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IONOSPHERIC AND RADIO PROPAGATION DISTURBANCES,

OCTOBER 1943 THROUGH FEBRUARY 1945.

This report gives an analysis of ionospheric and radio propagation disturbance, on a character-figure basis similar to the K figure of geomagnetic storminess, and a comparison of the IRPL forecasts with subsequently observed radio conditions. The scale chosen is that of the IRPL Radio Propagation Forecast, where estimates of the grade or quality of radio propagation are given on the following scale:

1 - useless	4 - poor to fair	7 - good
2 - very poor	5 - fair	8 - very good
3 - poor	6 - fair to good	9 - excellent

A number of radio traffic reports are regularly received by IRPL on the above scale. For the purpose of this analysis it was necessary to convert other forms of data to this scale, so that all the data could be combined into ionospheric character figures for local night and day conditions during the Greenwich day. The North Atlantic and North Pacific paths were considered separately.

The data not reported on the 1-9 scale of the forecasts were converted to that scale by the use of frequency distribution curves of the data, divided into nine class-intervals. Some of the reports already had the threshold level of disturbance determined; the Marconi and RCAC reports had such. For those where no definite threshold disturbance level already existed the data were split so that approximately 20-30% of the cases would be below this level; this agrees closely with the percentage of geomagnetic disturbance during that period. The conversion scales used are shown in Table 1. In all the conversions the maximum number of cases fell, as would be expected, between class-intervals 5 and 6, which represent normal conditions. The distribution curves for the most part were skewed toward the normal or quiet condition side. Sinde the reports were so varied in nature, it was not found possible in most cases to divide the class-intervals equally, but they were chosen to give as smooth a distribution curve as possible.

Several types of data were combined to try to present as complete a picture as possible of radio propagation conditions for each Greenwich day. The following agencies reported conditions using the 1-9 scale of the forecasts:

Alaskan Communication System of theU.S. Army;
Royal Air Force at Dorval, Canada
(reception from Goose, Iceland, and the United Kingdom);

(over) (111)

Royal Canadian Air Force (reception at Halifax, Ottawa and Vancouver);
Army Air Forces, North Atlantic Ferry Command;
Churchill, Canada (reception of WWV (5,000 kc), Washington, D.C. from 1800-0600 CST and WWV (10,000 kc), Washington, D.C. from 0600-1800 CST);
RCAC ratings of paths from Stockholm and Moscow to New York; London and Berne to New York;
Mackay ratings of paths from Moscow, Kaboul, and Bombay to New York and from Europe to New York.

Other reports, using a 1-9 scale which was modified in each case to fit the frequency distribution scales, were included:

Ottawa, Canada (reception from Southern England from 0600-1800 CST);
British Broadcasting Co. (reception of BBC Stations at Portland, Oregon; Phoenix, Arizona; St. Louis, Mo.; Cincinnati, Ohio; Indianapolis, Ind., and New York, N.Y.);
RCAC rating of paths from China to San Francisco;
Mackay hourly signal strengths over path from Chungking to San Francisco.

Commercial system reports were included as follows:

Marconi Co. rating of the Montreal to United Kingdon path;
RCAC rating of the North Atlantic path;
T.D. Figures of theBell Telephone Laboratories.

Radio traffic data, in the form of figure-of-merit ratings on a scale of 0 to 10 (0 representing no transmission possible and 10 perfect transmission), were used for the following paths:

Moscow to New York;
Chungking to San Francisco.

Radio field-intensity data were used in four ways. GSD, JZJ, and WWV (10,000 kc) recorded at College, Alaska, were included by counting the hours of transmission each day below the minimum reliable value of the recorder, thereby correlating disturbed comditions with a greater number of hours below minimum. WWV (10,000 kc) as recorded at Reykjavik, Iceland was used by counting the number of hours of transmission equal to the minimum reliable value of the recorder. Data for WWV (2,500, 5,000, 10,000, and 15,000 kc), as received at Kodiak, Alaska, were used by counting the number of hours of transmission on each frequency and combining the 2,500 kc and 5,000 kc for night conditions and the 10,000 kc and 15,000 kc for day conditions. GLH, Dorchester, Englan (13,525 kc), received at Riverhead, Long Island, N.Y., was included by using the percentage of hours of transmission for the day for which the intensities were less than the median values of hourly intensities for the month.

Finally, ionospheric data, in the form of a measure of auroral-zone absorption, was used by totaling the f_{min} (minimum received frequencies at

vertical incidence) for alternate hours of the day at College, Alaska. Also the total number of hours of f°f2 reported from local noon to local noon at Churchill, Canada, which, as stated in IRPL-C17, correlates well with radio disturbance, was included.

The conversion scales for the various types of radio propagation data are shown in Table 1. For analysis, the data were divided into four groups; North Atlantic local night (0100-1200 GCT, North Atlantic local day (1300-2400 GCT), North Pacific local day (0100-1200 GCT), and North Pacific local night (1300-2400 GCT). Character figures derived from the conversion scales were averaged in each case. The half day was considered disturbed if the average figure was 4 or lower and a quiet day if it was 5 or higher. Tables 2-5 are sample tables of the converted reported radio propagation data for each case.

It is at once evident that there is no unanimous agreement among the reported data as to what the quality of radio propagation is on a given day. On a day like 16 Dec. in Table 3, for example, where 16 out of 20 reports were only "fair" or worse, and two reports were "useless", nonetheless four reports were "fair to good" or better. On the other hand, on a day like 26 Dec., where 18 out of 20 reports were "fair to good" or better, two reports were still "fair" or worse. Even reports over the same paths do not always agree; on 20 Dec. the RCAC London-New York rating was "good" and the A.T. and T. "TD" rating was only "fair to poor". Any overall radio propagation quality rating therefore can be at best only a "consensus" rating, i.e., if most observers agree that conditions are bad, the day is probably disturbed. Hence the average of all reported ratings, converted to a common scale, was adopted as the radio propagation quality figure for the day.

Tables of the type of Tables 2-5 were made, including all data received for the period October 1943 through December 1944. Tentative tables for the North Atlantic path for January and February 1945 were also prepared.

Tables 6 and 7 list the radio propagation quality figures by days and months for the North Atlantic path and the North Pacific path, respectively. Disturbed ratings are those of 4 or less and are indicated by figures in parentheses. Table 8 lists the geomagnetically disturbed days based on an average K_A figure 2.5 for the Greenwich day. There was a higher percentage of geomagnetically disturbed days than days of radio disturbance. During the period October 1943 through February 1945 there were 27% of the former as against 20% of the latter based on the North Atlantic path ratings. The coefficient of correlation for the North Atlantic half-day rating against the corresponding half day K_A sum was 0.6294-0.0127 with the standard deviation of the K_A sum from the line of regression of 3.13. Fig. 1 shows this graphically. If the K_A sum for the half day was 11 or greater, the probability was high that the day was one of radio propagation disturbance. There were days of geomagnetic disturbance not accompanied by radio propagation disturbance. There seems to be some tendency for severe geomagnetic and radio propagation disturbance to be coincident, but after the geomagnetic conditions become quiet, moderate to slight radio propagation disturbance lingers on.

The graph of Fig. 2 shows the percentage of days of radio propagation disturbance month by month for the North Atlantic and the North Pacific paths, respectively. It illustrates well the fact that from June 1944 on there were comparatively few disturbances compared to the period up to then. During the period October 1943 through May 1944, when disturbances were relatively frequent, the graph for the North Atlantic ratings indicates greater occurrence of disturbances during the equinoctial periods, the peak of maximum disturbance being in October 1943, with a secondary peak in March 1944. The rise in December 1944 and January 1945 can be attributed to a greatly increased amount of solar activity during those months. A sunspot group of area greater than 1000 millionths of the sun's disc passed the sun's central meridian on 13-14 December and was associated with the great ionosphere storm beginning on 16 December.

Fig. 2 shows also that, except for January 1944 and December 1944, there were appreciably more disturbances over the North Atlantic path than over the North Pacific one; from October 1943 through December 1944, 21% of the days were disturbed for the former as against 14% for the latter. An explanation of this might be that 50% of the North Pacific path ratings are based on the Chungking to San Francisco path. Although this is a very long path with sharp contrast periods at sunrise and sunset and hence very sensitive to disturbance, it is not an auroral zone path such as those used in the North Atlantic ratings. Thus, disturbances spreading out from the auroral zone would not ordinarily affect this path as soon as they would North Atlantic paths, there would be fewer North Pacific disturbances, and they would tend to lag behind the North Atlantic ones. The disturbance ratings seem to bear this out; for example, the disturbance pattern beginning 23 October 1943 for the North Atlantic begins 24 October 1943 for the North Pacific. It should be pointed out that fewer ratings are available for the North Pacific than for the North Atlantic area, and thus the ratings are less reliable. More data need to be available before such an effect can be definitely established. Very severe disturbances seem to spread rapidly and are coincident for both the North Atlantic and North Pacific paths.

Recurrence tendencies are shown in Tables 9-12 and in Fig. 3; these are based on the North Atlantic radio propagation quality figures. In the tables the disturbed half or whole days indicated by D are listed on 26-, 27-, 28- and 29- day recurrence patterns. The 27-day table shows two more recurrences than the 28-day table and these two tables are definitely better than either the 26- or 29- day tables. The pattern of the 27-day table was best in grouping the disturbances in one part of the cycle rather than scattering them throughout the cycle. Until May 1944 the 27-day recurrence tendency was quite pronounced, but after that month, while passing through the end of the current sunspot minimum, there was no evident recurrence tendency. This is also shown in Fig. 3 which was constructed by using the superposed epoch method, combing the North Atlantic half-day radio propagation disturbance ratings, before and after disturbed days, for the two periods October 1943 through May 1944 and June 1944 through February 1945, respectively. In the first period the disturbances recurred 27- to 28- days later, but for the second period no recurrence was evident. The overall degree of disturbance is shown by the mean average quality

figures for the two periods - 5.05 and 6.05 respectively. The periods also show a contrast in that for October 1943 through May 1944 the pattern of disturbance around zero day is much broader as well as reaching a greater percentage deviation from average, indicating a greater degree of disturbance. The 0100-1200 GCT part of the day is much more disturbed than the 1300-2400 GCT part in each of the two cases.

Tables 13-28 show comparisons of the North Atlantic and North Pacific radio propagation quality figures with the IRPL warnings and with the IRPL A-zone short-time forecasts, and comparisons of the ISIB warnings with the North Atlantic ratings. H (hit) represents a quality figure of 4 or lower for a half or whole day for which a warning was given or for which the forecast was 4 or lower. M (miss) represents a quality figure of 4 or lower for a half or whole day for which no warning was given or for which the forecast was 5 or higher. G (good) represents a quality figure of 5 or higher for which no warning was given or for which the forecast was 5 or higher. S (superfluous) represents a quality figure of 5 or higher for which a warning was given or for which the forecast was 4 or lower.

Table 13 compares the IRPL daily radio disturbance warning with the North Atlantic quality figures. Except for the months of August and September 1944, the number of correct warnings or no warnings were considerably better than random choice of disturbed days. The failures of those two months is explained by the fact that during those months there were hardly any disturbances, and thus, on the basis of the recurrence tendency which had been well marked until then, many "S" warnings were given. The series of "S" warnings in the middle of September was due to the expectation that the first sizeable sunspot group of the new cycle would be followed by disturbance, and it was not. However, in the total period, radio propagation conditions were no better than fair after 46% of the "S" warnings. After October 1944 no disturbances were missed in the warnings; in that month, and subsequently, the use of the addition of visual magnetograph observations and direction-finder observations over the North Atlantic path to the other geomagnetic, solar and ionospheric data received on a daily basis greatly improved accuracy of the warnings.

Table 16 compares the ISIB warnings with the North Atlantic disturbance ratings. It will be noted that the ISIB issued fewer "S" warnings. However, in the period subsequent to October 1944 the ISIB missed seven disturbances whereas the IRPL missed none. Also, as stated above, many of the "S" warnings of the IRPL were followed by conditions no better than fair so that there is some justification for their having been given.

Table 19 compares the IRPL daily radio disturbance warnings with the North Pacific quality figures. There were fewer North Pacific disturbances and although almost the same percentage of disturbances were warned for correctly as in the case of the North Atlantic ratings, there were far too many "S" warnings given for this path. This is understandable in that the daily IRPL warning is based for the most part on North Atlantic data. This indicates that, in order to eliminate the issuance of so many "S" warnings for the North Pacific area, it would be advisable to set up a warning service for that area at some point on the Pacific coast, making use especially of up-to-the-minute direction finder observations, geomagnetic observations, and local ionospheric data.

Table 22 summarizes the data shown in Tables 13-21. It will be noted that in the period February 1944 through February 1945 the IRPL correctly forecast a higher percentage of the disturbed days than the ISIB; this is especially true since October 1944. On the other hand the ISIB have correctly forecast a higher percentage of good or quiet days. As stated above, most of the "S" warnings of the IRPL were followed by days that were only fair; warnings were given for 51% of the fair days by the IRPL as against 19% for the ISIB. The geometric mean of all days correctly forecast is 70.6% for the IRPL vs. 73.9% for the ISIB. Therefore if the user is interested in being warned beforehand of the probability of disturbance to follow, the IRPL daily warning was preferable, but if he is more interested in having quiet days correctly forecast the ISIB warning was preferable. The IRPL daily warnings against the North Pacific quality figures show only a slightly smaller percentage of (disturbed or good), days incorrectly forecast as compared to the North Atlantic quality figures but a very great increase in the number of good days for which warnings were given, since only 29% of the "S" warnings were followed by fair conditions. This again indicates the advisability of a North Pacific warning service from some place on the west coast.

