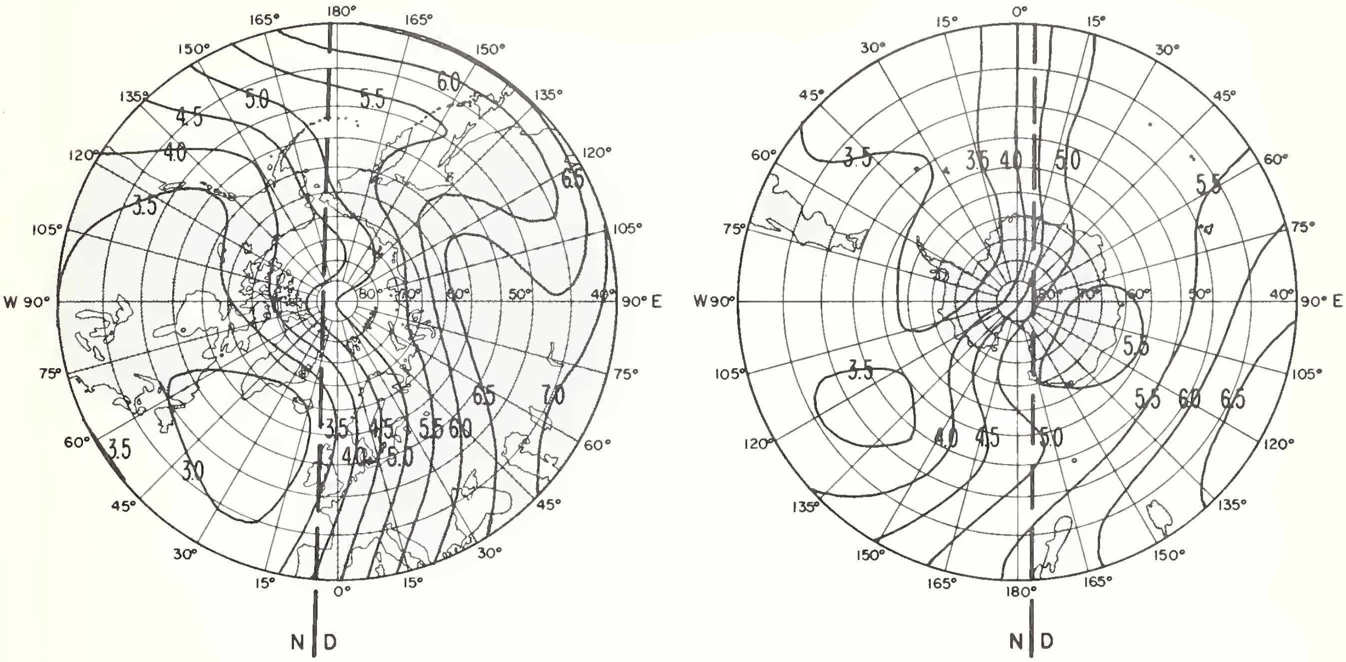

FIG. 16 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

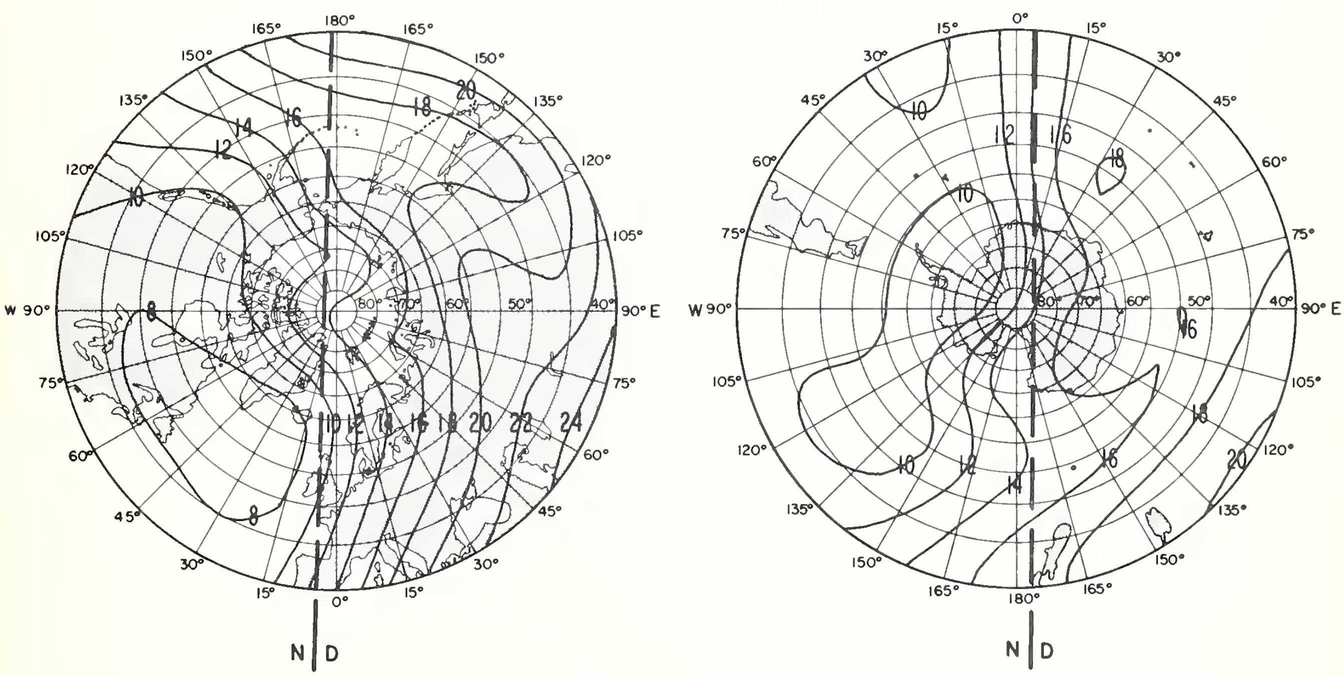

FIG. 16 B. PREDICTED MEDIAN MUF(4000)F2 (Mc/s)

