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METEOROLOGICAL ANALYSIS

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PREFACE

This report presents the data collected at the Enrico Fermi site from 1 December 1957 to 30 November 1958. The data are tabulated in three appendices to the report. Appendix A contains the wind data, Appendix B the temperature-lapse-rate data, and Appendix C the precipitation data. The data within each appendix are grouped according to the four seasons of the year with a one-year and a two-year summary at the end of each appendix.

The past three reports have emphasized the special meteorological conditions caused by the nearness of the site to Lake Erie. This fourth report presents no new ideas relative to the lake effect, but instead compares meteorological parameters between the first year, 1957, and the data collected during 1958.

We wish to acknowledge the assistance of Mr. Gale Biggs, who prepared some of the tables; Mrs. Katalin Racz and Mrs. Delores Wells, who abstracted the data from the chart rolls; and Mrs. Racz and Mr. Robert Sawicki, who drafted the figures.

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ABSTRACT

The wind data from 1958 are compared with those from 1957 using a Chi-square test as a measure of difference. The wind distributions are found to be quite similar, both by direction and by wind speed. Temperature-lapse-rate data are compared in the same manner, and although the difference was larger than with the wind distributions, the data from 1957 and 1958 could be considered as coming from the same population. Due to the natural variability found in the precipitation data, the computed value of Chi-square for the precipitation distributions was found to be significant.

I. COMPARISON OF WIND DATA

1. INTRODUCTION

This section contains a discussion of the wind-velocity distributions from 1958 compared with those of 1957. The past several progress reports have emphasized the nearness of the plant site to Lake Erie as the reason for the difference between observations of the wind-velocity distribution at the site and those obtained for the same period of time at Toledo Express Airport or Detroit City Airport, or even the distribution recorded in the five-year combined data from Toledo Municipal Airport. The aim of this discussion is not to emphasize the lake effect, but instead to compare the data of the two years so that differences, if any, and their quality, may be ascertained.

As more data become available from the plant site, Toledo Express and Detroit City Airport data will be needed less and less because correlations between Detroit City Airport and Toledo Express Airport on the one hand and the site on the other will not be required. Since the contracting agency expects to retain the meteorological equipment at the plant site for some years to come, a sufficient climatological record will be built up from on-site data to satisfy any need that might arise.

The wind records from the Enrico Fermi site, Toledo Express Airport, and Detroit City Airport for the winter, spring, summer, and fall seasons of 1958, together with a one-year summary for 1958 and a two-year summary for the combined years of 1957 and 1958, appear as Appendix A of this report. The five-year record 1950-1954 for Toledo Municipal Airport is also included for comparison and continuity. These data are Tables I-A through XXX-A and Figs. 1-A through 6-A. As has been pointed out in the second progress report, the Detroit City record appears to have an 8-point-compass observational bias. In the above mentioned tables, the bias has been removed as described in the last progress report (see Appendix A of UMRI Report 2515-3-P).

2. WIND DIRECTIONS AT THE ENRICO FERMI SITE

Because any discussion of wind-direction statistics will be relative to the population centers, a topographic map of the site and its surroundings is presented as Fig. 1. A loose copy of the same topographic map is included for use with the tables and figures of the Appendices.

In an effort to make a gross comparison of the 1958 wind directions with those of 1957, it was decided to use a Chi-square test to see how well the two

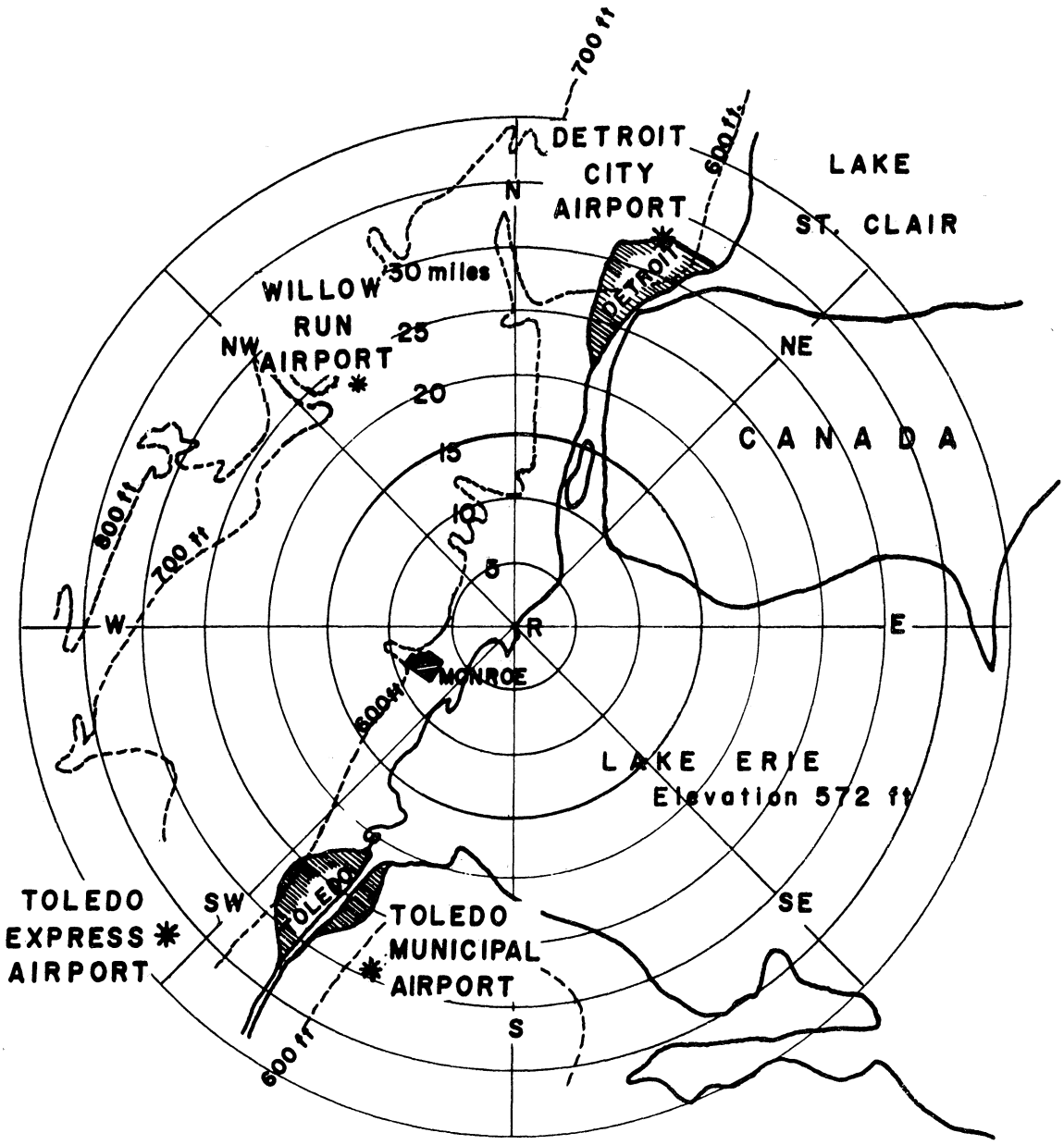

Fig. 1. A topographic map of Enrico Fermi site and surroundings.

years compared with each other. A Chi-square test is a statistical test used to measure the compatibility of observed and theoretical frequencies. In this report the theoretical frequencies will be represented by the 1957 data while the observed will be the frequencies from 1958.

Chi square may be calculated as follows for discrete variables:

$$\chi^2 = \sum_{i=1}^{k} \frac{(o_i - e_i)^2}{e_i} ,$$

where k = number of pairs of frequencies to be compared, o_i and e_i denote the "i"th pair of observed and expected frequencies, and $\Sigma o_i = \Sigma e_i$. Table I presents limiting values of Chi square in abridged form. The limiting values of Chi square depend upon a parameter ν, which is the number of degrees of freedom, equal to the number of categories being compared minus the number of restrictions. The only restriction in the comparisons of this report is that the total number of individuals in the hypothetical distribution has to be the same as in the sample distribution. This means that all categories can be filled except the last one and that number is fixed because of the given total. Therefore, in all cases computed in this report, ν is the number of categories minus one. In several cases there is so little calm wind that this category is combined with the one before it.

The hypothesis to be tested was that the 1958 data come from the population represented by the 1957 data. This assumes that the 1957 data as measured at the Enrico Fermi site are a good representation of the entire weather picture. The 1958 data are viewed in light of this hypothesis. As long as the computed value of Chi square is smaller than the limiting values at the 1% level in Table I, the hypothesis will be accepted and one can say that the 1958 data are compatible with the data from 1957. In the computation of Chi square, only the yearly summaries were compared since it could be seen from the wind roses that the two years did look quite similar.

The value of Chi square computed from the frequencies of occurrence of the 16 wind directions plus the calm condition was 2.68. This low value of Chi square for 16 degrees of freedom definitely confirms the observation that the wind-direction frequencies from 1957 and 1958 are from the same population. It is of interest to note that the Chi square value for 16 degrees of freedom at the 99% probability level is 5.812. It is true that there are certain seasonal variations, especially in the summer, but the general shapes of the wind roses are quite similar (see Figs. 13-17 in Progress Report No. 3 for comparison purposes).

A breakdown of the various wind directions relative to population centers now follows: W, WNW, NW, NNW, N, and NNE combined. The percentage frequency of winds from these several directions combined are tabulated in Table XXXI-A for the Enrico Fermi site, Toledo Express Airport, and Detroit City Airport for the 1958 seasons and for 5 years of the same seasons from 1950-1954 at Toledo Munici-

TABLE I

LIMITING VALUES OF CHI SQUARE

ν	10%	5%	1%	0.1%
1	2.71	3.84	6.64	10.83
2	4.61	5.99	9.21	13.82
3	6.25	7.82	11.34	16.27
4	7.78	9.49	13.28	18.46
5	9.24	11.07	15.09	20.52
6	10.64	12.59	16.81	22.46
7	12.02	14.07	18.48	24.32
8	13.36	15.51	20.09	26.12
9	14.68	16.92	21.67	27.88
10	15.99	18.31	23.21	29.59
11	17.28	19.68	24.73	31.26
12	18.55	21.03	26.22	32.91
13	19.81	22.36	27.69	34.53
14	21.06	23.69	29.14	36.12
15	22.31	25.00	30.58	37.70
16	23.54	26.30	32.00	39.25
18	25.99	28.87	34.81	42.31
20	28.41	31.41	37.57	45.32
23	32.01	35.17	41.64	49.73
26	35.56	38.88	45.67	54.05
30	40.26	43.77	50.89	59.70

pal Airport. It has already been shown that the wind-direction distributions from 1957 and 1958 are very similar. By applying a Chi-square test to the Enrico Fermi data of Table XXXI-A and to the same data from 1957 (Table XLIII of Progress Report No. 3), one can tell if there are seasonal differences in this particular wind-direction grouping. The same hypothesis is tested as before, that is, that the 1958 data came from the same population as the 1957 data. The computed value of Chi square was 3.65 with 3 degrees of freedom. Three degrees of freedom have to be used because there are only four seasonal categories. The value is less than the value at the 1% level in Table I, so the hypothesis is accepted. We conclude that, at least for these several wind directions, the seasonal distributions from 1957 and 1958 are samples from the same parent population.

ENE Monroe.—Table XXXII-A summarizes the data for the 1958 seasons in the same manner as Table XXXI-A. Table XLV of Progress Report No. 3 shows the 1957 data. Again a Chi-square test was applied, using 3 degrees of freedom. The value computed was 3.87. We again accept the hypothesis that the 1957 and 1958 winds by seasons from the ENE are quite similar.

E, ESE, SE, SSE, and S Combined.—Table XXXIII-A lists the percentage frequency of the occurrence of these wind directions at the plant site. Toledo Express Airport, and Detroit City Airport for the 1958 seasons as well as the same seasons during 1950-1954 from Toledo Municipal Airport. The 1957 data used in the comparison may be found in Table XLIV of Progress Report No. 3. The calculated value of Chi square, using 3 degrees of freedom, was 3.34. Again, the hypothesis is accepted.

SSW - Detroit River Communities.—The value of Chi square, using 3 degrees of freedom, computed from Table XXXIV-A of this report and Table XLVI of Progress Report No. 3 was 1.63. This low value of Chi square indicates that the 1958 seasonal data of SSW winds are in closer agreement with the 1957 data than any of the previous wind-direction groupings. Thus any remarks made about the effect of SSW winds in earlier reports may also be applied to the 1958 data.

SW and WSW - Ontario Shores.—Table XXXV-A presents the 1958 data which were compared with the data from Table XLVII of Progress Report No. 3. The computed value of Chi square, using 3 degrees of freedom, was 6.95, which is relatively quite high. It means that the probability that the 1958 data are from the same population as the 1957 data is about 8%. Thus we accept the hypothesis. The reason for such a high value is that the summer seasons of 1957 and 1958 were quite different relative to SW and WSW winds. In 1958 there were winds from those directions 24.3% of the time while in 1957 they occurred only 14.9% of the time. This may be attributed to the fact that the general circulation patterns for 1957 and 1958 during the summer season were quite different. The summer of 1957 could be said to have zonal flow while 1958 had meridional flow. Thus all the wind directions indicating north to south or south to north movements of the air were of higher frequency in 1958 than in 1957.

3. WIND SPEED AT THE ENRICO FERMI SITE

Direct comparisons of the wind speeds from the plant site and the airports at Detroit and Toledo are meaningless due to the differences in the heights of the wind instruments, general exposure of the instruments to all wind directions, etc. However, if the mean wind speed for each direction is expressed as a percentage of the overall mean wind speed for all directions, then some comparison may be made.

Figures 7-A through 12-A present such a comparison. The wind directions that have an over-water trajectory at the plant are delineated on each figure. The figures show that the winds with an over-water trajectory at Monroe have speeds greater than similar wind directions at Toledo and Detroit. This is as expected and the cause has been explained in the previous reports.

The wind-speed distribution at the plant site from 1958 was compared with that of 1957 on a directional basis using the annual summaries (see Table XXXVIII of Progress Report No. 3 and Table XXI-A of this report). The computed

value of Chi square using 15 degrees of freedom was 1.53. Such a value signifies that these two years are very similar relative to wind speed as observed on an annual basis. Here again there are seasonal differences but none that is striking.

II. COMPARISON OF TEMPERATURE-LAPSE-RATE DATA

1. INTRODUCTION

The temperature-lapse-rate measurements taken at the plant site are the temperature differences between 100 ft and 25 ft. These differences are categorized as strong lapse rates, those which exceed the dry adiabatic lapse rate; weak lapse rates, those which are intermediate between dry adiabatic and isothermal; and inversions, those where the temperature increases with height. Generally, strong lapse rates are associated with above average diffusion conditions, weak lapse rates with average diffusion conditions, and inversions with poor diffusion conditions. All the tabulated data relative to lapse-rate statistics appear as Appendix B in this report.

The temperature-lapse-rate data collected from the plant site have always been compared to the lapse-rate data from the WJBK-TV tower mainly because the WJBK-TV tower reaches to over 800 ft. Thus the comparisons with the WJBK-TV tower's data are important in developing a low-level climatology of the region in and around the plant site. The percentage frequencies of strong lapse, weak lapse, and inversions at the plant site are listed in Tables I-B, VIII-B, XV-B, XXII-B, XXIX-B, and XXXIV-B. The temperature-lapse-rate data from the WJBK-TV tower are abstracted and summarized in a somewhat different manner from those at the plant site. Because of this, only the relative frequencies of inversions in the layer from 20-300 ft at the WJBK-TV tower are presented in Tables II-B, IX-B, XVI-B, XXIII-B, XXX-B, and XXXV-B.

2. FREQUENCY OF INVERSIONS

As mentioned earlier in this report, the general circulation patterns were different in 1957 and in 1958. When discussing the general circulation, one cannot characterize the patterns year by year. It is true that 1957 had a great deal of N-S flow or a low zonal index throughout most of the year as compared to the normal, but there were periods of relatively high westerlies. It is also true that the early months of 1958 had a high index or a great number of westerly winds, but we cannot say that 1957 was a year of low index and 1958 was a year of high index. If this had been true, then the wind distributions would have been vastly different.

To test the frequency of inversions at the plant site from 1958 with the inversions from 1957, a Chi-square test was performed using the data from Table XXXIII-B and the data from Table XII of Progress Report No. 3. The value of Chi square computed was 22.40 for the occurrence of inversions using 16 degrees of

freedom. We must again accept the hypothesis that the year 1958 is a part of the same population as 1957. See Table I.

Seasonal comparisons could be made from Tables VII-B, XIV-B, XXI-B, and XXVIII-B, but any differences noted would only be a result of the particular synoptic patterns predominating during the seasons under consideration. In lapse-rate data, quite a bit of variability is to be expected from year to year and this is exactly what has been observed.

The lapse-rate summaries for 1957 indicated that there was a greater frequency of inversions at the WJBK-TV tower than at the plant site for every season of the year. The 1958 data do not bear out this observation; in fact, the opposite was observed in 1958 except in the spring season when there were more inversions at WJBK-TV tower than at the plant site. The 1958 data seem quite plausible and in fact more realistic than the 1957 data when one considers that the plant site has afternoon inversions caused by the lake-breeze effect in addition to the nocturnal and circulation inversions that would influence the WJBK-TV tower and the plant site.

The inversion frequency for the WJBK-TV tower and the plant site seem to be in phase by seasons for 1958 with a minimum occurring in the winter and a maximum in the summer. The inversion frequencies for 1957 are somewhat out of phase, with the minimum occurring at the plant site in the fall and the minimum at WJBK-TV tower occurring in the spring. The maximum occurs at both stations in the summer as expected. Thus the 1958 seasonal distribution seems to be closer to what would be expected in the area than the 1957 distribution.

3. THE DIURNAL VARIATION OF INVERSION

The hourly frequency of inversions for 1958 at the plant site and WJBK-TV tower is listed in Tables XXXIX-B to XLIV-B and demonstrated visually in Figs. 7-B to 12-B. The 1958 data show a distribution similar to that for 1957. WJBK-TV tower has a diurnal distribution of inversions typical of a land station. There is a single maximum in the evening caused by nocturnal cooling of the earth's surface and the single minimum during the day. The plant site has an entirely different distribution because of the closeness to Lake Erie. It has superimposed upon the normal distribution a second maximum in the afternoon caused by the sea-breeze inversion. Thus where WJBK-TV tower has a minimum during the day, the plant site has a great many inversions.

4. THE PERSISTANCE OF INVERSIONS

The duration of inversion periods is an important factor when considering the diffusion of an effluent. The long-term inversion is probably more important to the operation of the Enrico Fermi plant rather than short-period inversions because it is under the long-term inversion conditions when long travel distance

may occur and hence large areas are influenced. For this reason, a study of continuous inversion frequencies for a period of six hours or longer has been made at the WJBK-TV tower and the plant site; results are given in Tables III-B, X-B, XVII-B, and XXIV-B for the plant site and Tables IV-B, XI-B, XVIII-B, and XXV-B for WJBK-TV tower.

The number of occurrences of inversions six hours in duration or longer is greater at WJBK-TV tower than at the plant site for both 1957 and 1958. However, the plant site has many shorter period inversions than at the WJBK-TV tower due to the sea-breeze inversions. Thus the plant site is influenced by the normal nocturnal and circulation inversions plus the sea-breeze inversions. The net result is that the inversions climatology at the plant site is quite different from that at the WJBK-TV tower.

5. THE ASSOCIATION OF LAPSE RATES WITH WIND SPEED

Theoretically speaking, wind speeds during inversion periods should be less than wind speeds during lapse conditions. This is caused by the fact that the stability of the atmosphere during inversion periods inhibits most vertical motion, and hence any lateral motion near the surface which must necessarily accompany such vertical motions is also inhibited. To study such behavior at the plant site, Tables VII-B, XIV-B, XXI-B, XXVIII-B, XXXIII-B, and XXXVIII-B were prepared. These tables list the frequency of inversion and noninversion conditions together with the average wind speeds for these conditions according to the various wind directions.

Generally speaking, the average wind speed is greater during periods of noninversions than the wind speed during inversions for every season of 1957 and 1958. However, there are some seasons when winds from the SSE, S, SSW, and SW actually have higher speeds during inversions than during noninversions. A possible explanation for this may be that inversions under these conditions occur with an influx of warm air when the pressure gradient is stronger than it normally would be when the winds are from those directions during periods of noninversions.

A Chi-square test using 15 degrees of freedom was run on the mean wind speeds accompanying the inversion conditions using the data in Table XXXIII-B and Table XII of Progress Report No. 3. As expected, the value of Chi square was low, 5.65, indicating again that we must accept the hypothesis stated before.

6. THE ASSOCIATION OF LAPSE RATES WITH WIND DIRECTION

To determine the distribution of lapse-rate categories with wind direction, Tables V-B, XII-B, XIX-B, XXVI-B, XXXI-B, and XXXVI-B have been included. Columns 5, 6, and 7 of these tables list the percentage frequency of any wind direction within each lapse-rate category. For example, during the winter season

of 1958 (Table V-B), there were 25 occurrences of a N wind and a strong lapse rate. There were 895 occurrences of strong lapse rate during the season. Thus the percentage frequency of N wind within the strong-lapse-rate category is 25/895 or 2.8%. The last three columns present the percentage frequency of lapse rates for each wind direction as a percentage of the total lapse rate observations. Again using Table V-B, there were 25 occurrences of a N wind and a strong lapse rate. A total of 1872 observations were made during that period so the percentage frequency of N winds and strong lapse rates expressed as a percentage of the total observations is 25/1872 = 1.3%.

The winter and spring seasons of 1958 look quite similar to the 1957 seasons of winter and spring. The summer and fall seasons of 1958 are different from the same seasons of 1957. As mentioned in part 2 of this section of the report, the Chi-square test comparing 1958 with 1957 led us to accept the hypothesis that these are two samples from the same population.

III. COMPARISON OF PRECIPITATION DATA

1. INTRODUCTION

Precipitation is one of the most important weather phenomena when considering any air-pollution problems. The scavenging action of precipitation on any gaseous or particulate matter may be either helpful or harmful to the surrounding inversions, depending upon one's position relative to the precipitation. Should precipitation take place upwind from a given position, the scavenging action is helpful. Should the precipitation take place over a given area, the washout effects could become a problem.

The data relative to precipitation at the Enrico Fermi site are presented in Appendix C of this report.

2. SEASONAL VARIATIONS IN THE FREQUENCY OF PRECIPITATION

Precipitation is one weather element that is quite variable. In fact, Landsberg and Jacobs[1] claim that 30 years of data are necessary to establish a stable precipitation distribution. Therefore it is expected that there will be large departures from year to year, especially since the general circulation patterns were different in 1957 and 1958. Table XXIV-C shows the comparison at the plant site and Toledo Express Airport for 1957 and 1958 as well as the Toledo Municipal Airport average for the five-year period 1951-1954. Every season in 1958 had a greater frequency of precipitation than the corresponding season in 1957, both at the plant site and at Toledo Express Airport. During 1957 at the plant site, the maximum frequency was during the spring while the minimum was in the summer season. The maximum frequency of precipitation at the plant during 1958 was in the winter and the minimum was in the spring. An interesting note to show variability at the plant is that the wettest season of 1957 was the driest season of 1958.

A Chi-square test was used again to test the hypothesis that the 1958 distribution was from the same population as the 1957 one. The data used were from Table XXI-C and from Table LX of Progress Report No. 3. The computed value of Chi square was 58.87 with 15 degrees of freedom. This value is definitely significant, and as a result we must reject the hypothesis for the first time. Of course, when dealing with precipitation statistics, this result may be expected.

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1. Landsberg, H., and Jacobs, W. C., Compendium of Meteorology (1951), p. 979.

3. THE ASSOCIATION OF WIND SPEED AND WIND DIRECTION WITH PRECIPITATION

Because the effect of scavenging is dependent on the area over which such action might occur, the distribution of precipitation with wind velocity is of great importance. Tables I-C to III-C, VI-C to VIII-C, XI-C to XIII-C, XVI-C to XVIII-C, XXI-C to XXIII-C, and XXXI-C to XXXIII-C list the distribution of precipitation with wind direction at the plant site and Toledo Express Airport for the several seasons 1958, annual 1958, and a two-year summary. These tables also include the 5 years of data from Toledo Municipal Airport for the same seasons of the year. Figures 1-C to 6-C present the data visually.

In general, the precipitation of 1957 and 1958 is associated with above average wind speeds. Precipitation during the winter is most frequently associated with SW to WNW winds. These winds may be characterized as associated with pre-cold and post-cold frontal activity. In the spring, the precipitation distribution indicates the presence of both warm and cold frontal activity since easterly and westerly winds predominate in the distribution. The summer and fall seasons show a predominance of SW winds, indicating that pre-cold-frontal precipitation is prevelant.

4. THE ASSOCIATION OF PRECIPITATION WITH LAPSE RATE

The association of precipitation with the three different lapse-rate categories by wind direction is presented in Tables IV-C, V-C, IX-C, X-C, XIV-C, XV-C, XIX-C, XX-C, XXV-C, XXVI-C, and XXXIV-C. These tables were prepared in a similar manner to Tables VI-C, XII-C, XIX-C, XXXI-C, and XXXVI-C except that there is a mean wind speed associated with each wind-direction lapse-rate category in the first set of tables.

In general, both sets of tables indicate that precipitation during strong lapse conditions predominates for all seasons of 1957 and 1958. This is as would be normally expected. Fortunately, the occurrence of precipitation under inversion conditions is fairly infrequent. In 1957 the combination of precipitation and inversion occurred only 1.2% of the time, while in 1958 they occurred 3.5% of the time.

5. THE FREQUENCY OF CONTINUOUS PRECIPITATION

Tables XXIX-C, XXX-C,and XXXVI-C list the percentage frequencies of individual hours of continuous precipitation from 1 hour to greater than 15 hours within the three lapse-rate categories. In 1957, almost 60% of the time, the duration of precipitation was 2 hours or less. During 1958 the duration of precipitation lasted for 5 hours or less for about 60% of the time when precipitation occurred.

The association of hours of continuous precipitation with lapse-rate categories and wind directions is contained in Tables XXVII-C, XXVIII-C, and XXXV-C.

The average lengths of continuous precipitation were higher in 1958 than in 1957, indicating that precipitation of a short, showery type predominated in 1957, while the steady, warm frontal type predominated in 1958.

IV. SUMMARY

1. The wind-direction and wind-speed distributions for 1957 and 1958 may be considered quite similar.

2. The frequency of inversions at the plant site from 1957 and 1958 indicate that both samples are from the same population.

3. The 1958 inversion data show that there was a higher frequency of inversions at the site than at the WJBK-TV tower, which is opposite of what the observations showed in 1957. The 1958 data agree more with what would be expected.

4. The plant site diurnal inversion pattern has a minimum in the late morning, a secondary maximum in the afternoon, and a primary maximum in the late evening or early morning.

5. The sea-breeze effect causes a great many short-period inversions at the plant site.

6. Wind speeds during inversion periods are higher than would normally be expected at a land station.

7. The precipitation data from 1958 showed a greater frequency than for 1957, so the computed value of Chi square was significant.

8. Precipitation at the plant site is associated with above average wind speeds and strong-lapse-rate conditions.

9. In general, the two years of 1957 and 1958 are quite similar in the distributions of the meteorological parameters.

APPENDIX A

WIND DATA

TABLE I-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Enrico Fermi Site
(Aerovane at height of 102 ft)
1 December 1957 - 28 February 1958
(Winter)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N		1.0	1.4			2.4	2.4	48	14.1	93
NNE		0.9	1.0			1.9	1.9	37	13.7	90
NE		0.8	1.8	0.1		2.7	2.7	51	15.6	103
ENE	0.1	0.7	2.0	0.6		3.3	3.4	64	17.6	116
E	0.1	1.0	2.5	0.5		4.0	4.1	79	16.5	108
ESE	0.1	1.6	1.1			2.7	2.8	54	12.2	80
SE		0.6	1.4	0.2		2.2	2.2	43	16.2	107
SSE		0.7	1.3	0.1		2.1	2.1	40	15.6	103
S	0.1	2.2	1.7	0.4		4.3	4.4	84	13.6	89
SSW	0.1	3.1	3.6	0.4		7.1	7.2	136	14.3	94
SW	0.1	2.4	5.6	0.2		8.2	8.3	160	15.6	103
WSW		5.9	9.5	0.5		15.9	15.9	307	14.8	97
W	0.1	4.6	7.4	0.4	0.1	12.5	12.6	242	14.9	98
WNW	0.1	2.2	7.6	0.6		10.4	10.5	202	16.7	110
NW	0.1	2.6	7.9	0.5		11.0	11.1	215	16.4	108
NNW	0.1	2.4	4.8	0.5		7.7	7.8	151	15.6	103
Calm	1.0						1.0	20	0.0	
Totals	2.0	32.7	60.6	5.0	0.1	98.4	100.4	1933		
Mean									15.2	100

TABLE II-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Toledo Express Airport
(Wind instrument at height of 72 ft)
1 December 1957 - 28 February 1958
(Winter)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.3	4.2	1.7			5.9	6.2	134	10.6	94
NNE	0.1	1.2	0.5			1.7	1.8	40	10.4	92
NE	0.3	2.4	0.3			2.7	3.0	65	8.5	75
ENE	0.1	1.7	1.1			2.8	2.9	62	11.8	104
E	0.1	3.5	1.3			4.8	4.9	105	10.8	96
ESE	0.1	1.3	0.2			1.5	1.6	36	8.6	76
SE	0.4	2.4	0.3			2.7	3.1	67	8.1	72
SSE	0.1	2.4	0.5			2.9	3.0	64	9.6	85
S	0.4	3.6	1.8	0.1		5.5	5.9	126	11.0	97
SSW	0.1	2.4	2.0			4.4	4.5	96	12.6	112
SW	0.1	5.4	5.6	0.1	0.1	11.2	11.3	243	13.4	119
WSW	0.1	7.1	6.6	0.1		13.8	13.9	298	13.1	116
W	0.3	8.8	4.3			13.1	13.4	289	11.2	99
WNW	0.2	5.7	1.7			7.4	7.6	164	10.1	89
NW	0.4	6.4	3.1			9.5	9.9	214	11.0	97
NNW	0.1	5.0	2.1			7.1	7.2	157	11.0	97
Calm	—	—	—	—	—	—	—	—	—	—
Totals	3.2	63.5	33.1	0.3	0.1	97.0	100.2	2160		
Mean									11.3	100

TABLE III-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Detroit City Airport
(Wind instruments at height of 81 ft)
1 December 1957 - 28 February 1958
(Winter)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.6	4.5	4.5			9.0	9.6	207	12.5	90
NNE	0.3	1.7	0.6			2.3	2.6	55	9.8	71
NE	0.1	2.0	0.4			2.4	2.5	54	9.2	66
ENE	0.1	1.2	1.0			2.2	2.3	48	12.5	90
E	0.5	2.8	1.2			4.0	4.5	96	10.1	73
ESE	0.1	1.8	0.9			2.7	2.8	62	11.1	80
SE	0.3	1.9	0.6			2.5	2.8	62	9.6	69
SSE	0.3	1.4	0.8			2.2	2.5	55	10.7	77
S	0.5	4.2	2.6			6.8	7.3	156	11.4	82
SSW	0.1	1.0	3.1			4.1	4.2	91	15.7	113
SW		3.4	6.9	0.1		10.4	10.4	224	15.2	109
WSW	0.1	2.9	4.4	0.1		7.4	7.5	159	14.3	103
W	0.1	3.8	4.7	0.4		8.9	9.0	192	14.4	104
WNW	0.1	2.7	6.7	0.4	0.1	9.9	10.0	215	15.9	114
NW	0.2	3.9	9.1	0.9	0.1	14.0	14.2	309	16.0	115
NNW	0.1	1.2	6.3	0.2		7.7	7.8	167	17.1	123
Calm	0.4						0.4	8	0.0	
Totals	3.9	40.4	53.8	2.1	0.2	96.5	100.4	2160		
Mean									13.9	100

TABLE IV-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS, BIASED AND UNBIASED

Detroit City Airport
1 December 1957 - 28 February 1958
(Winter)

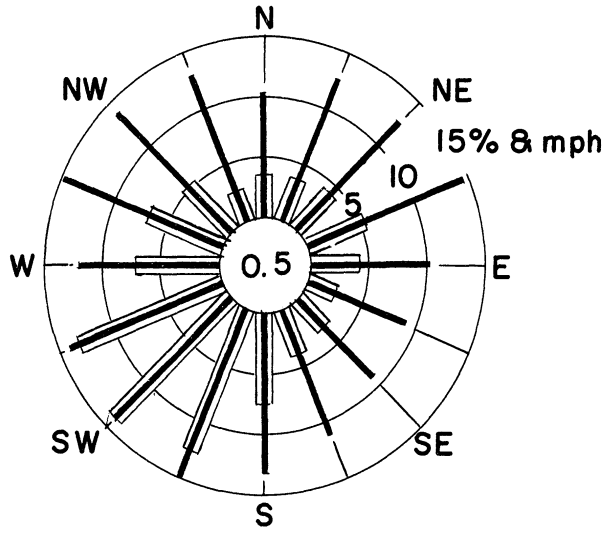
Wind Direction	Total Observations			
	Biased Record		Unbiased Record	
	No.	%	No.	%
N	207	9.6	159	7.4
NNE	55	2.6	61	2.8
NE	54	2.5	41	1.9
ENE	48	2.3	57	2.6
E	96	4.5	83	3.8
ESE	62	2.8	71	3.3
SE	62	2.8	51	2.4
SSE	55	2.5	68	3.1
S	156	7.3	116	5.4
SSW	91	4.2	138	6.4
SW	224	10.4	182	8.4
WSW	159	7.5	190	8.8
W	192	9.0	174	8.1
WNW	215	10.0	252	11.7
NW	309	14.2	271	12.5
NNW	167	7.8	238	11.0
Calm	8	0.4	8	0.4
Totals	2160	100.4	2160	100.0