Table 23 compares the IRPL-"A"-zone short-time (weekly and semi-weekly) forecasts with the North Atlantic radio propagation quality figures. During the period October 1943 through February 1945 65% of the days were correctly forecast for the North Atlantic path. During the period through May 1944 comparatively few disturbances were missed. After that month, however, because of the failure of the 27- to 28-day recurrence tendency, the problem of forecasting four to ten days in advance was very difficult. Statistical solar relationships of disturbance expected (a) three to four days after appearance of high green line coronal intensities in the east limb of the sun, (b) four days before up to central meridian passage of large calcium-floccular regions, and (c) two days before to three days after central meridian passage of large area sunspot groups, were used as the basis for radio disturbance forecasting.

These relationships were worked out on data obtained toward the end of the last sunspot cycle, involving low solar latitude regions for the most part, and are shown graphically in Fig. 4. Similar analyses, shown in Fig. 5, for the period Octover 1944 through March 1945, show much less definite correlation, during that period, of disturbances with high coronal intensities or large area calcium floccular regions. The coronal relationship apparently shifted to seven to nine days after east limb appearance, and only the period from two days before through central meridian passage of large calcium floccular regions tended to be disturbed. The large area sunspots indicated a pattern of disturbance beginning at the day of central meridian passage rather than two days before as in the earlier period. At the beginning of the new sunspot cycle the active solar regions are mostly in high latitudes, and this possibly explains the change in relationships. The fewer number of disturbances after May 1944, together with the apparent change in solar-radio relationships, explains the difficulties of forecasting in this period.

As with the daily radio disturbance warnings, many of the "S" forecasts were for days with no better than fair conditions. In general the forecast ratings for disturbance were not displaced by more than one to three days, so even though the exact day of disturbance was missed the general period for expecting disturbances was, on the whole, correct. Until the 27- to 28-day recurrence pattern begins to be evident again, or the solar relationships more pronounced, the semi-weekly forecast has to be considered as merely indicating the general period likely to be disturbed, and the IRPL daily warning revises the forecast as needed. During the period from October 1943 through February 1945 65% of the days were correctly forecast for the North Atlantic path.

Table 26 compares the IRPL "A"-zone forecasts with the North Pacific radio propagation disturbance ratings. Since there were fewer North Pacific than North Atlantic disturbances there are many more "S" forecasts, as in the case of the daily warnings, but the majority of these were on fair days. A higher percentage of disturbed days were correctly forecast for the North Pacific path, probably because there were fewer disturbances for this path. During the period from October 1943 through December 1944 63% of the days were correctly forecast.

The correlations of the half-day radio propagation quality figures with the IRPL "A"-zone forecasts for the North Atlantic and North Pacific case, 1300-2400 GCT, it is seen that the forecast tended to be a degree lower than actual conditions whereas for 0100-1200 GCT, which are the more disturbed hours, the agreement between forecast and observed conditions was greater, as should be expected. The correlation between the forecasts and the North Pacific radio propagation disturbance ratings were somewhat lower, as was indicated by the discussion above. In this case the forecasts were more severe than observed conditions. This should be expected from the fact that there were fewer North Pacific disturbances observed. The best fit of forecast and observed conditions was for the North Atlantic, 0100-1200 GCT, (local night). This was the most disturbed of the four cases. In evaluating the correlation it should be remembered that the purpose of the forecasts was to cover radio disturbances rather than quiet conditions.

Further studies of relationships between solar activity and radio disturbances are in progress, and it is expected that better statistical relationships will be discovered. As the new sunspot cycle progresses it is to be hoped that the 27- to 28-day recurrence pattern will again become evident and of assistance in improving the forecasts.

As the radio data become available North Atlantic and North Pacific radio propagation quality ratings for each month will be prepared and issued regularly in the IRPL-F series reports. As more data become available it may be necessary to change the conversion scales which were used in this report. Such changes will be reported from time to time, as necessary.

The radio propagation quality ratings as described in this report are issued in the hope that they may prove useful in analysis of radio propagation conditions as affected by geomagnetic and ionospheric disturbances and solar activity.

Table I

Conversion Scales for Radio Propagation Quality Data

	0	1	2	3	4	5	6	7	8	9	Radio Propagation Quality Figure
No. of hrs. mean to noon GST		0-2	3	4-5	6	7	8	9	10	11-12	Hours of F2 at Churchill, Canada
Average of actual condition reports.		0.0-1.5	1.6-2.5	2.6-3.5	3.6-4.5	4.6-5.5	5.6-6.5	6.6-7.5	7.6-8.5	8.6-9	WWV (5 Mc 1800-0600 GST and 10 Mc 0600-1800 CST) at Churchill, Canada; RAF and AAF Reports
Average of 0100-1200 GCT and 1300-2400 GCT.		4.75-5.0	4.0-4.75	3.25-4.0	2.5-3.25	2.0-2.5	1.75-2.0	1.5-1.75	1.25-1.5	0-1.25	Marconi Rating, Montreal to U.K.
Average of 0600-1800 EST and 1800-0600 EST- 2 values for each.		4.75-5.0	4.0-4.75	3.25-4.0	2.5-3.25	2.0-2.5	1.75-2.0	1.5-1.75	1.25-1.5	0-1.25	RCAC N. Atlantic Rating
Average of 2 values for 0600-1800 and 1800-0600 EST		1-1.5	2-2.5	3-3.5	4-4.5	5-5.5	6-6.5	7-7.5	8-8.5	9	RCAC Moscow and Stockholm, London and Berne to N.Y.
Figures of merit from traffic logs.	0	1	2	3	4	5	6	7	8	9-10	Moscow to New York Figure of Merit
As reported.		7.5-up	6.5-7.5	5.5-6.5	4.5-5.5	3.5-4.5	2.5-3.5	1.5-2.5	1-1.5	0-1	T.D. Figures (Bell Labs.)
No. of hrs. & min. recordable value	22-24	19-21	16-18	13-15	10-12	7-9	4-6	1-3	0		OSD at College, Alaska
Hours received--- 2.5 and 5 Mc converted values averaged for 0100-1200 GCT		0-2	3-4	5-6	7-8	9-10	11-12	13	14	15	WWV 2.5 Mc at Kodiak, Alaska
		0-2	3-4	5-6	7-9	10-11	12-14	15	16	17-24	WWV 5 Mc at Kodiak, Alaska
10 and 15 Mc converted values averaged for 1300-2400 GCT.		0	1-2	3-5	6	7-8	9-10	11-13	14-15	16-24	WWV 10 Mc at Kodiak, Alaska
		0	1-2	3	4	5	6	7	8	9 up	WWV 15 Mc at Kodiak, Alaska
Average of Goose Bay and St. John's to Halifax, Halifax to Ottawa, Prince George to Vancouver.		1.5	2.5-3.5	3.6-4.5	4.6-5.5	5.6-6.5	6.6-7.5	7.6-8.5	8.6-9		Canadian Ratings of RCAF
Av. of reception of U.K. at Portland, Ore., Phoenix, Ariz. St. Louis, Mo, Indianapolis, Ind., New York, N.Y.		1.9	2.0-2.4	2.5-2.9	3.0-3.4	3.5-4.4	4.5-4.9	5.0-5.4	5.5-5.9	6.0-9	British Broadcasting Co. Ratings.
No. of hrs. & min. recordable value			22-24	18-21	15-17	9-14	4-8	2-3	0-1		WWV 10 Mc at Reykjavik, Iceland
% of hrs. of field & median value			100	95-99	90-94	85-89	75-84	70-74	55-69	0-54	GLR at Riverhead, N.Y.
No. of hrs. & min. recordable value		24	22-23	21	17-20	13-16	10-12	7-9	3-6	1-2	WWV 10 Mc at College, Alaska
0600-1800 EST Average of 2 values		0	1	2	3	4	5	6	7	8	Ottawa, Canada, to S. England
Total of 12 hrs. fmia.		119.9	110-109.9	90-89.9	60-59.9	40-39.9	20-19.9	10-9.9	5-4.9	0	College, Alaska Absorption
Average of 2 values each on 1-9 scale		1.4-0	1.9-1.5	2.4-2.0	2.9-2.5	3.4-3.0	3.9-3.5	4.4-4.0	4.9-4.5	6.5-up	RCAC Chiam to S.F. 2000-0600 PWT
		1.4-0	2.0-1.5	2.5-2.1	3.0-2.6	3.5-3.1	4.0-3.6	4.5-4.1	5.0-4.6	6.5-up	RCAC Chiam to S.F. 0800-2000 PWT
Average of signal strength values on 1-9 scale		0.9-0	1.8-1.0	2.4-1.5	3.1-2.5	3.7-3.2	4.3-3.8	5.4-4.4	6.5-5.5	7.5-up	Mackay Chungking to S.F 0100-1200 GCT
		0.9-0	1.9-1.0	2.9-2.0	3.9-3.0	4.9-4.0	5.9-5.0	6.9-6.0	7.9-7.0	8.0-up	Mackay Chungking to S.F. 1300-2400 GCT
Average of 12 hourly values from figures of merit from traffic logs		0.9-0	1.4-1.0	1.9-1.5	2.5-2.0	3.2-2.6	3.9-3.3	4.9-4.0	5.9-5.0	6-up	Chungking to S.F. 0100-1200 GCT
		2.4-0	2.9-2.5	3.2-3.0	3.9-3.3	4.4-4.0	5.4-5.0	6.9-6.5	7.5-up	7-up	Chungking to S.F. 1300-2400 GCT
No. of hrs & min. recordable value		21-24	18-20	15-17	12-14	9-11	6-8	4-5	2-3	0-1	JZJ at College, Alaska
As reported.		1	2	3	4	5	6	7	8	9	Mackay Ratings, Alaskan Communications System

Table 2

North Atlantic Radio Propagation Quality Figures
Local Night 0100 - 1200 GCT

December 1944

Day	Hrs. of F_2 at Churchill, Canada	WWV 5 Mc(1800-0600 CST) Churchill, Canada	Marconi-Montreal to U.K. 0100-1200 GCT	RAF Dorval to Goose, Iceland and U. K.	AAF North Atlantic Command	RCAC-North Atlantic (1800-0600 EWT)	RCAC Moscow-Stockholm to N.Y.	RCA London & Berne to N.Y.	Mackay-Moscow, Kabool, Bombay	Mackay-European	Moscow to New York 0100-1200 GCT.	T.D. Figures	GSD at College, Alaska	WWV 2.5 & 5 Mc at Kodiak, Alaska	Canadian Ratings of RCAF	British Broadcasting Co. Ratings	Average Quality Figures
1	5	8	6	(4)	6	8	(4)	5	7	8	9	8	7	7	6	5	6
2	(4)	6	5	6	5	8	(1)	(4)	6	7	9	7	5	7	6	7	6
3	(3)	(4)	5	5	5	8	(2)	(4)	7	8	6	7	(3)	7	8	(4)	5
4	5	6	(4)	(4)	5	8	(3)	6	6	7	6	7	(4)	5	9	6	6
5	5	5	(4)	6	5	8	(2)	(3)	7	7	8	7	5	5	9	5	6
6	5	5	5	6	5	8	(3)	(4)	5	5	7	7	(4)	5	7	6	5
7	5	6	(4)	5	6	8	5	5	7	7	6	8	5	6	8	6	6
8	6	(4)	(4)	5	6	6	(4)	(4)	7	8	9	8	7	7	6	5	6
9	5	7	5	6	6	8	(3)	6	8	9	9	8	6	6	9	7	7
10	5	7	6	6	5	8	6	7	8	8	9	8	7	7	8	6	7
11	6	9	6	6	5	8	(3)	7	8	8	7	8	6	6	8	8	7
12	5	8	6	5	6	8	6	7	8	8	8	8	6	6	8	7	7
13	6	5	5	6	5	8	(4)	6	5	7	9	7	5	6	8	6	6
14	(4)	(2)	(3)	(3)	5	(4)	(3)	6	5	6	(4)	6	(2)	6	5	5	(4)
15	5	5	(4)	(3)	5	(4)	(2)	(3)	6	6	7	7	(2)	6	(4)	5	5
16	5	7	5	6	5	(4)	(2)	(3)	7	(3)	9	(3)	(2)	6	8	(2)	5
17	5	(3)	(3)	(2)	5	5	(1)	(2)	(2)	(3)	6	(2)	(2)	(4)	5	(2)	(3)
18	(2)	(3)	(2)	(2)	5	5	(1)	(1)	5	(4)	5	(4)	(2)	(2)	(4)	(2)	(3)
19	5	(4)	(4)	5	5	6	(2)	(2)	(4)	5	7	(4)	(2)	(1)	6	(2)	(4)
20	6	6	5	6	5	5	(1)	(2)	6	6	7	(4)	(4)	5	7	(4)	5
21	5	5	5	6	5	5	(4)	5	7	7	9	(4)	(4)	(4)	7	5	5
22	6	7	5	5	5	6	(3)	6	7	8	9	6	5	(4)	6	(4)	6
23	6	7	6	7	6	6	5	6	6	7	8	5	6	5	6	6	6
24	6	8	6	8	6	8	5	6	7	7	9	5	6	5	8	7	7
25	5	8	6	8	6	8	5	6	7	7	9	6	6	8	8	7	7
26	6	7	8	8	6	8	5	7	8	8	9	5	7	8	6	7	7
27	5	6	(4)	5	5	8	(4)	6	(4)	6	9	(2)	(3)	7	5	(4)	5
28	5	5	(4)	(3)	5	(3)	(1)	(1)	(4)	5	6	(2)	5	(2)	6	5	(4)
29	5	5	(4)	6	5	8	(1)	5	(4)	5	7	(2)	(4)	6	7	(4)	5
30	(4)	(4)	(4)	(4)	5	8	(1)	5	6	7	6	5	5	6	8	(2)	5
31	5	6	(3)	5	5	8	(2)	(3)	6	7	7	(4)	(4)	-	8	(4)	5

( ) = disturbed days.