SEPTEMBER 1965 UT=08

NORTH POLAR AREA

SOUTH POLAR AREA

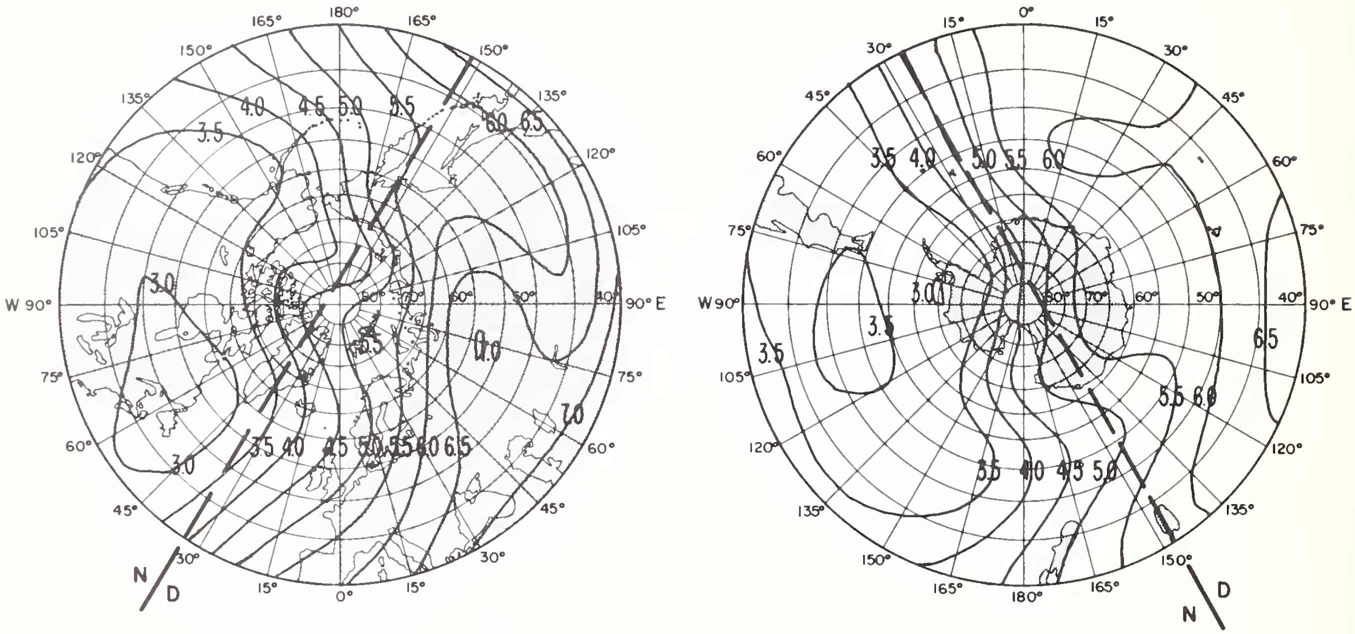

FIG. 17 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

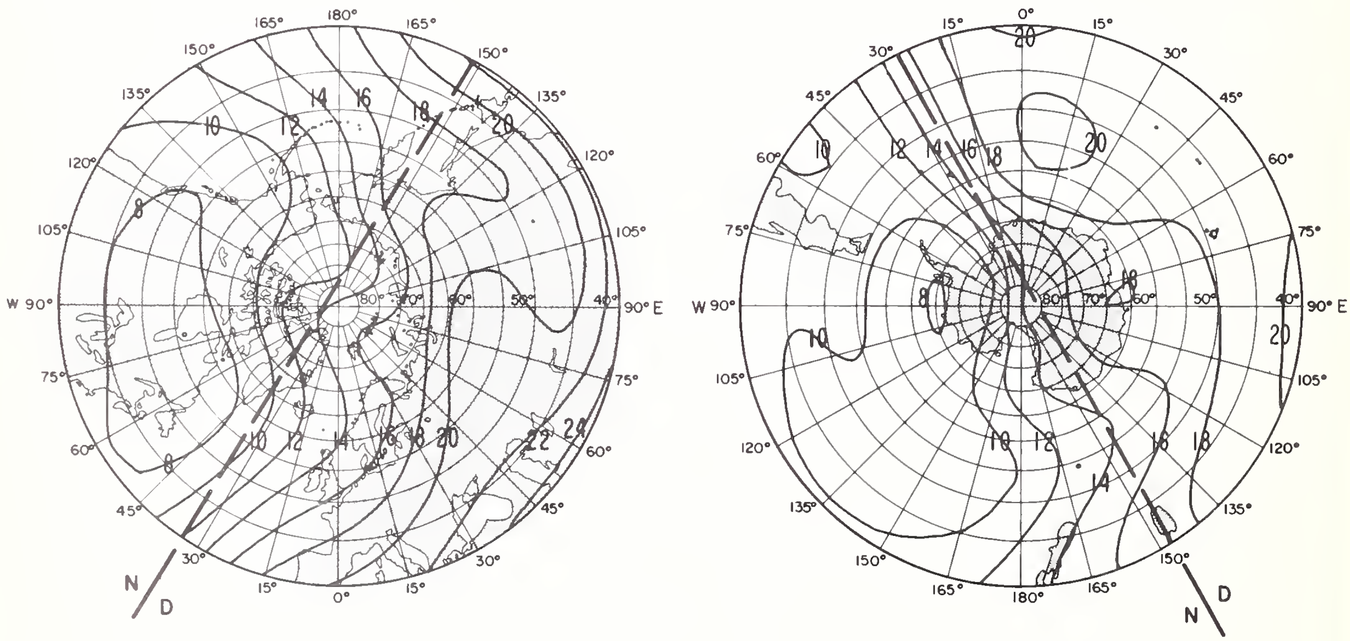

FIG. 17 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

SEPTEMBER 1965 UT = 10

NORTH POLAR AREA

SOUTH POLAR AREA