TABLE V-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS GROUPED ACCORDING TO WIND SPEEDS

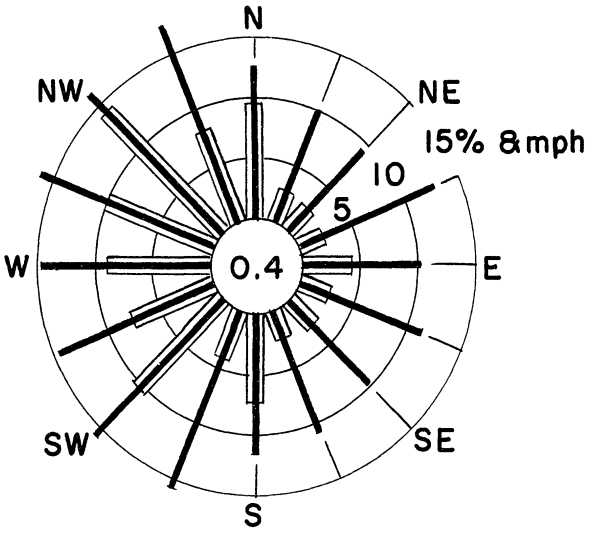
Toledo Municipal Airport
(Wind instruments at height of 47 ft)
1 January 1950 - 31 December 1954
(Winter Seasons)

Wind Direction	Speed, mph					Total Observations		Mean Speed	
	0-3	4-12	13-24	25 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.3	2.3	1.0		3.4	3.6	395	10.1	78
NNE	0.1	1.8	1.6	0.1	3.4	3.6	385	12.4	96
NE	0.2	1.9	1.8	0.1	3.8	4.0	432	12.3	95
ENE	0.2	2.1	2.8	0.4	5.3	5.5	591	14.3	111
E	0.3	2.6	1.4		4.0	4.3	467	10.1	78
ESE	0.2	2.0	0.6		2.5	2.8	301	9.1	71
SE	0.3	2.3	0.7		3.0	3.3	352	8.9	69
SSE	0.2	2.2	1.3		3.6	3.8	411	11.1	86
S	0.4	3.2	3.4	0.2	6.8	7.2	777	12.9	100
SSW	0.2	4.8	6.5	0.8	12.1	12.3	1330	14.5	112
SW	0.3	5.7	7.1	1.0	13.8	14.1	1524	14.1	109
WSW	0.3	5.4	6.6	1.0	12.9	13.2	1429	14.0	109
W	0.3	3.6	2.9	0.2	6.8	7.2	774	12.1	94
WNW	0.1	2.6	3.5	0.5	6.7	6.8	732	14.3	111
NW	0.2	2.1	2.7	0.2	5.0	5.3	570	13.5	105
NNW	0.1	1.2	2.2	0.1	2.6	2.7	295	12.5	97
Calm	0.5					0.5	59	0.0	
Totals	3.9	45.8	45.1	4.7	95.6	100.0	10824		
Mean								12.9	100



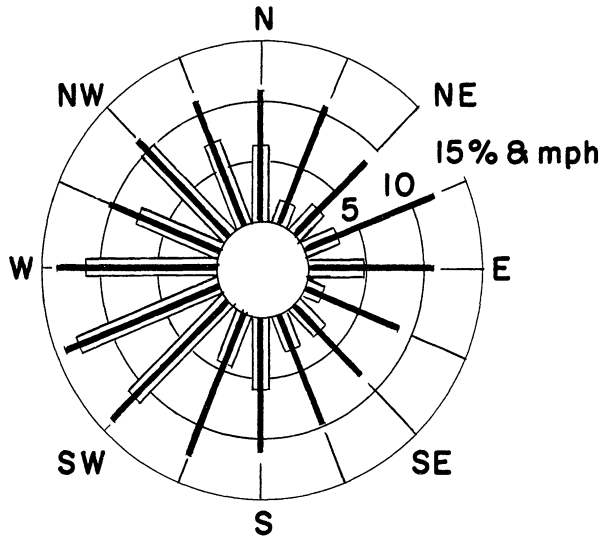
TOLEDO MUNICIPAL AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 47 ft.
Winter (Dec., Jan., Feb.) 1950-1954



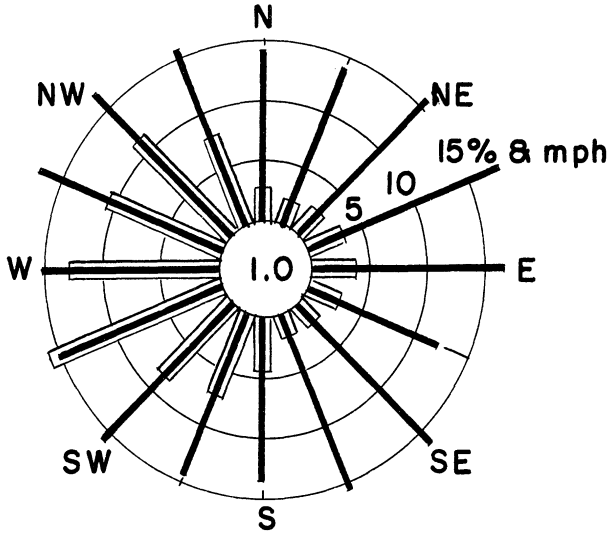
DETROIT CITY AIRPORT
DETROIT, MICHIGAN

Wind Instrument at Height of 81 ft.
Winter (Dec., Jan., Feb.) 1958



TOLEDO EXPRESS AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 72 ft.
Winter (Dec., Jan., Feb.) 1958



ENRICO FERMI POWER PLANT SITE
LAGOONA BEACH, MICHIGAN

Aerovane at Height of 102 ft.
Winter (Dec., Jan., Feb.) 1958

Fig. 1-A. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at Toledo Municipal Airport, Winter Seasons, 1950-1954; Detroit City Airport, Toledo Express Airport, and Enrico Fermi site, Winter, 1957-1958.

TABLE VI-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Enrico Fermi Site
(Aerovane at height of 102 ft)
1 March 1958 - 31 May 1958
(Spring)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.1	2.8	1.1	0.1		4.0	4.1	89	12.1	88.3
NNE	0.1	3.1	3.0	0.1		6.2	6.3	138	13.2	96.4
NE	0.1	1.5	9.0	1.1		11.6	11.7	258	17.9	130.7
ENE	0.1	2.5	5.2	0.5		8.2	8.3	180	15.7	114.6
E	0.1	1.8	3.2	1.1	0.3	6.4	6.5	143	17.7	129.2
ESE	0.1	2.1	2.2	0.2	0.1	4.6	4.7	102	14.4	105.1
SE		3.1	1.2			4.3	4.3	95	10.9	79.6
SSE	0.1	2.5	0.9			3.4	3.5	77	10.4	75.9
S		2.8	0.6			3.4	3.4	75	10.0	73.0
SSW	0.1	3.8	1.6			5.4	5.5	122	11.0	80.3
SW	0.1	3.5	2.8	0.1		6.4	6.5	141	12.7	92.7
WSW		4.6	3.2		0.1	7.9	7.9	174	12.7	92.7
W	0.1	4.7	3.2		0.1	8.0	8.1	180	12.5	91.2
WNW	0.1	3.4	4.0	0.1	0.1	7.6	7.7	169	13.8	100.7
NW	0.1	2.8	3.8	0.1		6.7	6.8	147	14.1	102.9
NNW		3.0	2.1	0.1		5.2	5.2	114	12.5	91.2
Calm	0.2						0.2	4	0.0	0.0
Totals	1.4	48.0	47.1	3.5	0.7	99.3	100.7	2208		
Mean									13.7	100

TABLE VII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Toledo Express Airport
(Wind instrument at height of 72 ft)
1 March 1958 - 31 May 1958
(Spring)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.3	3.8	1.5			5.3	5.6	125	10.5	88.2
NNE	0.3	3.0	1.4			4.4	4.7	103	10.6	89.1
NE	0.3	6.3	3.1			9.4	9.7	215	11.1	93.3
ENE	0.1	4.5	5.3			9.8	9.9	217	13.6	114.3
E	0.1	3.8	4.7	0.1		8.6	8.7	192	13.9	116.8
ESE	0.1	3.2	1.0			4.2	4.3	97	10.3	86.6
SE	0.1	1.4	0.4			1.8	1.9	42	9.5	79.8
SSE	0.1	1.4	0.5			1.9	2.0	46	10.1	84.9
S	0.1	2.4	0.3			2.7	2.8	63	8.8	73.9
SSW	0.1	2.3	1.4			3.7	3.8	85	11.8	99.2
SW	0.1	3.8	3.1	0.1		7.0	7.1	156	12.8	107.6
WSW	0.1	6.3	5.1		0.1	11.5	11.6	256	12.8	107.6
W	0.1	5.3	2.6	0.1	0.1	8.1	8.2	178	11.7	98.3
WNW	0.1	3.6	3.0	0.1		6.7	6.8	148	12.8	107.6
NW	0.4	5.2	2.5			7.7	8.1	177	11.0	92.4
NNW	0.1	3.0	1.7			4.7	4.8	106	11.6	97.5
Calm	0.1						0.1	2	0.0	0.0
Totals	2.6	59.3	37.6	0.4	0.2	97.5	100.1	2208		
Mean									11.9	100

TABLE VIII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Detroit City Airport
(Wind instruments at height of 81 ft)
1 March 1958 - 31 May 1958
(Spring)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.8	7.6	3.7			11.3	12.1	266	10.8	90.0
NNE	0.3	5.0	2.3	0.1		7.4	7.7	168	11.0	91.7
NE	0.5	5.7	5.2			10.9	11.4	249	12.5	104.2
ENE	0.3	3.0	2.2			5.2	5.5	121	11.8	98.3
E	0.4	3.5	2.9			6.4	6.8	150	12.0	100.0
ESE	0.1	2.0	0.6			2.6	2.7	61	9.9	82.5
SE	0.1	3.4	1.0			4.4	4.5	98	10.1	84.2
SSE	0.1	1.1				1.1	1.2	27	8.1	67.5
S	0.2	4.7	0.4			5.1	5.3	117	8.4	70.0
SSW	0.1	2.4	1.1			3.5	3.6	80	11.2	93.3
SW	0.2	3.4	2.6	0.1		6.1	6.3	138	12.3	102.5
WSW		1.7	1.6			3.3	3.3	73	13.0	108.3
W	1.0	5.0	4.2	0.3	0.1	9.6	10.6	236	12.4	103.3
WNW	0.1	1.9	4.5	0.4	0.1	6.9	7.0	154	15.8	131.7
NW	0.2	2.6	5.1	0.1		7.8	8.0	175	14.6	121.7
NNW	0.1	1.0	2.3			3.3	3.4	75	14.8	123.3
Calm	0.9						0.9	20	0.0	0.0
Totals	5.4	54.0	39.7	1.0	0.2	94.9	100.3	2208		
Mean									12.0	100

TABLE IX-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS, BIASED AND UNBIASED

Detroit City Airport
1 March 1958 - 31 May 1958
(Spring)

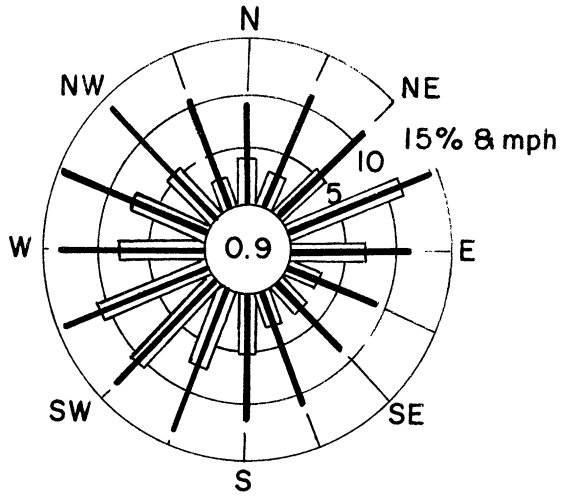
Wind Direction	Total Observations			
	Biased Record		Unbiased Record	
	No.	%	No.	%
N	266	12.1	199	9.0
NNE	168	7.7	254	11.5
NE	249	11.4	203	9.2
ENE	121	5.5	162	7.3
E	150	6.8	117	5.3
ESE	61	2.7	85	3.8
SE	98	4.5	67	3.0
SSE	27	1.2	42	1.9
S	117	5.3	85	3.8
SSW	80	3.6	117	5.3
SW	138	6.3	104	4.7
WSW	73	3.3	109	4.9
W	236	10.6	185	8.4
WNW	154	7.0	216	9.8
NW	175	8.0	136	6.2
NNW	75	3.4	107	4.8
Calm	20	0.9	20	0.9
Totals	2208	100.3	2208	99.8

TABLE X-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS GROUPED ACCORDING TO WIND SPEEDS

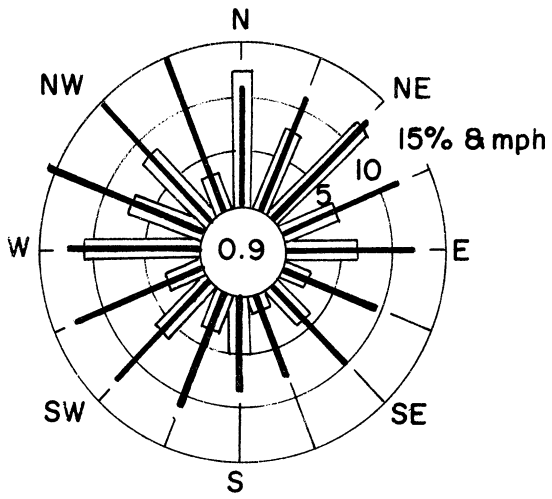
Toledo Municipal Airport
(Wind instruments at height of 47 ft)
1 January 1950 - 31 December 1954
(Spring Seasons)

Wind Direction	Speed, mph					Total Observations		Mean Speed	
	0-3	4-12	13-24	25 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.3	2.9	1.0		3.9	4.2	468	9.1	72
NNE	0.1	1.9	1.2		3.1	3.2	351	11.1	87
NE	0.2	3.0	2.7		5.8	6.0	667	11.8	93
ENE	0.2	4.1	6.5	0.7	11.2	11.4	1258	14.6	115
E	0.4	3.8	3.0	0.1	6.9	7.3	811	11.4	90
ESE	0.2	2.2	0.7		3.0	3.2	350	9.4	74
SE	0.3	2.3	0.5		2.7	3.0	332	8.4	66
SSE	0.2	1.8	0.9	0.1	2.7	2.9	323	11.0	87
S	0.3	2.9	1.8	0.2	4.9	5.3	582	11.7	92
SSW	0.2	3.1	3.5	0.4	7.0	7.2	796	13.7	108
SW	0.4	4.8	4.4	0.7	9.8	10.2	1127	13.3	105
WSW	0.3	4.2	5.4	0.9	10.4	10.8	1189	14.3	113
W	0.2	3.6	3.7	0.4	7.7	8.0	881	13.4	106
WNW	0.3	2.4	4.7	0.4	7.6	7.8	865	14.9	117
NW	0.1	2.2	3.1	0.3	5.6	5.8	636	14.0	110
NNW	0.2	1.7	0.8	0.1	2.6	2.8	307	10.6	83
Calm	0.9					0.9	97	0.0	
Totals	3.9	46.9	43.9	4.3	95.2	100.0	11040		
Mean								12.7	100



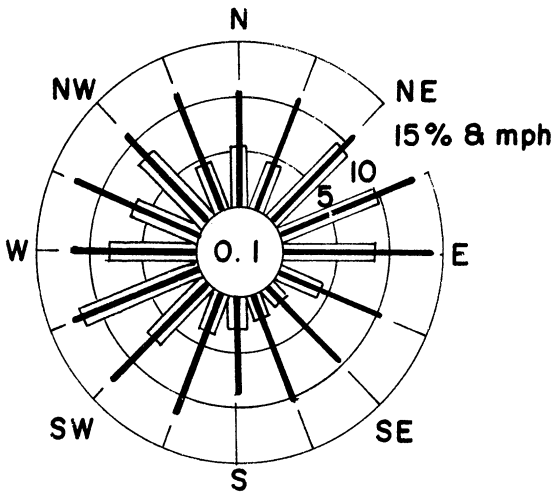
TOLEDO MUNICIPAL AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 47 ft.
Spring (Mar., Apr., May.) 1950-1954



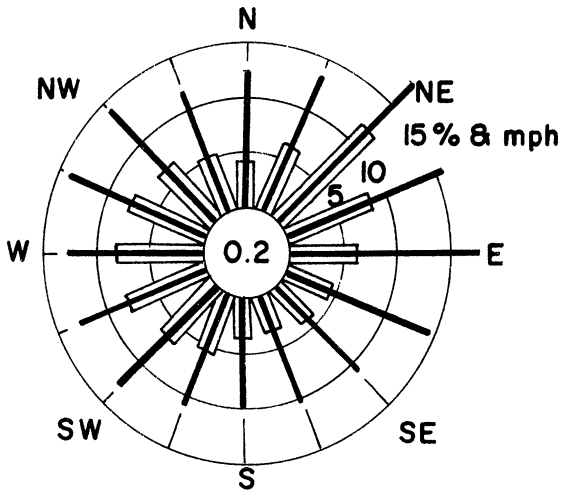
DETROIT CITY AIRPORT
DETROIT, MICHIGAN

Wind Instrument at Height of 81 ft.
Spring (Mar., Apr., May,) 1958



TOLEDO EXPRESS AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 72 ft.
Spring (Mar., Apr., May,) 1958



ENRICO FERMI POWER PLANT SITE
LAGOONA BEACH, MICHIGAN

Aerovane at Height of 102 ft.
Spring (Mar., Apr., May.) 1958

Fig. 2-A. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at Toledo Municipal Airport, Spring Seasons, 1950-1954; Detroit City Airport, Toledo Express Airport, and Enrico Fermi site, Spring, 1958.

TABLE XI-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Enrico Fermi Site
(Aerovane at height of 102 ft)
1 June 1958 - 31 August 1958
(Summer)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.3	2.3	0.6			2.9	3.2	71	9.4	87.0
NNE	0.1	3.1	0.9			4.0	4.1	90	10.0	92.6
NE	0.2	1.4	1.6			3.0	3.2	71	12.8	118.5
ENE	0.3	1.4	1.9			3.3	3.6	79	13.0	120.4
E		2.3	1.9			4.2	4.2	92	12.8	118.5
ESE	0.2	2.3	1.9			4.2	4.4	98	12.3	113.9
SE	0.1	3.7	1.9			5.6	5.7	128	11.4	105.6
SSE	0.1	5.3	1.4			6.7	6.8	152	10.0	92.6
S	0.1	5.4	0.7			6.1	6.2	138	9.0	83.3
SSW	0.2	6.9	2.4			9.3	9.5	210	10.5	97.2
SW	0.2	8.0	4.8			12.8	13.0	287	11.8	109.3
WSW	0.2	8.0	3.1			11.1	11.3	249	10.7	99.1
W	0.3	5.2	2.3	0.1		7.6	7.9	174	11.1	102.8
WNW	0.4	3.8	2.0			5.8	6.2	136	11.1	102.8
NW	0.1	3.4	0.6			4.0	4.1	92	9.3	86.1
NNW	0.2	4.6	0.7			5.3	5.5	123	9.1	84.3
Calm	0.8					0.0	0.8	18	0.0	0.0
Totals	3.8	67.1	28.7	0.1		95.9	99.7	2208		
Mean									10.8	100

TABLE XII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Toledo Express Airport
(Wind instruments at height of 72 ft)
1 June 1958 - 31 August 1958
(Summer)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.4	3.9	0.9			4.8	5.2	115	9.3	86.9
NNE	0.4	4.3	0.9			5.2	5.6	123	9.3	86.9
NE	0.2	3.5	0.6			4.1	4.3	95	9.1	85.0
ENE	0.4	2.3	0.4			2.7	3.1	68	8.5	79.4
E	0.5	2.6	1.5			4.1	4.6	102	10.8	100.9
ESE	0.4	3.9	0.9			4.8	5.2	115	9.2	86.0
SE	0.5	3.2	0.2			3.4	3.9	86	7.6	71.0
SSE	0.3	3.2	0.1			3.3	3.6	80	7.8	72.9
S	0.3	4.4	0.9			5.3	5.6	123	9.4	87.8
SSW	0.4	5.1	2.7			7.8	8.2	180	11.2	104.7
SW	0.4	5.9	6.6	0.1		12.6	13.0	287	13.2	123.4
WSW	0.3	7.6	7.4	0.2		15.2	15.5	341	13.1	122.4
W	0.1	4.2	2.1			6.3	6.4	142	11.3	105.6
WNW	0.2	4.1	2.4			6.5	6.7	149	11.7	109.3
NW	0.1	2.9	0.8	0.1		3.8	3.9	85	9.9	92.5
NNW	0.4	3.2	0.6			3.8	4.2	93	9.0	84.1
Calm	1.1						1.1	24	0.0	0.0
Totals	6.4	64.3	29.0	0.4		93.7	100.1	2208		
Mean									10.7	100

TABLE XIII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Detroit City Airport
(Wind instruments at height of 81 ft)
1 June 1958 - 31 August 1958
(Summer)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	1.5	6.0	1.3			7.3	8.8	195	8.4	77.1
NNE	0.4	3.8	1.1			4.9	5.3	116	9.8	89.9
NE	0.1	2.1	0.4			2.5	2.6	58	9.1	83.5
ENE	0.4	2.0	0.5			2.5	2.9	64	9.0	82.6
E	0.9	5.1	0.7			5.8	6.7	149	8.3	76.1
ESE	0.3	2.7	0.4			3.1	3.4	74	8.6	78.9
SE	0.7	4.7	0.5			5.2	5.9	131	8.2	75.2
SSE	0.1	2.7	0.5			3.2	3.3	75	9.4	84.4
S	0.7	8.8	2.1			10.9	11.6	256	9.5	87.2
SSW	0.1	3.4	1.8			5.2	5.3	117	11.5	105.5
SW	0.1	4.6	7.4			12.0	12.1	268	14.4	132.1
WSW	0.1	2.6	3.0			5.6	5.7	126	13.4	122.9
W	0.4	4.5	4.2	0.4		9.1	9.5	210	13.1	120.2
WNW	0.1	1.8	2.5	0.2	0.1	4.6	4.7	101	14.9	136.7
NW	0.3	3.6	3.2	0.1		6.9	7.2	158	12.7	116.5
NNW	0.2	1.9	1.2			3.1	3.3	74	11.4	104.6
Calm	1.6						1.6	36	0.0	0.0
Totals	8.0	60.3	30.8	0.7	0.1	91.9	99.9	2208		
Mean									10.9	100

TABLE XIV-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS, BIASED AND UNBIASED

Detroit City Airport
1 June 1958 - 31 August 1958
(Summer)

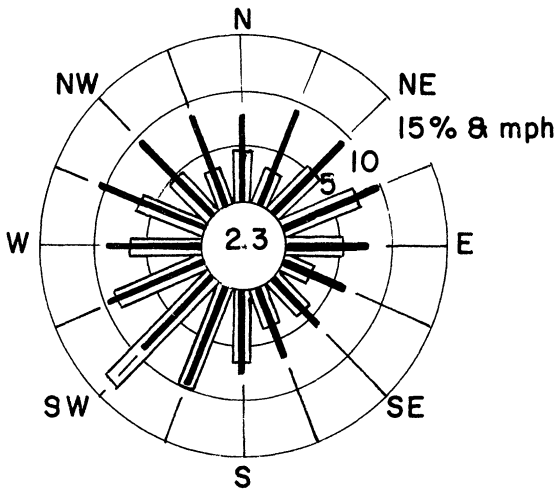
Wind Direction	Total Observations			
	Biased Record		Unbiased Record	
	No.	%	No.	%
N	195	8.8	163	7.4
NNE	116	5.3	133	6.0
NE	58	2.6	52	2.4
ENE	64	2.9	72	3.3
E	149	6.7	117	5.3
ESE	74	3.4	110	5.0
SE	131	5.9	96	4.3
SSE	75	3.3	119	5.4
S	256	11.6	182	8.2
SSW	117	5.3	206	9.3
SW	268	12.1	200	9.1
WSW	126	5.7	192	8.7
W	210	9.5	162	7.3
WNW	101	4.7	140	6.3
NW	158	7.2	117	5.3
NNW	74	3.3	111	5.0
Calm	36	1.6	36	1.6
Totals	2208	99.9	2208	99.9

TABLE XV-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS GROUPED ACCORDING TO WIND SPEEDS

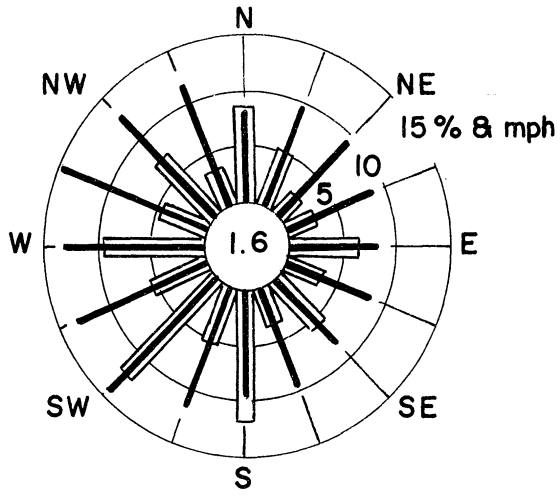
Toledo Municipal Airport
(Wind instruments at height of 47 ft)
1 January 1950 - 31 December 1954
(Summer Seasons)

Wind Direction	Speed, mph					Total Observations		Mean Speed	
	0-3	4-12	13-24	25 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.7	3.3	0.6		3.9	4.6	509	7.8	91
NNE	0.3	2.4	0.8		3.2	3.5	391	9.1	106
NE	0.6	3.7	1.3		5.0	5.6	619	9.1	106
ENE	0.6	4.9	2.2		7.1	7.7	849	9.9	115
E	0.7	4.1	0.6		4.7	5.4	604	7.7	90
ESE	0.4	2.5	0.1		2.6	3.0	330	6.4	74
SE	0.7	3.3	0.1		3.4	4.1	456	6.0	70
SSE	0.6	2.9	0.3		3.2	3.8	416	6.7	78
S	0.7	5.2	0.7		5.9	6.6	727	7.6	88
SSW	0.7	6.6	2.4	0.1	9.1	9.8	1086	9.7	113
SW	1.1	9.0	3.1	0.1	12.2	13.3	1463	9.1	106
WSW	0.7	5.5	2.6	0.1	8.2	8.9	973	9.7	113
W	0.8	4.1	1.4		5.5	6.3	705	8.8	102
WNW	0.5	3.8	2.1		5.9	6.4	721	10.5	122
NW	0.7	2.9	1.3		4.2	4.9	545	9.3	108
NNW	0.5	2.2	0.8		3.0	3.5	394	8.8	102
Calm	2.3					2.3	252	0.0	
Totals	12.6	66.4	20.4	0.3	87.1	99.7	11040		
Mean								8.6	100



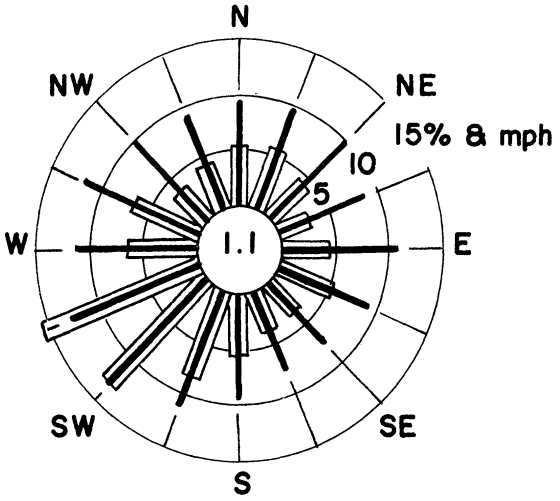
TOLEDO MUNICIPAL AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 47 ft.
Summer (June, July, Aug.) 1950-1954



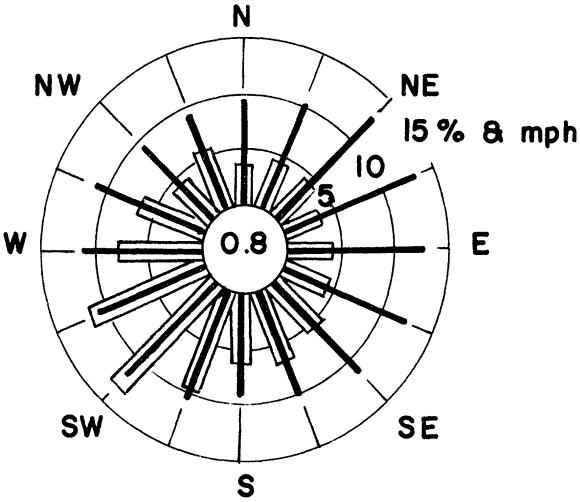
DETROIT CITY AIRPORT
DETROIT, MICHIGAN

Wind Instrument at Height of 81 ft.
Summer (June, July, Aug.) 1958



TOLEDO EXPRESS AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 72 ft.
Summer (June, July, Aug.) 1958



ENRICO FERMI POWER PLANT SITE
LAGOONA BEACH, MICHIGAN

Aerovane at Height of 102 ft.
Summer (June, July, Aug.) 1958

Fig. 3-A. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at Toledo Municipal Airport, Summer Seasons, 1950-1954; Detroit City Airport, Toledo Express Airport, and Enrico Fermi site, Summer, 1958.