Table 3

North Atlantic Radio Propagation Quality Figures
Local Day 1300-2400 GCT

December 1944

Day	Hrs. of F2 at Churchill, Canada	WWV 10 Mc (0600-1800 CST) Churchill, Canada	Marconi-Montreal to U.K. 1300-2400 GCT	RAF-Dorval to Goose, Iceland and U.K.	AAF-North Atlantic	RCAC-North Atlantic 0600-1800 EWT	RCAC Moscow and Stockholm to N.Y.	RCAC London and Berne to N.Y.	Mackay-Moscow, Kaboul, Bombay	Mackay-European	Moscow to New York 1300-2400 GCT	TD Figures	GSD at College, Alaska	WWV 10 & 15 Mc at Kodiak, Alaska	Canadian Ratings of RCAF	British Broadcasting Co. Ratings.	WWV 10 Mc at Reykjavik, Iceland	GLH at Riverhead, N.Y.	WWV 10 Mc at College, Alaska	Ottawa to England 0600-1800 CST	Average Quality Figure
1	5	7	8	6	6	8	5	8	7	8	7	8	7	6	6	5	5	8	6	5	7
2	(4)	5	8	6	5	8	(2)	8	6	7	7	7	5	6	6	7	5	7	6	5	6
3	(3)	8	8	6	5	8	(1)	8	7	8	5	7	(3)	7	8	(4)	5	6	6	(4)	6
4	5	8	8	8	5	8	5	8	6	7	9	7	(4)	7	9	6	5	7	6	5	7
5	5	6	8	7	5	8	6	8	7	7	7	7	5	6	9	5	5	6	6	7	6
6	5	8	8	8	5	8	(3)	8	5	5	7	7	(4)	6	7	6	5	7	6	5	6
7	5	7	8	8	6	8	7	8	7	7	9	8	5	6	8	6	6	7	8	5	7
8	6	8	8	8	6	6	5	8	7	8	9	8	7	6	6	5	5	8	7	6	7
9	5	7	8	7	6	8	8	8	8	9	9	8	6	5	9	7	5	8	7	7	7
10	5	8	8	8	6	8	8	6	8	8	8	8	7	7	8	6	6	8	7	7	7
11	6	8	8	7	5	8	7	8	8	8	9	8	6	5	8	8	7	8	7	7	7
12	5	8	8	8	6	8	7	8	8	8	9	8	6	5	8	7	7	8	7	7	7
13	6	(4)	8	7	5	5	7	8	5	7	8	7	5	6	8	6	6	7	6	5	6
14	(4)	(1)	8	8	5	(4)	7	8	5	6	5	6	(2)	5	5	5	5	7	6	6	5
15	5	6	8	7	5	(4)	8	8	6	6	8	7	(2)	7	(4)	5	5	7	5	6	6
16	5	(4)	(4)	(4)	5	(2)	(1)	(1)	7	(3)	6	(3)	(2)	(4)	8	(2)	6	(4)	5	5	(4)
17	5	5	(2)	(1)	5	(2)	(1)	(2)	(2)	(3)	(4)	(2)	(2)	(2)	5	(2)	6	(2)	(4)	(3)	(3)
18	(2)	(2)	(4)	6	5	(4)	(2)	5	5	(4)	6	(4)	(2)	(1)	(4)	(2)	(4)	(3)	(3)	(4)	(4)
19	5	7	5	6	5	(4)	(2)	7	(4)	5	9	(4)	(2)	(1)	6	(2)	6	(4)	(3)	5	5
20	6	8	8	7	5	5	5	7	6	6	6	(4)	(4)	6	7	(4)	5	(2)	(4)	5	6
21	5	6	8	6	5	5	6	7	7	7	9	(4)	(4)	6	7	5	5	(4)	6	5	6
22	6	5	8	7	5	6	6	7	7	8	9	6	5	5	6	(4)	6	5	5	(4)	6
23	6	7	8	7	6	8	(4)	8	6	7	9	5	6	7	6	6	6	6	7	5	6
24	6	7	8	8	6	8	7	8	7	7	9	5	6	7	8	7	7	7	5	5	7
25	5	7	8	8	6	8	7	8	7	7	9	6	6	6	8	7	8	6	7	5	7
26	6	8	8	8	6	8	8	8	8	8	9	5	7	6	6	7	7	7	7	(4)	7
27	5	(3)	(2)	(1)	5	(4)	(1)	(2)	(4)	6	5	(2)	(3)	(2)	5	(4)	(4)	(2)	5	(3)	(3)
28	5	5	8	8	5	8	(2)	8	(4)	5	9	(2)	5	(2)	6	5	5	6	6	5	5
29	5	(4)	(4)	8	5	8	(3)	5	(4)	5	7	(2)	(4)	(4)	7	(4)	6	(3)	5	(4)	5
30	(4)	(4)	6	6	5	8	(3)	5	6	7	7	5	5	(3)	8	(2)	5	(4)	(4)	5	5
31	5	6	5	6	5	8	(3)	7	6	7	8	(4)	(4)	-	8	(4)	5	5	(4)	(4)	5

( ) = disturbed days.

Table 4

North Pacific Radio Propagation Quality Figures
Local Day 0100 - 1200 GCT

December 1944

Day	College, Alaska Absorption	Alaskan Communications System	RCAC China to S.F. 0800-2000 PWT	Mackay Chungking to S.F. 0100-1200 GCT	Chungking to San Francisco figure of merit 0100-1200 GCT	JZJ at College, Alaska	Quality Figures
1	6	6	5	5	(4)		5
2	5	6	7	6	6		6
3	5	5	8	6	6		6
4	5	6	7	6	6		6
5	6	6	7	6	6		6
6	7	6	7	5	(4)		6
7	7	6	7	6	6		6
8	7	6	7	5	5		6
9	6	6	7	5	6		6
10	6	6	(4)	5	6		5
11	7	6	(4)	5	5		5
12	7	6	(4)	5	(3)		5
13	6	6	7	6	5		6
14	6	6	6	6	6		7
15	6	(2)	7	5	5		5
16	5	(2)	(1)	6	7		(4)
17	(3)	(2)	6	(3)	(1)		(3)
18	5	(2)	(3)	(3)	(3)		(3)
19	6	(3)	(2)	(3)	(3)		(3)
20	6	(4)	5	(4)	(3)		(4)
21	6	5	6	5	(4)		5
22	6	(4)	6	6	(3)		5
23	6	(4)	7	6	(4)		5
24	6	6	(3)	5	(4)		5
25	7	6	5	(4)	(3)		5
26	7	6	(4)	5	7		6
27	(4)	(4)	7	6	7		6
28	6	(4)	(2)	6	(3)		(4)
29	(4)	(4)	(3)	5	(4)		(4)
30	(4)	(4)	(3)	(4)	5		(4)
31	6	(4)	6	(3)	(1)		(4)

No Report

( ) = disturbed days.

Table 5

North Pacific Radio Propagation Quality Figures
Local Night 1300 - 2400 GCT

December 1944

Day	Alaskan Communications System	RCAC China to S.F. 2000-0600 PWT	Mackay Chungking to S.F. 1300-2400 GCT	Chungking to S.F. figure-of-merit 1300-2400 GCT	JZJat College, Alaska	Quality Figures
1	6	7	6	7		6
2	6	8	6	7		7
3	5	7	6	7		6
4	6	7	7	6		6
5	6	7	6	7		6
6	6	8	6	(4)		6
7	6	7	6	7		6
8	6	8	6	7		7
9	6	8	7	8		7
10	6	9	6	7		7
11	6	8	5	(4)		6
12	6	8	7	7		7
13	6	7	6	6		6
14	6	8	5	(3)		6
15	(2)	8	5	(1)		(4)
16	(2)	7	(3)	(1)		(3)
17	(2)	(2)	(3)	(3)		(2)
18	(2)	(3)	(4)	(3)		(3)
19	(3)	6	(4)	(2)		(4)
20	(4)	6	(3)	(4)		(4)
21	5	6	6	7		6
22	(4)	7	6	6		6
23	(4)	6	(4)	6		5
24	6	8	(3)	(3)		5
25	6	6	6	8		6
26	6	7	5	(4)		5
27	(4)	8	5	(2)		5
28	(4)	8	(3)	(2)		(4)
29	(4)	5	(4)	7		5
30	(4)	6	5	(4)		5
31	(4)	6	(4)	(2)		(4)

( ) = disturbed days.

Table 6

North Atlantic Radio Propagation
Quality Figures

Top Figure 0100-1200 GCT
Bottom Figure 1300-2400 GCT

Day	Oct. 1943	Nov. 1943	Dec. 1943	Jan. 1944	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	Jan. 1945	Feb. 1945
1	(2)	(3)	(4)	(4)	5	6	(4)	(4)	6	7	7	5	6	6	7	5	5
	(2)	(4)	5	(4)	6	7	6	(4)	6	7	7	6	6	7	7	5	6
2	(2)	(4)	5	5	5	6	(3)	(3)	5	6	6	(4)	6	7	6	5	5
	(2)	5	5	6	6	6	(4)	(4)	7	6	6	5	7	7	6	5	6
3	(2)	5	(4)	5	5	5	(4)	(4)	6	7	(2)	5	5	6	5	5	6
	(4)	5	(4)	6	7	7	6	5	7	6	(3)	6	6	7	6	5	7
4	(3)	5	(3)	6	5	5	(3)	5	7	7	5	6	6	6	6	5	6
	5	7	(3)	6	6	5	(4)	5	7	7	6	7	7	7	7	(4)	7
5	(4)	5	(4)	(4)	6	5	(3)	(4)	7	7	6	5	6	6	6	5	6
	5	7	(4)	5	6	6	(4)	(4)	7	7	6	7	7	6	6	6	7
6	(4)	(4)	5	6	6	(4)	(3)	(4)	7	7	6	7	6	(4)	5	5	5
	6	5	6	6	7	5	(4)	5	7	7	6	7	7	6	6	6	6
7	5	(4)	6	6	5	(3)	(4)	(4)	7	7	6	6	6	6	6	6	5
	6	6	6	6	(4)	5	(4)	5	7	7	6	7	7	6	7	7	7
8	(4)	(4)	5	5	(3)	(3)	(3)	(4)	7	7	7	6	6	5	6	6	5
	6	5	6	6	5	5	(4)	6	7	7	7	6	7	6	7	6	6
9	(3)	5	6	6	(4)	(3)	(4)	6	7	5	7	6	6	6	7	5	5
	(4)	5	6	7	(4)	(4)	6	7	7	6	7	7	7	7	7	6	6
10	(3)	6	6	6	(4)	(3)	(3)	6	7	6	6	6	5	6	7	(4)	5
	5	6	6	6	5	(4)	(4)	7	7	6	7	7	7	7	7	(4)	6
11	(4)	6	6	(4)	(4)	(3)	(3)	6	7	6	6	6	(4)	6	7	5	5
	6	6	7	(4)	5	5	5	7	7	6	7	7	6	6	7	5	6
12	5	5	6	(3)	(4)	(4)	(4)	6	7	7	5	5	5	6	7	6	6
	6	7	6	5	5	5	6	7	7	7	6	7	7	7	7	6	7
13	5	6	6	(3)	5	(3)	5	6	7	7	6	6	6	6	6	5	6
	7	7	7	5	6	(4)	7	7	7	7	6	7	7	7	6	7	7
14	6	7	7	(4)	(3)	(4)	6	7	6	7	7	6	5	6	(4)	6	6
	7	7	7	(4)	(4)	5	7	7	6	7	7	7	5	7	5	6	8
15	5	7	6	(3)	(4)	(4)	6	6	5	6	6	6	(3)	6	5	5	5
	7	7	6	5	(4)	6	6	7	5	6	7	7	5	7	6	(4)	6
16	7	6	5	(4)	(4)	(4)	(4)	7	6	6	6	6	(4)	7	5	(3)	(4)
	7	7	(4)	(4)	5	6	(4)	7	6	6	7	7	6	7	(4)	5	6
17	6	7	(3)	(3)	(4)	5	(4)	7	6	6	7	6	(4)	7	(3)	(4)	(4)
	7	8	(4)	(4)	6	6	6	7	7	6	7	7	6	7	(3)	(3)	6
18	6	6	(4)	(3)	5	6	6	6	6	7	5	6	5	6	(3)	5	6
	7	6	(4)	(4)	6	6	7	7	7	7	6	7	6	6	(4)	6	6
19	6	5	(3)	(4)	5	(4)	6	6	6	7	(4)	6	5	6	(4)	5	6
	7	(4)	(4)	5	6	5	7	7	7	6	6	7	7	7	5	5	7
20	6	(4)	(3)	(4)	5	(4)	6	7	7	7	5	5	6	5	5	5	6
	7	(4)	(3)	5	6	6	7	7	7	6	6	7	7	5	6	5	7
21	5	(3)	(4)	(4)	(4)	5	6	7	6	6	5	5	6	5	5	6	6
	7	(3)	(4)	5	5	7	7	7	7	6	7	6	7	6	6	6	7
22	5	(3)	(4)	5	5	(4)	6	7	5	6	6	5	6	6	6	6	6
	6	(3)	5	5	6	6	7	7	6	6	7	6	7	6	6	6	7
23	(4)	(3)	(4)	5	(4)	5	6	6	5	6	5	5	6	6	6	6	6
	6	(3)	(4)	6	6	7	7	7	5	6	6	6	7	7	7	7	7
24	(4)	(2)	5	5	5	5	6	6	6	7	5	5	6	6	7	6	6
	(4)	(3)	5	5	6	7	7	6	6	7	6	5	6	7	7	6	7
25	(3)	(3)	5	(4)	6	6	5	5	6	7	6	5	5	7	7	6	6
	(4)	(3)	5	5	7	7	7	7	7	7	7	6	7	7	7	7	7
26	(2)	(2)	(4)	5	5	(4)	5	7	6	7	6	6	5	6	7	6	5
	(3)	(3)	(4)	6	7	6	7	6	6	7	7	7	6	7	7	7	7
27	(3)	(2)	6	5	6	(3)	5	6	5	7	6	5	6	7	5	6	5
	(4)	(2)	6	5	7	(3)	6	6	6	7	7	6	7	7	(3)	7	6
28	(2)	(3)	5	5	5	(4)	5	7	6	7	5	6	6	7	(4)	7	(4)
	(2)	(3)	6	5	7	5	6	7	6	7	6	7	7	7	5	7	6
29	(2)	(3)	5	5	6	(3)	5	5	6	7	5	6	6	7	5	(3)	
	(2)	(3)	5	6	7	(4)	6	5	6	7	7	7	7	7	5	(3)	
30	(3)	(4)	6	5		(4)	(4)	(4)	6	6	5	6	6	7	5	(3)	
	(3)	(4)	6	6		(4)	6	5	6	7	7	6	7	7	5	(4)	
31	(3)		5	5		(4)		6		6	5		6		5	(4)	
	(4)		6	7		6		6		7	6		7		6	5	