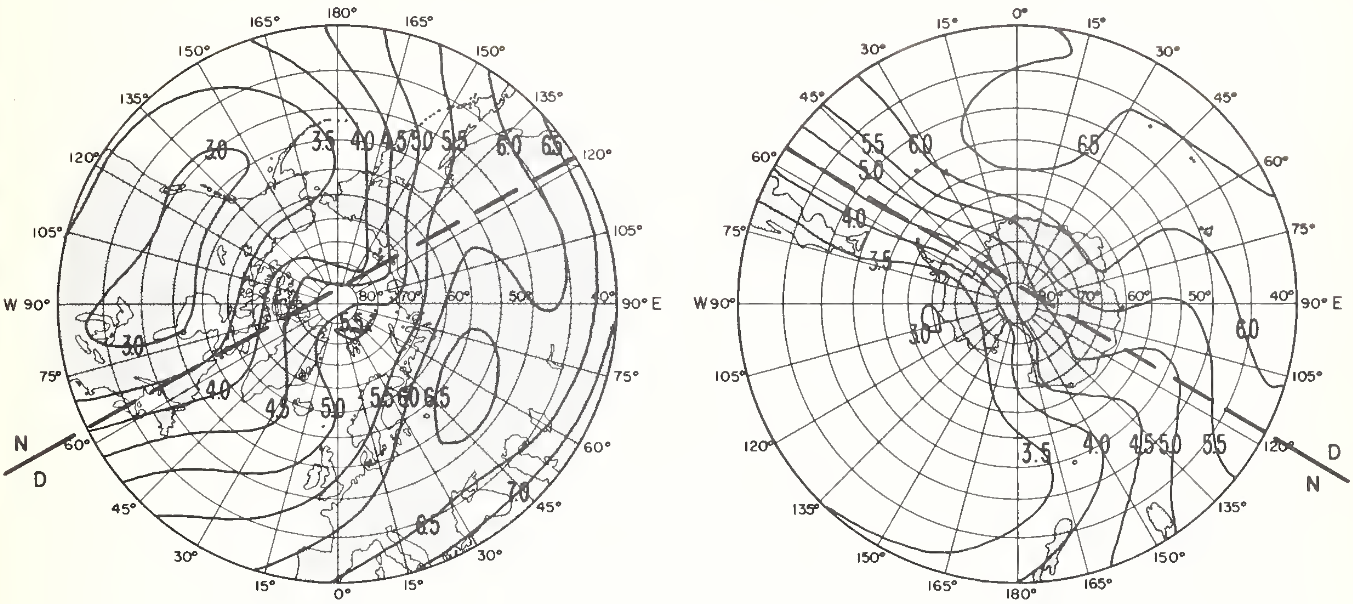

FIG. 18 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

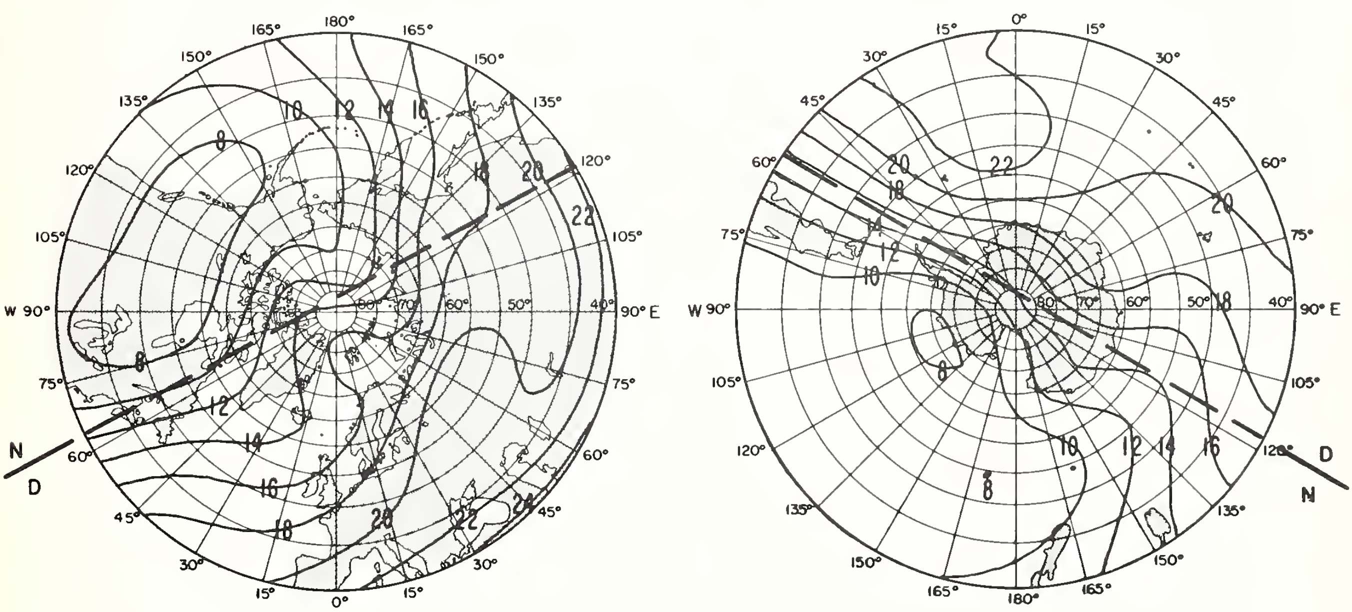

FIG. 18 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

SEPTEMBER 1965 UT = 12

NORTH POLAR AREA SOUTH POLAR AREA

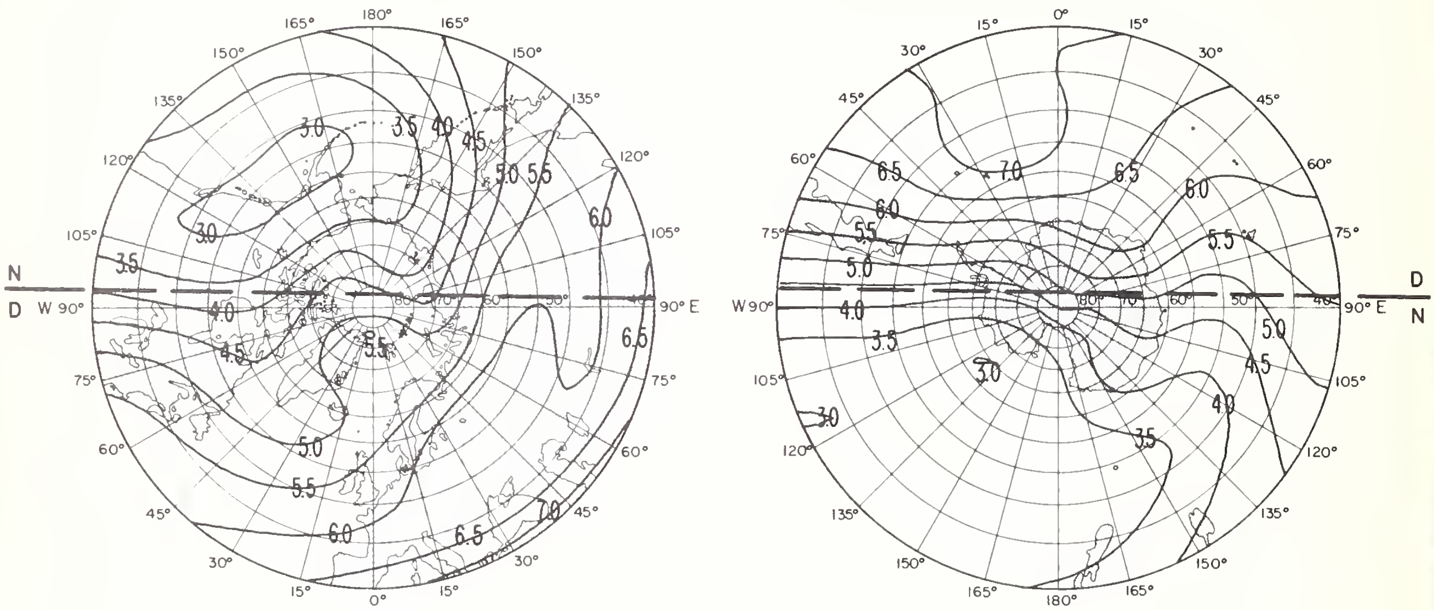

FIG. 19 A. PREDICTED MEDIAN MUF(ZERO)F2 (Mc/s)