TABLE XVI-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Enrico Fermi Site
(Aerovane at height of 102 ft)
1 September 1958 - 30 November 1958
(Fall)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.3	3.8	0.7			4.5	4.8	106	9.2	74.8
NNE	0.2	1.4	0.4			1.8	2.0	43	9.2	74.8
NE	0.2	1.5	2.3			3.8	4.0	87	13.7	111.4
ENE	0.1	1.0	1.3			2.3	2.4	52	13.3	108.1
E	0.1	1.2	0.9			2.1	2.2	48	11.8	95.9
ESE	0.1	2.7	0.9	0.0		3.6	3.7	81	10.5	85.4
SE	0.0	1.4	1.3	0.3		3.0	3.0	64	14.1	114.6
SSE	0.1	2.7	1.2			3.9	4.0	88	11.1	90.2
S	0.1	3.8	1.9	0.0		5.7	5.8	127	11.5	93.5
SSW	0.3	4.9	3.7	0.0		8.6	8.9	192	12.3	100.0
SW	0.1	5.1	9.0	0.3		14.4	14.5	316	14.8	120.3
WSW	0.2	4.5	6.1	0.1		10.7	10.9	240	14.0	113.8
W	0.0	6.2	4.9	0.5		11.6	11.6	253	13.2	107.3
WNW	0.1	6.5	2.5	0.0		9.0	9.1	198	10.9	88.6
NW	0.3	4.7	2.0	0.1		6.8	7.1	154	11.1	90.2
NNW	0.0	4.6	1.3			5.9	5.9	130	10.3	83.7
Calm	0.3	___	___	___		___	0.3	5	0.0	___
Totals	2.5	56.0	40.4	1.3		97.7	100.2	2184		
Mean									12.3	100

TABLE XVII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Toledo Express Airport
(Wind instruments at height of 72 ft)
1 September 1958 - 30 November 1958
(Fall)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.3	4.5	1.4			5.9	6.2	135	10.0	85.5
NNE	0.4	3.2	0.4			3.6	4.0	88	8.4	71.8
NE	0.4	2.0	0.4			2.4	2.8	59	8.5	72.6
ENE	0.5	2.0	0.4			2.4	2.9	63	8.5	72.6
E	0.2	1.7	0.5			2.2	2.4	54	9.7	82.9
ESE	0.2	2.3	0.5			2.8	3.0	65	9.3	79.5
SE	0.5	2.5	0.7			3.2	3.7	79	9.2	78.6
SSE	0.6	3.5	1.5			5.0	5.6	123	10.0	85.5
S	0.4	5.6	2.7	0.0		8.3	8.7	191	11.1	94.9
SSW	0.3	4.7	4.3	0.0		9.0	9.3	204	12.7	108.5
SW	0.3	5.2	9.2			14.4	14.7	320	14.5	123.9
WSW	0.2	5.0	7.3	0.2		12.5	12.7	278	14.3	122.2
W	0.1	2.6	3.1	0.2		5.9	6.0	131	14.0	119.7
WNW	0.2	3.3	2.7	0.1		6.1	6.3	139	12.6	107.7
NW	0.1	4.6	0.8	0.0		5.4	5.5	121	9.5	81.2
NNW	0.2	3.6	1.6			5.2	5.4	119	11.0	94.0
Calm	0.7						0.7	15	0.0	
Totals	5.6	56.3	37.5	0.5		94.3	99.9	2184		
Mean									11.7	100.0

TABLE XVIII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Detroit City Airport
(Wind instruments at height of 81 ft)
1 September 1958 - 30 November 1958
(Fall)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.9	6.0	3.1		0.0	9.1	10.0	218	10.8	83.7
NNE	0.2	2.0	0.7			2.7	2.9	65	10.1	78.3
NE	0.3	2.4	0.6			3.0	3.3	72	9.3	72.1
ENE	0.1	1.5	0.7			2.2	2.3	50	10.9	84.5
E	0.3	1.6	0.4			2.0	2.3	50	8.8	68.2
ESE		1.3	0.4			1.7	1.7	37	10.3	79.8
SE	0.2	3.7	1.1			4.8	5.0	107	10.0	77.5
SSE	0.2	2.1	0.4			2.5	2.7	57	9.0	69.8
S	0.4	6.6	2.1			8.7	9.1	197	10.1	78.3
SSW		3.4	4.1	0.1		7.6	7.6	168	14.0	108.5
SW	0.5	3.9	8.7	0.5		13.1	13.6	298	15.3	118.6
WSW	0.1	1.2	4.3	0.3		5.8	5.9	130	16.4	127.1
W	0.5	4.0	5.4	0.6	0.4	10.4	10.9	240	15.1	117.1
WNW	0.2	2.4	6.1	0.6	0.0	9.1	9.3	204	16.1	124.8
NW	0.5	2.5	3.1	0.4	0.1	6.1	6.6	144	13.8	107.0
NNW	0.3	2.3	2.9			5.2	5.5	120	13.2	102.3
Calm	1.2						1.2	27	0.0	
Totals	5.9	46.9	44.1	2.5	0.5	94.0	99.9	2184		
Mean									12.9	100.0

TABLE XIX-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS, BIASED AND UNBIASED

Detroit City Airport
1 September 1958 - 30 November 1958
(Fall)

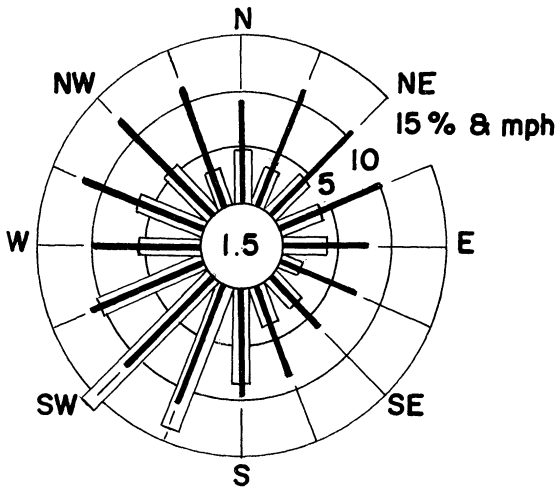
Wind Direction	Total Observations			
	Biased Record		Unbiased Record	
	No.	%	No.	%
N	218	10.0	170	7.8
NNE	65	2.9	92	4.2
NE	72	3.3	59	2.7
ENE	50	2.3	50	2.3
E	50	2.3	41	1.9
ESE	37	1.7	47	2.2
SE	107	5.0	76	3.5
SSE	57	2.7	84	3.8
S	197	9.1	151	6.9
SSW	168	7.6	244	11.2
SW	298	13.6	236	10.8
WSW	130	5.9	186	8.5
W	240	10.9	213	9.8
WNW	204	9.3	214	9.8
NW	144	6.6	134	6.1
NNW	120	5.5	160	7.3
Calm	27	1.2	27	1.2
Totals	2184	99.9	2184	100.0

TABLE XX-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS GROUPED ACCORDING TO WIND SPEEDS

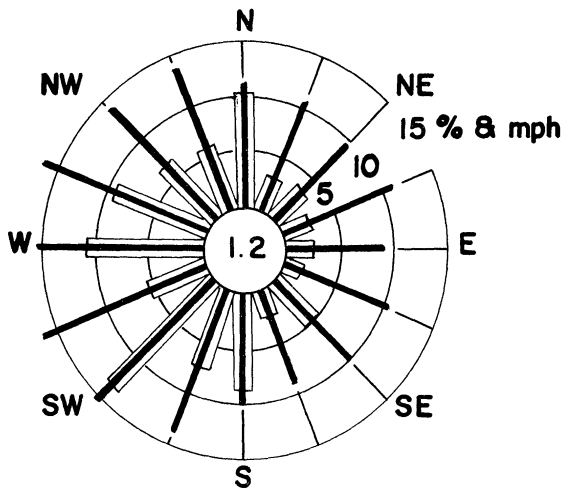
Toledo Municipal Airport
(Wind instruments at height of 47 ft)
1 January 1950 - 31 December 1954
(Fall Seasons)

Wind Direction	Speed, mph					Total Observations		Mean Speed	
	0-3	4-12	13-24	25 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.6	3.0	0.9		3.9	4.5	493	8.7	85
NNE	0.2	1.7	1.3		3.0	3.2	347	11.3	110
NE	0.4	2.4	1.5		3.9	4.3	478	10.4	100
ENE	0.4	2.1	1.2		3.3	3.7	403	10.0	97
E	0.6	2.6	0.5		3.1	3.7	405	7.5	73
ESE	0.2	1.6	0.1		1.7	1.9	221	7.1	69
SE	0.6	2.5	0.1		2.6	3.3	355	6.3	61
SSE	0.5	2.5	0.5	0.1	3.1	3.6	395	8.6	84
S	0.7	5.8	2.0	0.1	7.9	8.6	940	9.8	95
SSW	0.6	7.9	5.4	0.2	13.5	14.1	1556	11.4	111
SW	0.9	9.4	5.2	0.6	15.2	16.1	1745	11.3	110
WSW	0.8	5.5	3.7	0.3	9.5	10.3	1122	11.2	109
W	0.5	3.6	1.6	0.1	5.3	5.8	630	10.0	97
WNW	0.3	3.2	2.8	0.1	6.1	6.4	703	12.1	118
NW	0.6	2.3	2.6	0.1	5.0	5.5	606	12.1	118
NNW	0.2	1.7	1.3		3.0	3.2	362	11.2	109
Calm	1.5					1.5	159	0.0	
Totals	9.6	57.8	30.7	1.6	90.1	99.7	10920		
Mean								10.3	100



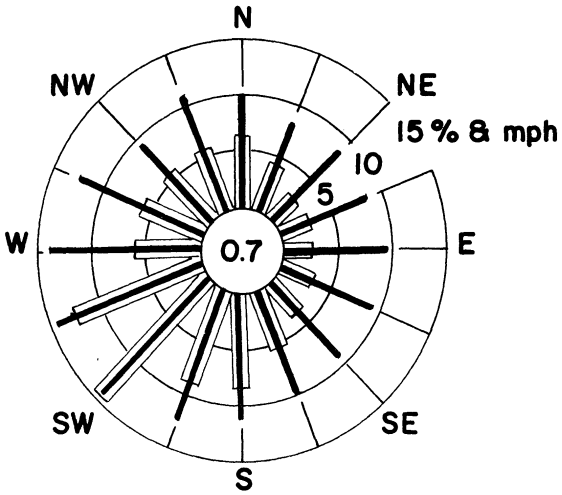
TOLEDO MUNICIPAL AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 47 ft.
Fall (Sept., Oct., Nov.) 1950-1954



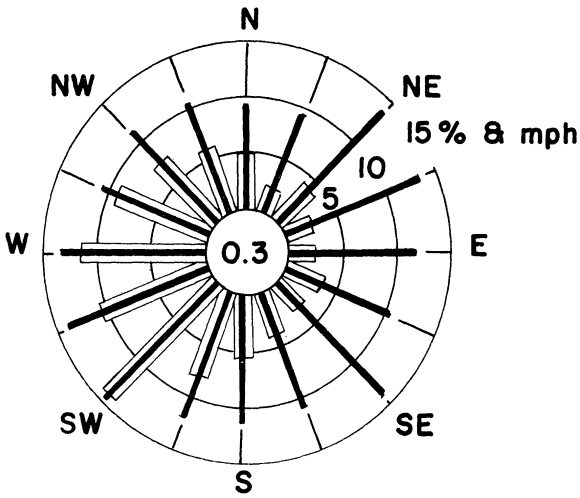
DETROIT CITY AIRPORT
DETROIT, MICHIGAN

Wind Instrument at Height of 81 ft.
Fall (Sept., Oct., Nov.) 1958



TOLEDO EXPRESS AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 72 ft.
Fall (Sept., Oct., Nov.) 1958



ENRICO FERMI POWER PLANT SITE
LAGOONA BEACH, MICHIGAN

Aerovane at Height of 102 ft.
Fall (Sept., Oct., Nov.) 1958

Fig. 4-A. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at Toledo Municipal Airport, Fall Seasons, 1950-1954; Detroit City Airport, Toledo Express Airport, and Enrico Fermi site, Fall, 1958.

TABLE XXI-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Enrico Fermi Site
(Aerovane at height of 102 ft)
1 December 1957 - 30 November 1958
(Annual)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.2	2.5	1.0	0.0		3.5	3.7	314	10.6	82.2
NNE	0.1	2.2	1.3	0.0		3.5	3.6	308	11.8	91.5
NE	0.1	1.3	3.7	0.3		5.3	5.4	467	16.1	124.8
ENE	0.1	1.4	2.6	0.2		4.2	4.3	375	15.1	117.0
E	0.1	1.6	2.1	0.4	0.1	4.2	4.3	362	15.4	119.4
ESE	0.1	2.2	1.5	0.1	0.0	3.8	3.9	335	12.5	96.9
SE	0.0	2.3	1.5	0.1		3.9	3.9	330	12.4	96.1
SSE	0.1	2.9	1.2	0.0		4.1	4.2	357	11.0	85.3
S	0.1	3.6	1.2	0.1		4.9	5.0	424	10.8	83.7
SSW	0.1	4.7	2.8	0.1		7.6	7.7	660	11.9	92.2
SW	0.1	4.8	5.6	0.1		10.5	10.6	904	13.7	106.2
WSW	0.1	5.8	5.3	0.1	0.0	11.2	11.3	970	13.2	102.3
W	0.1	5.2	4.3	0.2	0.0	9.7	9.8	849	13.1	101.5
WNW	0.2	4.0	3.9	0.2	0.0	8.1	8.3	705	13.3	103.1
NW	0.1	3.4	3.4	0.2		7.0	7.1	608	13.4	103.9
NNW	0.1	3.7	2.2	0.1		6.0	6.1	518	12.1	93.8
Calm	0.6						0.6	47	0.0	
Totals	2.3	51.6	43.6	2.2	0.1	97.5	99.8	8533		
Mean									12.9	100.0

TABLE XXII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Toledo Express Airport
(Wind instruments at height of 71 ft)
1 December 1957 - 30 November 1958
(Annual)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.3	4.1	1.4			5.5	5.8	509	10.1	88.6
NNE	0.3	2.9	0.8			3.7	4.0	354	9.6	84.2
NE	0.3	3.6	1.1			4.7	5.0	434	9.9	86.8
ENE	0.3	2.6	1.8			4.4	4.7	410	11.7	102.6
E	0.2	2.9	2.0	0.0		4.9	5.1	453	12.0	105.3
ESE	0.2	2.7	0.6			3.3	3.5	313	9.5	83.3
SE	0.4	2.4	0.4			2.8	3.2	274	8.5	74.6
SSE	0.3	2.6	0.7			3.3	3.6	313	9.4	82.5
S	0.3	4.0	1.4	0.0		5.4	5.7	503	10.4	91.2
SSW	0.2	3.6	2.6	0.0		6.2	6.4	565	12.1	106.1
SW	0.2	5.1	6.1	0.1	0.0	11.3	11.5	1006	13.6	119.3
WSW	0.1	6.5	6.6	0.1	0.0	13.2	13.3	1173	13.3	116.7
W	0.2	5.2	3.0	0.1	0.0	8.3	8.5	740	11.8	103.5
WNW	0.2	4.2	2.4	0.1		6.7	6.9	600	11.7	102.6
NW	0.3	4.8	1.8	0.0		6.6	6.9	597	10.5	92.1
NNW	0.2	3.7	1.5			5.2	5.4	475	10.7	93.9
Calm	0.5						0.5	41	0.0	
Totals	4.5	60.9	34.2	0.4	0.0	95.5	100.0	8760		
Mean									11.4	100.0

TABLE XXIII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Detroit City Airport
(Wind instruments at height of 82 ft)
1 December 1957 - 30 November 1958
(Annual)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.9	6.0	3.1		0.0	9.1	10.0	886	10.7	86.3
NNE	0.3	3.1	1.2	0.0		4.3	4.6	404	10.4	83.9
NE	0.3	3.0	1.6			4.6	4.9	433	11.1	89.5
ENE	0.2	2.0	1.1			3.1	3.3	283	11.1	89.5
E	0.5	3.3	1.3			4.6	5.1	445	10.0	80.6
ESE	0.1	2.0	0.6			2.6	2.7	234	9.9	79.8
SE	0.3	3.4	0.8			4.2	4.5	398	9.4	75.8
SSE	0.2	1.8	0.4			2.2	2.4	214	9.4	75.8
S	0.4	6.1	1.8			7.9	8.3	726	9.9	79.8
SSW	0.0	2.6	2.5	0.0		5.1	5.1	456	13.2	106.4
SW	0.2	3.8	6.4	0.2		10.4	10.6	928	14.6	117.7
WSW	0.1	2.1	3.3	0.1		5.5	5.6	488	14.4	116.1
W	0.5	4.3	4.6	0.4	0.1	9.4	9.9	878	13.7	110.5
WNW	0.1	2.2	4.9	0.4	0.1	7.6	7.7	674	15.8	127.4
NW	0.3	3.2	5.1	0.4	0.0	8.7	9.0	786	14.7	118.5
NNW	0.2	1.6	3.2	0.0		4.8	5.0	436	14.6	117.7
Calm	1.0						1.0	91	0.0	
Totals	5.6	50.5	41.9	1.5	0.2	94.1	99.7	8760		
Mean									12.4	100.0

TABLE XXIV-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS, BIASED AND UNBIASED

Detroit City Airport
1 December 1957 - 30 November 1958
(Annual)

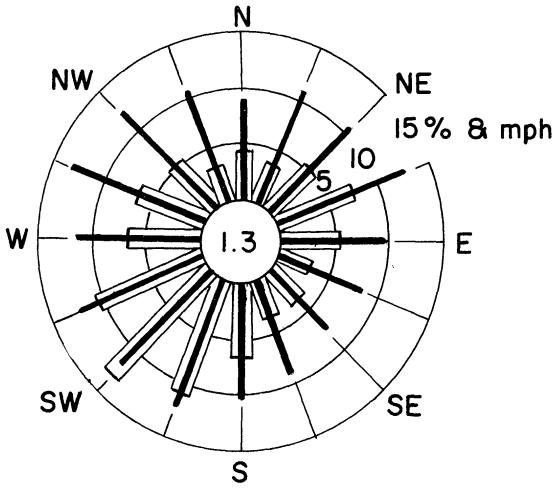
Wind Direction	Total Observations			
	Biased Record		Unbiased Record	
	No.	%	No.	%
N	886	10.0	694	7.9
NNE	404	4.6	542	6.2
NE	433	4.9	353	4.0
ENE	283	3.3	340	3.9
E	445	5.1	356	4.1
ESE	234	2.7	314	3.6
SE	398	4.5	292	3.3
SSE	214	2.4	309	3.5
S	726	8.3	532	6.1
SSW	456	5.1	708	8.1
SW	928	10.6	718	8.2
WSW	488	5.6	680	7.8
W	878	9.9	736	8.4
WNW	674	7.7	823	9.4
NW	786	9.0	655	7.5
NNW	436	5.0	617	7.0
Calm	91	1.0	91	1.0
Totals	8760	99.7	8760	100.0

TABLE XXV-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

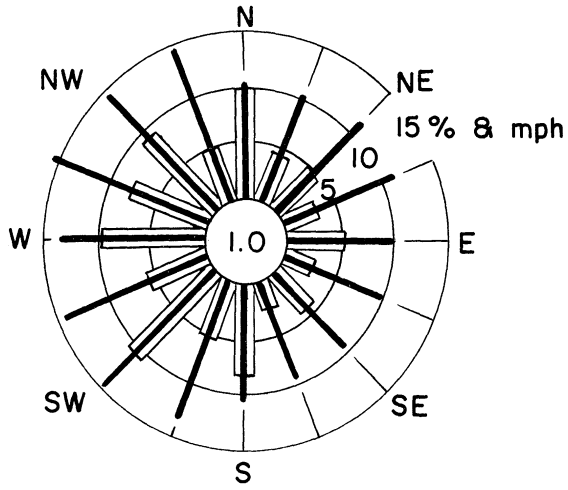
Toledo Municipal Airport
(Wind instruments at height of 47 ft)
1 January 1950 - 31 December 1954
(5-Year Summary)

Wind Direction	Speed, mph					Total Observations		Mean Speed	
	0-3	4-12	13-24	25 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.5	2.9	0.9		3.8	4.3	1865	8.8	79
NNE	0.2	2.0	1.2		3.2	3.4	1474	10.9	98
NE	0.4	2.8	1.8		4.6	5.0	2196	10.8	97
ENE	0.3	3.3	3.2	0.2	6.7	7.0	3101	12.6	113
E	0.5	3.3	1.4		4.7	5.2	2287	9.5	86
ESE	0.3	2.1	0.4		2.5	2.8	1202	8.1	73
SE	0.5	2.6	0.3		2.9	3.4	1495	7.3	66
SSE	0.3	2.4	0.7	0.1	3.2	3.5	1545	9.2	83
S	0.5	4.2	2.0	0.1	6.3	6.8	3026	10.4	94
SSW	0.4	5.6	4.5	0.4	10.5	10.9	4768	12.3	111
SW	0.7	7.2	4.9	0.5	12.6	13.3	5859	11.9	107
WSW	0.5	5.1	4.6	0.5	10.2	10.7	4713	12.5	113
W	0.5	3.7	2.4	0.2	6.3	6.8	2990	11.3	102
WNW	0.3	3.0	3.3	0.2	6.5	6.8	3021	13.1	118
NW	0.4	2.4	2.4	0.1	4.9	5.3	2357	12.3	111
NNW	0.3	1.7	1.1		2.8	3.1	1358	10.6	95
Calm	1.3					1.3	567	0.0	
Totals	7.9	54.3	35.1	2.3	91.7	99.6	43824		
Mean								11.1	100



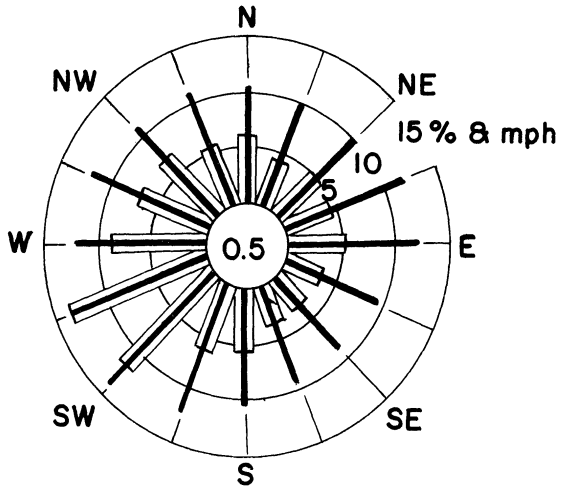
TOLEDO MUNICIPAL AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 47 ft.
Annual Summary 1950 - 1954



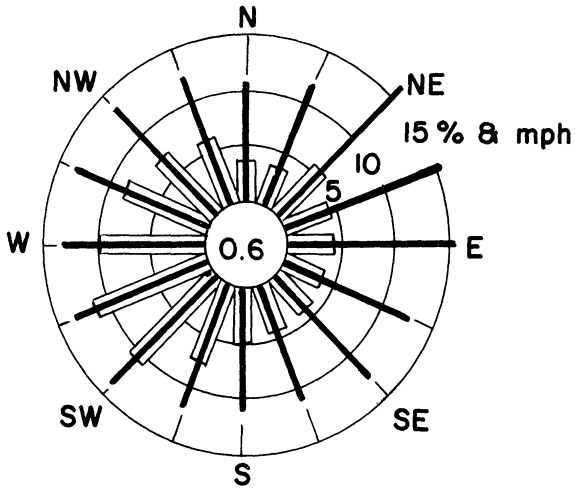
DETROIT CITY AIRPORT
DETROIT, MICHIGAN

Wind Instrument at Height of 81 ft.
Annual Summary 1958



TOLEDO EXPRESS AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 72 ft.
Annual Summary 1958



ENRICO FERMI POWER PLANT SITE
LAGOONA BEACH, MICHIGAN

Aerovane at Height of 102 ft.
Annual Summary 1958

Fig. 5-A. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at Toledo Municipal Airport, Five-Year Summary, 1950-1954; Detroit City Airport, Toledo Express Airport, and Enrico Fermi Site, Annual Summary, 1957-1958.

TABLE XXVI-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Enrico Fermi Site
(Aerovane at height of 102 ft)
1 December 1956 - 30 November 1958
(2-Year Summary)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.2	2.6	1.0	0.1		3.7	3.9	663	10.8	85.0
NNE	0.2	2.2	1.5	0.1		3.8	4.0	691	13.6	107.1
NE	0.1	1.5	3.8	0.2	0.0	5.5	5.6	974	15.7	123.6
ENE	0.2	1.9	3.0	0.2	0.0	5.1	5.3	926	14.7	115.7
E	0.2	1.9	2.0	0.2	0.2	4.3	4.5	771	14.7	115.7
ESE	0.2	2.5	1.7	0.1	0.0	4.3	4.5	768	12.1	95.3
SE	0.1	2.3	1.4	0.1		3.8	3.9	672	12.1	95.3
SSE	0.1	3.4	1.2	0.1		4.7	4.8	822	10.8	85.0
S	0.1	3.5	1.4	0.1		5.0	5.1	879	10.9	85.8
SSW	0.2	4.3	3.0	0.1	0.0	7.4	7.6	1305	12.3	96.8
SW	0.2	4.4	4.9	0.1	0.0	9.4	9.6	1663	13.4	105.5
WSW	0.2	5.4	5.1	0.5	0.1	11.1	11.3	1929	13.6	107.1
W	0.2	4.8	3.5	0.2	0.0	8.5	8.7	1512	12.6	99.2
WNW	0.2	4.3	3.6	0.1	0.0	8.0	8.2	1410	12.7	100.0
NW	0.2	3.7	2.7	0.1		6.5	6.7	1143	12.3	96.8
NNW	0.1	4.0	1.7	0.1		5.8	5.9	1011	11.2	88.2
Calm	0.4						0.4	73	0.0	
Totals	3.1	52.7	41.5	2.4	0.3	96.9	100.0	17212		
Mean									12.7	100.0

TABLE XXVII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Toledo Express Airport
(Wind instruments at height of 71 ft)
1 December 1956 - 30 November 1958
(2-Year Summary)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.4	4.6	1.3	0.0		5.9	6.3	1111	9.8	88.3
NNE	0.3	3.2	1.0	0.0		4.2	4.5	797	9.9	89.2
NE	0.3	3.7	1.1			4.8	5.1	889	9.7	88.3
ENE	0.3	3.1	1.8	0.0		4.9	5.2	923	11.3	101.8
E	0.3	3.5	1.9	0.1	0.0	5.5	5.8	1011	11.4	102.7
ESE	0.3	2.7	0.5			3.2	3.5	608	8.8	79.3
SE	0.4	2.3	0.3			2.6	3.0	496	8.1	72.9
SSE	0.3	2.6	0.7	0.0	0.0	3.3	3.6	628	9.6	86.5
S	0.3	4.3	1.6	0.0		5.9	6.2	1095	10.4	93.7
SSW	0.2	3.5	2.4	0.1		6.0	6.2	1091	12.0	108.1
SW	0.2	5.1	5.4	0.1	0.0	10.6	10.8	1903	13.5	121.6
WSW	0.2	6.4	5.8	0.3	0.1	12.6	12.8	2233	13.2	118.9
W	0.2	4.9	2.8	0.1	0.0	7.8	8.0	1407	11.8	106.3
WNW	0.2	4.3	2.2	0.0		6.5	6.7	1187	11.3	101.8
NW	0.4	4.4	1.5	0.0		5.9	6.3	1105	10.1	90.9
NNW	0.3	3.6	1.2			4.8	5.1	887	10.2	91.9
Calm	0.9						0.9	149	0.0	
Totals	5.5	62.2	31.5	0.7	0.1	94.5	100.0	17520		
Mean									11.1	100.0

TABLE XXVIII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS
GROUPED ACCORDING TO WIND SPEEDS

Detroit City Airport
(Wind instruments at height of 82 ft)
1 December 1956 - 30 November 1958
(2-Year Summary)

Wind Direction	Speed, mph						Total Observations		Mean Speed	
	0-3	4-12	13-24	25-31	32 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	1.1	6.4	3.0		0.0	9.4	10.5	1837	10.4	87.4
NNE	0.4	3.2	1.1	0.0		4.3	4.7	832	10.1	84.9
NE	0.5	2.9	1.3			4.2	4.7	827	10.1	84.9
ENE	0.2	2.6	1.1			3.7	3.9	680	10.7	90.0
E	0.7	4.1	1.1	0.0		5.2	5.9	1028	9.2	77.3
ESE	0.2	2.2	0.5			2.7	2.9	494	9.4	78.9
SE	0.4	3.4	0.6			4.0	4.4	766	8.8	73.9
SSE	0.2	2.2	0.5	0.0		2.7	2.9	511	9.5	79.8
S	0.4	6.4	1.9	0.0		8.3	8.7	1539	10.0	84.0
SSW	0.1	2.3	2.3	0.0		4.6	4.7	819	13.1	110.1
SW	0.2	3.8	5.7	0.3	0.0	9.8	10.0	1758	14.5	121.8
WSW	0.1	2.2	3.2	0.1		5.5	5.6	980	14.4	121.0
W	0.4	4.4	4.5	0.3	0.1	9.3	9.7	1678	13.4	112.6
WNW	0.1	2.3	4.4	0.4	0.1	7.2	7.3	1269	15.5	130.3
NW	0.4	3.7	4.1	0.2	0.0	8.0	8.4	1486	13.4	112.6
NNW	0.2	1.9	2.6	0.0		4.5	4.7	823	13.5	113.4
Calm	1.1						1.1	193	0.0	
Totals	6.7	54.0	37.9	1.3	0.2	93.4	100.1	17520		
Mean									11.9	100.0

TABLE XXIX-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS, BIASED AND UNBIASED

Detroit City Airport
1 December 1956 - 30 November 1958
(2-Year Summary)

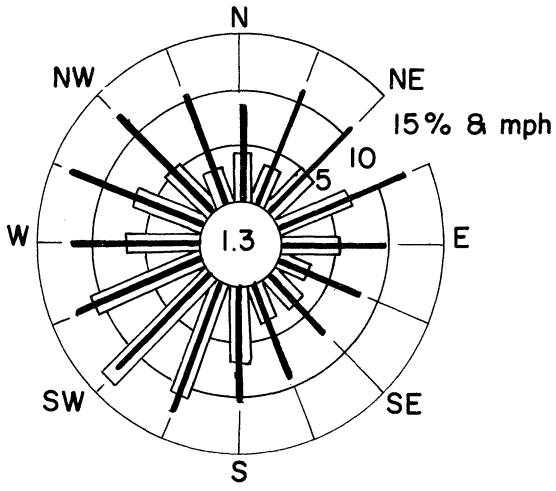
Wind Direction	Total Observations			
	Biased Record		Unbiased Record	
	No.	%	No.	%
N	1837	10.5	1433	8.2
NNE	832	4.7	1099	6.3
NE	827	4.7	694	4.0
ENE	680	3.9	804	4.6
E	1028	5.9	844	4.8
ESE	494	2.9	637	3.6
SE	766	4.4	574	3.3
SSE	511	2.9	723	4.1
S	1539	8.7	1126	6.4
SSW	819	4.7	1309	7.5
SW	1758	10.0	1354	7.7
WSW	980	5.6	1354	7.7
W	1678	9.7	1415	8.1
WNW	1269	7.3	1541	8.8
NW	1486	8.4	1225	7.0
NNW	823	4.7	1195	6.8
Calm	193	1.1	193	1.1
Totals	17520	100.1	17520	100.0

TABLE XXX-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS IN VARIOUS DIRECTIONS GROUPED ACCORDING TO WIND SPEEDS

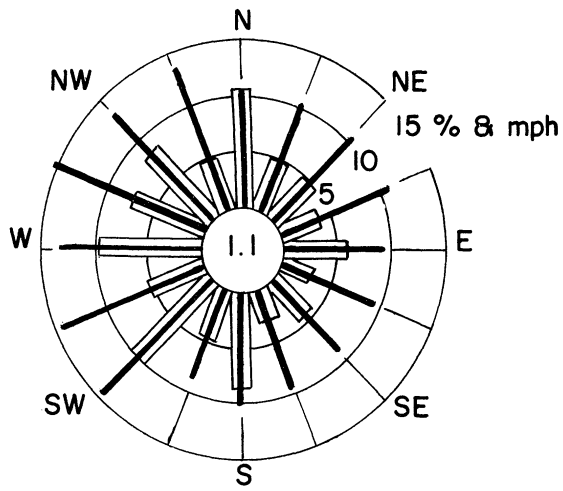
Toledo Municipal Airport
(Wind instruments at height of 47 ft)
1 January 1950 - 31 December 1954
(Five-Year Summary)

Wind Direction	Speed, mph					Total Observations		Mean Speed	
	0-3	4-12	13-24	25 and Over	Total 4 and Over	%	No.	mph	% of Overall Mean
N	0.5	2.9	0.9		3.8	4.3	1865	8.8	79
NNE	0.2	2.0	1.2		3.2	3.4	1474	10.9	98
NE	0.4	2.8	1.8		4.6	5.0	2196	10.8	97
ENE	0.3	3.3	3.2	0.2	6.7	7.0	3101	12.6	113
E	0.5	3.3	1.4		4.7	5.2	2287	9.5	86
ESE	0.3	2.1	0.4		2.5	2.8	1202	8.1	73
SE	0.5	2.6	0.3		2.9	3.4	1495	7.3	66
SSE	0.3	2.4	0.7	0.1	3.2	3.5	1545	9.2	83
S	0.5	4.2	2.0	0.1	6.3	6.8	3026	10.4	94
SSW	0.4	5.6	4.5	0.4	10.5	10.9	4768	12.3	111
SW	0.7	7.2	4.9	0.5	12.6	13.3	5859	11.9	107
WSW	0.5	5.1	4.6	0.5	10.2	10.7	4713	12.5	113
W	0.5	3.7	2.4	0.2	6.3	6.8	2990	11.3	102
WNW	0.3	3.0	3.3	0.2	6.5	6.8	3021	13.1	118
NW	0.4	2.4	2.4	0.1	4.9	5.3	2357	12.3	111
NNW	0.3	1.7	1.1		2.8	3.1	1358	10.6	95
Calm	1.3					1.3	567	0.0	
Totals	7.9	54.3	35.1	2.3	91.7	99.6	43824		
Mean								11.1	100



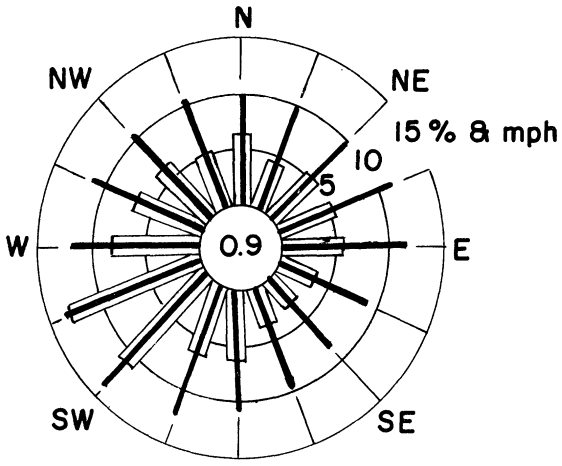
TOLEDO MUNICIPAL AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 47 ft
Five year Summary 1950-1954



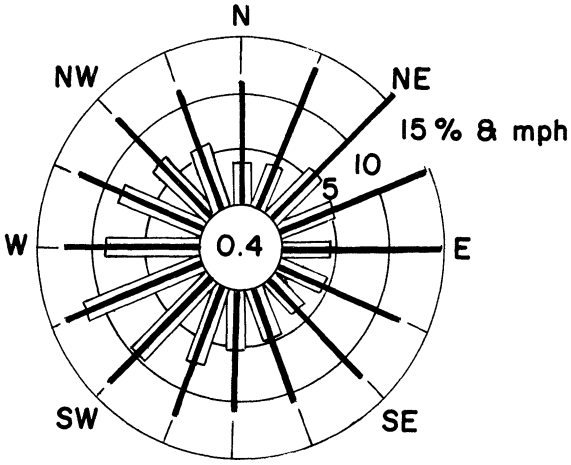
DETROIT CITY AIRPORT
DETROIT, MICHIGAN

Wind Instrument at Height of 81 ft.
Two year Summary 1956-1958



TOLEDO EXPRESS AIRPORT
TOLEDO, OHIO

Wind Instrument at Height of 72 ft.
Two year Summary 1956-1958



ENRICO FERMI POWER PLANT SITE
LAGOONA BEACH, MICHIGAN

Aerovane at Height of 102 ft.
Two year Summary 1956-1958

Fig. 6-A. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at Toledo Municipal Airport, Five-Year Summary, 1950-1954; Detroit City Airport, Toledo Express Airport, and Enrico Fermi Site, Two-Year Summary, 1956-1958.