( ) = disturbed days.

Table 7

North Pacific Radio Propagation Quality Figures

Top Figure 0100-1200 GCT
Bottom Figure 1300-2400 GCT

Day	Oct. 1943	Nov. 1943	Dec. 1943	Jan. 1944	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944
1	(3)	5	5	(4)	(4)	6	6	5	7	7	7	6	5	6	5
	(4)	5	5	(4)	(4)	8	5	5	7	7	8	6	6	6	6
2	(3)	5	5	5	5	7	5	5	7	8	7	5	6	6	6
	(4)	6	5	5	5	8	5	6	6	7	6	5	7	6	7
3	(3)	6	5	6	(4)	7	(3)	5	7	8	5	7	(4)	6	6
	5	5	6	5	(4)	7	(3)	5	7	8	5	6	5	5	6
4	(3)	5	(4)	6	6	5	(4)	(4)	8	8	7	7	5	6	6
	6	5	5	5	6	6	(4)	5	7	8	7	6	6	7	6
5	5	7	5	5	6	5	(4)	6	7	8	6	7	7	5	6
	6	7	5	(4)	6	6	5	5	8	8	7	7	7	7	6
6	6	(4)	(4)	5	6	(4)	(4)	5	7	7	7	7	7	6	6
	6	5	(3)	5	6	5	5	5	7	7	7	7	7	6	6
7	5	6	5	6	5	(4)	(4)	5	8	7	7	7	7	6	6
	6	(4)	6	7	5	(4)	(4)	5	7	8	8	7	6	6	6
8	5	6	6	6	(4)	(4)	(3)	7	8	7	7	7	7	(4)	6
	6	7	6	7	(4)	5	(4)	7	7	7	6	6	6	6	7
9	5	6	7	5	(4)	(4)	5	7	7	7	6	8	7	5	6
	6	6	6	(4)	6	5	(3)	7	7	8	6	7	7	5	7
10	5	5	6	6	5	5	6	7	7	7	7	7	6	5	5
	5	5	6	5	7	5	5	7	7	7	7	7	7	(4)	7
11	6	5	6	5	5	(4)	(4)	7	7	7	7	6	5	5	5
	7	6	7	(4)	7	(4)	5	7	6	8	7	7	7	6	6
12	6	6	6	5	(4)	(4)	6	7	8	7	7	7	7	5	5
	6	6	6	5	(4)	5	6	7	7	7	6	7	7	6	7
13	5	7	6	(4)	5	5	7	8	8	8	7	6	6	5	6
	6	7	7	(4)	5	5	6	8	7	7	7	7	7	6	6
14	6	6	6	(4)	5	(4)	7	8	7	8	8	6	5	5	7
	7	5	7	(3)	5	5	7	8	7	8	7	7	6	5	6
15	6	6	7	(4)	(3)	5	7	7	7	7	8	7	(4)	5	5
	6	6	7	(4)	5	5	7	8	7	7	7	7	6	7	(4)
16	6	5	(4)	5	(4)	6	5	7	6	7	8	7	7	5	(4)
	7	6	5	(4)	(4)	6	6	8	6	5	7	7	7	6	(3)
17	6	6	5	(4)	5	6	5	7	7	7	7	7	(4)	6	(3)
	7	6	5	(4)	5	6	7	7	7	7	7	6	6	6	(2)
18	6	5	5	(4)	5	6	5	8	7	7	7	7	5	6	(3)
	7	7	6	(4)	5	5	6	8	6	7	6	7	(4)	5	(3)
19	7	5	(4)	5	7	(4)	7	7	7	7	7	7	(4)	6	(3)
	7	6	7	(4)	5	(4)	6	8	8	7	7	7	6	7	(4)
20	7	5	5	5	5	5	7	7	7	7	7	6	5	5	(4)
	7	6	5	(4)	(4)	6	7	8	7	7	7	7	6	6	(4)
21	8	(4)	(3)	5	5	6	7	8	8	7	6	7	7	5	5
	7	5	5	6	5	6	7	8	7	6	6	7	6	6	6
22	7	(4)	5	(4)	5	6	7	8	6	7	6	7	7	5	5
	7	(3)	5	(4)	5	6	7	7	7	5	6	7	7	6	6
23	5	5	6	5	5	6	7	8	6	6	7	7	5	6	5
	6	(4)	5	5	5	6	7	7	7	7	7	6	7	5	5
24	(4)	(4)	7	5	6	5	7	6	6	7	6	7	6	7	5
	(4)	5	6	5	7	5	7	7	6	8	6	7	7	7	5
25	5	(4)	7	5	5	6	7	7	7	7	7	6	6	7	5
	5	5	6	5	6	6	7	7	7	7	7	7	7	6	6
26	5	(3)	5	5	6	5	7	8	7	7	7	6	6	6	6
	6	(4)	(4)	5	7	5	6	6	7	8	7	7	6	5	5
27	(4)	(4)	5	5	6	(3)	7	7	5	7	7	6	6	6	6
	6	(3)	6	6	5	5	7	6	6	7	7	7	6	7	5
28	(4)	(4)	5	5	7	(3)	7	7	6	7	6	7	6	5	(4)
	5	(3)	6	6	7	(4)	8	6	6	7	6	6	5	7	(4)
29	(4)	(4)	5	5	7	(4)	8	7	6	7	7	7	5	5	(4)
	5	(4)	5	6	8	5	7	7	6	7	7	7	5	6	5
30	(4)	5	(4)	5		5	6	6	6	7	7	6	6	5	(4)
	5	(4)	6	(4)		6	6	5	6	7	7	6	6	6	5
31	(4)		(4)	(4)		5		5		8	7		6		(4)
	(4)		(4)	5		6		6		7	7		6		(4)

Table 8

Geomagnetically Disturbed Days, Based on $K_A \geq 2.5$

Day	Oct. 1943	Nov. 1943	Dec. 1943	Jan. 1944	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	Jan. 1945	Feb. 1945
1	D	D		D				D					D				
2	D		D				D	D			D	D			D		
3	D		D				D				D		D				
4	D		D			D	D	D									
5		D	D				D	D						D			D
6		D				D	D	D									
7	D	D			D	D	D	D									
8	D	D			D	D											D
9	D				D	D				D							
10	D				D	D	D									D	
11				D	D							D	D				
12				D	D	D											
13				D		D									D		
14				D	D								D				
15				D	D				D				D			D	D
16		D	D	D			D								D		D
17	D		D	D											D	D	
18			D	D							D				D		
19		D	D			D											
20		D	D		D									D			
21		D	D						D			D					
22	D	D	D			D			D								
23		D	D														
24	D	D					D				D	D	D				
25	D	D															D
26	D	D	D			D			D								D
27	D	D				D									D		D
28	D	D									D				D		
29	D	D				D		D								D	
30	D					D	D					D			D		
31	D										D						

Table 9

Radio Disturbance Based on North Atlantic Quality Figures
(Disturbed if Half or Whole Day ≤ 4)

26-Day Recurrence Table

Day	Oct. 1, 1943	Oct. 27, 1943	Nov. 22, 1943	Dec. 18, 1943	Jan. 13, 1944	Feb. 8, 1944	Mar. 5, 1944	Mar. 31, 1944	Apr. 26, 1944	May 22, 1944	June 17, 1944	July 13, 1944	Aug. 8, 1944	Sept. 3, 1944	Sept. 29, 1944	Oct. 25, 1944	Nov. 20, 1944	Dec. 16, 1944	Jan. 11, 1945	Feb. 6, 1945
1	D	D	D	D	D	D		D										D		
2	D	D	D	D	D	D	D	D										D		
3	D	D	D	D	D	D	D	D										D		
4	D	D	D	D	D	D	D	D										D		
5	D	D	D	D	D	D	D	D	D										D	
6	D	D	D	D	D		D	D	D										D	
7		D	D		D	D	D	D	D										D	
8	D		D		D	D	D	D	D											
9	D		D	D	D	D	D	D		D										
10	D		D			D	D	D	D											
11	D	D					D	D	D											D
12		D	D				D	D	D				D					D		D
13		D	D		D			D	D						D	D		D		
14			D			D														
15				D			D													
16						D	D													
17								D							D					
18							D	D							D					
19				D											D				D	
20																		D	D	
21																			D	
22							D					D								
23	D						D													D
24	D	D					D													
25	D	D	D	D			D										D			
26	D	D	D	D	D		D						D					D		

(63 out of 141 do not recur)

Table 10

Radio Disturbance Based on North Atlantic Quality Figures
(Disturbed if Half or Whole Day ≥ 4)

27-Day Recurrence Table

Day	Oct. 1, 1943	Oct. 28, 1943	Nov. 24, 1943	Dec. 21, 1943	Jan. 17, 1944	Feb. 13, 1944	Mar. 11, 1944	Apr. 7, 1944	May 4, 1944	May 31, 1944	June 27, 1944	July 24, 1944	Aug. 20, 1944	Sept. 16, 1944	Oct. 13, 1944	Nov. 9, 1944	Dec. 6, 1944	Jan. 2, 1945	Jan. 29, 1945	Feb. 25, 1945
1	D	D	D	D	D		D	D											D	
2	D	D	D	D	D	D	D	D	D										D	
3	D	D	D	D	D	D	D	D	D						D			D	D	
4	D	D	D		D	D	D	D	D						D					D
5	D	D	D		D	D	D	D	D						D					
6	D	D	D	D			D	D												
7			D																	
8	D		D																	
9	D				D	D	D										D	D		
10	D	D	D				D	D												
11	D	D	D			D		D				D					D			
12		D	D	D			D										D			
13																	D			
14													D				D	D		
15																		D		
16				D			D											D		
17							D													
18							D													
19							D												D	
20							D												D	
21							D													
22				D	D		D										D			
23	D	D	D	D	D	D	D										D			
24	D	D	D	D	D	D	D	D												
25	D	D	D	D	D	D	D	D							D					
26	D	D	D	D	D	D	D	D						D						
27	D	D	D	D	D	D	D	D	D			D								

(56 out of 141 do not recur)

Table 11

Radio Disturbance Based on North Atlantic Quality Figures
(Disturbed if Half or Whole Day ≥ 4)