NORTH POLAR AREA SOUTH POLAR AREA

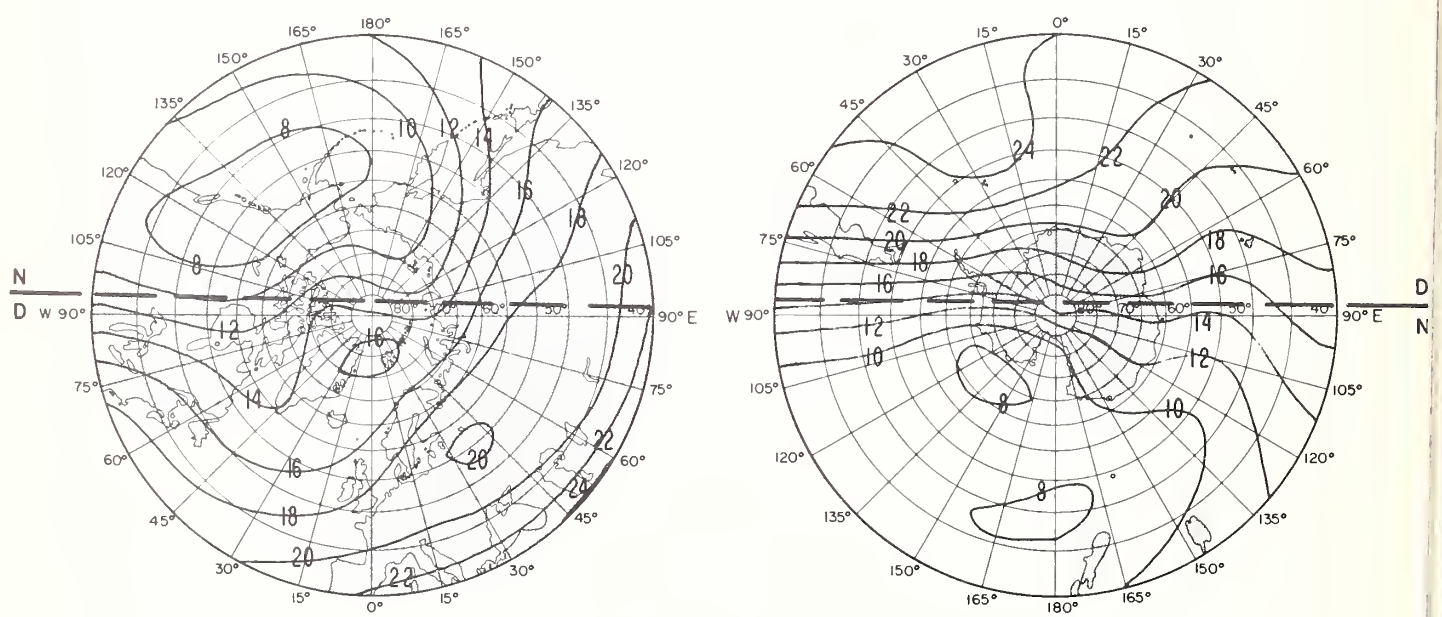

FIG. 19 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

SEPTEMBER 1965 UT = 14

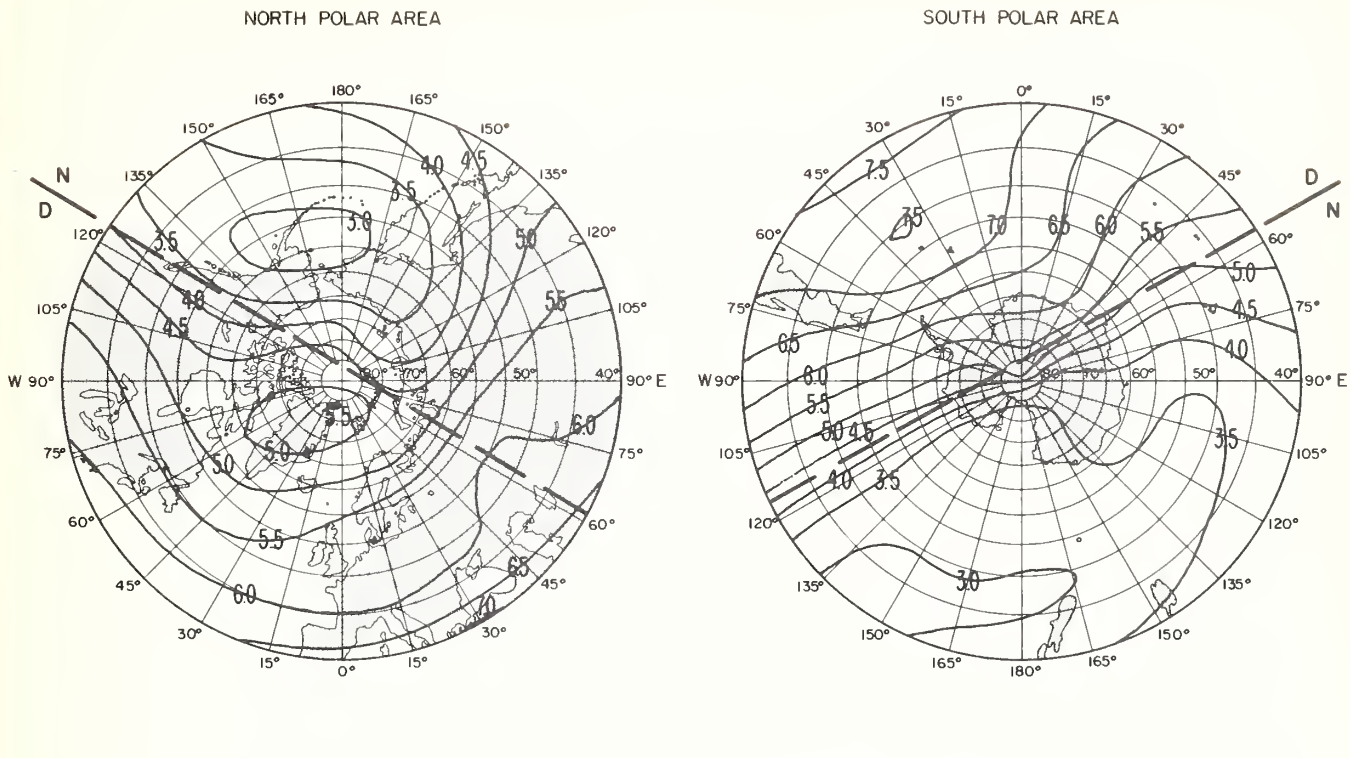

FIG. 20 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

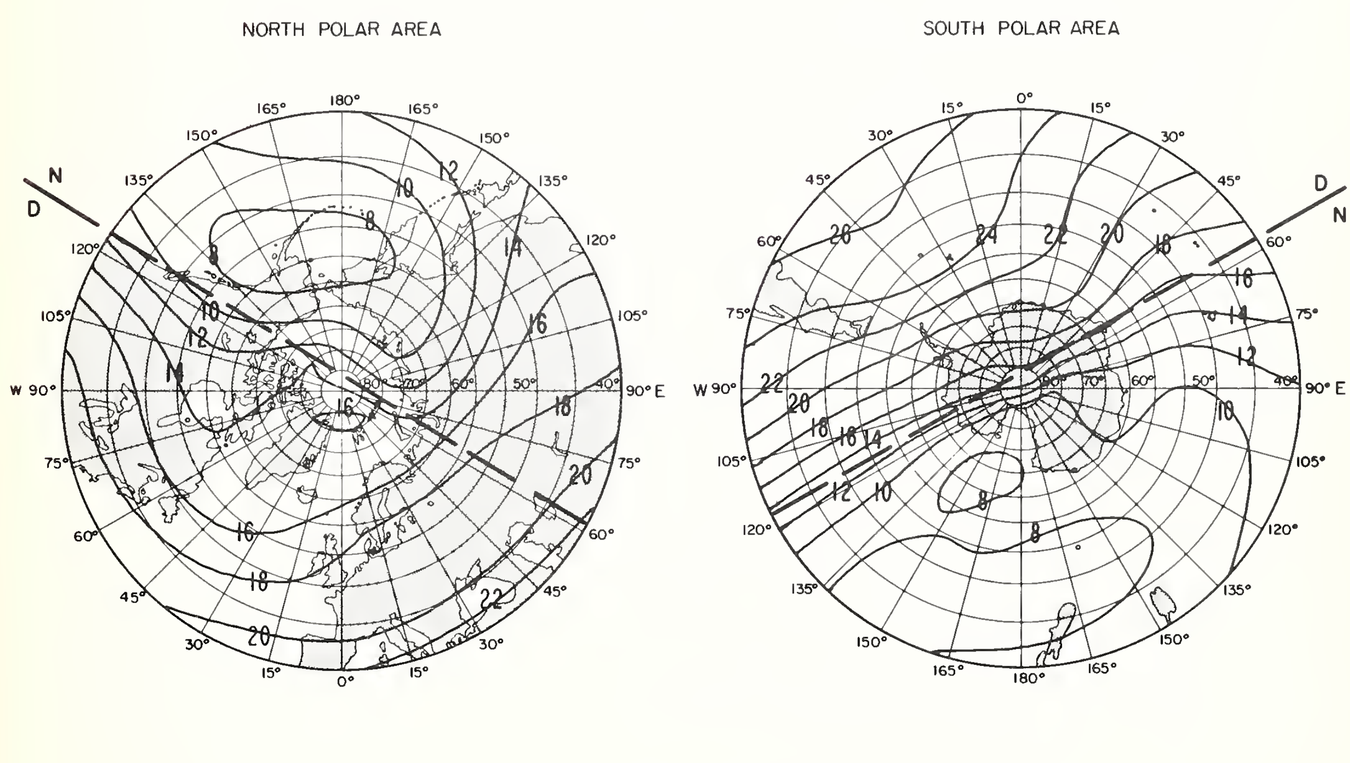

FIG. 20 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

SEPTEMBER 1965 UT = 16