TABLE XXXI-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS FROM 1 DECEMBER 1957 - 30 NOVEMBER 1958
(W, WNW, NW, NNW, N, and NNE)

	Enrico Fermi Site	Toledo Express Airport	Detroit City Airport (approximation)	Toledo Municipal Airport (5-yr Avg)
Winter	46.3	46.1	53.5	29.2
Spring	38.2	38.2	49.7	31.8
Summer	31.0	31.9	37.3	29.2
Fall	40.5	33.4	45.0	28.6
Annual	38.6	37.5	46.4	29.7
Summary	37.4	36.9	45.2	

TABLE XXXII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS FROM 1 DECEMBER 1957 - 30 NOVEMBER 1958
(ENE)

	Enrico Fermi Site	Toledo Express Airport	Detroit City Airport (approximation)	Toledo Municipal Airport (5-yr Avg)
Winter	3.4	2.9	2.6	5.3
Spring	8.3	9.9	7.3	11.4
Summer	3.6	3.1	3.3	7.1
Fall	2.4	2.9	2.3	3.7
Annual	4.3	4.7	3.9	7.0
Summary	5.3	5.2	4.6	

TABLE XXXIII-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS FROM 1 DECEMBER 1957 - 30 NOVEMBER 1958
(E, ESE, SE, SSE, and S)

	Enrico Fermi Site	Toledo Express Airport	Detroit City Airport (approximation)	Toledo Municipal Airport (5-yr Avg)
Winter	15.6	18.5	18.0	21.4
Spring	22.4	19.7	17.8	21.7
Summer	27.3	22.9	28.2	22.9
Fall	18.7	23.4	18.3	21.1
Annual	21.3	21.1	20.6	21.7
Summary	22.8	22.1	22.2	

TABLE XXXIV-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS FROM 1 DECEMBER 1957 - 30 NOVEMBER 1958
(SSW)

	Enrico Fermi Site	Toledo Express Airport	Detroit City Airport (approximation)	Toledo Municipal Airport (5-yr Avg)
Winter	7.2	4.5	6.4	12.1
Spring	5.5	3.8	5.3	7.2
Summer	9.5	8.2	9.3	9.1
Fall	8.9	9.3	11.2	14.1
Annual	7.7	6.4	8.1	10.9
Summary	7.6	6.2	7.5	

TABLE XXXV-A

PERCENTAGE FREQUENCY OF OCCURRENCE OF WINDS FROM 1 DECEMBER 1957 - 30 NOVEMBER 1958
(SW and WSW)

	Enrico Fermi Site	Toledo Express Airport	Detroit City Airport (approximation)	Toledo Municipal Airport (5-yr Avg)
Winter	24.2	25.2	17.2	26.7
Spring	14.4	18.7	9.6	21.0
Summer	24.3	28.5	17.8	20.4
Fall	25.4	27.4	19.3	26.4
Annual	21.9	24.8	16.0	24.0
Summary	20.9	23.6	15.4	

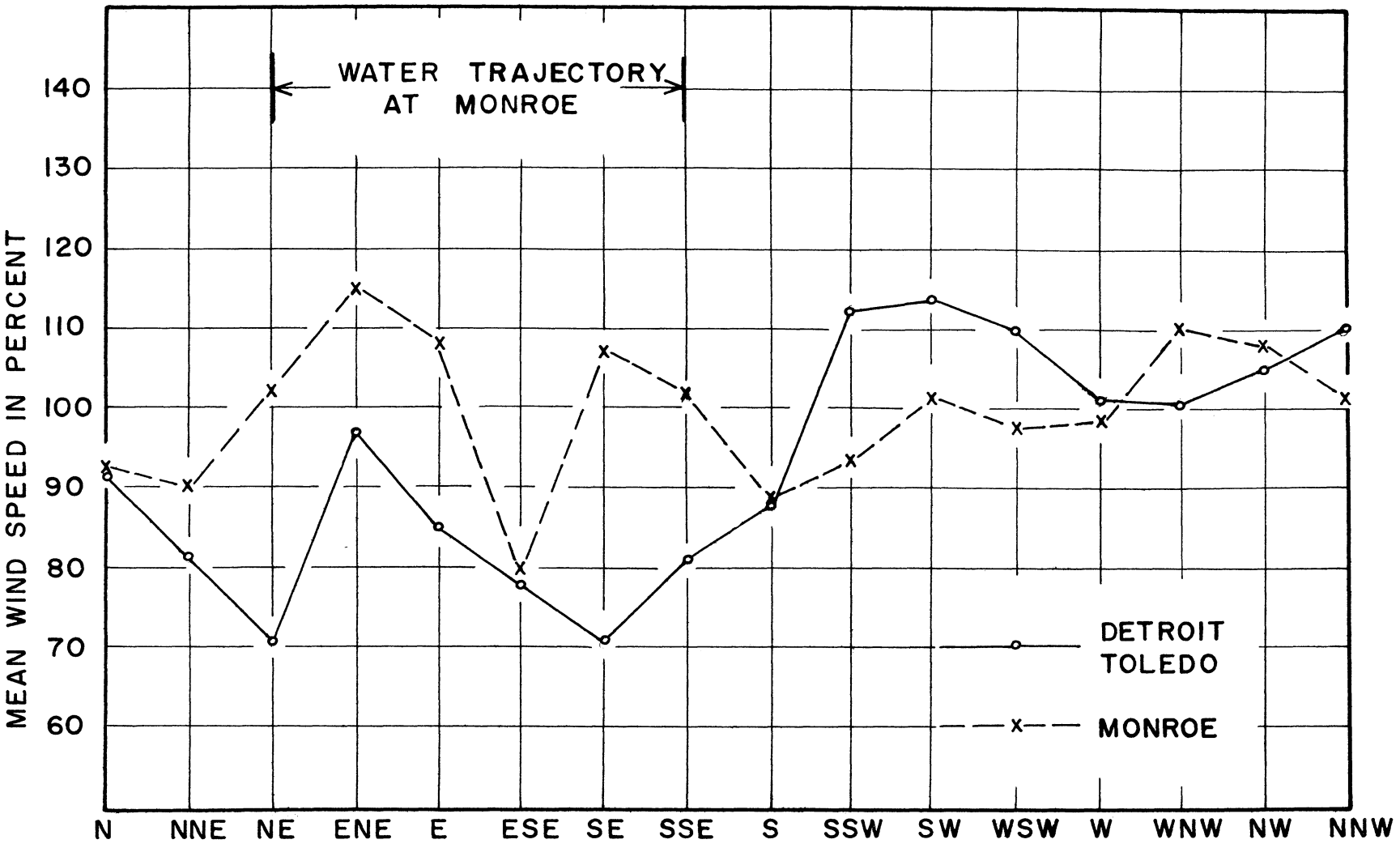


Fig. 7-A. Mean wind speed at the Enrico Fermi site and Detroit-Toledo combined, for 16 directions, expressed as a percentage of the overall mean winter wind speed, 1957-1958.

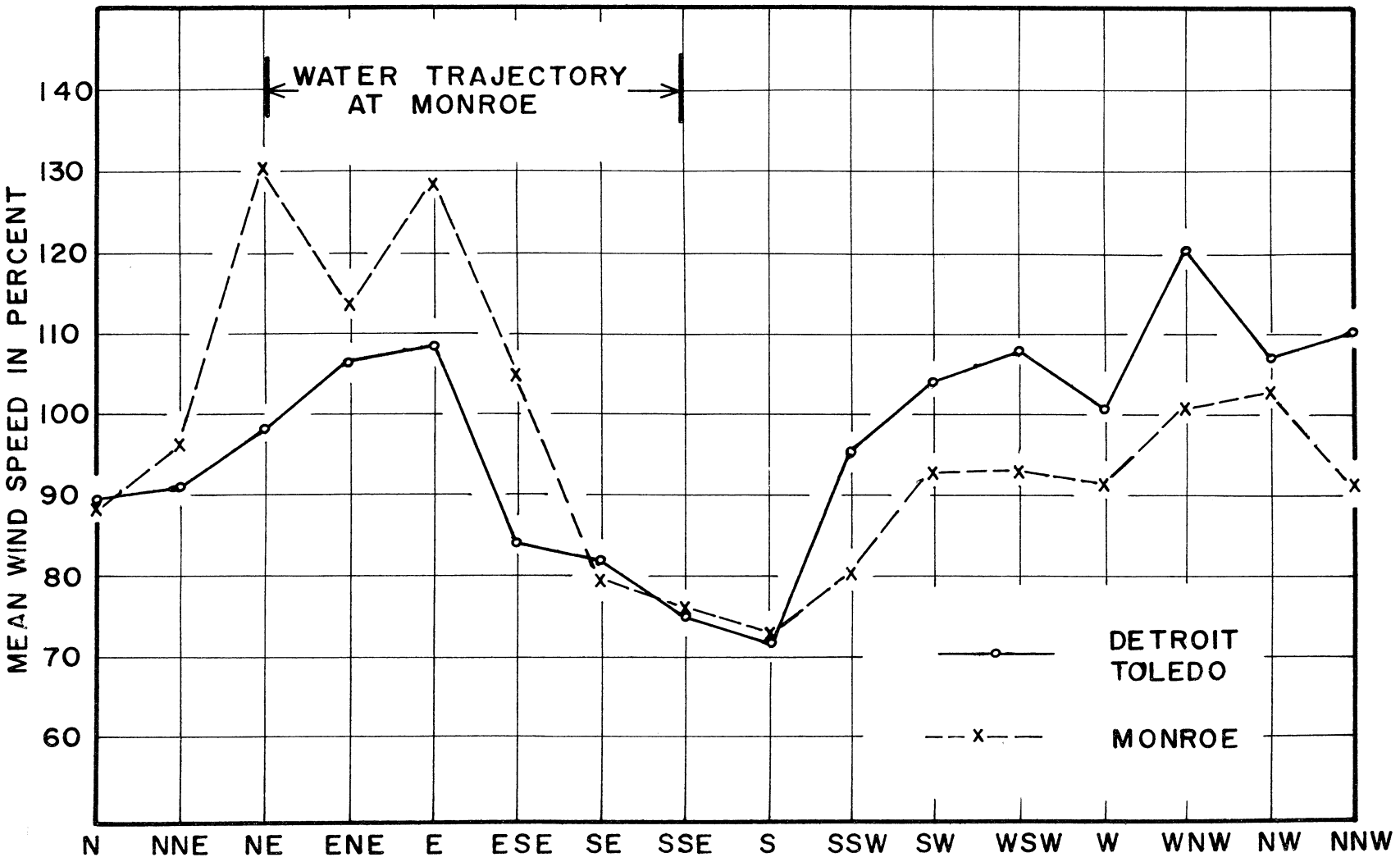


Fig. 8-A. Mean wind speed at the Enrico Fermi site and Detroit-Toledo combined, for 16 directions, expressed as a percentage of the overall mean spring wind speed, 1958.

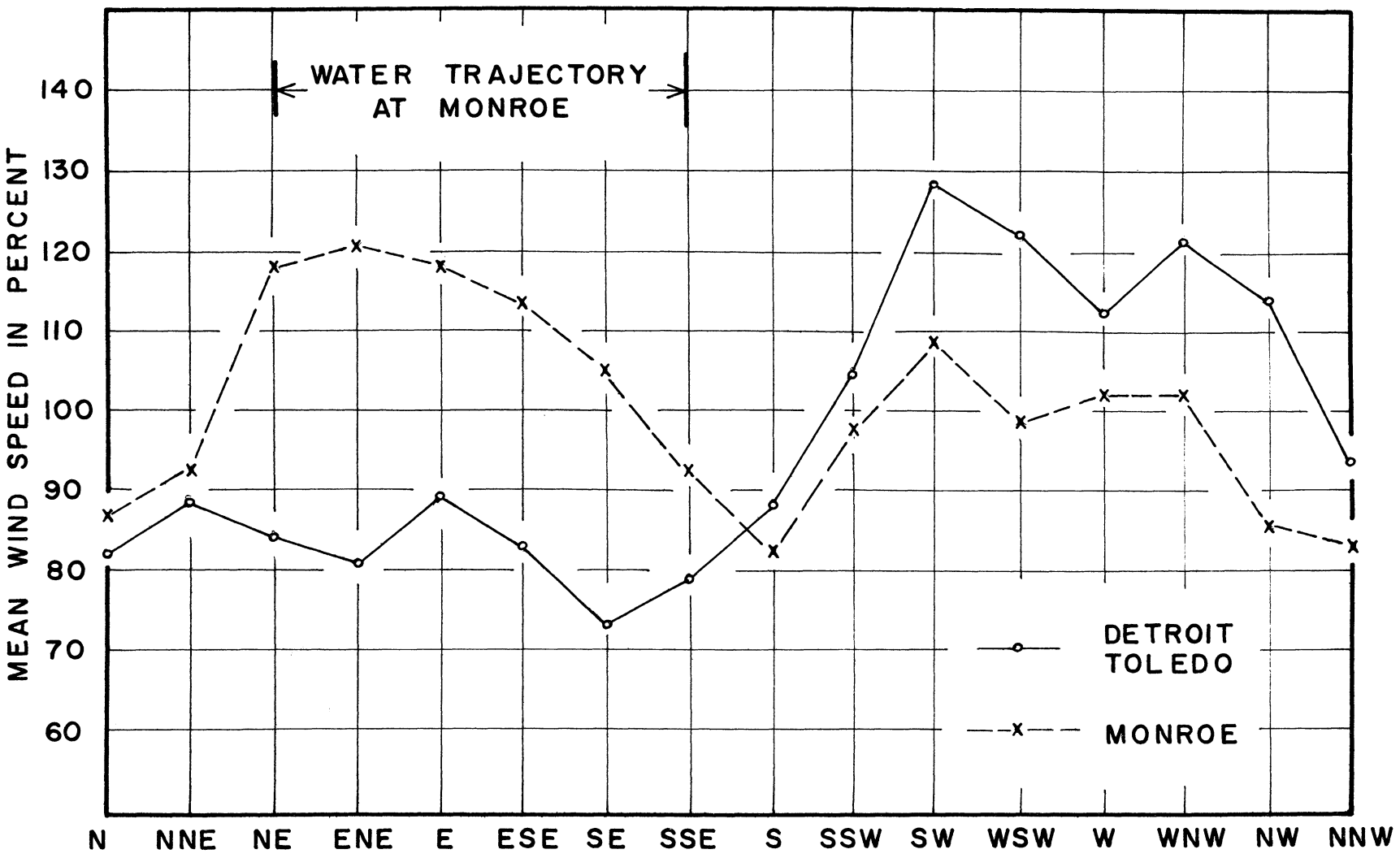


Fig. 9-A. Mean wind speed at the Enrico Fermi site and Detroit-Toledo combined, for 16 directions, expressed as a percentage of the overall mean summer wind speed, 1958.

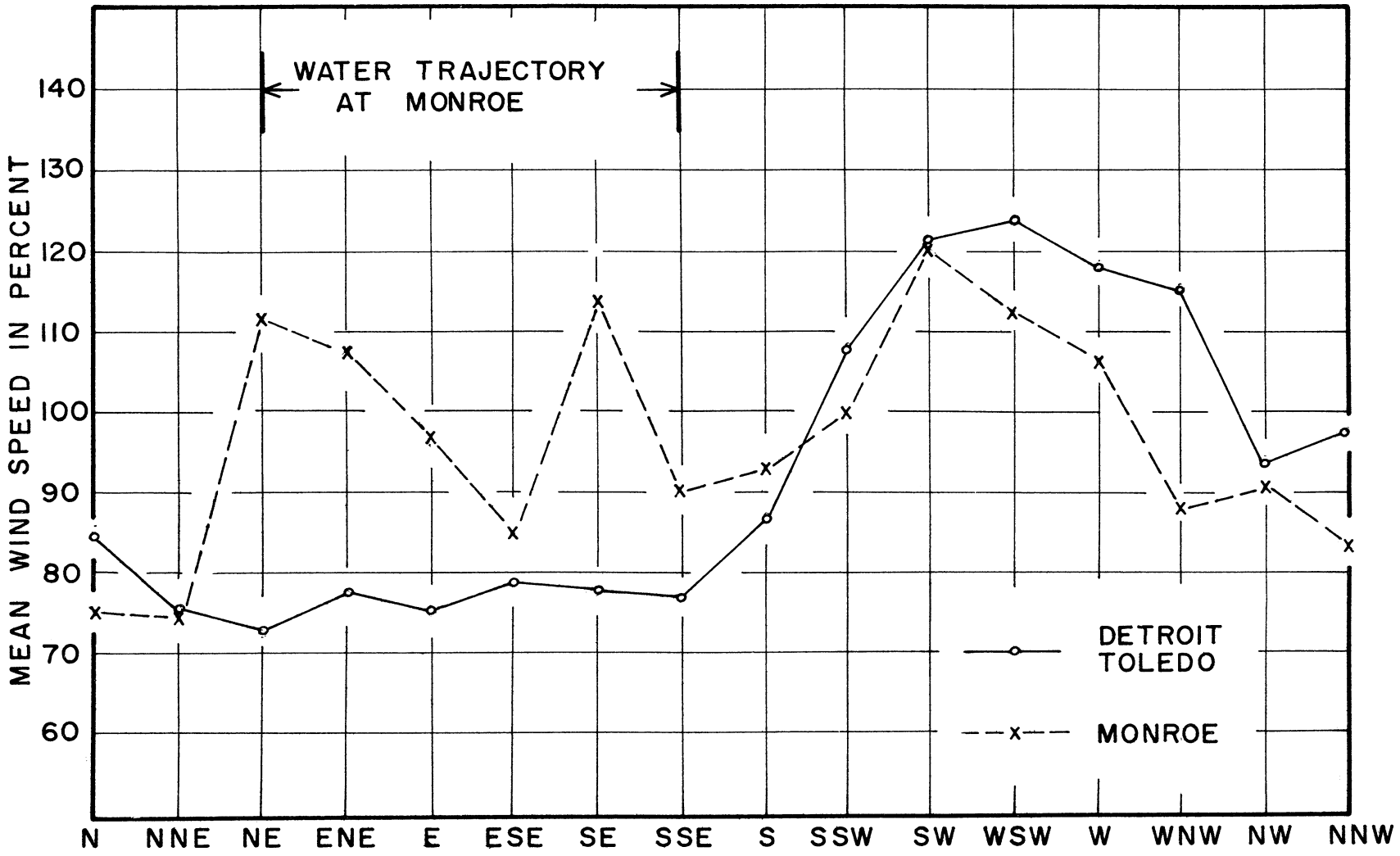


Fig. 10-A. Mean wind speed at the Enrico Fermi site and Detroit-Toledo combined, for 16 directions, expressed as a percentage of the overall mean fall wind speed, 1958.

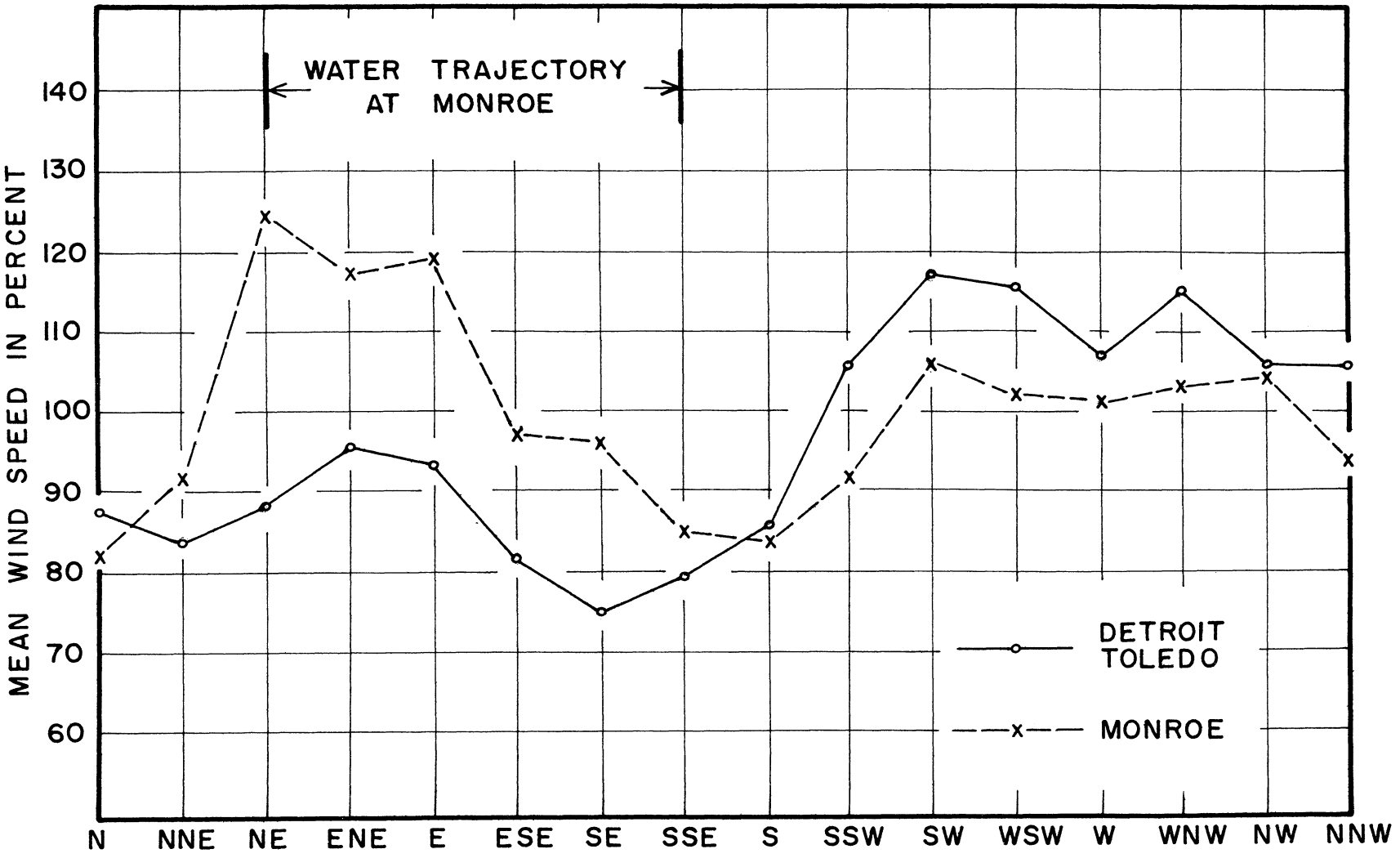


Fig. 11-A. Mean wind speed at the Enrico Fermi site and Detroit-Toledo combined, for 16 directions, expressed as a percentage of the overall mean annual wind speed, 1957-1958.

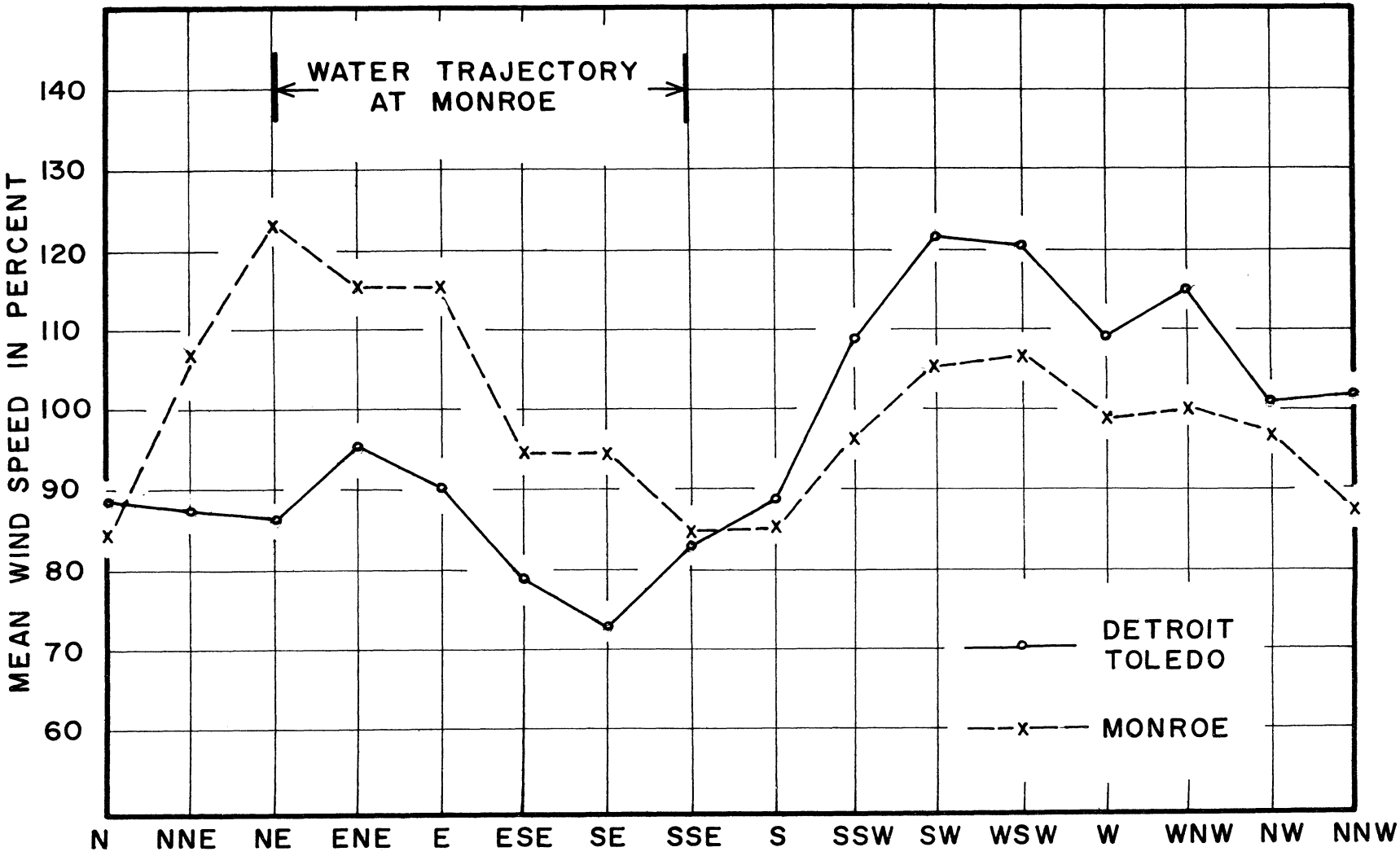


Fig. 12-A. Mean wind speed at the Enrico Fermi site and Detroit-Toledo combined, for 16 directions, expressed as a percentage of the overall mean two-year wind speed, 1956-1958.

APPENDIX B

TEMPERATURE-LAPSE-RATE DATA

TABLE I-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE ENRICO FERMI SITE

1 December 1957-28 February 1958
(Winter)

Total hours	2160		
Number missing hours	94		
Number hourly observations	2066		
Percent missing data		4.5	
Percent inversions			19.3
Percent strong lapse			49.9
Percent weak lapse			30.8
			100.0%

TABLE II-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE WJBK-TV TOWER

1 December 1957-28 February 1958
(Winter)

Total hours	2160	
Number missing hours	2	
Number hourly observations	2158	
Percent missing data		0.1%
Numbers hours inversion	391	
Percent inversions		18.1%

TABLE III-B

FREQUENCY OF CONTINUOUS INVERSIONS AT THE ENRICO FERMI SITE

1 December 1957-28 February 1958
(Winter)

Duration, hr					
6-12		13-24		25 and Over	
Hr	Mean Wind Speed, mph	Hr	Mean Wind Speed, mph	Hr	Mean Wind Speed, mph
9	msg.	21	16	28	msg.
9	msg.	18	9	35	18
8	msg.	14	9		
6	msg.	16	14		
7	17	17	22		
9	7	23	16		
6	5				
6	15				
12	9				
7	15				
7	15				
9	12				
6	23				
8	13				
10	19				

Total number of inversions over 5 hr in duration = 23
Total hours of continuous inversion over 5 hr in duration = 291
Average length of continuous inversions over 5 hr in duration = 10.0

TABLE IV-B

FREQUENCY OF CONTINUOUS INVERSIONS AT THE WJBK-TV TOWER

1 December 1957 - 28 February 1958
(Winter)

Duration, hr		
6-12	13-24	25 and Over
9	13	
9	17	
12	13	
11	18	
6	15	
10	13	
10	14	
7	15	
6	13	
6	16	
10		
8		
8		
6		
6		
6		
10		
6		
6		

Total number of inversions over 5 hr in duration = 29
Total hours of continuous inversions over 5 hr in duration = 299
Average length of continuous inversions over 5 hr in duration = 10.3

TABLE V-B

THE ASSOCIATION OF TEMPERATURE LAPSE RATES WITH WIND DIRECTION AT THE ENRICO FERMI SITE

1 December 1957 - 28 February 1958
(Winter)

Wind Direction	Hourly Lapse Rates			Compass Totals	Percent Frequency of Lapse Rate					
					Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I
N	25	21	2	48	2.8	3.4	0.6	1.3	1.1	0.1
NNE	19	11	7	37	2.1	1.8	1.9	1.0	0.6	0.4
NE	35	3	7	45	3.9	0.5	1.9	1.9	0.2	0.4
ENE	43	6	13	62	4.8	1.0	3.9	2.3	0.3	0.7
E	49	17	14	80	5.5	2.8	3.6	2.6	0.9	0.7
ESE	29	13	16	58	3.2	2.1	4.5	1.5	0.7	0.9
SE	31	5	8	44	3.5	0.8	2.2	1.7	0.3	0.4
SSE	21	5	14	40	2.3	0.8	3.9	1.1	0.3	0.7
S	19	23	31	73	2.1	3.7	8.6	1.0	1.2	1.7
SSW	42	36	52	130	4.7	5.8	14.5	2.2	1.9	2.8
SW	50	63	41	154	5.6	10.2	11.4	2.7	3.4	2.2
WSW	107	138	36	281	12.0	22.3	10.0	5.7	7.4	1.9
W	125	72	38	235	14.0	11.7	10.6	6.7	3.8	2.0
WNW	106	74	18	198	11.8	12.0	5.0	5.7	4.0	1.0
NW	106	67	43	216	11.8	10.8	12.0	5.7	3.6	2.3
NNW	82	55	14	151	9.2	8.9	3.9	4.4	2.9	0.7
Calm	6	9	5	20	0.7	1.5	1.4	0.3	0.5	0.3
Totals	895	618	359	1872	100.0	100.1	99.9	47.8	33.1	19.2

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE VI-B

THE ASSOCIATION OF INVERSION PERIODS AND WIND DIRECTION
AT THE ENRICO FERMI SITE

1 December 1957 - 28 February 1958
(Winter)

Wind Direction	Daytime				Nighttime			
	No.	Occurrences, %		Mean Wind Speed	No.	Occurrences, %		Mean Wind Speed
		Total	Overall			Total	Overall	
N					2	1.0	0.6	9.5
NNE	3	1.9	0.8	10.3	4	2.0	1.1	9.5
NE	1	0.6	0.3	14.0	6	3.0	1.7	13.2
ENE	4	2.6	1.1	21.8	9	4.5	2.5	14.3
E	6	3.8	1.7	12.2	8	4.0	2.2	18.6
ESE	5	3.2	1.4	17.2	11	5.4	3.1	16.9
SE	5	3.2	1.4	13.2	3	1.5	0.8	16.3
SSE	7	4.5	2.0	15.4	7	3.5	2.0	15.0
S	18	11.5	5.0	13.7	13	6.4	3.6	10.0
SSW	29	18.6	8.1	15.2	23	11.4	6.4	14.8
SW	24	15.4	6.7	7.5	17	8.4	4.7	18.5
WSW	13	8.3	3.6	16.6	23	11.4	6.4	12.6
W	15	9.6	4.2	17.5	22	10.9	6.1	10.5
WNW	8	5.1	2.2	15.1	10	5.0	2.8	12.9
NW	14	9.0	3.9	19.4	29	14.4	8.1	12.9
NNW	2	1.3	0.6	23.5	12	5.9	3.4	9.3
Calm	2	1.3	0.6	0.0	3	1.5	0.8	0.0
Totals	156	99.9	43.6		202	100.2	56.3	
Average				15.9				13.2

TABLE VII-B

WIND DIRECTION AND MEAN WIND SPEED ASSOCIATED WITH INVERSIONS AND NONINVERSIONS AT THE ENRICO FERMI SITE

1 December 1957-28 February 1958
(Winter)

Wind Direction	Inversion		Noninversion	
	Occurrence, %	Mean Speed, mph	Occurrence, %	Mean Speed, mph
N	0.1	9.5	2.5	13.1
NNE	0.4	9.9	1.6	13.1
NE	0.4	13.3	2.0	15.4
ENE	0.7	16.6	2.6	17.4
E	0.7	15.8	3.5	16.7
ESE	0.8	17.0	2.2	11.2
SE	0.4	14.4	2.0	16.3
SSE	0.7	15.2	1.4	15.0
S	1.7	12.2	2.2	10.8
SSW	2.8	15.0	4.2	14.0
SW	2.2	17.9	6.0	15.1
WSW	2.0	13.9	13.1	14.6
W	2.0	13.3	10.5	14.1
WNW	1.0	13.9	9.6	16.4
NW	2.3	15.0	9.2	15.8
NNW	0.7	11.4	7.3	15.6
Calm	0.3	0.0	0.8	0.0
Totals	19.2		80.7	
Average		14.4		14.8

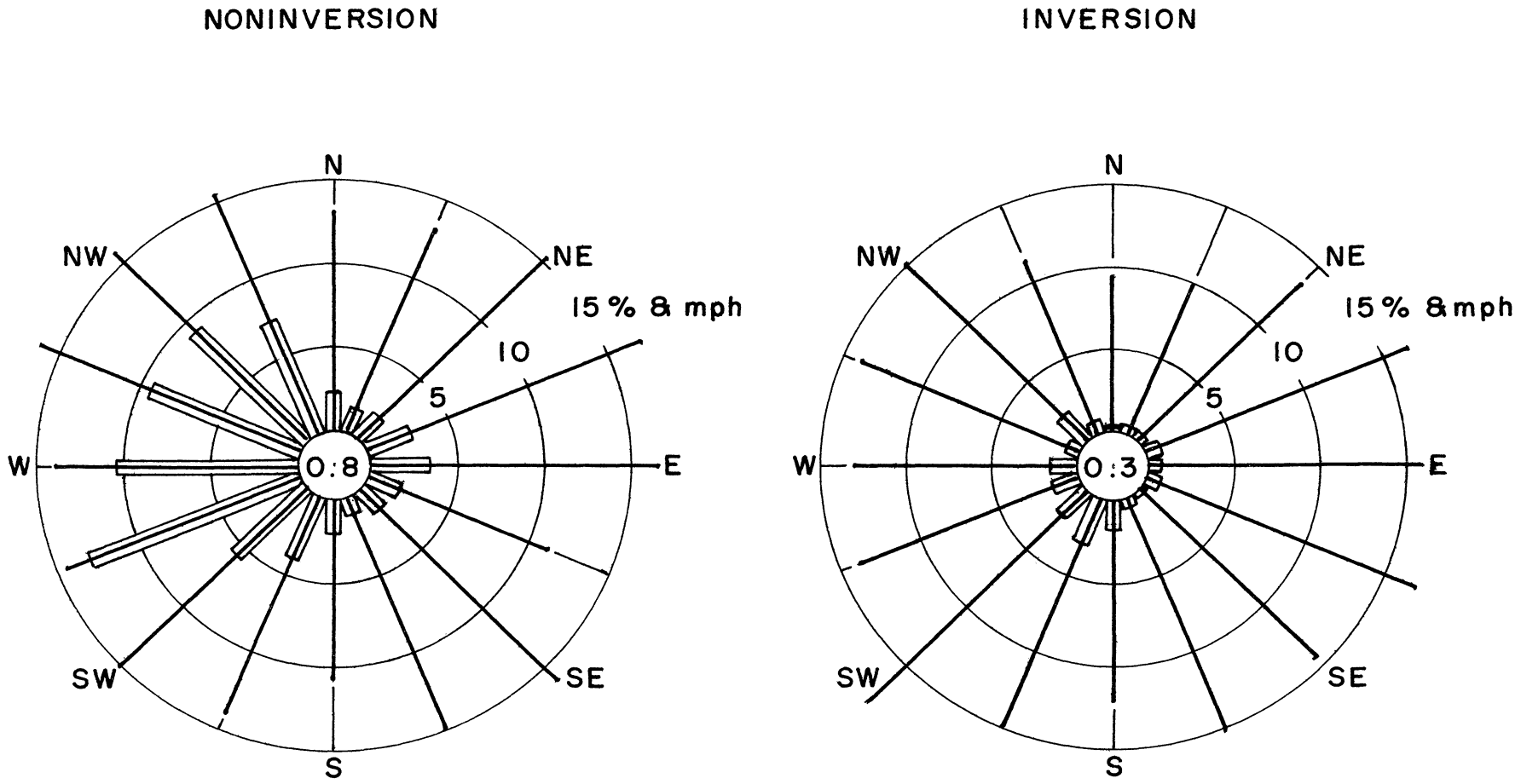


Fig. 1-B. Percentage frequency of inversions and noninversions associated with winds for 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at the Enrico Fermi site: Winter, 1957-1958.