28-Day Recurrence Table

Day	Oct. 1, 1943	Oct. 29, 1943	Nov. 26, 1943	Dec. 24, 1943	Jan. 21, 1944	Feb. 18, 1944	Mar. 17, 1944	Apr. 14, 1944	May 12, 1944	June 9, 1944	July 7, 1944	Aug. 4, 1944	Sept. 1, 1944	Sept. 29, 1944	Oct. 27, 1944	Nov. 24, 1944	Dec. 22, 1944	Jan. 19, 1945	Feb. 16, 1945
1	D	D	D		D														D
2	D	D	D										D						D
3	D	D	D	D			D	D											
4	D	D	D			D	D	D											
5	D	D	D		D														
6	D		D			D	D										D		
7																	D		
8	D		D																
9	D	D	D	D															
10	D	D	D				D												
11	D	D					D								D			D	
12							D											D	
13				D			D							D				D	D
14							D										D		
15							D												
16							D					D							
17							D	D						D					
18					D	D	D	D						D					
19				D	D	D	D	D	D					D					
20				D	D	D	D	D									D		
21			D	D	D	D	D									D			
22		D	D	D	D	D	D	D											
23	D	D	D	D	D	D	D	D								D			
24	D	D	D	D		D	D	D								D			
25	D	D	D	D	D	D	D	D								D	D		
26	D	D	D	D	D	D	D									D	D		
27	D	D	D	D	D	D	D										D		
28	D	D	D	D	D	D					D								

(58 out of 141 do not recur)

Table 12

Radio Disturbance Based on North Atlantic Quality Figures
(Disturbed if Half or Whole Day ≥ 4)

Day	Oct. 1, 1943	Oct. 30, 1943	Nov. 28, 1943	Dec. 27, 1943	Jan. 25, 1944	Feb. 23, 1944	Mar. 23, 1944	Apr. 21, 1944	May 20, 1944	June 18, 1944	July 17, 1944	Aug. 15, 1944	Sept. 13, 1944	Oct. 12, 1944	Nov. 10, 1944	Dec. 9, 1944	Jan. 7, 1945	Feb. 5, 1945
1	D	D	D		D	D											D	
2	D	D	D															
3	D	D	D															
4	D	D	D				D							D			D	
5	D						D					D		D				
6	D		D	D			D							D		D		
7			D				D											
8	D	D	D				D									D		
9	D	D					D									D	D	
10	D	D		D			D	D								D	D	
11	D						D	D	D							D	D	
12							D	D										D
13						D	D	D										D
14					D	D	D											
15					D	D	D	D										
16				D	D	D	D	D										
17				D	D	D	D	D										
18				D	D	D	D	D			D							
19			D	D	D	D	D					D				D		
20			D	D		D	D									D		
21		D	D	D	D	D	D											
22		D	D	D	D	D												
23	D	D	D	D	D	D											D	
24	D	D	D	D	D												D	D
25	D	D	D	D			D										D	
26	D	D	D			D	D							D				
27	D	D				D										D		
28	D	D			D													
29	D	D	D			D							D					

(64 out of 141 do not recur)

Table 13

Comparison of North Atlantic Radio Propagation Quality Figures With IRPL Warnings

H if hits half day or whole
M if misses half day or whole
(S) period following warning not better than fair
S period following warning better than fair

Day	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	Jan. 1945	Feb. 1945	
1	.		H	H	S	S		(S)	S	S		(S)		
2			H	H	(S)	S		M	S				S	
3		(S)	H	H			M	(S)			(S)		S	
4			H	(S)			(S)			S	S			
5		(S)	H	H	S		S			S		(S)	S	
6		H	H	H	S					H			(S)	
7	H	H	H	H					S	S				
8	H	H	H	H						(S)				
9	H	H	H	S										
10	H	H	H				S		(S)			H		
11	H	H	H			S	S	S	M		S	(S)		
12	H	H	H				(S)	(S)	(S)				S	
13	(S)	H	(S)	S		S		S	S		S			
14	H	H						S			H			
15	H	H						S	H		(S)	H		
16	H	M	M				S	S	H		H	H	H	
17	H	(S)	M		S			S	H		H	H	H	
18	(S)	S								S	H	(S)		
19		M					H	S		S	H			
20		H	S							(S)	(S)			
21	M		S				(S)		S	(S)				
22		M	S					(S)				S		
23	M		S		(S)		(S)	(S)	S					
24	(S)	(S)	S		S		(S)	(S)	S			S		
25		S	(S)		S		S	(S)	(S)					
26		M	(S)	S	S						S			
27		M		S				(S)		S	H		(S)	
28		H	(S)	S			(S)				H		H	
29		M	(S)	(S)			(S)					H		
30		H	H	H			(S)		S		(S)	H		
31		H		S			(S)				(S)	H		
														Total Period
H	10	14	13	8	0	0	1	0	3	1	7	7	3	67
M	2	6	2	0	0	0	1	1	1	0	0	0	0	13
G	14	5	5	15	21	27	15	14	16	19	15	18	19	203
S	3	6	10	8	9	4	14	15	11	10	9	6	6	111

Table 14

Comparison of North Atlantic Radio Propagation Quality Figures (Local Night) (0100-1200 GCT) With IRPL Warnings

(x = Warning Given)

Day	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	Jan. 1944	Feb. 1944
1	5	6	(4)x	(4)x	6 x	7 x	7	5 x	6 x	6 x	6	5 x	5
2	5	6	(3)x	(3)x	5 x	6 x	6	(4)	6 x	7	6	5	5
3	5	5 x	(4)x	(4)x	6	7	(2)	5 x	5	6	5 x	5	6 x
4	5	5	(3)x	5 x	7	7	5 x	6	6	6	6 x	5	6
5	6	5 x	(3)x	(4)x	7 x	7	6 x	5	6	6 x	6	5 x	6 x
6	6	(4)x	(3)x	(4)x	7 x	7	6	7	6	(4)x	5	5	5 x
7	5 x	(3)x	(4)x	(4)x	7	7	6	6	6 x	6 x	6	6	5
8	(3)x	(3)x	(3)x	(4)x	7	7	7	6	6	5 x	6	6	5?
9	(4)x	(3)x	(4)x	6 x	7	5	7	6	6	6	7	5	5
10	(4)x	(3)x	(3)x	6	7	6	6 x	6	5	6	7	(4)x	5
11	(4)x	(3)x	(3)x	6	7	6 x	6 x	6 x	(4)	6	7 x	5 x	5
12	(4)x	(4)x	(4)x	6	7	7	5 x	5 x	5 x	6	7	6	6 x
13	5 x	(3)x	5 x	6 x	7	7 x	6	6 x	6 x	6	6 x	5	6
14	(3)x	(4)x	6	7	6	7	7	6 x	5	6	(4)x	6	6
15	(4)x	(4)x	6	6	5	6	6	6 x	(3)x	6	5 x	5	5
16	(4)x	(4)	(4)	7	6	6	6 x	6 x	(4)x	7	5	(3)x	(4)x
17	(4)x	5 x	(4)	7	6x	6	7	6 x	(4)x	7	(3)x	(4)x	(4)x
18	5 x	6 x	6	6	6	7	5	6	5	6 x	(3)x	5 x	6
19	5	(4)	6	6	6	7	(4)x	6 x	5	6 x	(4)x	5	6
20	5	(4)x	6 x	7	7	7	5	5	6	5	5 x	5	6
21	(4)	5	6 x	7	6	6	5 x	5	6 x	5 x	5	6	6
22	5	(4)	6 x	7	5	6	6	5 x	6	6	6	6 x	6
23	(4)	5	6 x	6	5 x	6	5 x	5 x	6 x	6	6	6	6
24	5 x	5 x	6 x	6	6 x	7	5 x	5 x	6 x	6	7	6 x	6
25	6	6 x	5 x	5	6 x	7	6 x	5 x	5 x	7	7	6	6
26	5	(4)	5 x	7 x	6 x	7	6	6	5	6	7 x	6	5
27	6	(3)	5	6 x	5	7	6	5	6	7 x	5	6	5 x
28	5	(4)x	5 x	7 x	6	7	5 x	6 x	6	7	(4)x	7	(4)x
29	6	(3)	5 x	5 x	6	7	5 x	6	6	7	5	(3)x	
30		(4)x	(4)x	(4)x	6	6	5 x	6	6 x	7	5 x	(3)x	
31		(4)x		6 x		6	5 x		6		5 x	(4)x	

Table 15

Comparison of North Atlantic Radio Propagation Quality Figures (Local Day) (1300 - 2400 GCT) With IRPL Warnings

(x = Warning Given)

Day	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	Jan. 1945	Feb. 1945
1	6	7	6 x	(4)x	6 x	7 x	7	6 x	6 x	7 x	7	5 x	6
2	6	6	(4)x	(4)x	7 x	6 x	6	5	7 x	7 ?	6	5	6 x
3	7	7 x	6 x	5 x	7	6	(3)	6 x	6	7	6 x	5	7 x
4	6	5	(4)x	5 x	7	7	6 x	7	7	7 x	7 x	5	7
5	6	6 x	(4)x	(4)x	7 x	7	6 x	7	7	6 x	6	6 x	7 x
6	7	5 x	(4)x	5 x	7 x	7	6	7	7	6 x	6	6	6 x
7	(4)x	5 x	(4)x	5 x	7	7	6	7	7 x	6 x	7	7	7
8	5 x	5 x	(4)x	6 x	7	7	7	6	7	6 x	7	6	6
9	(4)x	(4)x	6 x	7 x	7	6	7	7	7	7	7	6	6
10	5 x	(4)x	(4)x	7	7	6	7 x	7	7 x	7	7	(4)x	6
11	5 x	5 x	5 x	7	7	6 x	7 x	7 x	6	6	7 x	5 x	6
12	5 x	5 x	6 x	7	7	7	6 x	7 x	7 x	7	7	6	7 x
13	6 x	(4)x	7 x	7 x	7	7 x	6	7 x	7 x	7	6 x	7	7
14	(4)x	5 x	7	7	6	7	7	7 x	5	7	5 x	6	8
15	(4)x	6 x	6	7	5	6	7	7 x	5 x	7	6 x	(4)x	6
16	5 x	6	(4)	7	6	6	7 x	7 x	6 x	7	(4)x	5 x	6 x
17	6 x	6 x	6	7	7 x	6	7	7 x	6 x	7	(3)x	(4)x	6 x
18	6 x	6 x	7	7	7	7	6	7	6	6 x	(4)x	6 x	6
19	6	5	7	7	7	6	6 x	7 x	7	7 x	5 x	5	7
20	6	6 x	7 x	7	7	6	6	7	7	5 x	5 x	5	7
21	5	7	7 x	7	7	6	7 x	6	7 x	6 x	6	6	7
22	6	6	7 x	7	6	6	7	6 x	7	6	6	6 x	7
23	6	7	7 x	7	5 x	6	6 x	6 x	7 x	6	6	7	7
24	6 x	7 x	7 x	6	6 x	7	6 x	5 x	6 x	7	7	7 x	7
25	7	7 x	7 x	7	7 x	7	7 x	6 x	7 x	7	7	7	7
26	7	6	7 x	6 x	6 x	7	7	7	6	7	7 x	7	7
27	7	(3)	6	6 x	6	7	7	6	7	7 x	(3)x	7	7
28	7	5 x	6 x	7 x	6	7	6 x	7 x	7	7	5 x	7	6 x
29	7	(4)	6 x	5 x	6	7	7 x	7	7	7	5	(3)x	
30		(4)x	6 x	5 x	6	7	7 x	6	7 x	7	5 x	(4)x	
31		6 x		6 x		6	6 x		7		5 x	5 x	

Table 16

Comparison of North Atlantic Radio Propagation Quality Figures With ISIB Warnings

H if hits half day or whole
M if misses half day or whole
(S) period following warning not better than fair
S period following warning better than fair.