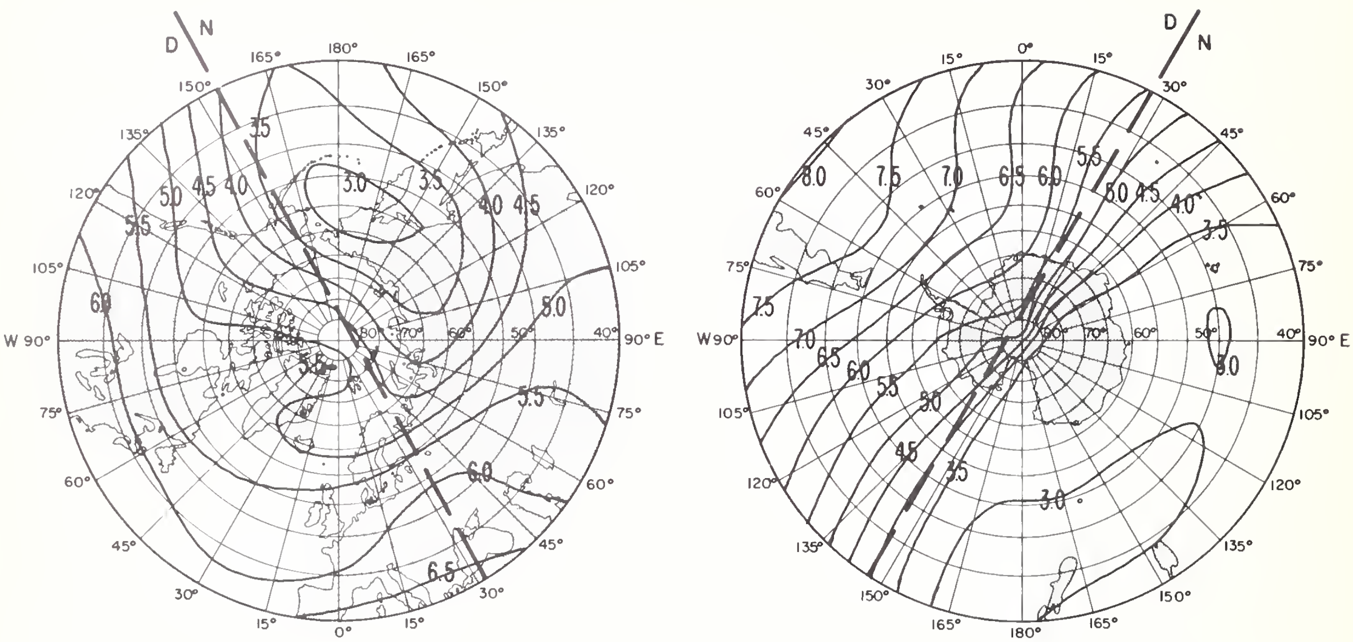

FIG. 21 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

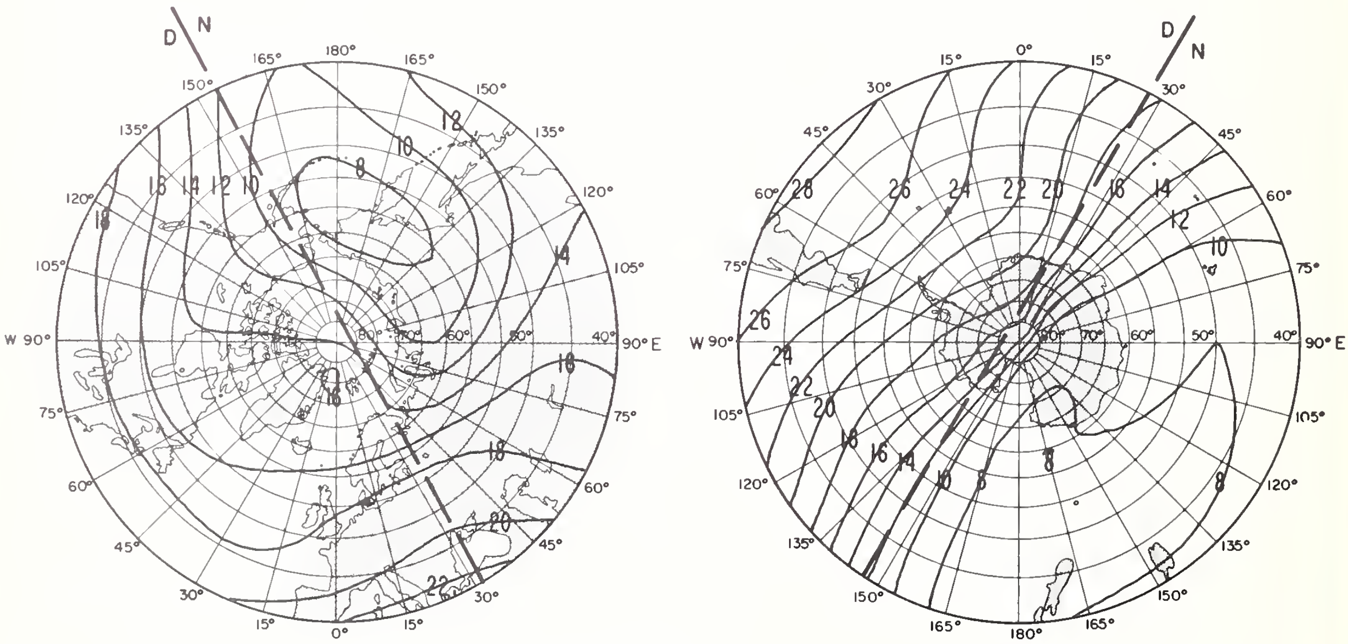

FIG. 21 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

SEPTEMBER 1965 UT = 18

NORTH POLAR AREA SOUTH POLAR AREA

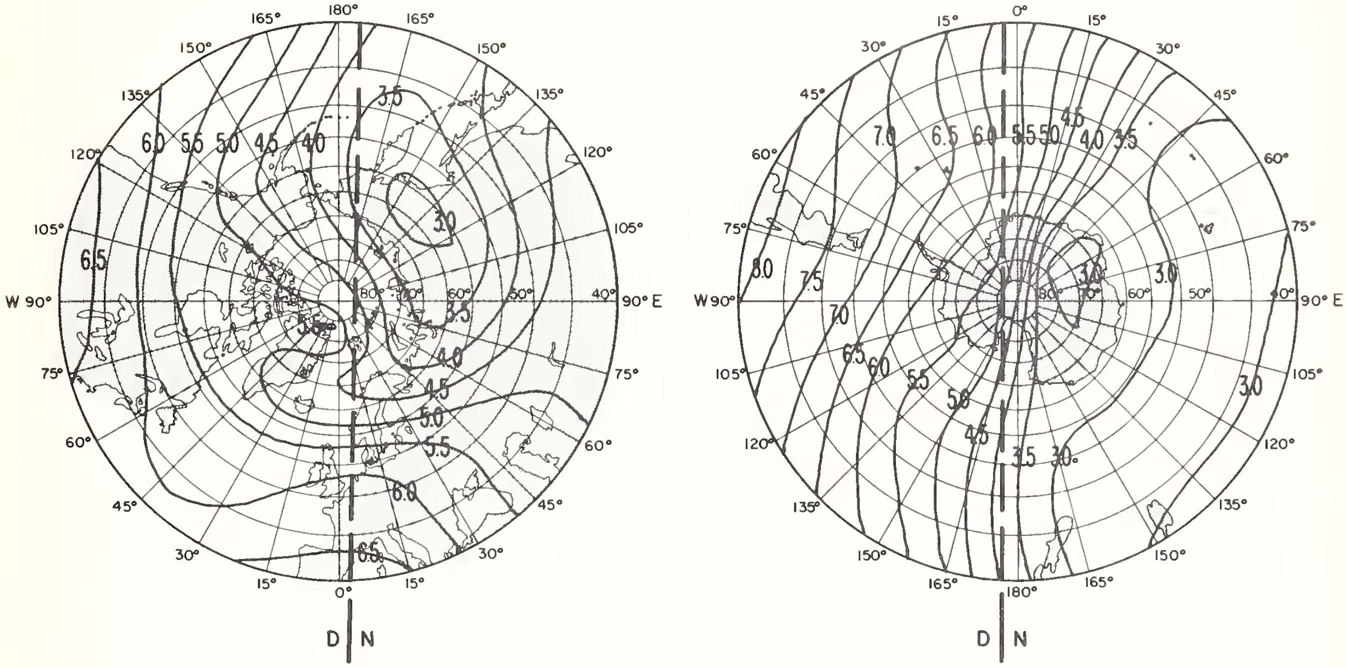

FIG. 22 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA SOUTH POLAR AREA