TABLE VIII-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE ENRICO FERMI SITE

1 March 1958-31 May 1958
(Spring)

Total hours	2208		
Number missing hours	537		
Number hourly observations	1671		
Percent missing data		24.3	
Percent inversions			20.6
Percent strong lapse			68.3
Percent weak lapse			11.0
			99.9%

TABLE IX-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE WJBK-TV TOWER

1 March 1958-31 May 1958
(Spring)

Total hours	2208	
Number missing hours	264	
Number hourly observations	1944	
Percent missing data		12.0%
Numbers hours inversion	583	
Percent inversions		30.0%

TABLE X-B

FREQUENCY OF CONTINUOUS INVERSIONS AT THE ENRICO FERMI SITE

1 March 1958-31 May 1958
(Spring)

Duration, hr					
6-12		13-24		25 and Over	
Hr	Mean Wind Speed, mph	Hr	Mean Wind Speed, mph	Hr	Mean Wind Speed, mph
10	9	23	13	25	14
10	6			65	13
6	6			37	12
9	6				
7	9				
7	11				
9	16				
9	5				
7	15				
6	21				
9	7				
10	9				

Total number of inversions over 5 hr in duration = 16
Total hours of continuous inversion over 5 hr in duration = 249
Average length of continuous inversions over 5 hr in duration = 15.6

TABLE XI-B

FREQUENCY OF CONTINUOUS INVERSIONS AT THE WJBK-TV TOWER

1 March 1958 - 31 May 1958
(Spring)

Duration, hr		
6-12	13-24	25 and Over
11	14	
7	13	
10	16	
10	14	
9	14	
6	15	
12	13	
12	17	
6	13	
6	15	
12	15	
12	18	
7	14	
6		
12		
10		
8		
12		
11		
10		
11		
12		
12		
12		

Total number of inversions over 5 hr in duration = 37
Total hours of continuous inversions over 5 hr in duration = 427
Average length of continuous inversions over 5 hr in duration = 11.5

TABLE XII-B

THE ASSOCIATION OF TEMPERATURE LAPSE RATES WITH WIND DIRECTION AT THE ENRICO FERMI SITE

1 March 1958 - 31 May 1958
(Spring)

Wind Direction	Hourly Lapse Rates			Compass Totals	Percent Frequency of Lapse Rate					
					Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I
N	39	4	24	67	3.4	2.2	7.0	2.3	0.2	1.4
NNE	55	11	23	89	4.8	6.0	6.7	3.3	0.7	1.4
NE	161	15	12	188	14.1	8.2	3.5	9.6	0.9	0.7
ENE	102	11	14	127	8.9	6.0	4.1	6.1	0.7	0.8
E	100	8	9	117	8.8	4.3	2.6	6.0	0.5	0.5
ESE	51	9	19	79	4.5	4.9	5.5	3.1	0.5	1.1
SE	34	14	28	76	3.0	7.6	8.1	2.0	0.8	1.7
SSE	37	10	18	65	3.2	5.4	5.2	2.2	0.6	1.1
S	36	7	15	58	3.2	3.8	4.3	2.2	0.4	0.9
SSW	46	7	27	80	4.0	3.8	7.8	2.8	0.4	1.6
SW	55	5	24	84	4.8	2.7	7.0	3.3	0.3	1.4
WSW	106	17	17	140	9.3	9.2	4.9	6.3	1.0	1.0
W	81	28	38	147	7.1	15.2	11.0	4.9	1.7	2.3
WNW	83	7	41	131	7.3	3.8	11.9	5.0	0.4	2.5
NW	72	20	19	111	6.3	10.9	5.5	4.3	1.2	1.1
NNW	83	11	15	109	7.3	6.0	4.3	5.0	0.7	0.9
Calm	___	___	2	2	___	___	0.6	___	___	0.1
Totals	1141	184	345	1670	100.0	100.0	100.0	68.4	11.0	20.5

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XIII-B

THE ASSOCIATION OF INVERSION PERIODS AND WIND DIRECTION
AT THE ENRICO FERMI SITE

1 March 1958 - 31 May 1958
(Spring)

Wind Direction	Daytime				Nighttime			
	No.	Occurrences, %		Mean Wind Speed	No.	Occurrences, %		Mean Wind Speed
		Total	Overall			Total	Overall	
N	8	4.1	2.3	10.8	16	10.5	4.6	7.4
NNE	8	4.1	2.3	9.3	15	9.9	4.3	8.1
NE	6	3.1	1.7	13.5	6	3.9	1.7	8.5
ENE	8	4.1	2.3	15.4	6	3.9	1.7	15.0
E	7	3.6	2.0	11.4	2	1.3	0.6	14.0
ESE	15	7.8	4.3	10.3	4	2.6	1.2	15.5
SE	24	12.4	7.0	10.8	4	2.6	1.2	9.2
SSE	14	7.3	4.1	9.6	4	2.6	1.2	13.3
S	10	5.2	2.9	10.8	5	3.3	1.4	9.6
SSW	18	9.3	5.2	12.3	9	5.9	2.6	11.0
SW	9	4.7	2.6	16.0	15	9.9	4.3	10.3
WSW	6	3.1	1.7	14.8	11	7.2	3.2	10.1
W	11	5.7	3.2	14.0	27	17.8	7.8	10.3
WNW	25	13.0	7.2	15.6	16	10.5	4.6	10.4
NW	16	8.3	4.6	13.4	3	2.0	0.9	6.3
NNW	7	3.6	2.0	11.6	8	5.3	2.3	9.8
Calm	1	0.5	0.3	0.0	1	0.7	0.3	0.0
Totals	193	99.9	55.7		152	99.9	43.9	
Average				12.4				10.0

TABLE XIV-B

WIND DIRECTION AND MEAN WIND SPEED ASSOCIATED WITH INVERSIONS AND NONINVERSIONS AT THE ENRICO FERMI SITE

1 March 1958 - 31 May 1958
(Spring)

Wind Direction	Inversion		Noninversion	
	Occurrence, %	Mean Speed, mph	Occurrence, %	Mean Speed, mph
N	1.4	8.8	2.6	11.7
NNE	1.4	8.5	4.0	14.1
NE	0.7	11.0	10.5	19.2
ENE	0.8	15.2	6.8	16.5
E	0.5	12.0	6.5	19.6
ESE	1.1	11.4	3.6	17.2
SE	1.7	10.6	2.9	10.7
SSE	1.1	10.4	2.8	10.0
S	0.9	10.4	2.6	9.7
SSW	1.6	11.9	3.2	11.1
SW	1.4	12.5	3.6	12.2
WSW	1.0	11.8	7.4	12.9
W	2.3	11.1	6.5	12.7
WNW	2.5	13.4	5.4	14.6
NW	1.1	12.2	5.5	14.0
NNW	0.9	10.9	5.6	13.7
Calm	0.1	00.0	___	___
Totals	20.5		79.5	
Average		11.3		14.6

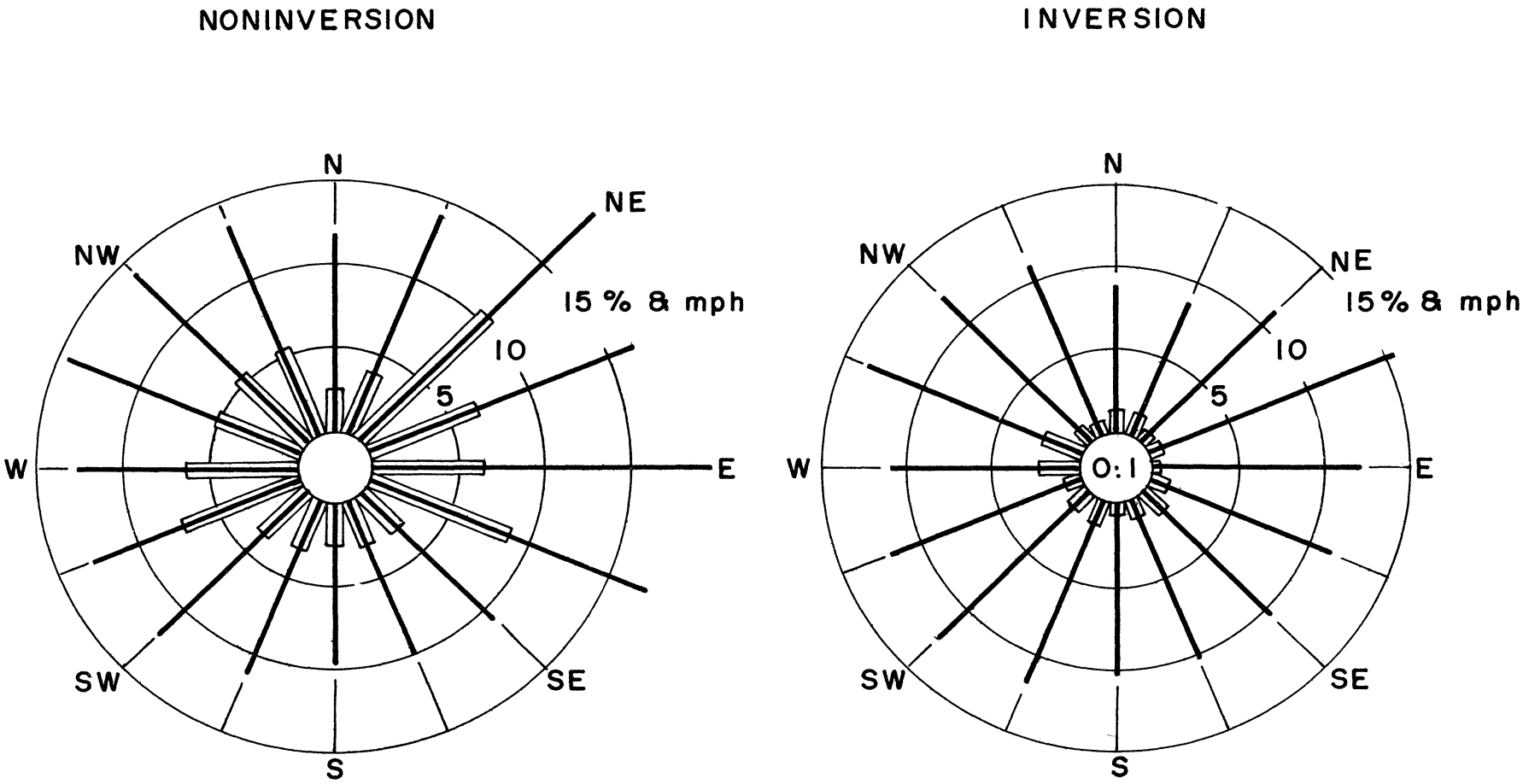


Fig. 2-B. Percentage frequency of inversions and noninversions associated with winds for 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at the Enrico Fermi site: Spring, 1958.

TABLE XV-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE ENRICO FERMI SITE

1 June 1958-31 August 1958
(Summer)

Total hours	2208		
Number missing hours	580		
Number hourly observations	1628		
Percent missing data		26.2	
Percent inversions			45.6
Percent strong lapse			18.9
Percent weak lapse			35.5
			100.0%

TABLE XVI-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE WJBK-TV TOWER

1 June 1958-31 August 1958
(Summer)

Total hours	2208	
Number missing hours	64	
Number hourly observations	2144	
Percent missing data		2.9%
Numbers hours inversion	806	
Percent inversions		37.6%

TABLE XVII-B

FREQUENCY OF CONTINUOUS INVERSIONS AT THE ENRICO FERMI SITE

1 June 1958 - 31 August 1958
(Summer)

Duration, hr					
6-12		13-24		25 and Over	
Hr	Mean Wind Speed, mph	Hr	Mean Wind Speed, mph	Hr	Mean Wind Speed, mph
11	11.9	16	10.8	28	6.4
6	12.2	19	10.8		
7	7.4	14	6.8		
6	7.0	14	10.7		
6	16.7	13	5.2		
10	11.4	15	4.5		
12	14.2	19	7.4		
10	12.0	16	11.3		
6	17.2	13	10.1		
7	5.9	13	5.8		
6	11.3	18	6.7		
8	9.2				
7	13.9				
8	6.4				
9	8.1				
6	12.7				
6	10.8				
9	6.9				
10	6.8				
10	8.4				
8	11.0				
8	7.2				
8	5.8				
8	8.5				
8	9.1				
7	12.1				
6	8.0				
10	10.4				
6	13.0				
6	6.0				
7	4.9				
7	5.1				
6	9.3				
8	10.2				
6	9.3				
10	8.4				
6	11.3				
12	8.1				
11	11.4				
12	14.0				

Total number of inversions over 5 hr in duration	=	52
Total hours of continuous inversion over 5 hr in duration	=	518
Average length of continuous inversions over 5 hr in duration	=	10.0

TABLE XVIII-B

FREQUENCY OF CONTINUOUS INVERSIONS AT THE WJBK-TV TOWER

1 June 1958 - 31 August 1958
(Summer)

Duration, hr			
6-12		13-24	25 and Over
10	12	13	
9	11	13	
6	10	14	
8	6	14	
8	11	16	
10	9	16	
10	11	15	
10	10	13	
6	12	13	
11	10	13	
11	11	18	
11		14	
9		13	
10		14	
11		14	
10			
8			
6			
7			
12			
6			
11			
9			
6			
11			
11			
8			
12			
11			
10			
11			

Total number of inversions over 5 hr in duration = 57
Total hours of continuous inversions over 5 hr in duration = 615
Average length of continuous inversions over 5 hr in duration = 10.8

TABLE XIX-B

THE ASSOCIATION OF TEMPERATURE LAPSE RATES WITH WIND DIRECTION AT THE ENRICO FERMI SITE

1 June 1958 - 31 August 1958
(Summer)

Wind Direction	Hourly Lapse Rates			Compass Totals	Percent Frequency of Lapse Rate					
					Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I
N	9	13	23	45	2.9	2.2	3.1	0.6	0.8	1.4
NNE	14	6	33	53	4.6	1.0	4.4	0.9	0.4	2.0
NE	33	9	12	54	10.7	1.6	1.6	2.0	0.6	0.7
ENE	31	8	11	50	10.1	1.4	1.5	1.9	0.5	0.7
E	32	18	8	58	10.4	3.1	1.1	2.0	1.1	0.5
ESE	23	20	16	59	7.5	3.5	2.2	1.4	1.2	1.0
SE	31	20	36	87	10.1	3.5	4.8	1.9	1.2	2.2
SSE	26	19	71	116	8.5	3.3	9.6	1.6	1.2	4.4
S	3	41	56	100	1.0	7.1	7.5	0.2	2.5	3.4
SSW	7	86	88	181	2.3	14.9	11.8	0.4	5.3	5.4
SW	6	98	125	229	2.0	17.0	16.8	0.4	6.0	7.7
WSW	17	93	86	196	5.5	16.1	11.6	1.0	5.7	5.3
W	16	63	60	139	5.2	10.9	8.1	1.0	3.9	3.7
WNW	9	32	47	88	2.9	5.5	6.3	0.6	2.0	2.9
NW	15	21	30	66	4.9	3.6	4.0	0.9	1.3	1.8
NNW	35	31	30	96	11.4	5.4	4.0	2.1	1.9	1.8
Calm	0	0	11	11	0.0	0.0	1.5			0.7
Totals	307	578	743	1628	100.0	100.1	99.9	18.9	35.6	45.6

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XX-B

THE ASSOCIATION OF INVERSION PERIODS AND WIND DIRECTION
AT THE ENRICO FERMI SITE

1 June 1958 - 31 August 1958
(Summer)

Wind Direction	Daytime				Nighttime			
	No.	Occurrences, %		Mean Wind Speed	No.	Occurrences, %		Mean Wind Speed
		Total	Overall			Total	Overall	
N	7	1.6	0.9	6.0	16	5.1	2.2	6.9
NNE	9	2.1	1.2	7.7	24	7.6	3.2	7.4
NE	8	1.9	1.1	5.4	4	1.3	0.5	8.0
ENE	8	1.9	1.1	5.3	3	1.0	0.4	3.3
E	7	1.6	0.9	7.9	1	0.3	0.1	4.0
ESE	12	2.8	1.6	6.3	4	1.3	0.5	10.3
SE	35	8.2	4.7	10.5	1	0.3	0.1	11.0
SSE	63	14.7	8.5	8.9	8	2.5	1.1	10.4
S	34	7.9	4.6	9.0	22	7.0	3.0	8.0
SSW	45	10.5	6.1	10.3	43	13.7	5.8	8.8
SW	76	17.7	10.2	11.0	49	15.6	6.6	9.9
WSW	47	11.0	6.3	10.0	39	12.4	5.2	8.8
W	29	6.8	3.9	11.7	31	9.9	4.2	9.6
WNW	18	4.2	2.4	11.7	29	9.2	3.9	8.4
NW	10	2.3	1.3	8.4	20	6.4	2.7	8.1
NNW	17	4.0	2.3	9.1	13	4.1	1.7	7.2
Calm	4	0.9	0.5	0.0	7	2.2	0.9	0.0
Totals	429	100.1	57.6		314	99.9	42.1	
Average				9.6				8.4

TABLE XXI-B

WIND DIRECTION AND MEAN WIND SPEED ASSOCIATED WITH INVERSIONS AND NONINVERSIONS AT THE ENRICO FERMI SITE

1 June 1958-31 August 1958
(Summer)

Wind Direction	Inversion		Noninversion	
	Occurrence, %	Mean Speed, mph	Occurrence, %	Mean Speed, mph
N	1.4	6.7	1.4	7.3
NNE	2.0	7.5	1.2	8.8
NE	0.7	6.2	2.6	13.4
ENE	0.7	4.7	2.4	14.7
E	0.5	7.4	3.1	11.5
ESE	1.0	7.3	2.6	12.5
SE	2.2	10.5	3.1	10.7
SSE	4.4	9.1	2.8	11.3
S	3.4	8.6	2.7	9.1
SSW	5.4	9.6	5.7	11.0
SW	7.7	10.6	6.4	11.9
WSW	5.3	9.5	6.8	10.4
W	3.7	10.6	4.8	12.7
WNW	2.9	9.7	2.5	11.8
NW	1.8	8.2	2.2	9.4
NNW	1.8	8.3	4.1	8.7
Calm	0.7	0.0		
Totals	45.6		54.4	
Average		9.1		11.1

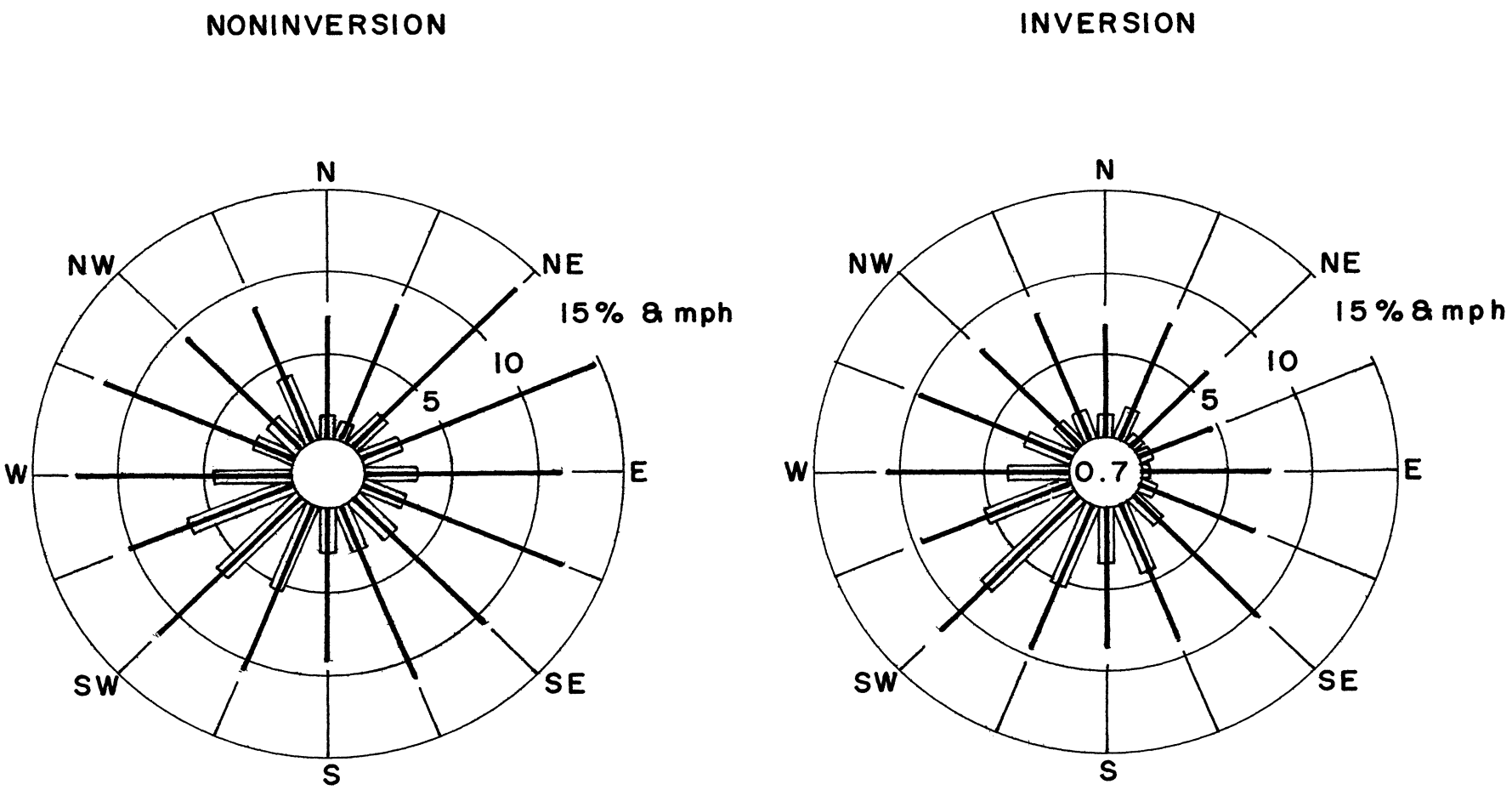


Fig. 3-B. Percentage frequency of inversions and noninversions associated with winds for 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at the Enrico Fermi site: Summer, 1958.

TABLE XXII-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE ENRICO FERMI SITE

1 September 1958-30 November 1958
(Fall)

Total hours	2184		
Number missing hours	238		
Number hourly observations	1946		
Percent missing data		10.9	
Percent inversions			41.9
Percent strong lapse			17.0
Percent weak lapse			41.2
			100.1%

TABLE XXIII-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE WJBK-TV TOWER

1 September 1958-30 November 1958
(Fall)

Total hours	2184	
Number missing hours	2	
Number hourly observations	2182	
Percent missing data		0.1%
Numbers hours inversion	821	
Percent inversions		37.6%

TABLE XXIV-B

FREQUENCY OF CONTINUOUS INVERSIONS AT THE ENRICO FERMI SITE

1 September 1958-30 November 1958
(Fall)

Duration, hr					
6-12		13-24		25 and Over	
Hr	Mean Wind Speed, mph	Hr	Mean Wind Speed, mph	Hr	Mean Wind Speed, mph
8	14.4	14	7.2	25	7.2
8	17.3	17	6.9	29	13.9
11	9.6	18	9.1	29	15.4
7	4.4	18	9.8	33	14.8
9	6.3	14	12.9		
6	9.5	13	4.9		
8	13.3	13	10.3		
7	7.1	16	4.9		
7	9.3	13	11.5		
9	7.1	23	10.1		
9	18.7	18	10.2		
9	11.0	14	5.4		
8	13.0	14	11.3		
10	15.1	19	11.4		
12	3.3	17	12.1		
10	11.7	14	10.5		
12	9.9	14	8.1		
12	11.3	15	10.3		
8	13.0	15	12.1		
12	13.6				
7	9.3				
7	8.6				
8	6.6				
7	16.4				
10	11.5				

Total number of inversions over 5 hr in duration = 48
Total hours of continuous inversion over 5 hr in duration = 636
Average length of continuous inversions over 5 hr in duration = 13.3

TABLE XXV-B

FREQUENCY OF CONTINUOUS INVERSIONS AT THE WJBK-TV TOWER

1 September 1958 - 30 November 1958
(Fall)

Duration, hr		
6-12	13-24	25 and Over
10	13	
9	13	
6	13	
6	14	
12	15	
7	14	
7	13	
12	13	
12	14	
6	14	
11	14	
9	14	
9	14	
11	13	
9	15	
11	15	
8	14	
8	14	
6	14	
6	13	
11	15	
10	14	
8		
8		

Total number of inversions over 5 hr in duration = 46
Total hours of continuous inversions over 5 hr in duration = 517
Average length of continuous inversions over 5 hr in duration = 11.2

TABLE XXVI-B

THE ASSOCIATION OF TEMPERATURE LAPSE RATES WITH WIND DIRECTION AT THE ENRICO FERMI SITE

1 September 1958 - 30 November 1958
(Fall)

Wind Direction	Hourly Lapse Rates			Compass Totals	Percent Frequency of Lapse Rate					
					Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I
N	29	37	39	105	8.8	4.6	4.8	1.5	1.9	2.0
NNE	15	15	9	39	4.5	1.9	1.1	0.8	0.8	0.5
NE	42	29	11	82	12.7	3.6	1.3	2.2	1.5	0.6
ENE	26	11	10	47	7.9	1.4	1.2	1.3	0.6	0.5
E	10	22	13	45	3.0	2.7	1.6	0.5	1.1	0.7
ESE	11	46	20	77	3.3	5.7	2.5	0.6	2.4	1.0
SE	18	30	14	62	5.5	3.7	1.7	0.9	1.5	0.7
SSE	14	24	38	76	4.2	3.0	4.7	0.7	1.2	2.0
S	3	38	72	113	0.9	4.7	8.8	0.2	2.0	3.7
SSW	10	74	91	175	3.0	9.2	11.2	0.5	3.8	4.7
SW	6	101	170	277	1.8	12.6	20.9	0.3	5.2	8.7
WSW	9	92	95	196	2.7	11.5	11.7	0.5	4.7	4.9
W	28	109	75	212	8.5	13.6	9.2	1.4	5.6	3.9
WNW	19	76	67	162	5.8	9.5	8.2	1.0	3.9	3.4
NW	33	58	54	145	10.0	7.2	6.6	1.7	3.0	2.8
NNW	57	39	34	130	17.3	4.9	4.2	2.9	2.0	1.7
Calm	___	___	3	3	___	___	0.4	___	___	0.2
Totals	330	801	815	1946	99.9	99.8	100.1	17.0	41.2	42.0

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXVII-B

THE ASSOCIATION OF INVERSION PERIODS AND WIND DIRECTION
AT THE ENRICO FERMI SITE

1 September 1958 - 30 November 1958
(Fall)

Wind Direction	Daytime				Nighttime			
	No.	Occurrences, %		Mean Wind Speed	No.	Occurrences, %		Mean Wind Speed
		Total	Overall			Total	Overall	
N	8	2.9	1.0	6.8	31	5.8	3.8	7.8
NNE					9	1.7	1.1	8.4
NE	2	0.7	0.2	15.5	9	1.7	1.1	9.4
ENE	6	2.2	0.7	9.0	4	0.7	0.5	3.8
E	6	2.2	0.7	10.2	7	1.3	0.9	9.0
ESE	15	5.4	1.8	12.1	5	0.9	0.6	15.0
SE	5	1.8	0.6	10.2	9	1.7	1.1	12.6
SSE	24	8.6	2.9	11.0	14	2.6	1.7	7.7
S	24	8.6	2.9	9.9	48	9.0	5.9	10.0
SSW	21	7.5	2.6	8.9	70	13.1	8.6	11.5
SW	70	25.0	8.6	14.0	100	18.7	12.3	12.6
WSW	31	11.1	3.8	13.4	64	11.9	7.9	10.8
W	30	10.8	3.7	12.9	45	8.4	5.5	9.4
WNW	15	5.4	1.8	11.7	52	9.7	6.4	9.9
NW	10	3.6	1.2	10.3	44	8.2	5.4	9.4
NNW	9	3.2	1.1	7.8	25	4.7	3.1	8.9
Calm	3	1.1	0.4	0.0				
Totals	279	100.1	34.0		536	100.1	65.9	
Average				11.6				10.4

TABLE XXVIII-B

WIND DIRECTION AND MEAN WIND SPEED ASSOCIATED WITH INVERSIONS AND NONINVERSIONS AT THE ENRICO FERMI SITE

1 September 1958 - 30 November 1958
(Fall)

Wind Direction	Inversion		Noninversion	
	Occurrence, %	Mean Speed, mph	Occurrence, %	Mean Speed, mph
N	2.0	7.6	3.4	9.5
NNE	0.5	8.4	1.5	9.9
NE	0.6	10.5	3.6	13.4
ENE	0.5	6.9	1.9	13.1
E	0.7	9.5	1.6	11.7
ESE	1.0	12.8	2.9	10.1
SE	0.7	11.7	2.5	14.3
SSE	2.0	9.8	2.0	12.7
S	3.7	9.9	2.1	13.1
SSW	4.7	10.9	4.3	13.1
SW	8.7	13.2	5.5	15.8
WSW	4.9	11.7	5.2	16.7
W	3.9	10.8	7.0	15.2
WNW	3.4	10.3	4.9	11.8
NW	2.8	9.6	4.7	11.5
NNW	1.7	8.6	4.9	10.6
Calm	0.2	0.0	___	___
Totals	42.0		58.0	
Average		10.8		13.1

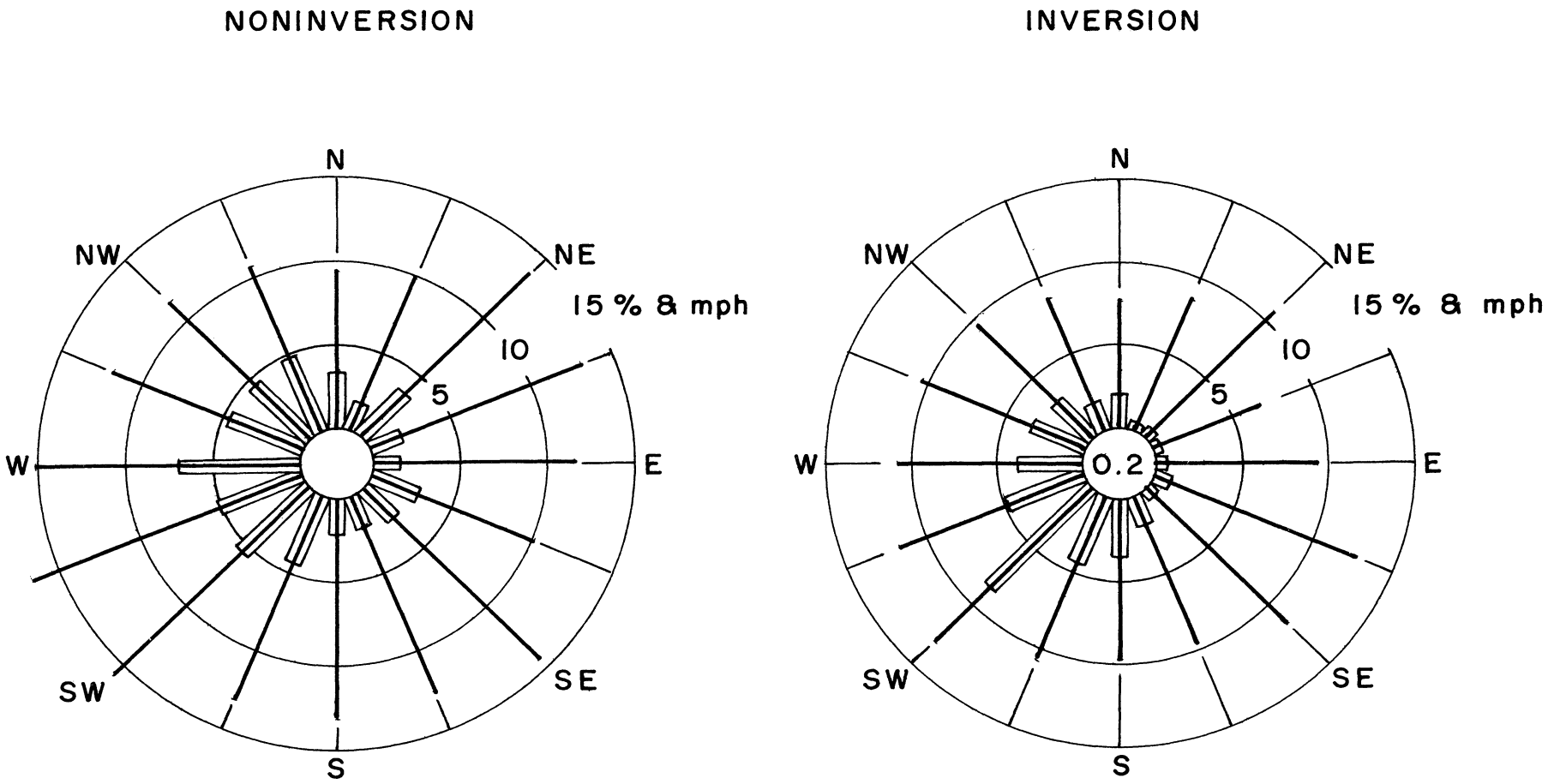


Fig. 4-B. Percentage frequency of inversions and noninversions associated with winds for 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at the Enrico Fermi site: Fall, 1958.