Day	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	Jan. 1945	Feb. 1945	
1			M	H					S					
2	(S)		H	H				M						
3			H	H			M							
4		(S)	H	(S)								M		
5		(S)	H	H										
6		M	H	H						H				
7	M	H	H	H										
8	M	H	H	M										
9	M	H	H											
10	H	H	H									H		
11	H	H	H						M			(S)		
12	H	M	H				(S)		(S)			S	S	
13	(S)	M										(S)		
14	H	M									M			
15	H	H							H			M		
16	H	H	H						H		H	M	M	
17	H		H						M		H	M	H	
18											H	(S)		
19		H					M				H			
20		H									(S)	(S)		
21	H	(S)								(S)	(S)			
22		M												
23	M				(S)									
24					S									
25														
26		M												
27		H									H		(S)	
28		H	(S)								H		H	
29		H	(S)									H		
30		H	H	H								H		
31		H										M		
														Total Period
H	8	14	14	7	0	0	0	0	2	1	6	3	2	57
M	4	6	1	1	0	0	2	1	2	0	1	5	1	24
G	15	8	13	22	28	31	28	29	25	28	22	18	23	290
S	2	3	2	1	2	0	1	0	2	1	2	5	2	23

Table 17

Comparison of North Atlantic Radio Propagation Quality Figures (Local Night)(0100-1200 GCT) With ISIB Warnings

(x = Warning Given)

y	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	Jan. 1945	Feb. 1945
	5	6	(4)	(4)x	6	7	7	5	6 x	6	6	5	5
	5 x	6	(3)	(3)x	5	6	6	(4)	6	7	6	5	5
	5	5	(4)x	(4)x	6	7	(2)	5	5	6	5	5	6
	5	5	(3)x	5 x	7	7	5	6	6	6	6	5	6
	6	5 x	(3)x	(4)x	7	7	6	5	6	6	6	5	6
	6	(4)	(3)x	(4)x	7	7	6	7	6	(4)x	5	5	5
	5	(3)x	(4)x	(4)x	7	7	6	6	6	6	6	6	5
	(3)	(3)x	(3)x	(4)	7	7	7	6	6	5	6	6	5
	(4)	(3)x	(4)x	6	7	5	7	6	6	6	7	5	5
	(4)x	(3)x	(3)x	6	7	6	6	6	5	6	7	(4)	5
	(4)x	(3)x	(3)x	6	7	6	6	6	(4)	6	7	5 x	5
	(4)x	(4)	(4)x	6	7	7	5 x	5	5 x	6	7	6 x	6 x
	5 x	(3)	5	6	7	7	6	6	6	6	6	5 x	6
	(3)x	(4)	6	7	6	7	7	6	5	6	(4)	6	6
	(4)x	(4)x	6	6	5	6	6	6	(3)x	6	5	5	5
	(4)x	(4)x	(4)	7	6	6	6	6	(4)x	7	5	(3)	(4)
	(4)x	5	(4)x	7	6	6	7	6	(4)	7	(3)x	(4)	(4)x
	5	6	6	6	6	7	5	6	5	6	(3)x	5 x	6
	5	(4)x	6	6	6	7	(4)	6	5	6	(4)x	5	6
	5	(4)x	6	7	7	7	5	5	6	5	5 x	5 x	6
	(4)x	5 x	6	7	6	6	5	5	6	5 x	5 x	6	6
	5	(4)	6	7	5	6	6	5	6	6	6	6	6
	(4)	5	6	6	5 x	6	5	5	6	6	6	6	6
	5	5	6	6	6 x	7	5	5	6	6	7	6	6
	6	6	5	5	6	7	6	5	5	7	7	6	6
	5	(4)	5	7	6	7	6	6	5	6	7	6	5
	6	(3)x	5	6	5	7	6	5	6	7	5	6	5 x
	5	(4)x	5 x	7	6	7	5	6	6	7	(4)x	7	(4)x
	6	(3)x	5 x	5	6	7	5	6	6	7	5	(3)x	
		(4)x	(4)x	(4)x	6	6	5	6	6	7	5	(3)x	
		(4)x		6		6	5		6		5	(4)	

Table 18

Comparison of North Atlantic Radio Propagation Quality Figures (Local Day) (1300-2400 GCT) With ISIB Warnings.

(x = Warning Given)

Day	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	Jan. 1945	Feb. 1945
1	6	7	6	(4)x	6	7	7	6	6 x	7	7	5	6
2	6 x	6	(4)x	(4)x	7	6	6	5	7	7	6	5	6
3	7	7	6 x	5 x	7	6	(3)	6	6	7	6	5	7
4	6	5 x	(4)x	5 x	7	7	6	7	7	7	7	(4)	7
5	6	6	(4)x	(4)x	7	7	6	7	7	6	6	6	7
6	7	5	(4)x	5 x	7	7	6	7	7	6 x	6	6	6
7	(4)	5 x	(4)x	5 x	7	7	6	7	7	6	7	7	7
8	5	5 x	(4)x	6	7	7	7	6	7	6	7	6	6
9	(4)	(4)x	6 x	7	7	6	7	7	7	7	7	6	6
10	5 x	(4)x	(4)x	7	7	6	7	7	7	7	7	(4)x	6
11	5 x	5 x	5 x	7	7	6	7	7	6	6	7	5 x	6
12	5 x	5	6 x	7	7	7	6 x	7	7 x	7	7	6 x	7 x
13	6 x	(4)	7	7	7	7	6	7	7	7	6	7	7
14	(4)x	5	7	7	6	7	7	7	5	7	5	6	8
15	(4)x	6 x	6	7	5	6	7	7	5 x	7	6	(4)	6
16	5 x	6 x	(4)x	7	6	6	7	7	6 x	7	(4)x	5	6
17	6 x	6	6	7	7	6	7	7	6	7	(3)x	(3)	6 x
18	6	6	7	7	7	7	6	7	6	6	(4)x	6 x	6
19	6	5 x	7	7	7	6	6	7	7	7	5 x	5	7
20	6	6 x	7	7	7	6	6	7	7	5	5 x	5 x	7
21	5 x	7 x	7	7	7	6	7	6	7	6 x	6	6	7
22	6	6	7	7	6	6	7	6	7	6	6	6	7
23	6	7	7	7	5 x	6	6	6	7	6	6	7	7
24	6	7	7	6	6 x	7	6	5	6	7	7	6	7
25	7	7	7	7	7	7	7	6	7	7	7	7	7
26	7	6	7	6	6	7	7	7	6	7	7	7	7
27	7	(3)x	6	6	6	7	7	6	7	7	(3)x	7	6 x
28	7	5 x	6 x	7	6	7	6	7	7	7	5 x	7	6 x
29	7	(4)x	6 x	5	6	7	7	7	7	7	5	(3)x	
30		(4)x	6 x	5 x	6	7	7	6	7	7	5	(4)x	
31		6 x		6		6	6		7		5	5	

Table 19

Comparison of North Pacific Radio Propagation Quality Figures With IRPL Warnings

H if hits half day or whole
M if misses half day or whole
(S) period following warning not better than fair
S period following warning better than fair

Day	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	
1	M		(S)	(S)	S	S		S	(S)	S		
2			(S)	(S)	S	S			S			
3	M	S	H	(S)				S	M		S	
4			H	H			S			S	S	
5		(S)	H	(S)	S		S			(S)		
6		H	H	(S)	S					S		
7	(S)	H	H	(S)					S	S		
8	H	H	H	S						S		
9	H	H	H	S								
10	(S)	(S)	(S)				S		S	M		
11	(S)	H	H			S	S	S			(S)	
12	H	H	S				S	S	S			
13	(S)	(S)	S	S		S		S	S		S	
14	(S)	H						S			S	
15	H	(S)						S	H		H	
16	H						S	S	S		H	
17	(S)	S			S			S	H		H	
18	(S)	(S)							M	(S)	H	
19		M					S	S	M	S	H	
20	M	(S)	S							S	H	
21			S				S		S	(S)		
22			S					S				
23			S		S		S	S	(S)			
24	S	(S)	S		S		S	S	S			
25		S	S		S		S	S	S			
26			S	S	S						(S)	
27		M		S						S	(S)	
28		H	S	S			S	S			H	
29		M	S	S			S				M	
30		(S)	S	(S)			S		S		H	
31		S		(S)			S				H	
												Total Period
H	5	8	8	1	0	0	0	0	2	1	9	34
M	3	3	0	0	0	0	0	0	3	1	1	11
G	13	8	7	15	21	27	16	15	14	18	14	168
S	8	12	15	15	9	4	15	15	12	10	7	122

Table 20

Comparison of North Pacific Radio Propagation Quality Figures (Local Day) (0100-1200 GCT) With IRPL Warnings

(x = Warning Given)

Day	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944
1	(4)	6	6 x	5 x	7 x	7 x	7	6 x	5 x	6 x	5
2	5	7	5 x	5 x	7 x	8 x	7	5	6 x	6	6
3	(4)	7 x	(3)x	5 x	7	8	5	7 x	(4)	6	6 x
4	6	5	(4)x	(4)x	8	8	7 x	7	5	6	6 x
5	6	5 x	(4)x	6 x	7 x	8	6 x	7	7	5 x	6
6	6	(4)x	(4)x	5 x	7 x	7	7	7	7	6 x	6
7	5 x	(4)x	(4)x	5 x	8	7	7	7	7 x	6 x	6
8	(4)x	(4)x	(3)x	7 x	8	7	7	7	7	(4)x	6
9	(4)x	(4)x	5 x	7 x	7	7	6	8	7	5	6
10	5 x	5 x	6 x	7	7	7	7 x	7	6 x	5	5
11	5 x	(4)x	(4)x	7	7	7 x	7 x	6 x	5	5	5 x
12	(4)x	(4)x	6 x	7	8	7	7 x	7 x	7 x	5	5
13	5 x	5 x	7 x	8 x	8	8 x	7	6 x	6 x	5	6 x
14	5 x	(4)x	7	8	7	8	8	6 x	5	5	7 x
15	(3)x	5 x	7	7	7	7	8	7 x	(4)x	5	5 x
16	(4)x	6	5	7	6	7	8 x	7 x	7 x	5	(4)x
17	5 x	6 x	5	7	7 x	7	7	7 x	(4)x	6	(3)x
18	5 x	6 x	5	8	7	7	7	7	5	6 x	(3)x
19	7	(4)	7	7	7	7	7 x	7 x	(4)	6 x	(3)x
20	5	5 x	7 x	7	7	7	7	6	5	5	(4)x
21	5	6	7 x	8	8	7	6 x	7	7 x	5 x	5
22	5	6	7 x	8	6	7	6	7 x	7	5	5
23	5	6	7 x	8	6 x	6	7 x	7 x	5 x	6	5
24	6 x	5 x	7 x	6	6 x	7	6 x	7 x	6 x	7	5
25	5	6 x	7 x	7	7 x	7	7 x	6 x	6 x	7	5
26	6	5	7 x	8 x	7 x	7	7	6	6	6	6 x
27	6	(3)	7	7 x	5	7	7	6	6	6 x	6
28	7	(3)x	7 x	7 x	6	7	6 x	7 x	6	5	(4)x
29	7	(4)	8 x	7 x	6	7	7 x	7	5	5	(4)
30		5 x	6 x	6 x	6	7	7 x	6	6 x	5	(4)x
31		5 x		5 x		8	7 x		6		(4)x

Table 21

Comparison of North Pacific Radio Propagation Quality Figures (Local Night) (1300-2400 GCT) With IRPL Warnings

(x = Warning Given)

Day	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944
1	(4)	8	5 x	5 x	7 x	7 x	8	6 x	6 x	6 x	6
2	5	8	5 x	6 x	6 x	7 x	6	5	7 x	6	7
3	(4)	7 x	(3)x	5 x	7	8	5	6 x	5	5	6 x
4	6	6	(4)x	5 x	7	8	7 x	6	6	7 x	6 x
5	6	6 x	5 x	5 x	8 x	8	7 x	7	7	7 x	6
6	6	5 x	5 x	5 x	7 x	7	7	7	7	6 x	6
7	5 x	(4)x	(4)x	5 x	7	8	8	7	6 x	6 x	6
8	(4)x	5 x	(4)x	7 x	7	7	6	6	6	6 x	7
9	6 x	5 x	(3)x	7 x	7	8	6	7	7	5	7
10	7 x	5 x	5 x	7	7	7	7 x	7	7 x	(4)	7
11	7 x	(4)x	5 x	7	6	8 x	7 x	7 x	7	6	6 x
12	(4)x	5 x	6 x	7	7	7	6 x	7 x	7 x	6	7
13	5 x	5 x	6 x	8 x	7	7 x	7	7 x	7 x	6	6 x
14	5 x	5 x	7	8	7	8	7	7 x	6	5	6 x
15	5 x	5 x	7	8	7	7	7	7 x	6 x	7	(4)x
16	(4)x	6	6	8	6	5	7 x	7 x	7 x	6	(3)x
17	5 x	6 x	7	7	7 x	7	7	6 x	6 x	6	(2)x
18	5 x	5 x	6	8	6	7	6	7	(4)	5 x	(3)x
19	5	(4)	6	8	8	7	7 x	7 x	6	7 x	(4)x
20	(4)	6 x	7 x	8	7	7	7	7	6	6 x	(4)x
21	5	6	7 x	8	7	6	6 x	7	6 x	6 x	6
22	5	6	7 x	7	7	5	6	7 x	7	6	6
23	5	6	7 x	7	7 x	7	7 x	6 x	7 x	5	5
24	7 x	5 x	7 x	7	6 x	8	6 x	7 x	7 x	7	5
25	6	6 x	7 x	7	7 x	7	7 x	7 x	7 x	6	6
26	7	5	6 x	6 x	7 x	8	7	7	6	5	5 x
27	6	5	7	6 x	6	7	7	7	6	7 x	5 x
28	7	(4)x	8 x	6 x	6	7	6 x	6 x	5	7	(4)x
29	8	5	7 x	7 x	6	7	7 x	7	5	6	5
30		6 x	6 x	5 x	6	7	7 x	6	6 x	6	5 x
31		6 x		6 x		7	7 x		6		(4)x

Table 22

IRPL and ISIB Daily Warnings Compared With
North Atlantic Radio Propagation Quality Figures.

	% Disturbed Whole or Half Days Correctly Forecast		% Good Days Correctly Forecast		% Fair Days Forecast as Stormy		% of S Warnings Followed by Fair Day	
1944	IRPL	ISIB	IRPL	ISIB	IRPL	ISIB	IRPL	ISIB*
Feb.	83	67	82	88	31	15	100	100
Mar.	70	70	45	73	57	43	67	100
Apr.	87	93	33	87	83	33	50	100
May	100	88	65	96	67	33	25	100
June	No disturbed days		70	93	40	20	22	50
July	No disturbed days		87	100	0	0	0	No warnings
Aug.	50	0	52	97	82	9	64	100
Sept.	0	0	48	100	64	0	53	No warnings
Oct.	75	50	59	93	38	12	27	50
Nov.	100	100	66	97	100	33	30	100
Dec.	100	86	63	92	50	20	55	100
1945								
Jan.	100	38	75	78	31	31	67	80
Feb.	100	67	76	92	18	9	33	50
Mean	79	60	63	91	51	19	46	85

IRPL Daily Warning Compared With
North Pacific Radio Propagation Quality Figures.