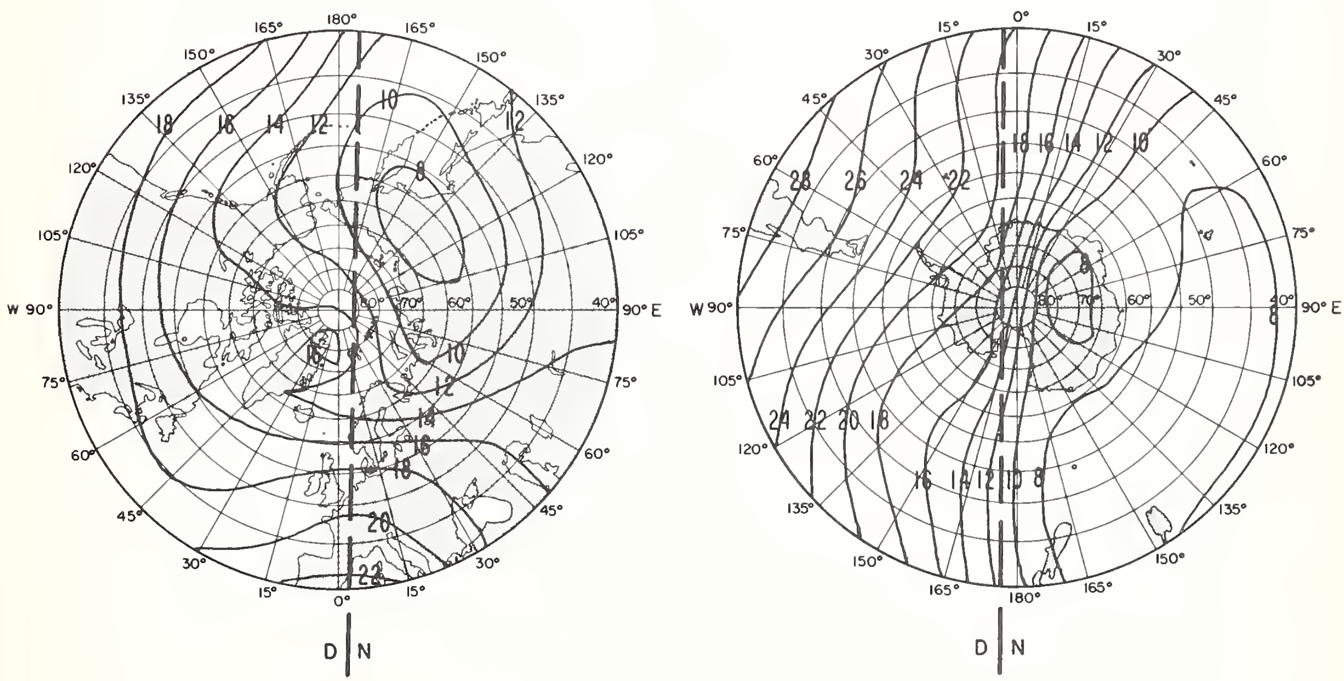

FIG. 22 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

SEPTEMBER 1965 UT = 20

NORTH POLAR AREA

SOUTH POLAR AREA

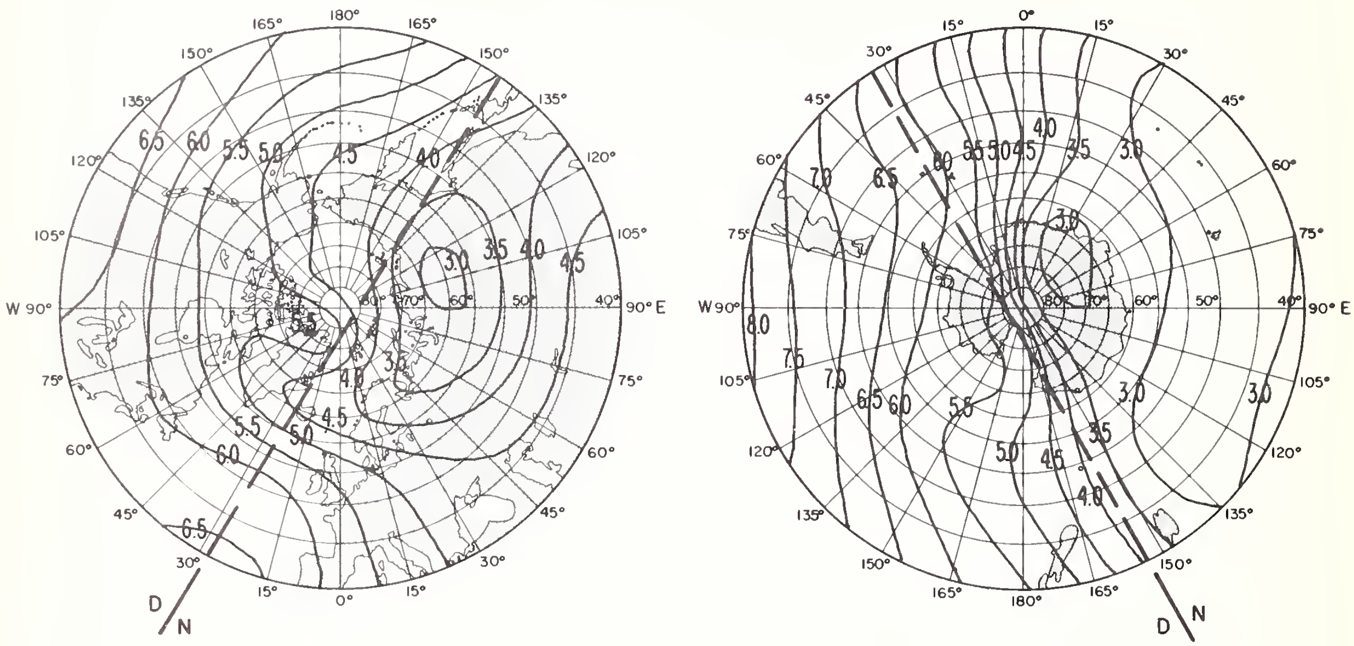

FIG. 23 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

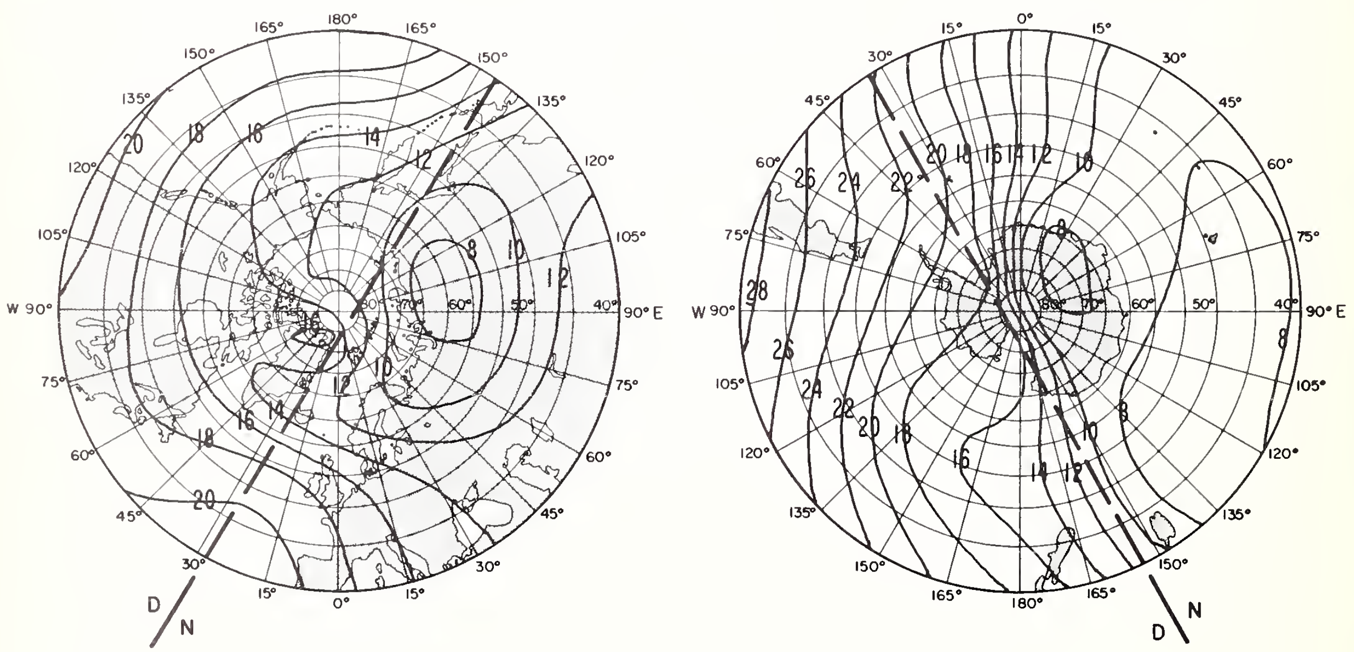

FIG. 23 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