TABLE XXIX-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE ENRICO FERMI SITE

1 December 1957-30 November 1958
(Annual)

Total hours	8760		
Number missing hours	1449		
Number hourly observations	7311		
Percent missing data		16.5	
Percent inversions			31.5
Percent strong lapse			38.4
Percent weak lapse			30.1
			100.0%

TABLE XXX-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE WJBK-TV TOWER

1 December 1957-30 November 1958
(Annual)

Total hours	8760	
Number missing hours	332	
Number hourly observations	8428	
Percent missing data		3.8%
Numbers hours inversion	2601	
Percent inversions		30.9%

TABLE XXXI-B

THE ASSOCIATION OF TEMPERATURE LAPSE RATES WITH WIND DIRECTION AT THE ENRICO FERMI SITE

1 December 1957 - 30 November 1958
(Annual)

Wind Direction	Hourly Lapse Rates			Compass Totals	Percent Frequency of Lapse Rate					
					Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I
N	102	75	88	265	3.8	3.4	3.9	1.4	1.1	1.2
NNE	103	43	72	218	3.9	2.0	3.2	1.4	0.6	1.0
NE	271	56	42	369	10.1	2.6	1.9	3.8	0.8	0.6
ENE	202	36	48	286	7.6	1.7	2.1	2.8	0.5	0.7
E	191	65	44	300	7.1	3.0	1.9	2.7	0.9	0.6
ESE	114	88	71	273	4.3	4.0	3.1	1.6	1.2	1.0
SE	114	69	86	269	4.3	3.2	3.8	1.6	1.0	1.2
SSE	98	58	141	297	3.7	2.7	6.2	1.4	0.8	2.0
S	61	109	174	344	2.3	5.0	7.7	0.9	1.5	2.4
SSW	105	203	258	566	3.9	9.3	11.4	1.5	2.9	3.6
SW	117	267	360	744	4.4	12.2	15.9	1.6	3.8	5.1
WSW	239	340	235	814	8.9	15.6	10.4	3.4	4.8	3.3
W	250	272	210	732	9.4	12.5	9.3	3.5	3.8	3.0
WNW	217	189	173	579	8.1	8.7	7.6	3.0	2.7	2.4
NW	226	166	146	538	8.5	7.6	6.5	3.2	2.3	2.1
NNW	257	136	93	486	9.6	6.2	4.1	3.6	1.9	1.3
Calm	6	9	21	36	0.2	0.4	0.9	0.1	0.1	0.3
Totals	2673	2181	2262	7116	100.1	100.1	99.9	37.5	30.7	31.8

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXXII-B

THE ASSOCIATION OF INVERSION PERIODS AND WIND DIRECTION
AT THE ENRICO FERMI SITE

1 December 1957 - 30 November 1958
(Annual)

Wind Direction	Daytime				Nighttime			
	No.	Occurrences, %		Mean Wind Speed	No.	Occurrences, %		Mean Wind Speed
		Total	Overall			Total	Overall	
N	23	2.2	1.0	7.9	65	5.4	2.9	7.6
NNE	20	1.9	0.9	8.7	52	4.3	2.3	8.0
NE	17	1.6	0.8	9.9	25	2.1	1.1	9.1
ENE	26	2.5	1.1	11.8	22	1.8	1.0	11.1
E	26	2.5	1.1	10.3	18	1.5	0.8	13.6
ESE	47	4.4	2.1	10.6	24	2.0	1.1	15.2
SE	69	6.5	3.1	10.8	17	1.4	0.8	12.4
SSE	108	10.2	4.8	9.9	33	2.7	1.5	10.6
S	86	8.1	3.8	10.5	88	7.3	3.9	9.5
SSW	113	10.7	5.0	11.6	145	12.0	6.4	11.2
SW	179	16.9	7.9	13.3	181	15.0	8.0	12.2
WSW	97	9.2	4.3	12.3	137	11.4	6.1	10.5
W	85	8.0	3.8	13.4	125	10.4	5.5	9.9
WNW	66	6.2	2.9	13.6	107	8.9	4.7	9.8
NW	50	4.7	2.2	13.5	96	8.0	4.2	10.1
NNW	35	3.3	1.5	10.1	58	4.8	2.6	8.7
Calm	10	0.9	0.4	0.0	11	0.9	0.5	0.0
Totals	1057	99.8	46.7		1204	99.9	53.4	
Average				11.6				10.3

TABLE XXXIII-B

WIND DIRECTION AND MEAN WIND SPEED ASSOCIATED WITH INVERSIONS AND NONINVERSIONS AT THE ENRICO FERMI SITE

1 December 1957 - 30 November 1958
(Annual)

Wind Direction	Inversion		Noninversion	
	Occurrence, %	Mean Speed, mph	Occurrence, %	Mean Speed, mph
N	1.2	7.7	2.5	10.7
NNE	1.0	8.2	2.1	12.3
NE	0.6	9.9	4.6	16.8
ENE	0.7	11.5	3.3	15.9
E	0.6	11.7	3.6	16.3
ESE	1.0	12.1	2.8	12.9
SE	1.2	11.1	2.6	12.7
SSE	2.0	10.0	2.2	11.8
S	2.4	10.0	2.4	10.6
SSW	3.6	11.4	4.3	12.4
SW	5.1	12.8	5.4	14.0
WSW	3.3	11.2	8.1	13.8
W	3.0	11.3	7.3	13.9
WNW	2.4	11.2	5.7	14.5
NW	2.1	11.2	5.5	13.8
NNW	1.3	9.3	5.5	12.8
Calm	0.3	0.0	0.2	0.0
Totals	31.8		68.1	
Average		10.9		13.7

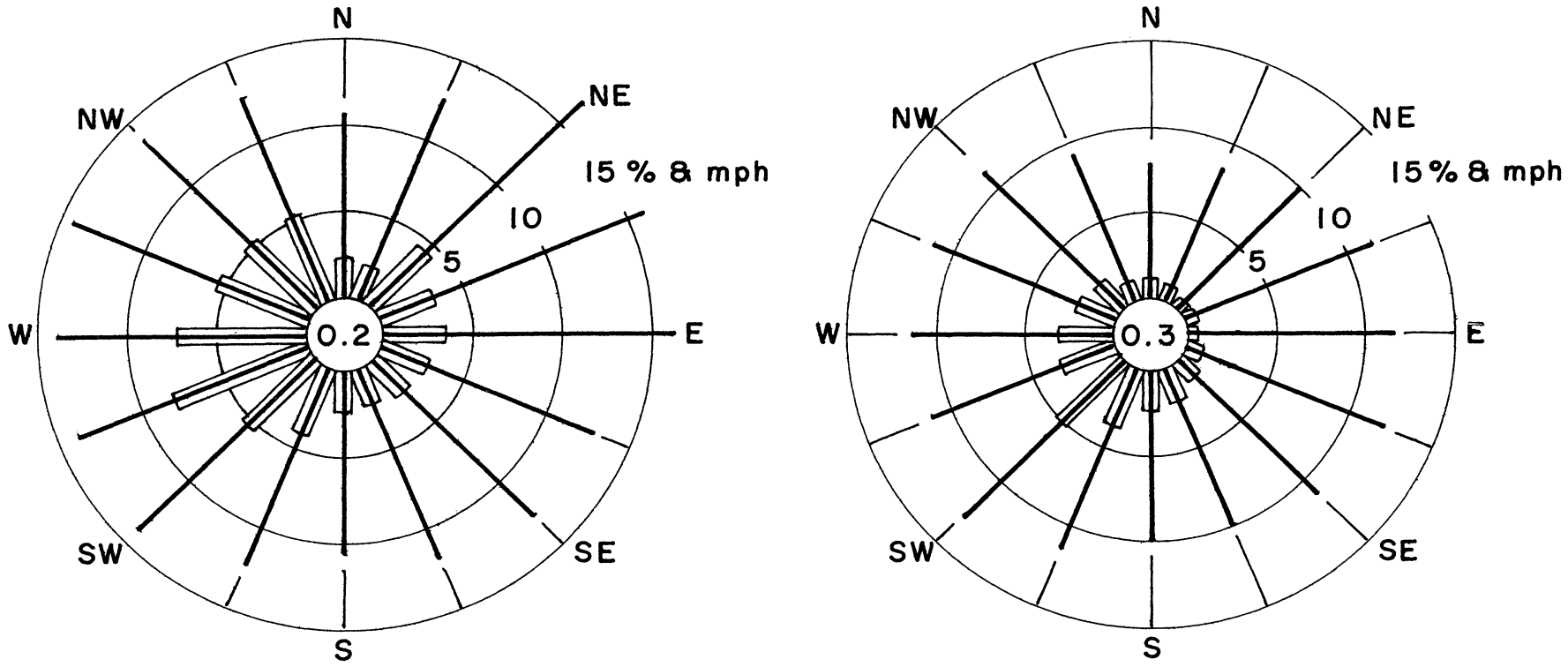


Fig. 5-B. Percentage frequency of inversions and noninversions associated with winds for 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at the Enrico Fermi site: Annual Summary, 1957-1958.

TABLE XXXIV-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE ENRICO FERMI SITE

1 December 1956-30 November 1958
(2-Year Summary)

Total hours	17520		
Number missing hours	3251		
Number hourly observations	14269		
Percent missing data		18.6	
Percent inversions			25.5
Percent strong lapse			51.7
Percent weak lapse			22.9
			100.1%

TABLE XXXV-B

SUMMARY OF TEMPERATURE-LAPSE-RATE DATA AT THE WJBK-TV TOWER

1 December 1956-30 November 1958
(2-Year Summary)

Total hours	17520	
Number missing hours	2358	
Number hourly observations	15162	
Percent missing data		13.5%
Numbers hours inversion	4568	
Percent inversions		30.1%

TABLE XXXVI-B

THE ASSOCIATION OF TEMPERATURE LAPSE RATES WITH WIND DIRECTION AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1958
(2-Year Summary)

Wind Direction	Hourly Lapse Rates			Compass Totals	Percent Frequency of Lapse Rate					
					Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I
N	311	96	128	535	4.3	3.0	3.6	2.2	0.7	0.9
NNE	331	72	145	548	4.6	2.2	4.0	2.4	0.5	1.0
NE	637	82	99	818	8.9	2.5	2.8	4.5	0.6	0.7
ENE	552	69	92	713	7.7	2.1	2.6	3.9	0.5	0.7
E	411	98	94	603	5.7	3.0	2.6	2.9	0.7	0.7
ESE	348	145	148	641	4.8	4.5	4.1	2.5	1.0	1.1
SE	238	103	211	552	3.3	3.2	5.9	1.7	0.7	1.5
SSE	243	108	288	639	3.4	3.3	8.0	1.7	0.8	2.1
S	232	193	297	722	3.2	6.0	8.3	1.7	1.4	2.1
SSW	431	307	394	1132	6.0	9.5	11.0	3.1	2.2	2.8
SW	446	433	472	1351	6.2	13.4	13.2	3.2	3.1	3.4
WSW	739	510	320	1569	10.3	15.8	8.9	5.3	3.6	2.3
W	560	364	292	1216	7.8	11.2	8.1	4.0	2.6	2.1
WNW	628	256	250	1134	8.7	7.9	7.0	4.5	1.8	1.8
NW	537	217	192	946	7.5	6.7	5.4	3.8	1.5	1.4
NNW	523	169	137	829	7.3	5.2	3.8	3.7	1.2	1.0
Calm	16	16	26	58	0.2	0.5	0.7	0.1	0.1	0.2
Totals	7183	3238	3585	14006	99.9	100.0	100.0	51.2	23.0	25.8

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXXVII-B

THE ASSOCIATION OF INVERSION PERIODS AND WIND DIRECTION
AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1958
(2-Year Summary)

Wind Direction	Daytime				Nighttime			
	No.	Occurrences, %		Mean Wind Speed	No.	Occurrences, %		Mean Wind Speed
		Total	Overall			Total	Overall	
N	38	2.2	1.1	7.6	90	4.8	2.5	7.3
NNE	49	2.9	1.4	9.1	96	5.1	2.7	8.4
NE	49	2.9	1.4	12.3	50	2.6	1.4	8.9
ENE	48	2.8	1.3	11.1	43	2.3	1.2	10.4
E	49	2.9	1.4	10.4	46	2.4	1.3	11.6
ESE	97	5.7	2.7	11.6	51	2.7	1.4	13.8
SE	163	9.6	4.5	11.5	53	2.8	1.5	13.0
SSE	210	12.4	5.9	10.5	73	3.9	2.0	11.8
S	156	9.2	4.4	10.1	141	7.5	3.9	9.9
SSW	178	10.5	5.0	11.6	216	11.4	6.0	11.6
SW	224	13.2	6.2	13.5	248	13.1	6.9	11.8
WSW	125	7.4	3.5	12.0	194	10.3	5.4	10.1
W	112	6.6	3.1	12.7	180	9.5	5.0	9.6
WNW	86	5.1	2.4	12.8	164	8.7	4.6	9.2
NW	58	3.4	1.6	12.5	134	7.1	3.7	9.2
NNW	40	2.4	1.1	10.0	97	5.1	2.7	8.2
Calm	13	0.8	0.4	0.0	13	0.7	0.4	0.0
Totals	1695	100.0	47.4		1889	100.0	52.6	
Average				11.5				10.2

TABLE XXXVIII-B

WIND DIRECTION AND MEAN WIND SPEED ASSOCIATED WITH INVERSIONS AND NONINVERSIONS AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1958
(2-Year Summary)

Wind Direction	Inversion		Noninversion	
	Occurrence, %	Mean Speed, mph	Occurrence, %	Mean Speed, mph
N	0.9	7.4	2.9	11.2
NNE	1.0	8.7	2.9	12.9
NE	0.7	10.6	5.1	16.2
ENE	0.6	10.7	4.4	15.0
E	0.7	11.0	3.9	15.8
ESE	1.1	12.3	3.5	12.0
SE	1.5	11.9	2.4	11.8
SSE	2.0	10.9	2.5	10.6
S	2.1	10.0	3.0	10.9
SSW	2.8	11.6	5.3	12.7
SW	3.4	12.6	6.3	13.4
WSW	2.3	10.9	8.9	14.0
W	2.1	10.8	6.6	13.3
WNW	1.8	10.4	6.3	13.5
NW	1.4	10.2	5.4	12.7
NNW	1.0	8.8	4.9	12.0
Calm	0.2	0.0	0.2	0.0
Totals	25.6		74.5	
Average		10.8		13.2

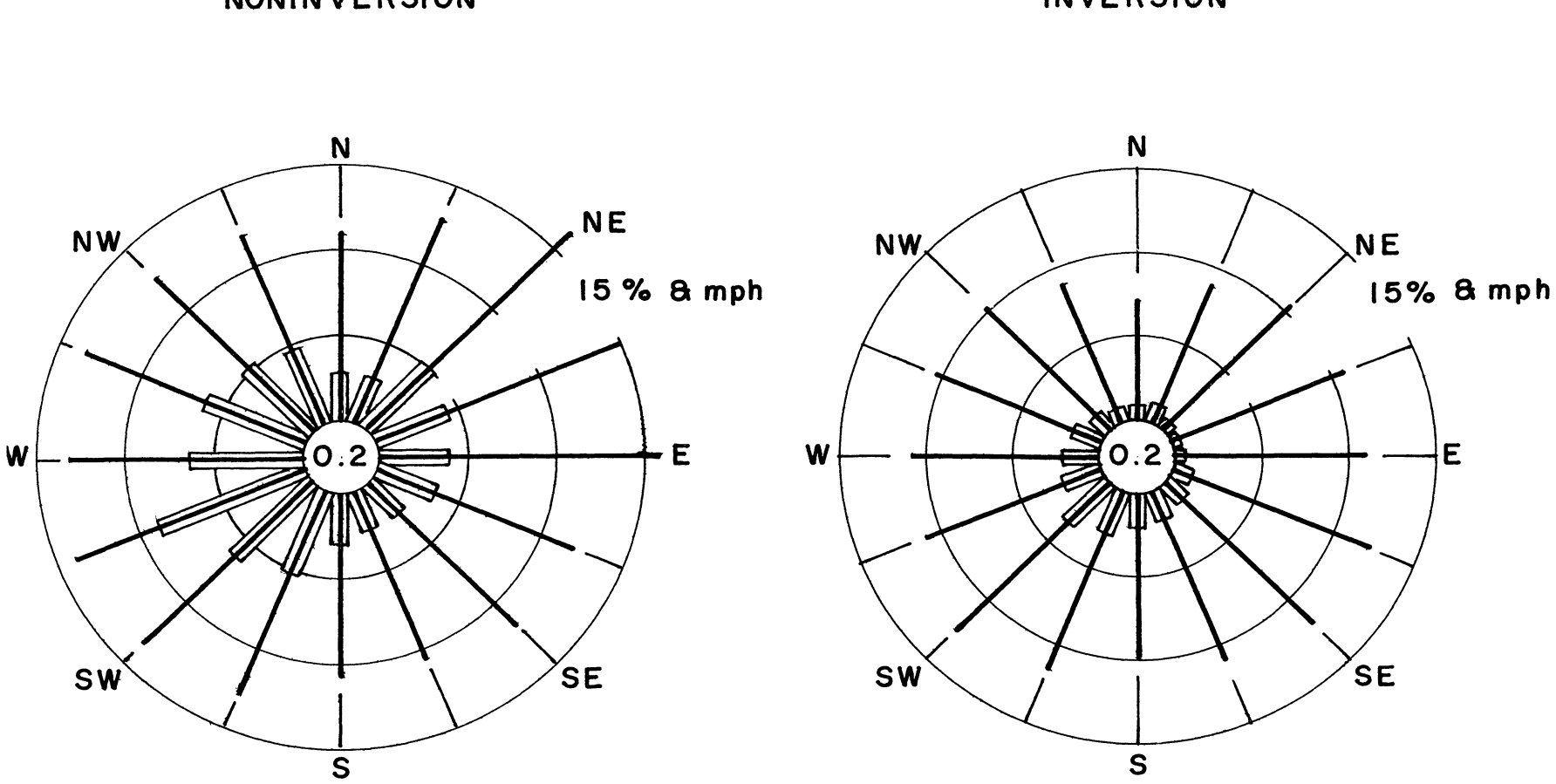


Fig. 6-B. Percentage frequency of inversions and noninversions associated with winds for 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) at the Enrico Fermi site: Two-Year Summary, 1956-1958.

TABLE XXXIX-B

HOURLY PERCENTAGE FREQUENCY OF INVERSIONS BY SEASONS AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1957

Hour Ending	Winter	Spring	Summer	Fall
0100	25.7	20.0	18.0	26.2
0200	24.3	20.0	19.7	31.3
0300	23.0	20.0	24.6	23.1
0400	23.3	25.8	21.7	17.2
0500	24.7	20.2	25.0	22.6
0600	25.0	20.5	28.9	21.0
0700	22.5	19.5	19.6	25.8
0800	21.4	17.2	9.1	19.4
0900	22.2	11.1	6.5	16.9
1000	11.1	13.5	13.4	10.6
1100	11.1	14.6	14.9	9.1
1200	15.3	19.1	24.6	9.0
1300	19.4	20.5	15.4	10.6
1400	21.9	23.6	21.5	12.3
1500	22.5	21.3	24.6	19.7
1600	19.2	20.5	35.9	16.7
1700	14.9	15.7	34.4	13.2
1800	13.3	16.7	25.0	14.7
1900	17.3	15.6	14.1	14.7
2000	24.0	16.7	9.7	20.6
2100	32.0	16.7	11.5	13.4
2200	29.3	16.7	16.1	14.9
2300	25.3	20.0	16.1	19.7
2400	24.3	20.2	11.5	18.2
Average	21.4	18.6	19.2	17.5

TABLE XL-B

HOURLY PERCENTAGE FREQUENCY OF INVERSIONS BY SEASONS AT THE WJBK-TV TOWER

1 December 1956 - 30 November 1957

Hour Ending	Winter	Spring	Summer	Fall
0100	39.7	49.3	79.7	64.0
0200	39.7	45.2	72.9	59.3
0300	41.3	43.8	78.0	59.3
0400	42.9	45.2	78.3	58.0
0500	43.5	46.6	76.3	58.0
0600	39.7	46.6	79.7	58.0
0700	38.1	39.7	70.7	57.0
0800	33.3	23.3	50.0	55.8
0900	28.6	15.1	32.0	41.9
1000	17.7	4.1	17.2	20.9
1100	8.2	4.1	16.4	16.3
1200	6.6	4.1	7.5	11.6
1300	8.2	2.7	11.1	11.8
1400	3.3	4.1	7.4	12.8
1500	5.1	4.2	5.6	9.3
1600	4.9	1.3	3.6	11.4
1700	0.0	2.6	6.8	5.1
1800	6.3	1.3	5.1	7.6
1900	23.8	6.5	1.7	37.9
2000	31.7	16.9	18.6	64.5
2100	38.1	28.6	44.8	72.1
2200	42.9	29.3	67.1	69.5
2300	42.9	28.4	62.7	68.3
2400	38.1	39.2	76.3	72.1
Average	26.0	22.2	40.4	41.8

TABLE XLI-B

HOURLY PERCENTAGE FREQUENCY OF INVERSIONS BY SEASONS AT THE ENRICO FERMI SITE

1 December 1957 - 30 November 1958

Hour Ending	Winter	Spring	Summer	Fall
0100	20.9	18.8	56.1	53.1
0200	19.8	23.5	56.7	50.6
0300	18.8	26.9	52.9	49.4
0400	20.0	25.8	55.9	40.7
0500	20.0	25.4	52.2	44.4
0600	16.7	25.0	53.7	46.9
0700	13.3	23.3	51.5	48.1
0800	16.9	18.6	38.2	44.4
0900	16.7	16.4	23.5	35.8
1000	18.4	14.5	30.3	25.9
1100	19.5	14.7	37.9	15.0
1200	19.5	14.3	26.1	15.0
1300	18.4	20.3	20.3	17.5
1400	21.6	23.7	30.0	21.3
1500	26.4	22.2	42.6	35.0
1600	23.0	16.7	54.9	40.0
1700	20.5	20.8	60.9	46.9
1800	19.3	22.4	51.4	47.0
1900	20.7	23.4	58.2	50.6
2000	20.7	21.6	48.5	57.1
2100	17.2	24.7	44.1	57.8
2200	18.4	18.1	53.7	56.3
2300	18.6	18.6	45.6	51.9
2400	17.6	17.4	50.8	51.9
Average	19.3	20.4	45.7	41.8

TABLE XLII-B

HOURLY PERCENTAGE FREQUENCY OF INVERSIONS BY SEASONS AT THE WJBK-TV TOWER

1 December 1957 - 30 November 1958

Hour Ending	Winter	Spring	Summer	Fall
0100	32.2	51.8	68.5	68.1
0200	28.9	56.8	68.5	63.7
0300	31.1	48.1	75.3	60.4
0400	33.3	48.1	71.9	59.3
0500	31.1	48.1	73.9	60.4
0600	31.1	53.1	75.3	56.0
0700	23.3	50.6	66.3	58.2
0800	22.2	48.1	38.2	54.9
0900	26.7	27.2	30.3	34.1
1000	15.6	21.0	16.9	13.2
1100	7.8	9.9	11.2	5.5
1200	4.5	11.1	13.5	2.2
1300	3.4	8.6	13.5	2.2
1400	3.3	11.1	14.6	3.3
1500	0.0	3.7	12.4	4.4
1600	1.1	2.5	7.8	3.3
1700	1.1	1.2	6.7	2.2
1800	4.4	4.9	4.4	9.9
1900	14.4	4.9	0.0	25.3
2000	17.8	21.0	14.4	53.8
2100	24.4	39.5	40.0	62.6
2200	22.2	44.4	55.6	67.0
2300	26.7	49.4	58.9	64.8
2400	27.8	54.3	65.6	67.0
Average	18.1	30.0	37.7	37.6

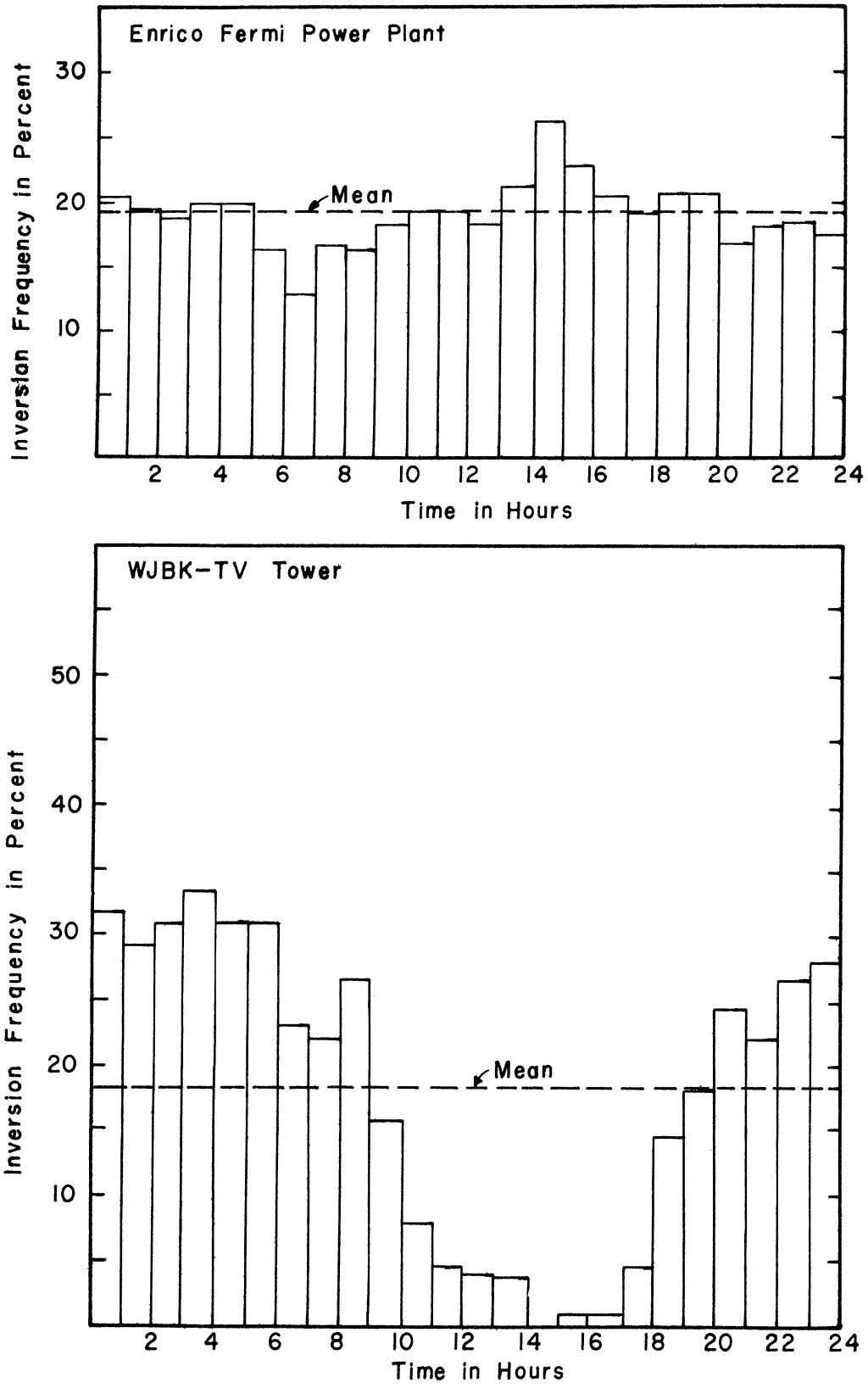


Fig. 7-B. Diurnal variation of inversions at the Enrico Fermi site and at WJBK-TV tower: Winter, 1957-1958.