	% Disturbed Whole or Half Days Correctly Forecast	% Good Days Correctly Forecast	% Fair Days Forecast as Stormy	% of S Warnings Followed by Fair Day
1944				
Feb.	62	62	54	88
Mar.	73	67	64	67
Apr.	100	47	50	20
May	100	50	66	53
June	No disturbed days	70	0	0
July	No disturbed days	87	0	0
Aug.	No disturbed days	52	0	0
Sept.	No disturbed days	50	0	0
Oct.	67	54	29	17
Nov.	50	64	13	33
Dec.	90	67	27	43
Mean	77	61	29	29

*The few S warnings given by the ISIB are, as indicated, almost always on fair days.

Table 23

Comparison of North Atlantic Radio Propagation
Quality Figures with IRPL A-Zone Forecast

H if hits half day or whole
M if misses half day or whole
(S) period following warning not better than fair
S period following warning better than fair.

y	Oct. 1943	Nov. 1943	Dec. 1943	Jan. 1944	Feb. 1944	Mar. 1944	Apr. 1944	May 1944	June 1944	July 1944	Aug. 1944	Sept. 1944	Oct. 1944	Nov. 1944	Dec. 1944	Jan. 1945	Feb. 1945
	H	H	M	H	(S)		H	H	S	S			S				
2	H	M	(S)				H	H	(S)	S		H	S		S		
3	M	(S)	H				H	H	S	S	M				(S)		
4	M	S	H			(S)	H	(S)	S							M	
5	M	S	H	H		S	H	H			S					(S)	
6	H	H	(S)	S		H	H	H				S		M		S	
7		H			H	H	H	H					S	S			
8	H	M			H	H	H	H						(S)			
9	H				H	H	H										
0	H				H	M	H							S		M	
1	H		S	H	H	H	M						M	S		(S)	(S)
2	S		S	H	H	H	M			S				S		(S)	S
3			S	H	S	H		S		S						(S)	
4	S	S		H	H	H	S					S		S	M		
5		S	S	H	H	M	S				S	S	M	S		M	(S)
6	S	S	H	H	H	M	H				S	S	M		H	M	M
7			H	H	M		M				S	S	H		H	M	M
8	S	S	H	H		S				S		S	(S)		M		
9	S	M	H	H		H				S	M	S		S	M		S
0		H	H	H		H				S		(S)	S	(S)			S
1		H	H	H	M		S						S				
2	S	H	H	S	(S)	M	S						S				
3	H	H	H		H		S			S			S			S	
4	H	H	S		(S)		S		S	S		(S)	S	S		S	
5	H	H	S	M			S		S							S	S
6	H	H	H	(S)		M	(S)	S	S					S			(S)
7	H	H	S	(S)		H		S	(S)			(S)	S	S	M		
8	H	H		(S)	(S)	H		S				S	S		M		M
9	H	H	(S)	(S)		M	(S)	(S)			(S)	S	S		(S)	M	
0	H	M	S			M	M	H	S		(S)	S	S		(S)	M	
1	H		S			H					(S)					M	

																		Tot. Per.
H	16	13	12	13	10	13	11	8	0	0	0	1	1	0	2	0	0	100
M	3	4	1	1	2	7	4	0	0	0	2	0	3	1	5	8	3	44
G	6	6	6	11	12	8	6	17	21	21	22	16	14	17	20	15	18	336
S	6	7	12	6	5	3	9	6	9	10	7	13	13	12	4	8	7	137

NORTH ATLANTIC
RADIO PROPAGATION QUALITY FIGURE

HALF-DAY K_A SUM	2	3	4	5	6	7	8
23.5		1	1				
21.0	1	3					
18.5	2	4	3	2			
16.0	8	19	13	3	2		
13.5	4	21	32	21	15	3	
11.0		13	41	42	34	11	
8.5		4	24	45	84	49	1
6.0			12	59	122	105	
3.5			5	22	75	75	1
1.0				8	16	28	

FIG. 1. CORRELATION OF RADIO PROPAGATION AND GEOMAGNETIC DISTURBANCE.

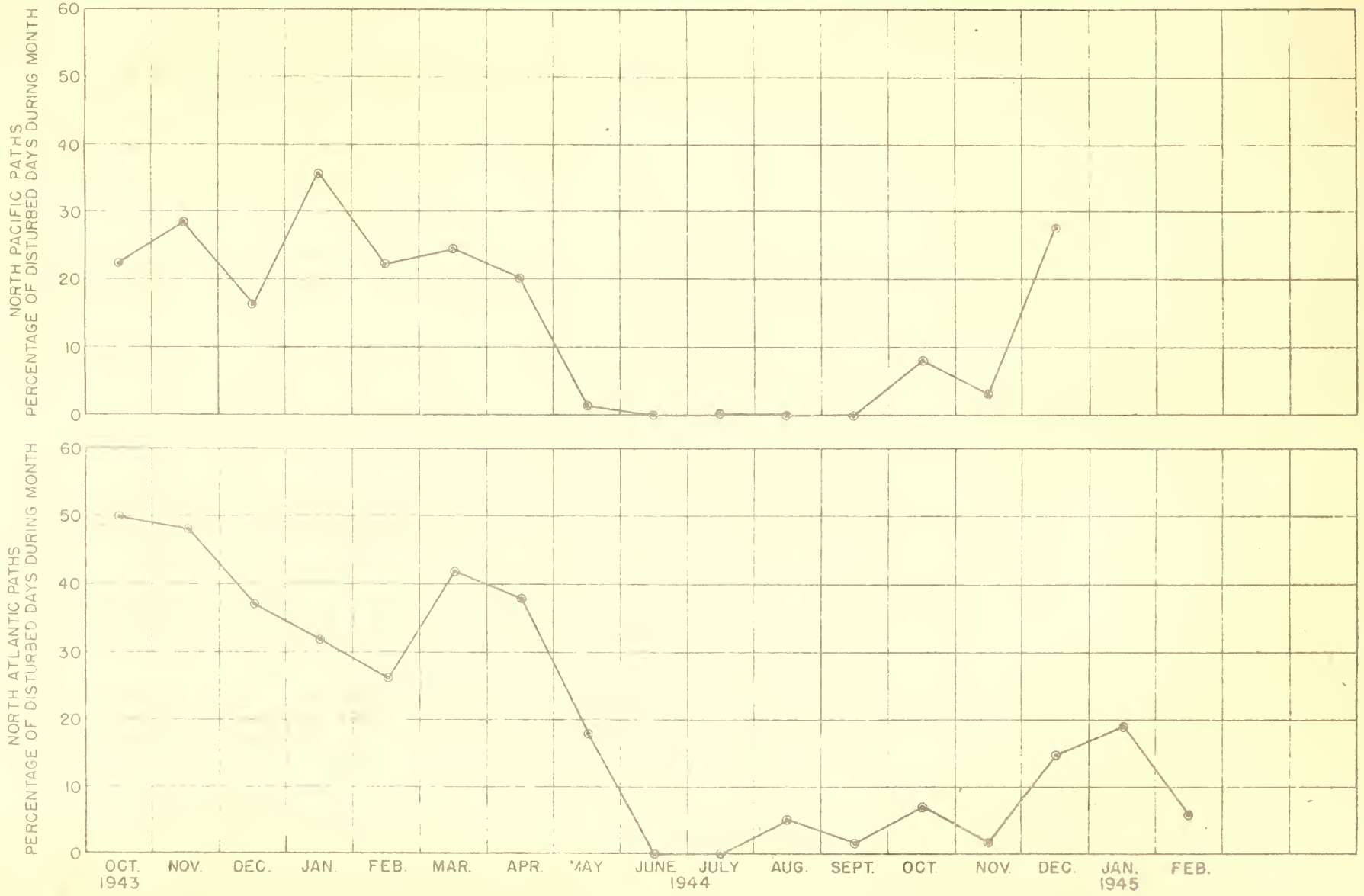

FIG. 2. RELATIVE FREQUENCY OF OCCURRENCE OF RADIO PROPAGATION DISTURBANCE.

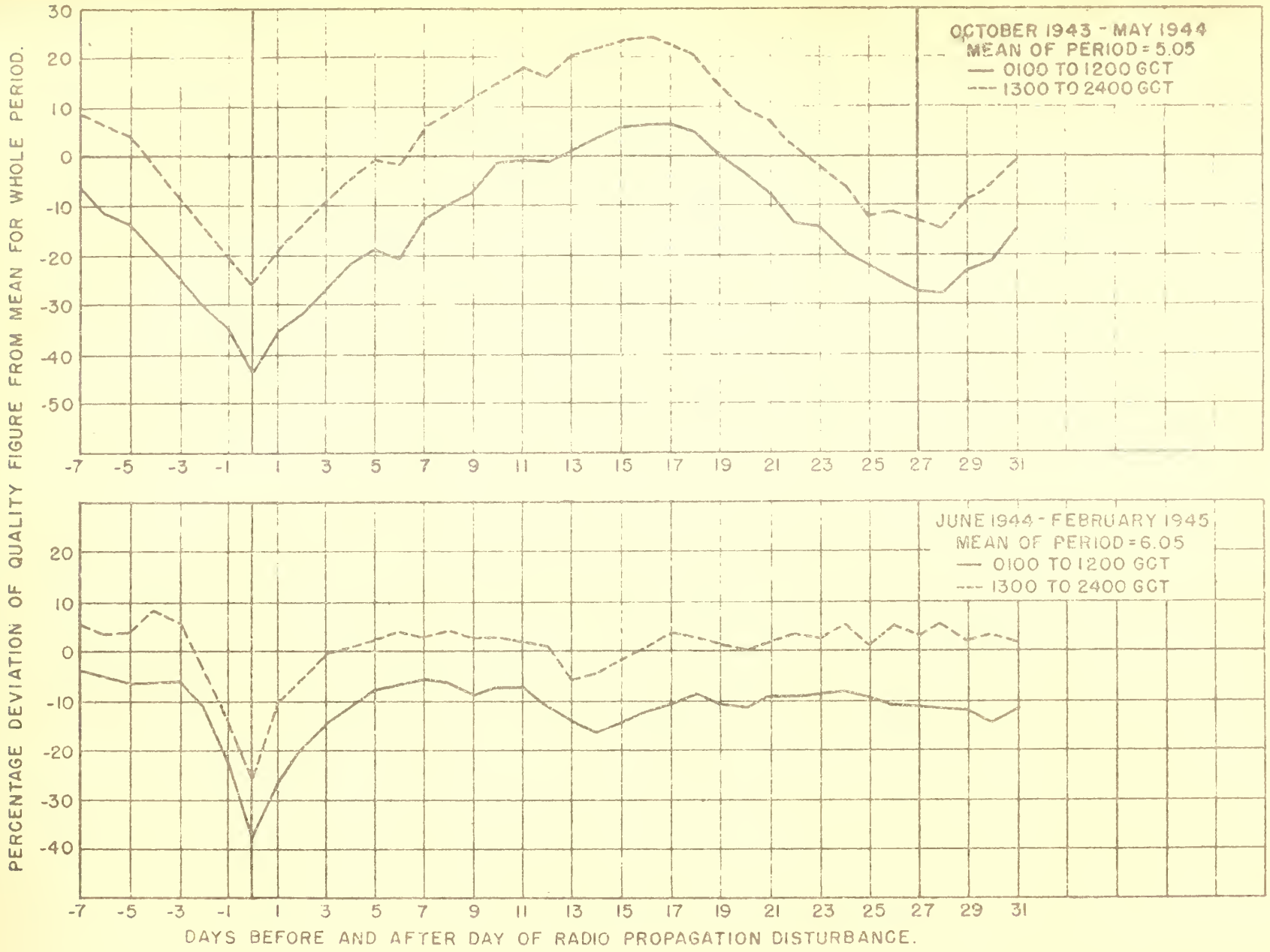

FIG 3. RECURRENCE TENDENCIES OF NORTH ATLANTIC RADIO PROPAGATION DISTURBANCES.