SEPTEMBER 1965 UT = 22

NORTH POLAR AREA

SOUTH POLAR AREA

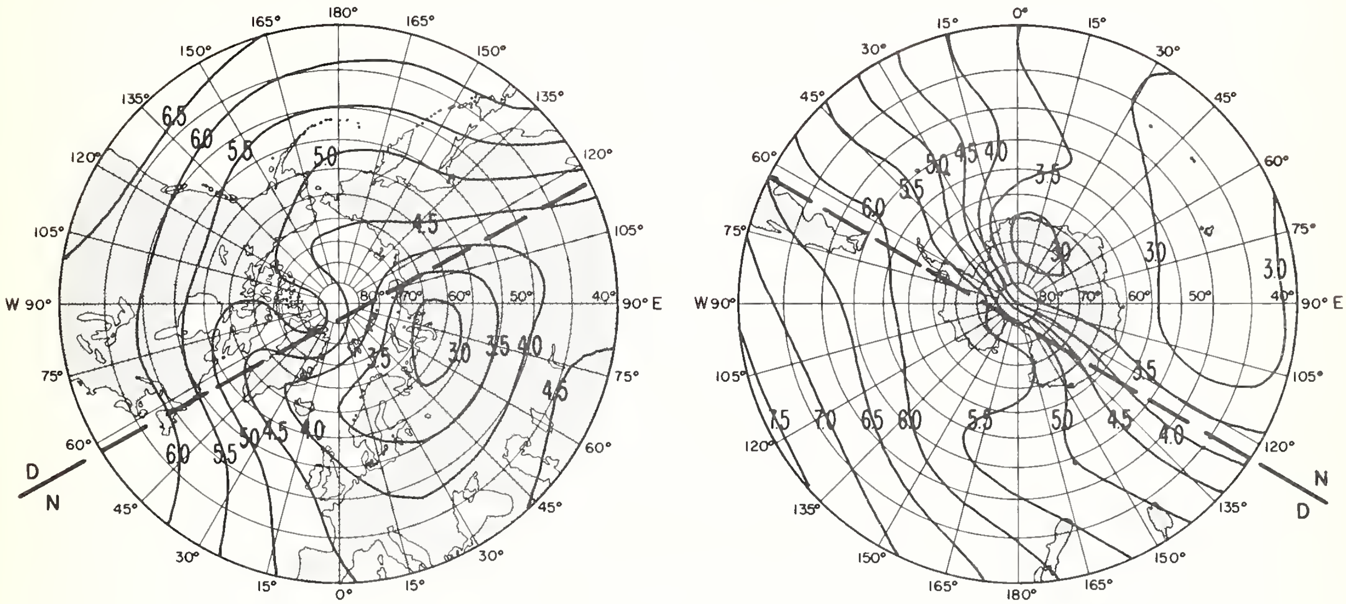

FIG. 24 A. PREDICTED MEDIAN MUF (ZERO) F2 (Mc/s)

NORTH POLAR AREA

SOUTH POLAR AREA

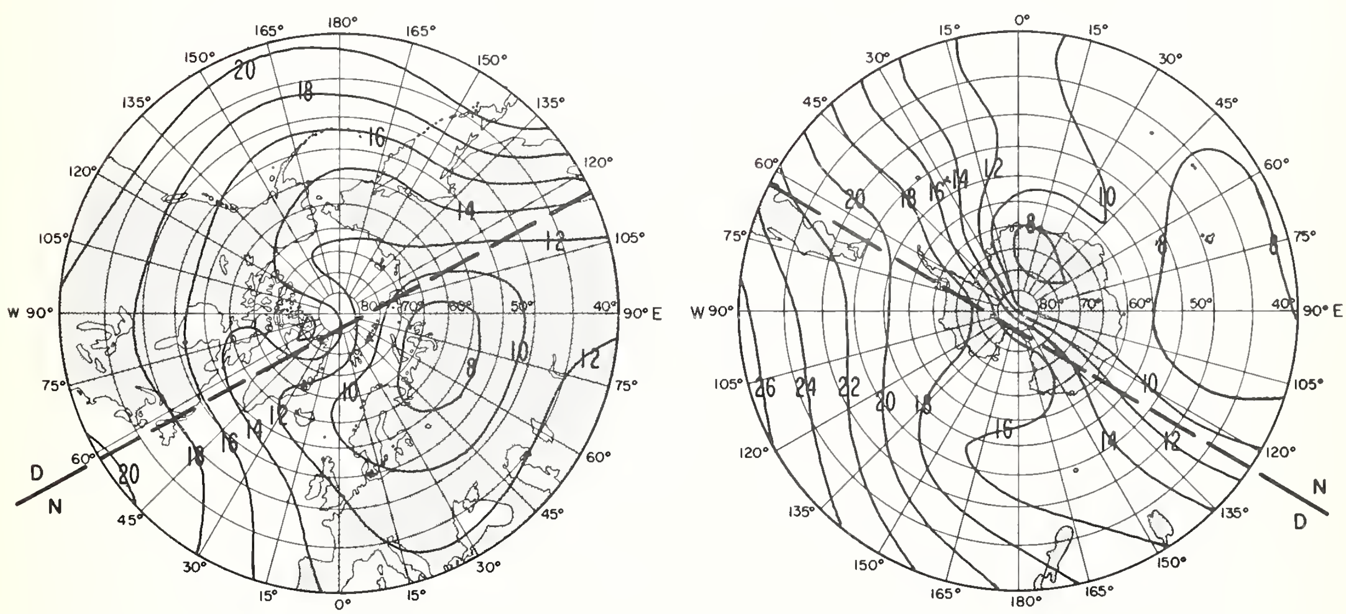

FIG. 24 B. PREDICTED MEDIAN MUF (4000) F2 (Mc/s)

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DEPARTMENTS OF THE ARMY
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WASHINGTON, D.C., 20301, *1 June 1965*

TB 11–499–30/TO 31–3–28, Central Radio Propagation Laboratory Ionospheric Predictions for September 1965, is published for the use of all concerned.

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NG: None.
USAR: None.
For explanation of abbreviations used, see AR 320–50.

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