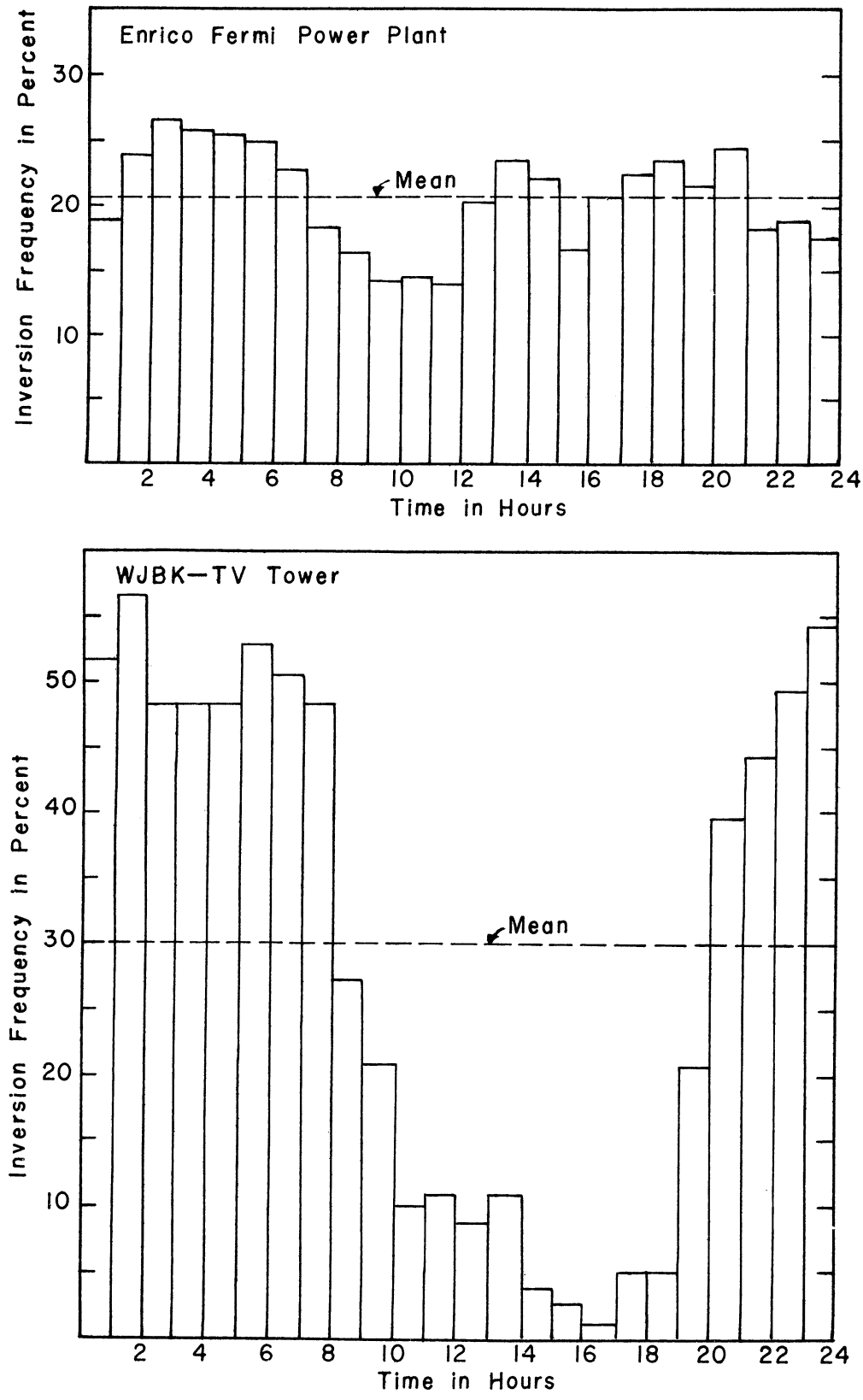


Fig. 8-B. Diurnal variation of inversions at the Enrico Fermi site and at WJBK-TV tower: Spring, 1958.

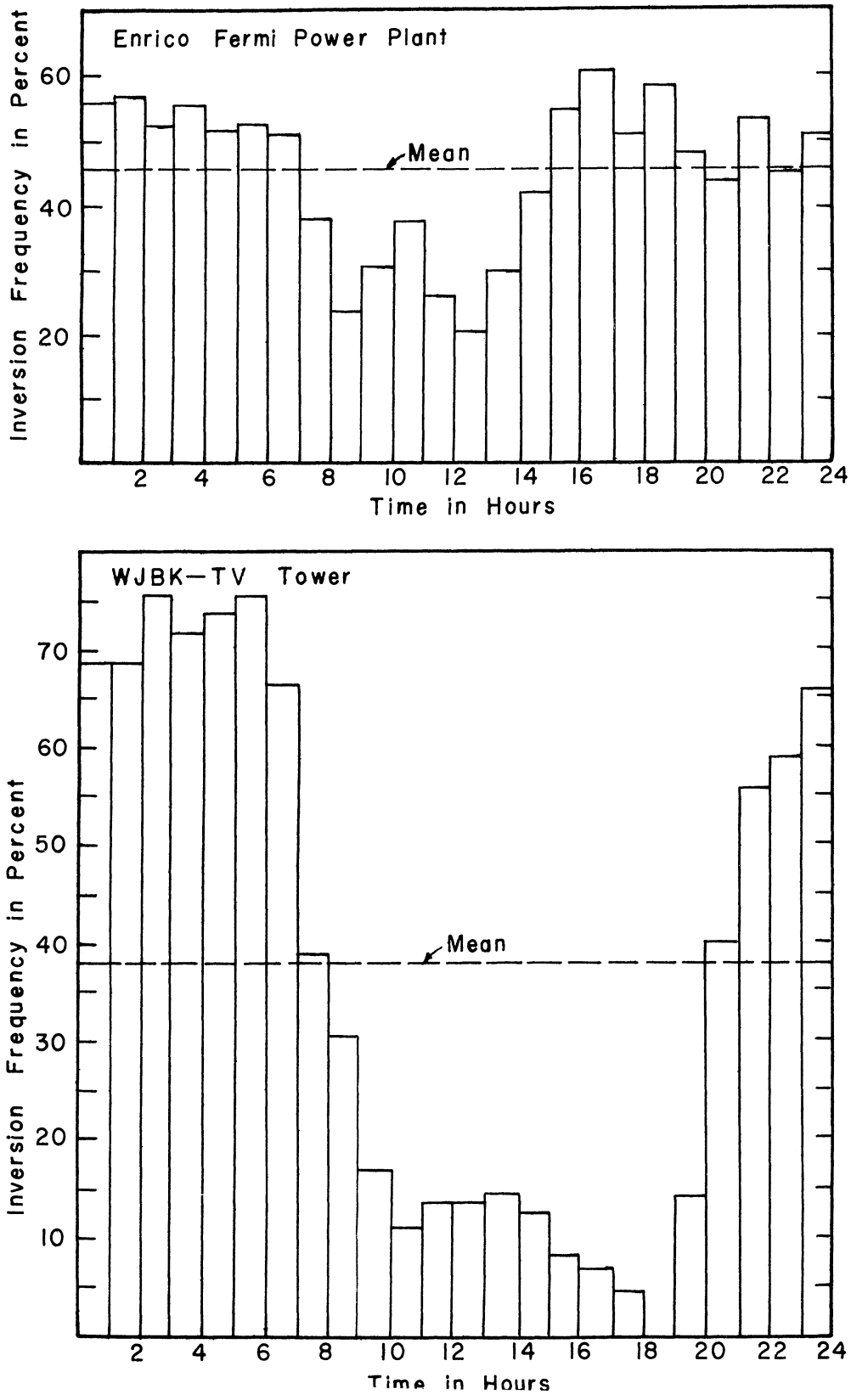


Fig. 9-B. Diurnal variation of inversions at the Enrico Fermi site and at WJBK-TV tower: Summer, 1958.

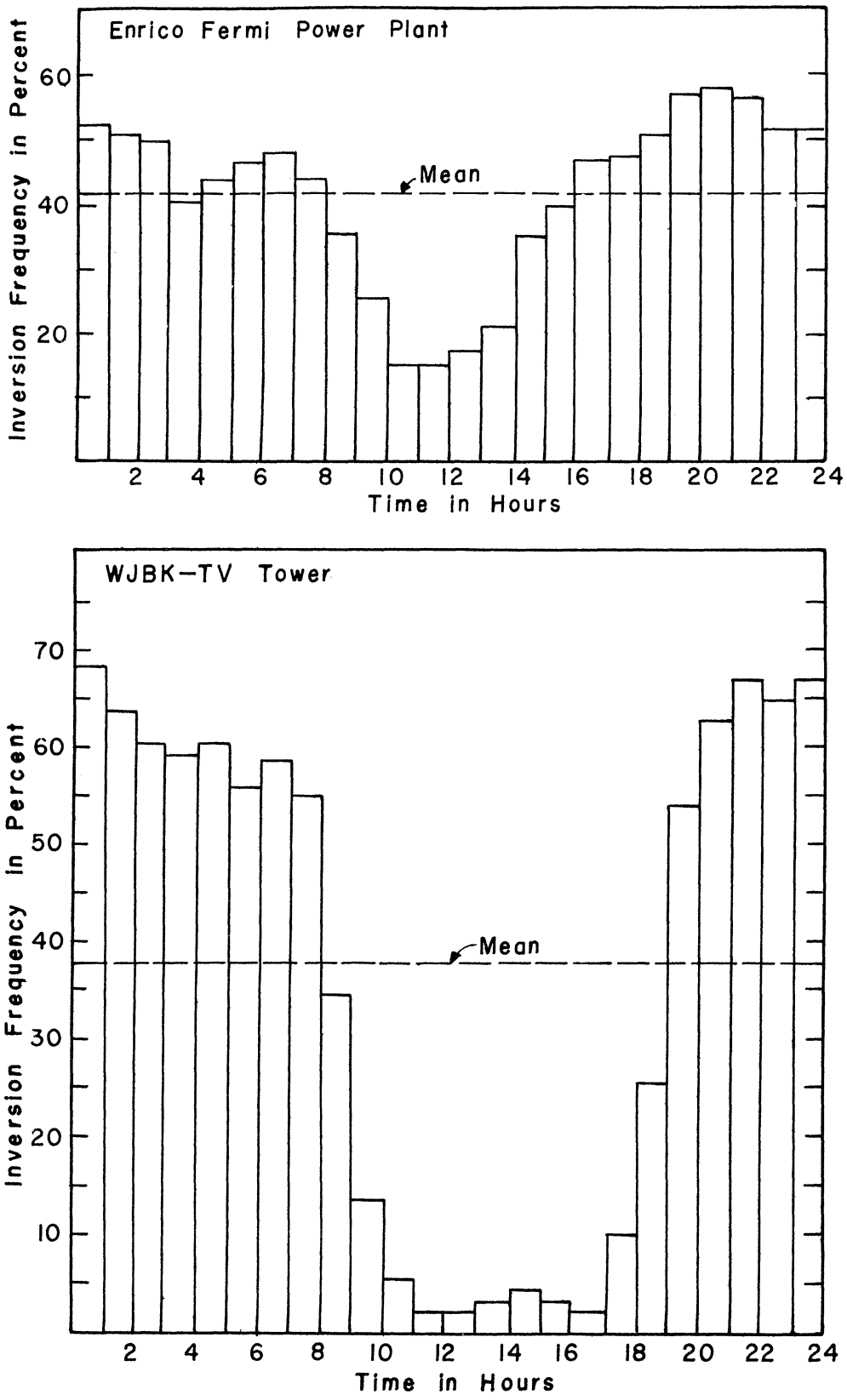


Fig. 10-B. Diurnal variation of inversions at the Enrico Fermi site and at WJBK-TV tower: Fall, 1958.

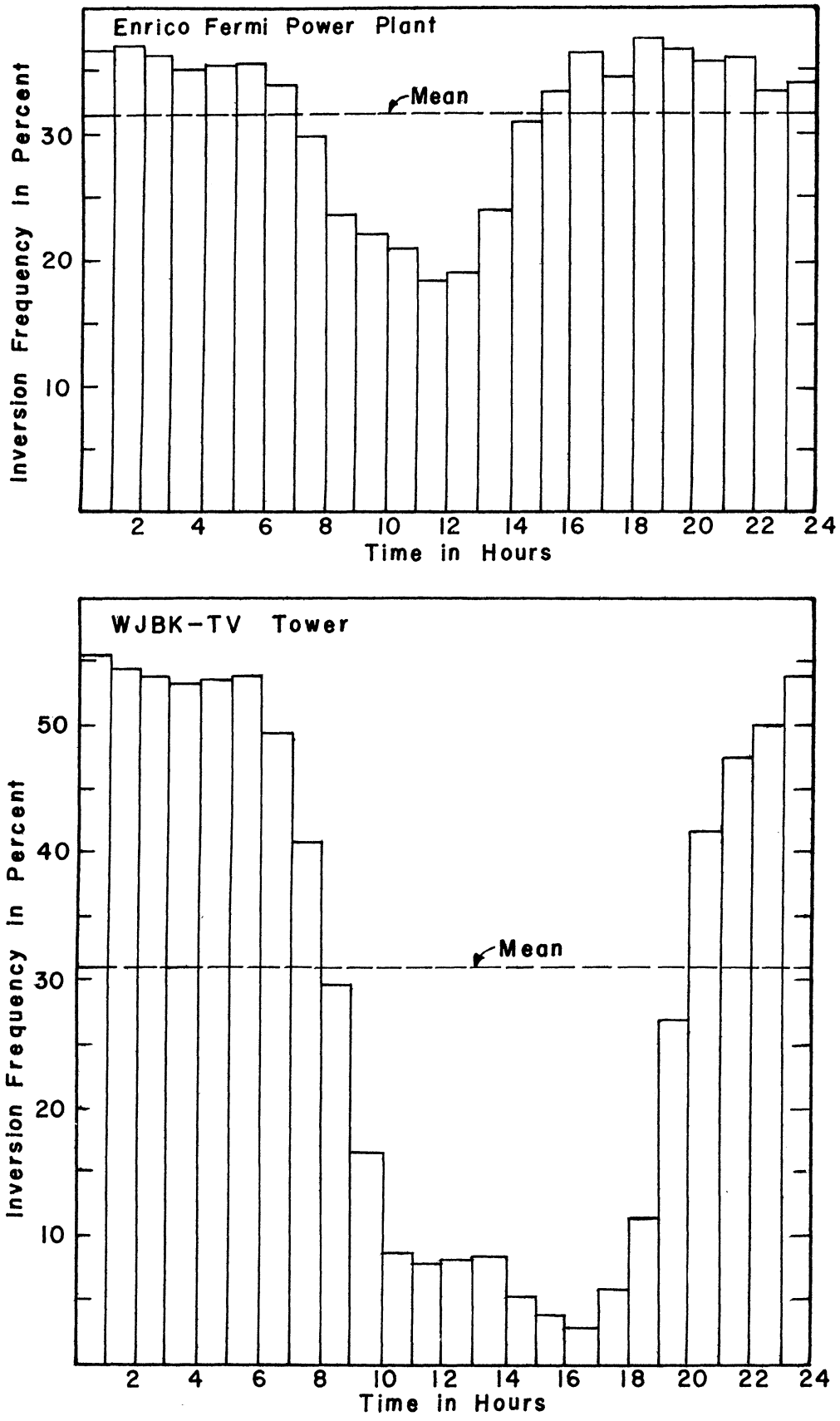


Fig. 11-B. Diurnal variation of inversions at the Enrico Fermi site and at WJBK-TV tower: Annual Summary, 1957-1958.

TABLE XLIII-B

HOURLY PERCENTAGE FREQUENCY OF INVERSIONS AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1958

Hour Ending	1957 Annual	1958 Annual	2-Year Summary
0100	22.4	36.8	29.6
0200	23.4	37.1	30.3
0300	22.4	36.5	29.5
0400	22.4	35.0	28.7
0500	22.9	35.1	29.0
0600	23.5	35.3	29.4
0700	21.7	33.9	27.8
0800	17.2	29.9	23.6
0900	17.6	23.5	20.6
1000	12.2	22.1	17.2
1100	12.6	21.1	16.8
1200	17.1	18.5	17.8
1300	16.8	19.0	17.9
1400	20.2	23.9	22.0
1500	22.0	31.3	26.7
1600	22.7	33.2	27.9
1700	19.0	36.5	27.7
1800	17.2	34.4	25.8
1900	15.5	37.3	26.4
2000	18.0	36.7	27.4
2100	18.8	35.7	27.3
2200	19.4	35.9	27.6
2300	20.4	33.4	26.9
2400	19.0	34.0	26.5
Average	19.4	31.5	25.4

TABLE XLIV-B.

HOURLY PERCENTAGE FREQUENCY OF INVERSION AT THE WJBK-TV TOWER

1 December 1956 - 30 November 1958

Hour Ending	1957 Annual	1958 Annual	2-Year Summary
0100	58.0	55.3	56.7
0200	54.1	54.4	54.3
0300	55.2	53.8	54.5
0400	55.7	53.3	54.5
0500	55.7	53.4	54.6
0600	55.5	53.8	54.7
0700	51.1	49.6	50.4
0800	41.1	40.7	40.9
0900	30.0	29.6	29.8
1000	15.4	16.5	15.9
1100	11.3	8.5	9.9
1200	7.7	7.7	7.7
1300	8.4	7.8	8.1
1400	7.3	8.0	7.7
1500	6.3	5.1	5.7
1600	5.3	3.7	4.5
1700	3.5	2.8	3.2
1800	4.9	6.0	5.5
1900	17.8	11.4	14.6
2000	33.2	27.0	30.1
2100	45.3	41.8	43.6
2200	50.7	47.4	49.1
2300	49.1	50.0	49.5
2400	54.8	53.7	54.3
Average	32.4	30.9	31.7

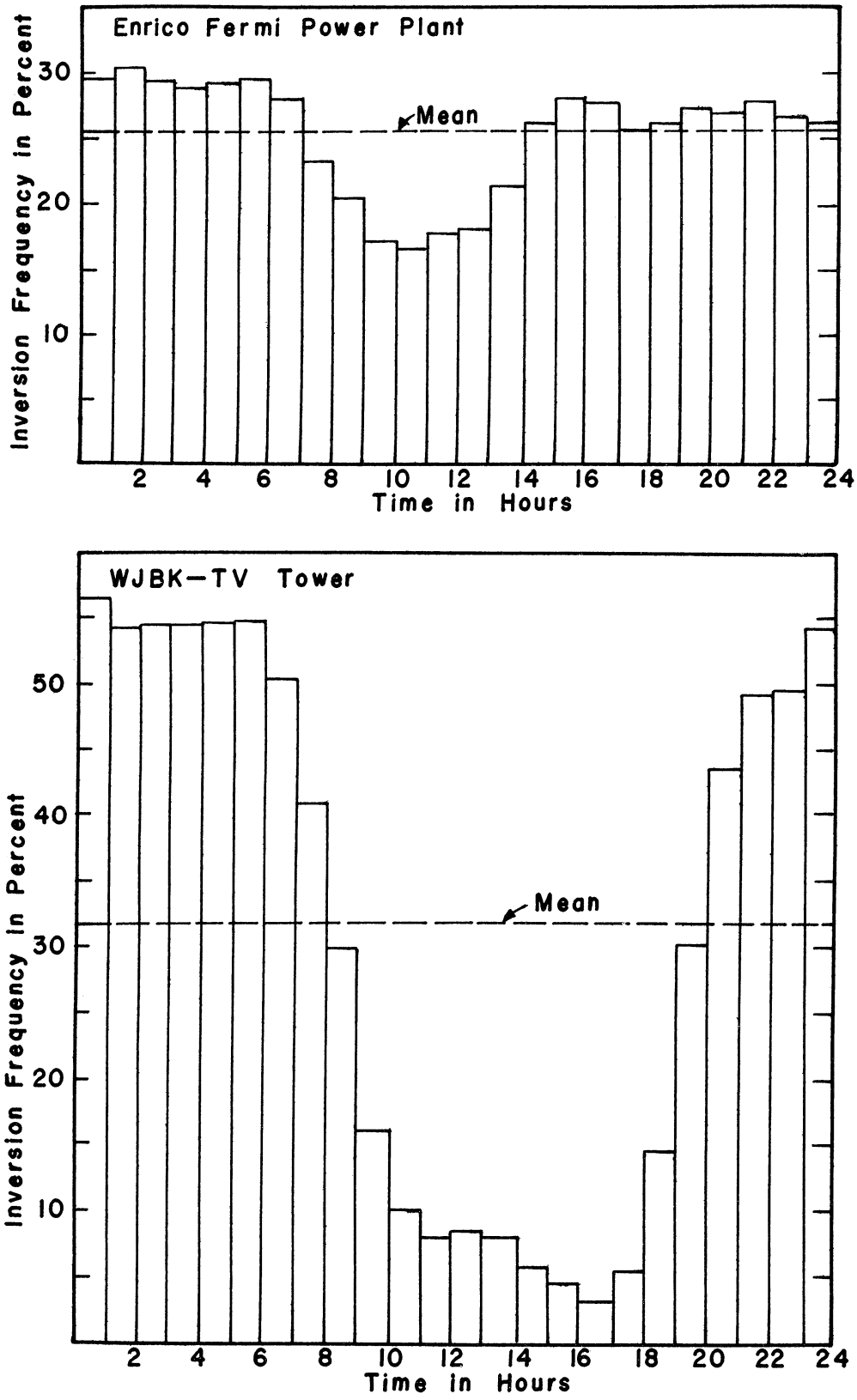


Fig. 12-B. Diurnal variation of inversions at the Enrico Fermi site and at WJBK-TV tower: Two-Year Summary, 1956-1958.

APPENDIX C

PRECIPITATION DATA

TABLE I-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE ENRICO FERMI SITE

1 December 1957 - 28 February 1958
(Winter)

Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	14.1	13.6	11	2.3	0.6
NNE	13.7	12.4	9	1.9	0.5
NE	15.6	15.3	21	4.3	1.1
ENE	17.6	18.8	19	3.9	1.0
E	16.5	21.4	24	5.0	1.2
ESE	12.2	12.6	21	4.3	1.1
SE	16.2	14.1	13	2.7	0.7
SSE	15.6	17.6	17	3.5	0.9
S	13.6	16.1	27	5.6	1.4
SSW	14.3	11.6	15	3.1	0.8
SW	15.6	14.7	40	8.3	2.1
WSW	14.8	14.9	81	16.8	4.2
W	14.9	14.3	64	13.2	3.3
WNW	16.7	17.0	52	10.8	2.7
NW	16.4	15.3	34	7.0	1.8
NNW	15.6	17.3	29	6.0	1.5
Calm	0.0	0.0	6	1.2	0.3
Totals			483	99.9	25.2
Average	15.2	17.4			

TABLE II-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE TOLEDO EXPRESS AIRPORT

1 December 1957 - 28 February 1958
(Winter)

Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	10.6	14.0	25	4.2	1.2
NNE	10.4	13.7	17	2.9	0.8
NE	8.5	12.2	22	3.7	1.0
ENE	11.8	13.9	28	4.7	1.3
E	10.8	13.4	43	8.7	2.0
ESE	8.6	6.3	12	2.4	0.6
SE	8.1	9.2	28	4.7	1.3
SSE	9.6	14.7	20	3.4	0.9
S	11.0	15.0	24	4.0	1.1
SSW	12.6	12.4	19	3.2	0.9
SW	13.4	13.6	46	7.7	2.1
WSW	13.1	13.8	96	16.2	4.4
W	11.2	12.9	77	13.0	3.6
WNW	10.1	11.7	54	9.1	2.5
NW	11.0	13.6	45	7.6	2.1
NNW	11.0	13.0	38	6.4	1.8
Calm	———	———	———	———	———
Totals			594	101.9	27.6
Average	11.3	13.0			

TABLE III-C

THE ASSOCIATION OF PRECIPITATION WITH WIND
AT THE TOLEDO MUNICIPAL AIRPORT

1 January 1950 - 31 December 1954
(Winter Seasons)

Wind Direction	Average Wind Speed, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
			Total Hours of Precipitation	Total Hours
N	12.1	78	7.1	0.7
NNE	15.9	81	7.4	0.7
NE	13.6	75	6.8	0.7
ENE	16.7	136	12.4	1.3
E	12.0	73	6.7	0.7
ESE	11.9	46	4.2	0.4
SE	11.1	57	5.2	0.5
SSE	13.9	60	5.5	0.6
S	14.6	116	10.6	1.1
SSW	15.2	114	10.4	1.1
SW	16.9	77	7.0	0.7
WSW	15.7	47	4.3	0.4
W	12.4	26	2.4	0.2
WNW	14.5	32	2.9	0.3
NW	14.3	47	4.3	0.4
NNW	13.5	29	2.6	0.3
Calm	0.0	2	0.2	0.0
Totals		1096	100.0	10.1
Average	14.3			

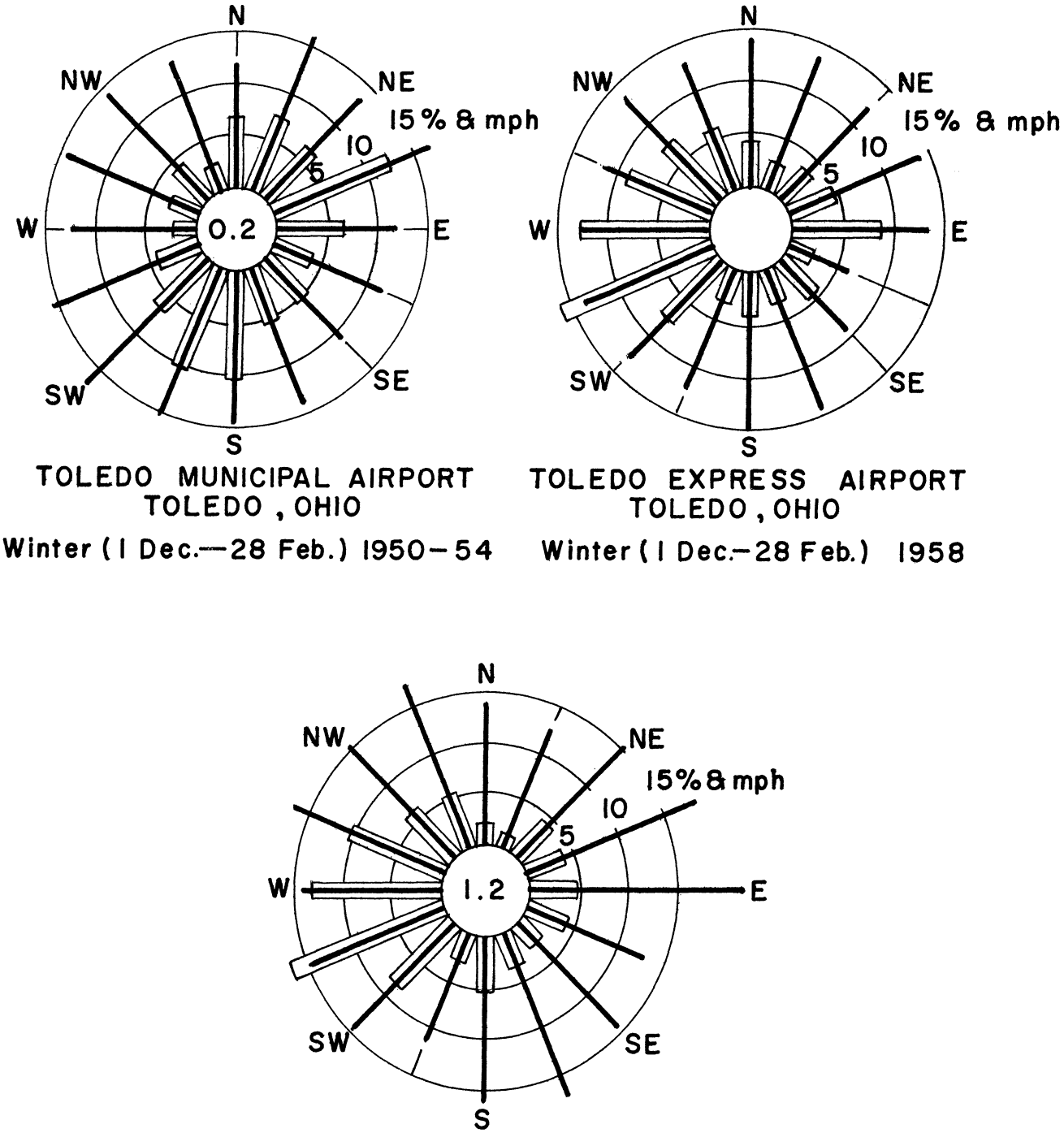


Fig. 1-C. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) with precipitation at Toledo Municipal Airport, Winter Seasons, 1950-1954, and at Toledo Express Airport and the Enrico Fermi site, Winter, 1957-1958.

TABLE IV-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 December 1956 - 31 January 1957
(Winter)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	8	1		9	22.6	6.0		14.8	3.0		0.5	0.1	
NNE	8	6		14	22.8	10.3		14.8	18.2		0.5	0.3	
NE	9	7	1	17	25.3	17.1	25.0	16.7	21.2	4.0	0.5	0.4	0.1
ENE		5	3	8		7.8	11.3		15.2	12.0		0.3	0.2
E	3	3	1	7	8.7	5.0	9.0	5.6	9.1	4.0	0.2	0.2	0.1
ESE	1	1	2	4	12.0	11.0	10.0	1.9	3.0	8.0	0.1	0.1	0.1
SE	1		5	6	6.0		12.0	1.9		20.0	0.1		0.3
SSE													
S	5			5	14.4			9.3			0.3		
SSW	7	1	6	14	15.3	23.0	15.5	13.0	3.0	24.0	0.4	0.1	0.3
SW			2	2			7.0			8.0			0.1
WSW	6	5	1	12	11.7	13.4	7.0	11.1	15.2	4.0	0.3	0.3	0.1
W	1	2	1	4	3.0	9.5	7.0	1.9	6.1	4.0	0.1	0.1	0.1
WNW	1		2	3	7.0		7.5	1.9		8.0	0.1		0.1
NW	1	1	1	3	18.0	12.0	8.0	1.9	3.0	4.0	0.1	0.1	0.1
NNW	3	1		4	22.3	7.0		5.6	3.0		0.2	0.1	
Calm													
Totals	54	33	25	112				100.4	100.0	100.0	3.4	2.1	1.6
Average					18.1	11.5	11.8						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE V-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 December 1957 - 31 January 1958
(Winter)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	7	3	1	11	14.3	14.3	7.0	3.1	1.9	1.8	0.4	0.2	0.1
NNE	8		1	9	13.3		6.0	3.5		1.8	0.4		0.1
NE	16		5	21	15.3		14.2	7.0		8.8	0.9		0.3
ENE	10	2	7	19	17.8	20.5	19.7	4.4	1.3	12.3	0.5	0.1	0.4
E	17	6	1	24	22.7	16.7	22.0	7.4	3.9	1.8	0.9	0.3	0.1
ESE	13	3	5	21	11.9	14.7	13.0	5.7	1.9	8.8	0.7	0.2	0.3
SE	12	1		13	14.3	11.0		5.3	0.6		0.6	0.1	
SSE	9	2	4	15	14.1	25.5	18.8	3.9	1.3	7.0	0.5	0.1	0.2
S	4	3	7	14	12.0	10.0	10.7	1.8	1.9	12.3	0.2	0.2	0.4
SSW	7	3	3	13	10.4	10.3	23.7	3.1	1.9	5.3	0.4	0.2	0.2
SW	3	27		30	15.7	13.1		1.3	17.5		0.2	1.4	
WSW	17	42	9	68	14.8	15.2	14.1	7.4	27.3	15.8	0.9	2.2	0.5
W	36	18	8	62	15.4	13.8	10.1	15.8	11.7	14.0	1.9	1.0	0.4
WNW	33	15	2	50	17.2	16.7	12.0	14.5	9.7	3.5	1.8	0.7	0.1
NW	18	13	3	34	16.8	15.5	5.3	7.9	8.4	5.3	1.0	0.5	0.2
NNW	18	10	1	29	17.8	17.3	9.0	7.9	6.5	1.8	1.0	0.3	0.1
Calm		6		6		0.0			3.9			0.3	
Totals	228	154	57	439				100.0	99.7	100.3	12.3	7.8	3.4
Average					15.9	14.4	13.8						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE VI-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE ENRICO FERMI SITE

1 March 1958 - 31 May 1958
(Spring)

Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	12.1	15.0	16	6.0	0.7
NNE	13.2	15.0	10	3.8	0.5
NE	17.9	12.4	24	9.0	1.1
ENE	15.7	18.1	28	10.5	1.3
E	17.7	9.7	6	2.3	0.3
ESE	14.4	22.8	8	3.0	0.4
SE	10.9	10.0	5	1.9	0.2
SSE	10.4	12.0	5	1.9	0.2
S	10.0	9.9	9	3.4	0.4
SSW	11.0	11.3	7	2.6	0.3
SW	12.7	14.1	12	4.5	0.5
WSW	12.7	13.1	17	6.4	0.8
W	12.5	12.1	43	16.2	1.9
WNW	13.8	13.6	25	9.4	1.1
NW	14.1	12.1	16	6.0	0.7
NNW	12.5	13.6	35	13.2	1.6
Calm	0.0	—	—	—	—
Totals			266	100.1	12.0
Average	13.7	13.7			

TABLE VII-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE TOLEDO EXPRESS AIRPORT

1 March 1958 - 31 May 1958
(Spring)

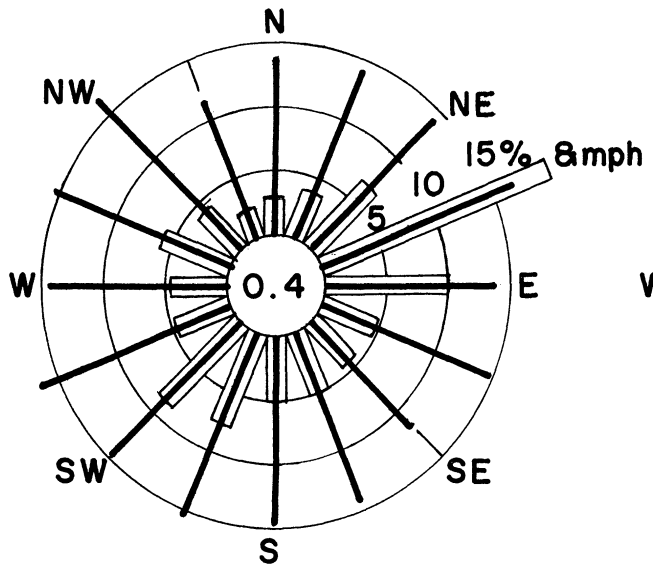
Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	10.5	11.7	32	8.4	1.4
NNE	10.6	12.4	17	4.5	0.8
NE	11.1	13.0	33	8.7	1.5
ENE	13.6	14.8	34	8.9	1.5
E	13.9	12.6	11	2.9	0.5
ESE	10.3	8.0	6	1.6	0.3
SE	9.5	7.2	8	2.1	0.4
SSE	10.1	7.8	5	1.3	0.2
S	8.8	8.4	16	4.2	0.7
SSW	11.8	13.0	12	3.1	0.5
SW	12.8	13.9	23	6.0	1.0
WSW	12.8	13.2	60	15.7	2.7
W	11.7	12.1	42	11.0	1.9
WNW	12.8	12.4	24	6.3	1.1
NW	11.0	10.1	32	8.4	1.4
NNW	11.6	11.8	26	6.8	1.2
Calm	0.0	—	—	—	—
Totals			381	99.9	17.1
Average	11.9	12.2			