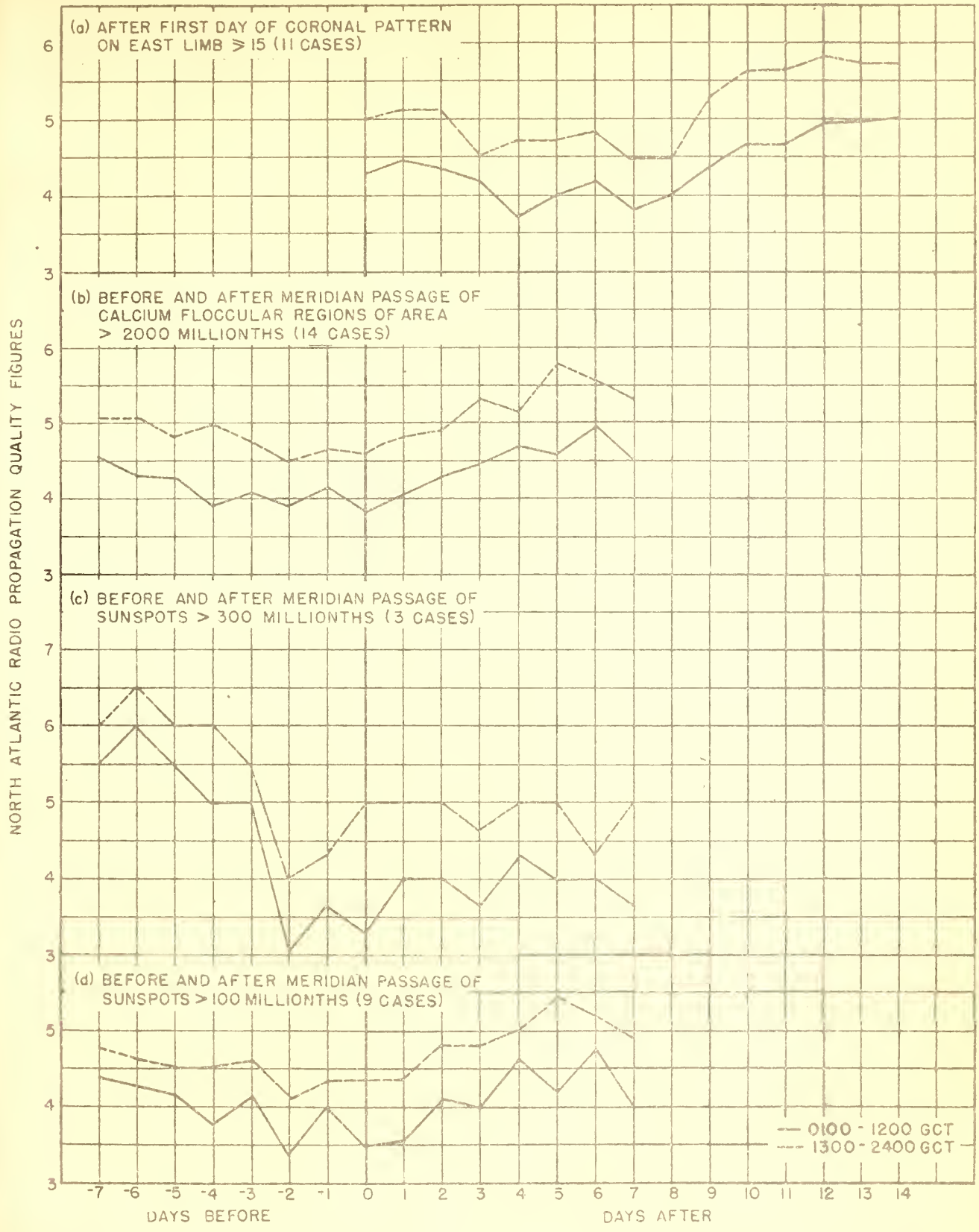

FIG.4. RELATION BETWEEN NORTH ATLANTIC RADIO PROPAGATION QUALITY FIGURES AND SOLAR ACTIVITY, BY SUPERPOSED EPOCH METHOD.

OCTOBER 1943 - MAY 1944

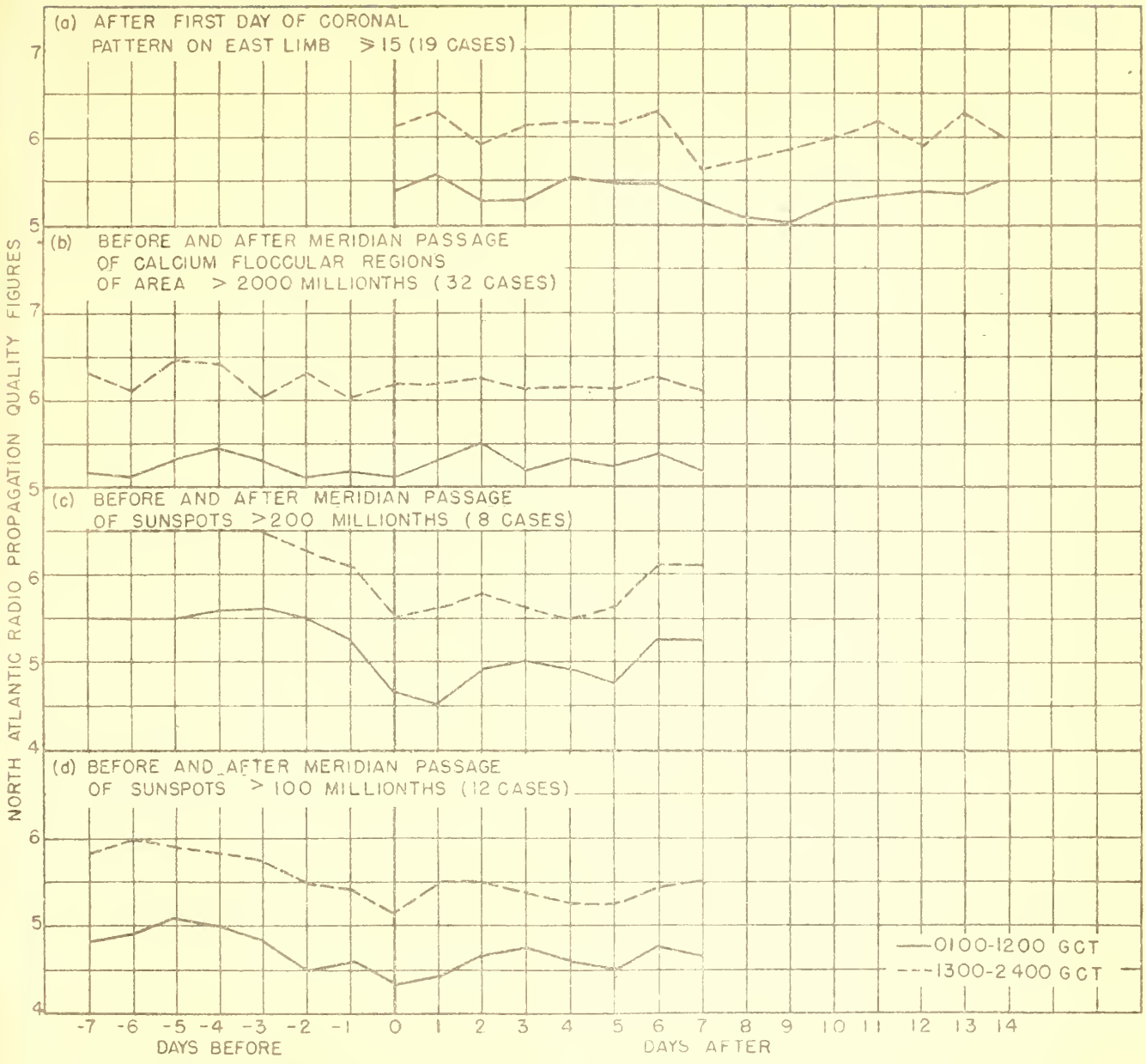

FIG. 5. RELATION BETWEEN NORTH ATLANTIC RADIO PROPAGATION QUALITY FIGURES AND SOLAR ACTIVITY, BY SUPERPOSED EPOCH METHOD.

OCTOBER 1944-MARCH 1945

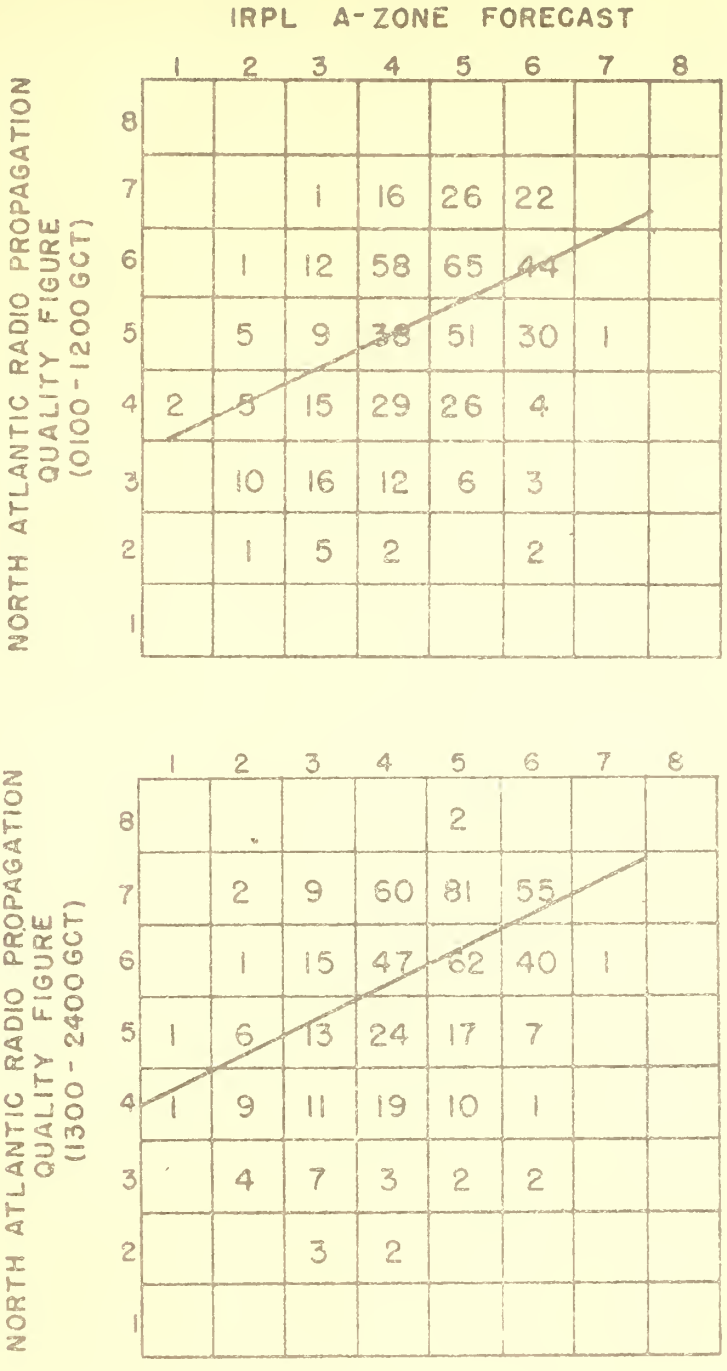

FIG.6. CORRELATION OF NORTH ATLANTIC RADIO PROPAGATION DISTURBANCE AND IRPL A-ZONE FORECASTS.

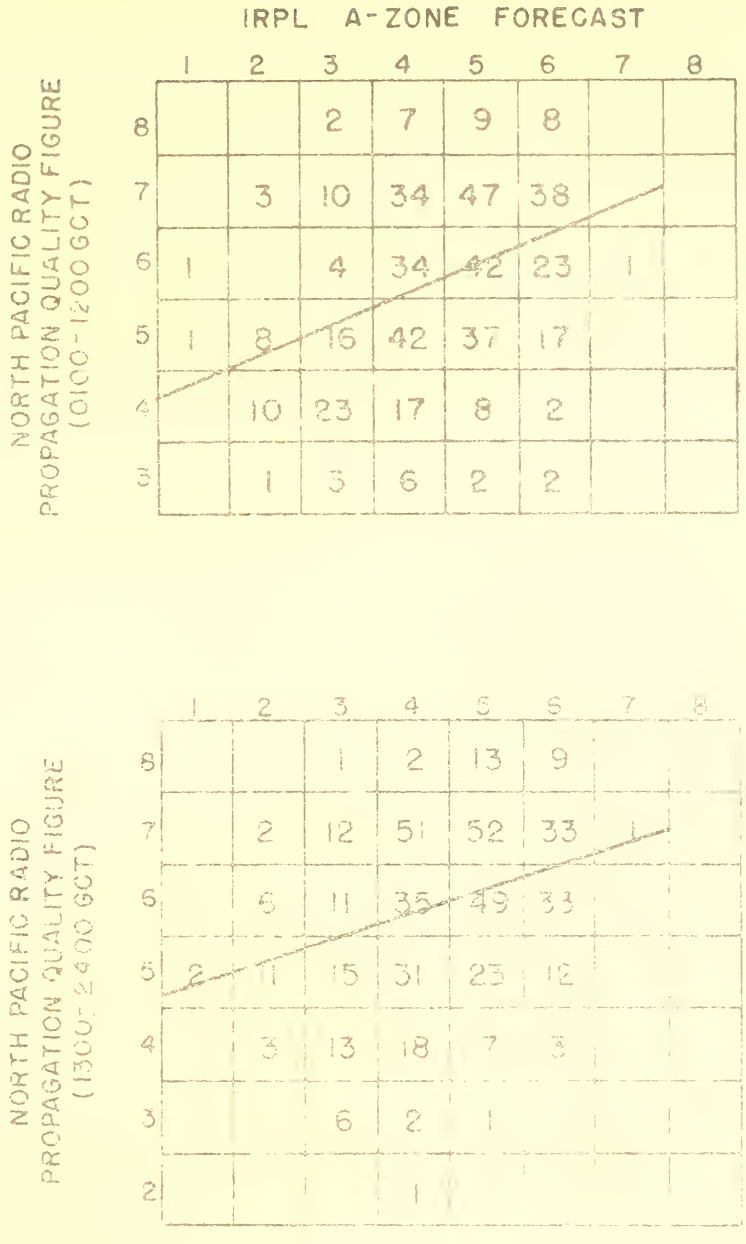

FIG. 7. CORRELATION OF NORTH PACIFIC RADIO PROPAGATION DISTURBANCE AND IRPL A-ZONE FORECASTS.