TABLE VIII-C

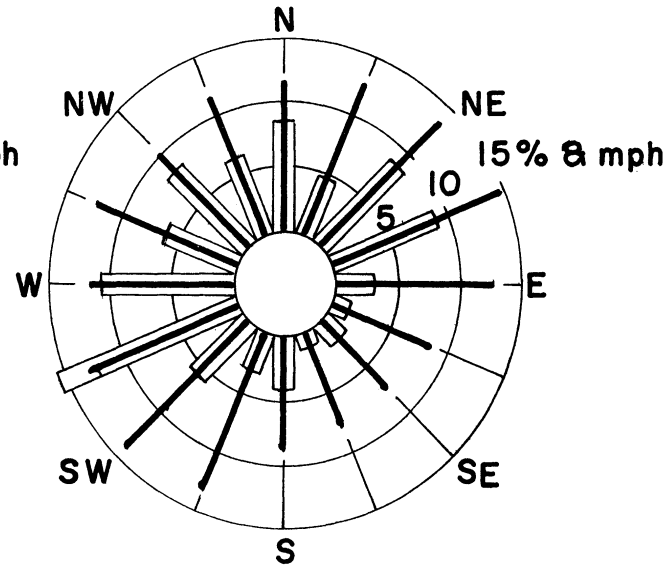
THE ASSOCIATION OF PRECIPITATION WITH WIND
AT THE TOLEDO MUNICIPAL AIRPORT

1 January 1950 - 31 December 1954
(Spring Seasons)

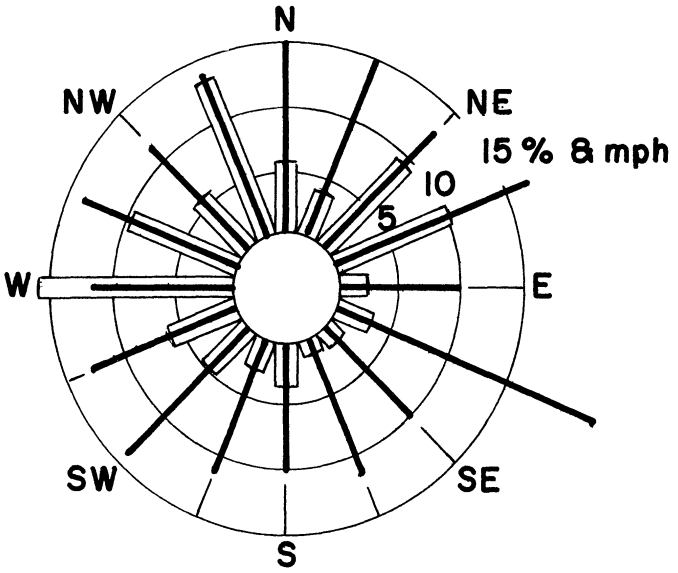
Wind Direction	Average Wind Speed, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
			Total Hours of Precipitation	Total Hours
N	13.3	26	2.7	0.2
NNE	14.0	34	3.5	0.3
NE	13.9	69	7.1	0.6
ENE	16.3	193	19.8	1.7
E	13.4	98	10.1	0.9
ESE	14.5	44	4.5	0.4
SE	11.6	40	4.1	0.4
SSE	14.0	49	5.0	0.4
S	14.6	49	5.0	0.4
SSW	15.4	73	7.5	0.7
SW	14.8	84	8.6	0.8
WSW	16.4	46	4.7	0.4
W	14.3	45	4.6	0.4
WNW	15.5	57	5.9	0.5
NW	16.6	40	4.1	0.4
NNW	11.5	23	2.4	0.2
Calm	0.0	4	0.4	0.0
Totals		974	100.0	8.8
Average	14.7			



TOLEDO MUNICIPAL AIRPORT
TOLEDO, OHIO
Spring (1 Mar.—31 May) 1950-54



TOLEDO EXPRESS AIRPORT
TOLEDO, OHIO
Spring (1 Mar.—31 May) 1958



ENRICO FERMI POWER PLANT SITE
LAGOONA BEACH, MICHIGAN
Spring (1 Mar.-31 May) 1958

Fig. 2-C. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) with precipitation at Toledo Municipal Airport, Spring Seasons, 1950-1954, and at Toledo Express Airport and the Enrico Fermi site, Spring, 1958.

TABLE IX-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 March 1957 - 31 May 1957
(Spring)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	1		2	3	2.0		7.0	0.7		4.7	0.0		0.1
NNE	7	2		9	16.0	8.5		5.1	20.0		0.3	0.1	
NE	8	1		9	15.9	11.0		5.8	10.0		0.4	0.0	
ENE	35		1	36	19.2		8.0	25.3		2.3	1.6		0.0
E	25	3	9	37	32.8	8.3	11.9	18.1	30.0	20.9	1.2	0.2	0.4
ESE	6		3	9	15.0		12.3	4.3		6.7	0.3		0.2
SE	9		11	20	17.3		16.9	6.5		25.6	0.4		0.5
SSE	2		9	11	8.0		15.8	1.4		20.9	0.1		0.4
S	2		4	6	16.5		6.3	1.4		9.3	0.1		0.2
SSW	4	1	3	8	12.8	17.0	10.3	2.9	10.0	6.7	0.2	0.0	0.2
SW	8	2		10	15.4	11.0		5.8	20.0		0.4	0.1	
WSW	6	1	1	8	18.5	12.0	4.0	4.3	10.0	2.3	0.3	0.0	0.0
W	2			2	15.5			1.4			0.1		
WNW	20			20	15.1			14.5			0.9		
NW	3			3	12.0			2.2			0.2		
NNW													
Calm													
Totals	138	10	43	191				99.7	100.0	99.4	6.5	0.4	2.0
Average					19.5	10.4	12.9						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE X-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 March 1958 - 31 May 1958
(Spring)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	16			16	15.0			9.2			1.0		
NNE	9			9	15.9			5.2			0.5		
NE	22			22	21.4			12.6			1.3		
ENE	16	5		21	20.8	15.0		9.2	12.5		1.0	0.3	
E	4	2		6	11.8	5.5		2.3	5.0		0.2	0.1	
ESE	6	1	1	8	27.8	4.0	11.0	3.4	2.5	4.0	0.4	0.1	0.1
SE	2	2	1	5	12.0	5.0	16.0	1.1	5.0	4.0	0.1	0.1	0.1
SSE	4		1	5	11.0		16.0	2.3		4.0	0.2		0.1
S	4	1	3	8	10.3	11.0	9.3	2.3	2.5	12.0	0.2	0.1	0.2
SSW	3			3	11.7			1.7			0.2		
SW	5		4	9	11.2		18.0	2.9		16.0	0.3		0.2
WSW	8	2	6	16	12.1	10.5	12.8	4.6	5.0	24.0	0.5	0.1	0.4
W	19	17	4	40	11.7	12.0	12.0	10.9	42.5	16.0	1.1	1.0	0.2
WNW	18	2	1	21	13.5	12.5	13.0	10.3	5.0	4.0	1.1	0.1	0.1
NW	14	2		16	11.9	13.0		8.0	5.0		0.8	0.1	
NNW	24	6	4	34	13.4	14.8	11.5	13.8	15.0	16.0	1.4	0.4	0.2
Calm													
Totals	174	40	25	239				99.8	100.0	100.0	10.3	2.4	1.6
Average					15.2	11.9	13.1						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

Total 2208 - 538 msg. = 1670

TABLE XI-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE ENRICO FERMI SITE

1 June 1958 - 31 August 1958
(Summer)

Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	9.4	8.3	3	1.1	0.1
NNE	10.0	9.0	9	3.3	0.4
NE	12.8	15.0	10	3.7	0.5
ENE	13.0	13.2	6	2.2	0.3
E	12.8	12.3	19	7.0	0.9
ESE	12.3	11.4	5	1.8	0.2
SE	11.4	10.4	8	3.0	0.4
SSE	10.0	8.3	12	4.4	0.5
S	9.0	11.7	9	3.3	0.4
SSW	10.5	12.2	32	11.8	1.4
SW	11.8	12.3	36	13.3	1.6
WSW	10.7	10.9	54	19.9	2.4
W	11.1	10.0	33	12.2	1.5
WNW	11.1	9.7	18	6.6	0.8
NW	9.3	8.9	8	3.0	0.4
NNW	9.1	9.6	9	3.3	0.4
Calm	0.0	—	—	—	—
Totals			271	99.9	12.3
Average	10.8	11.1			

TABLE XII-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE TOLEDO EXPRESS AIRPORT

1 June 1958 - 31 August 1958
(Summer)

Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	9.3	10.5	10	3.4	0.4
NNE	9.3	8.7	9	3.0	0.4
NE	9.1	6.8	9	3.0	0.4
ENE	8.5	11.0	14	4.7	0.6
E	10.8	12.0	14	4.7	0.6
ESE	9.2	10.8	12	4.0	0.5
SE	7.6	6.8	8	2.7	0.4
SSE	7.8	10.1	5	1.7	0.2
S	9.4	10.6	19	6.4	0.9
SSW	11.2	12.5	31	10.4	1.4
SW	13.2	14.3	46	15.5	2.1
WSW	13.1	12.6	57	19.2	2.6
W	11.3	11.4	29	9.8	1.3
WNW	11.7	11.6	17	5.7	0.8
NW	9.9	10.9	11	3.7	0.5
NNW	9.0	7.8	6	2.0	0.3
Calm	0.0	—	—	—	—
Totals			297	99.9	13.4
Average	10.7	11.6			

TABLE XIII-C

THE ASSOCIATION OF PRECIPITATION WITH WIND
AT THE TOLEDO MUNICIPAL AIRPORT

1 January 1950 - 31 December 1954
(Summer Seasons)

Wind Direction	Average Wind Speed, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
			Total Hours of Precipitation	Total Hours
N	11.2	18	3.8	0.2
NNE	11.5	24	5.0	0.2
NE	11.0	42	8.8	0.4
ENE	10.2	25	5.2	0.2
E	11.3	28	5.9	0.3
ESE	7.6	8	1.7	0.1
SE	7.3	18	3.8	0.2
SSE	8.2	17	3.6	0.2
S	8.2	27	5.7	0.2
SSW	12.4	62	13.0	0.6
SW	10.8	82	17.2	0.7
WSW	11.4	38	8.0	0.3
W	9.8	21	4.4	0.2
WNW	12.0	24	5.0	0.2
NW	10.9	13	2.7	0.1
NNW	13.0	21	4.4	0.2
Calm	0.0	9	1.9	0.1
Totals		477	100.0	4.3
Average	10.6			

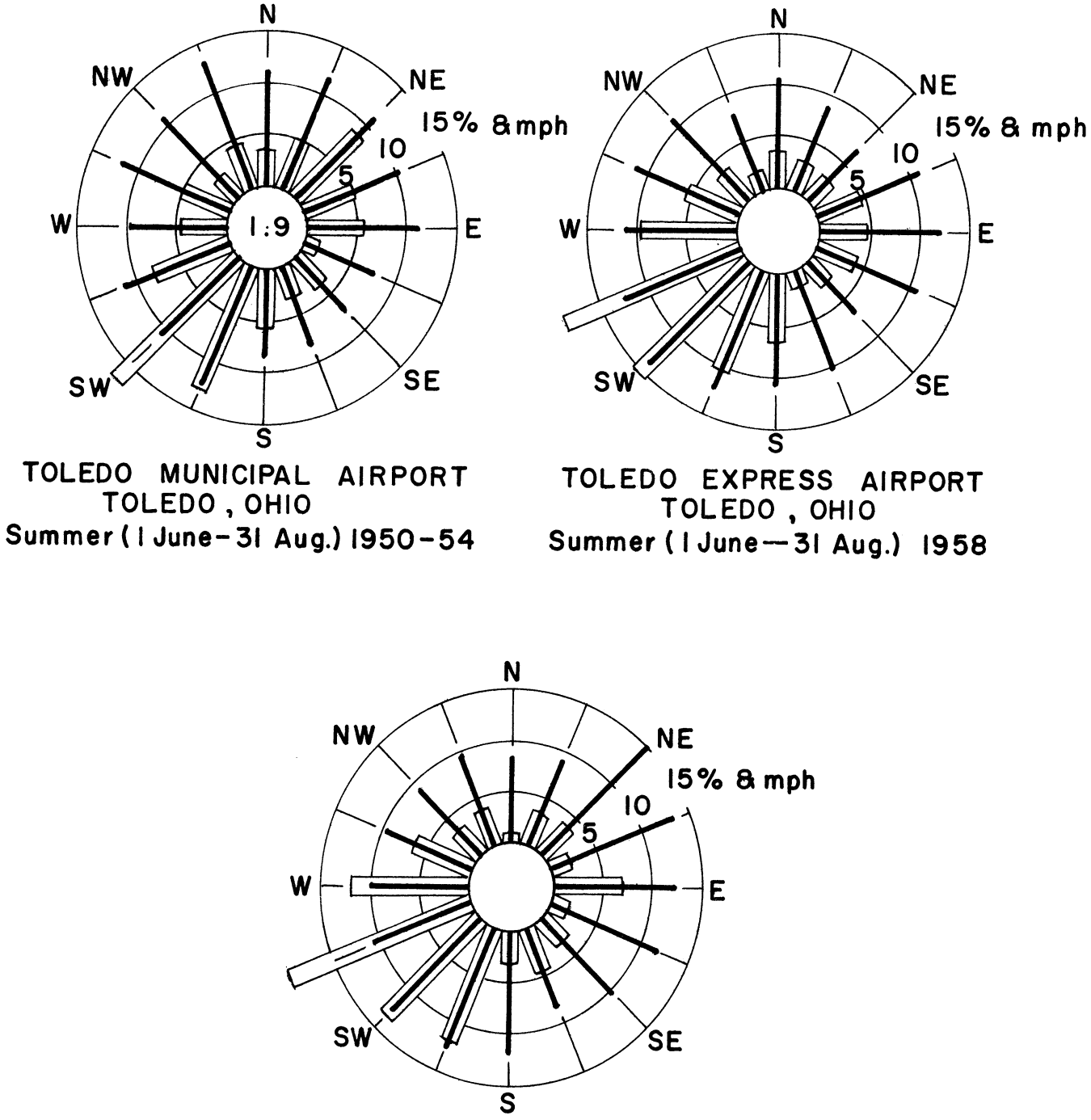


Fig. 3-C. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) with precipitation at Toledo Municipal Airport, Summer Seasons, 1950-1954, and at Toledo Express Airport and the Enrico Fermi site, Summer, 1958.

TABLE XIV-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 June 1957 - 31 August 1957
(Summer)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	1			1	7.0			5.0			0.1		
NNE	1		2	3	3.0		8.5	5.0		14.3	0.1		0.1
NE													
ENE													
E			1	1			2.0			7.1			0.1
ESE	2			2	5.5			10.0			0.1		
SE													
SSE	1			1	4.0			5.0			0.1		
S	6		2	8	13.7		6.0	30.0		14.3	0.4		0.1
SSW	2	1	1	4	16.0	11.0	11.0	10.0	50.0	7.1	0.1	0.1	0.1
SW	4			4	14.5			20.0			0.3		
WSW	1	1	3	5	15.0	15.0	8.0	5.0	50.0	21.4	0.1	0.1	0.2
W			1	1			7.0			7.1			0.1
WNW	1			1	12.0			5.0			0.1		
NW			1	1			12.0			7.1			0.1
NNW	1		3	4	10.0		12.0	5.0		21.4	0.1		0.2
Calm													
Totals	20	2	14	36				100.0	100.0	99.8	1.5	0.2	1.0
Average					11.7	13.0	8.6						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XV-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 June 1958 - 31 August 1958
(Summer)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	1			1	1.0			2.0			0.1		
NNE	2	1	1	4	7.5	7.0	3.0	4.1	1.7	1.6	0.1	0.1	0.1
NE	8		1	9	15.4		13.0	16.3		1.6	0.5		0.1
ENE	3		2	5	18.7		9.0	6.1		3.1	0.2		0.1
E	11		2	13	14.3		5.0	22.5		3.1	0.7		0.1
ESE	1		3	4	10.0		11.0	2.0		4.7	0.1		0.2
SE	1	2		3	12.0	8.5		2.0	3.4		0.1	0.1	
SSE	2	1	6	9	11.0	8.0	7.2	4.1	1.7	9.4	0.1	0.1	0.4
S	1	3	4	8	11.0	12.0	11.8	2.0	5.2	6.3	0.1	0.3	0.2
SSW		20	6	26		11.9	11.5		34.5	9.4		1.2	0.4
SW	1	9	9	19	12.0	13.1	10.9	2.0	15.5	14.1	0.1	0.6	0.6
WSW	8	8	13	29	13.6	11.5	9.6	16.3	13.8	20.3	0.5	0.5	0.8
W	2	7	8	17	16.5	8.4	10.3	4.1	12.1	12.5	0.1	0.4	0.5
WNW	4	4	5	13	10.3	14.3	4.0	8.2	6.9	7.8	0.2	0.2	0.3
NW	1	3	2	6	8.0	10.3	6.5	2.0	5.2	3.1	0.1	0.2	0.1
NNW	3		2	5	10.3		11.5	6.1		3.1	0.2		0.1
Calm													
Totals	49	58	64	171				99.8	100.0	100.1	3.2	3.7	4.0
Average					13.1	11.4	9.3						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

Total 2208 - 580 msg. = 1628

TABLE XVI-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE ENRICO FERMI SITE

1 September 1958 - 30 November 1958
(Fall)

Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	9.2	8.5	11	3.0	0.5
NNE	9.2	12.1	12	3.3	0.5
NE	13.7	14.0	23	6.2	1.1
ENE	13.3	13.6	17	4.6	0.8
E	11.8	13.9	14	3.8	0.6
ESE	10.5	14.7	11	3.0	0.5
SE	14.1	12.7	10	2.7	0.5
SSE	11.1	12.5	12	3.3	0.5
S	11.5	11.5	15	4.1	0.7
SSW	12.3	12.7	28	7.6	1.3
SW	14.8	16.0	55	14.9	2.5
WSW	14.0	17.1	41	11.1	1.9
W	13.2	15.6	50	13.6	2.3
WNW	10.9	12.7	26	7.0	1.2
NW	11.1	12.8	28	7.6	1.3
NNW	10.3	9.1	16	4.3	0.7
Calm	———	———	———	———	———
Totals			369	100.1	16.9
Average	12.3	14.0			

TABLE XVII-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE TOLEDO EXPRESS AIRPORT

1 September 1958 - 30 November 1958
(Fall)

Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	10.0	9.1	19	5.8	0.9
NNE	8.4	7.7	12	3.6	0.5
NE	8.5	9.4	21	6.4	1.0
ENE	8.5	9.9	14	4.3	0.6
E	9.7	9.6	16	4.9	0.7
ESE	9.3	9.8	13	4.0	0.6
SE	9.2	11.9	12	3.6	0.5
SSE	10.0	8.3	24	7.3	1.1
S	11.1	12.4	28	8.5	1.3
SSW	12.7	12.6	27	8.2	1.2
SW	14.5	15.3	37	11.2	1.7
WSW	14.3	16.1	25	7.6	1.1
W	14.0	15.1	22	6.7	1.0
WNW	12.6	14.2	20	6.1	0.9
NW	9.5	10.8	19	5.8	0.9
NNW	11.0	12.6	17	5.2	0.8
Calm	0.0	0.0	3	0.9	0.1
Totals			329	100.1	14.9
Average	11.7	11.9			

TABLE XVIII-C

THE ASSOCIATION OF PRECIPITATION WITH WIND
AT THE TOLEDO MUNICIPAL AIRPORT

1 January 1950 - 31 December 1954
(Fall Seasons)

Wind Direction	Average Wind Speed, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
			Total Hours of Precipitation	Total Hours
N	14.6	36	5.7	0.3
NNE	15.2	40	6.3	0.4
NE	11.5	27	4.3	0.2
ENE	14.3	35	5.5	0.3
E	10.8	53	8.4	0.5
ESE	10.0	15	2.4	0.1
SE	9.4	14	2.2	0.1
SSE	13.6	35	5.5	0.3
S	14.3	69	10.9	0.6
SSW	13.6	77	12.1	0.7
SW	12.4	79	12.5	0.7
WSW	12.2	48	7.6	0.4
W	9.7	23	3.6	0.2
WNW	12.9	27	4.3	0.2
NW	17.1	33	5.2	0.3
NNW	19.2	18	2.8	0.2
Calm	0.0	5	0.8	0.0
Totals		634	100.0	5.8
Average	13.2			

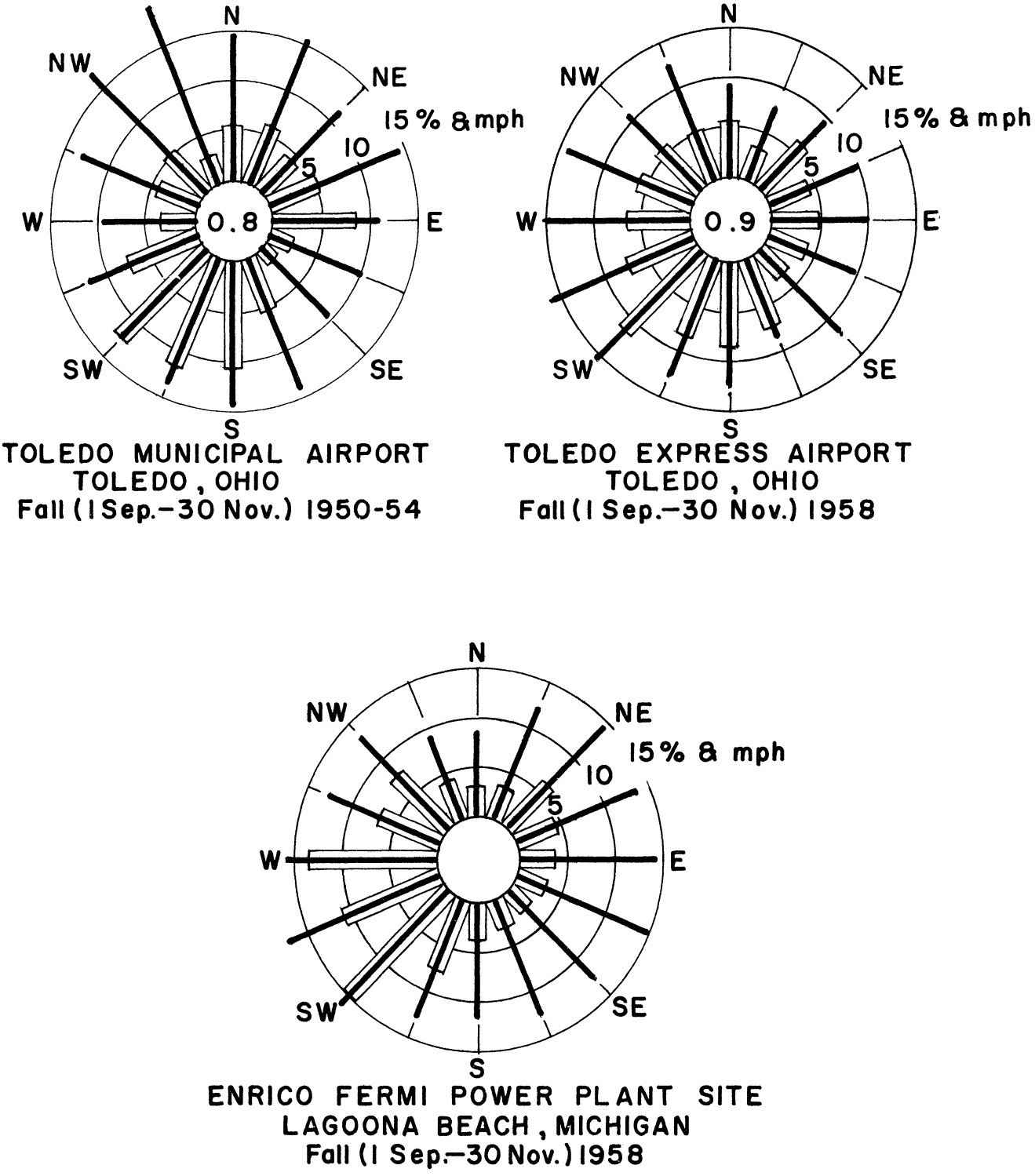


Fig. 4-C. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) with precipitation at Toledo Municipal Airport, Fall Seasons, 1950-1954, and at Toledo Express Airport and the Enrico Fermi site, Fall, 1958.

TABLE XIX-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 September 1957 - 30 November 1957
(Fall)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N													
NNE													
NE													
ENE			1	1			9.0			8.3			0.1
E													
ESE													
SE			3	3			27.0			25.0			0.2
SSE	8	1	3	12	14.5	14.0	14.7	23.5	12.5	25.0	0.5	0.1	0.8
S	5	2		7	13.8	11.5		14.7	25.0		0.3	0.1	0.5
SSW	10	2		12	15.6	12.0		29.4	25.0		0.7	0.1	0.8
SW	1	3	2	6	11.0	16.7	12.0	2.9	37.5	16.7	0.1	0.2	0.4
WSW	1		1	2	8.0		15.0	2.9		8.3	0.1		0.1
W	2		1	3	7.0		12.0	5.9		8.3	0.1		0.2
WNW	1		1	2	21.0		12.0	2.9		8.3	0.1		0.1
NW	2			2	7.0			5.9			0.1		0.1
NNW	4			4	18.5			11.8			0.3		0.3
Calm													
Totals	34	8	12	54				99.9	100.0	99.9	2.3	0.5	3.6
Average					14.2	13.9	16.4						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XX-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 September 1958 - 30 November 1958
(Fall)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	8	3		11	9.0	7.0		7.0	2.5		2.4	0.9	
NNE	5	6	1	12	13.4	9.8	14.0	4.4	5.1	0.9	1.5	1.8	0.3
NE	10	10	3	23	16.0	12.3	13.0	8.8	8.5	2.8	2.9	2.9	0.9
ENE	9	4	4	17	15.9	12.0	10.3	7.9	3.4	3.7	2.6	1.2	1.2
E	5	5	4	14	13.8	14.2	13.8	4.4	4.2	3.7	1.5	1.5	1.2
ESE	1	2	8	11	21.0	11.0	14.9	0.9	1.7	7.3	0.3	0.6	2.4
SE	1	3	6	10	19.0	14.0	11.0	0.9	2.5	5.5	0.3	0.9	1.8
SSE	1	4	6	11	8.0	11.5	13.0	0.9	3.4	5.5	0.3	1.2	1.8
S	1	4	9	14	17.0	12.8	9.7	0.9	3.4	8.3	0.3	1.2	2.6
SSW	2	6	12	20	17.5	13.0	11.4	1.8	5.1	11.0	0.6	1.8	3.5
SW	3	14	34	51	13.0	20.0	15.0	2.6	11.9	31.2	0.9	4.1	10.0
WSW	5	18	14	37	17.8	20.0	16.0	4.4	15.3	12.8	1.5	5.3	4.1
W	23	18	5	46	17.0	16.0	7.6	20.2	15.3	4.6	6.8	5.3	1.5
WNW	11	9	1	20	12.9	13.0	9.0	9.6	7.6	0.9	3.2	2.6	0.3
NW	18	8	1	27	13.7	11.0	7.0	15.8	6.8	0.9	5.3	2.4	0.3
NNW	11	4	1	16	8.6	10.8	8.0	9.6	3.4	0.9	3.2	1.2	0.3
Calm													
Totals	114	118	109	340				100.1	100.1	100.0	33.6	34.9	32.2
Average					14.1	14.7	13.1						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXI-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE ENRICO FERMI SITE

1 December 1957 - 30 November 1958
(Annual)

Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	10.6	12.4	41	2.9	0.5
NNE	11.8	12.2	40	2.9	0.5
NE	16.1	14.0	78	5.6	0.9
ENE	15.1	16.8	70	5.0	0.8
E	15.4	15.9	63	4.5	0.7
ESE	12.5	14.8	45	3.2	0.5
SE	12.4	12.3	36	2.6	0.4
SSE	11.0	13.2	46	3.3	0.5
S	10.8	13.3	60	4.3	0.7
SSW	11.9	12.1	82	5.9	1.0
SW	13.7	14.6	143	10.3	1.7
WSW	13.2	14.1	193	13.9	2.3
W	13.1	18.7	190	13.7	2.2
WNW	13.3	14.3	121	8.7	1.4
NW	13.4	13.3	86	6.2	1.0
NNW	12.1	13.6	89	6.4	1.0
Calm	0.0	0.0	6	0.4	0.1
Totals			1389	100.0	16.2
Average	12.9	14.5			

TABLE XXII-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE TOLEDO EXPRESS AIRPORT

1 December 1957 - 30 November 1958
(Annual)

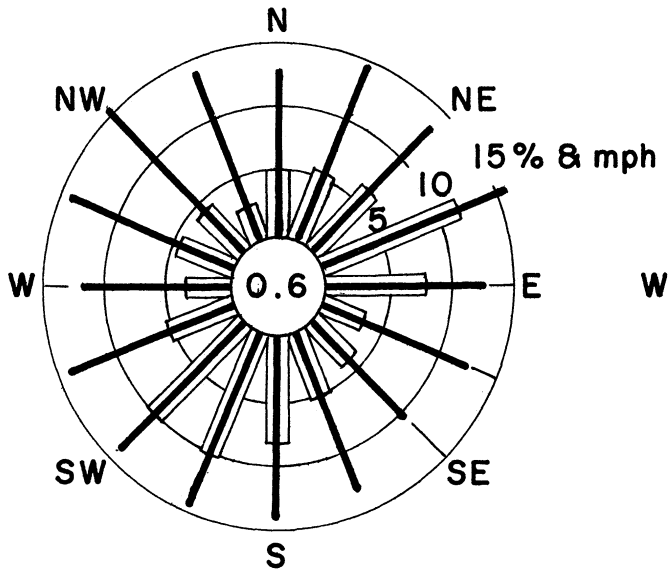
Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	10.1	11.7	86	5.4	1.0
NNE	9.6	11.2	55	3.4	0.6
NE	9.9	11.3	85	5.3	1.0
ENE	11.7	13.2	90	5.6	1.0
E	12.0	12.3	84	5.2	1.0
ESE	9.5	8.9	43	2.7	0.5
SE	8.5	9.2	56	3.5	0.6
SSE	9.4	10.8	54	3.4	0.6
S	10.4	12.0	87	5.4	1.0
SSW	12.1	12.6	89	5.6	1.0
SW	13.6	14.3	152	9.5	1.7
WSW	13.3	13.6	238	14.9	2.7
W	11.8	12.7	170	10.6	1.9
WNW	11.7	12.3	115	7.2	1.3
NW	10.5	11.9	107	6.7	1.2
NNW	10.7	15.2	87	5.4	1.0
Calm	0.0	0.0	3	0.2	0.0
Totals			1601	100.0	18.1
Average	11.4	12.3			

TABLE XXIII-C

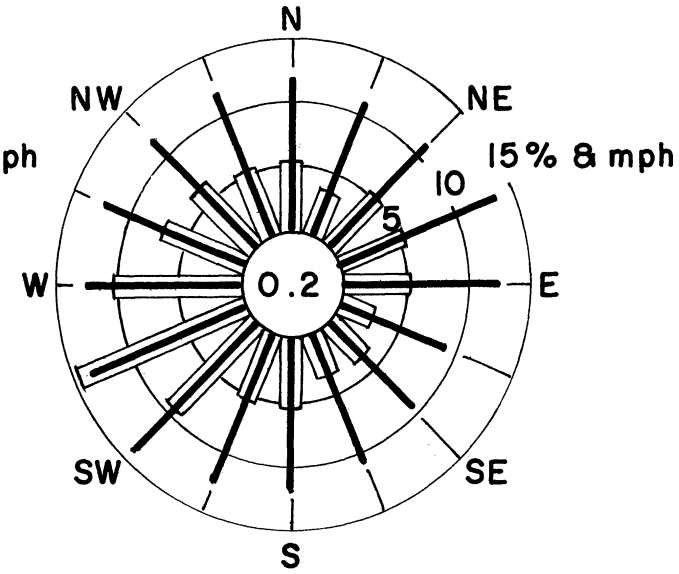
THE ASSOCIATION OF PRECIPITATION WITH WIND
AT THE TOLEDO MUNICIPAL AIRPORT

1 January 1950 - 31 December 1954
(Annual Summary)

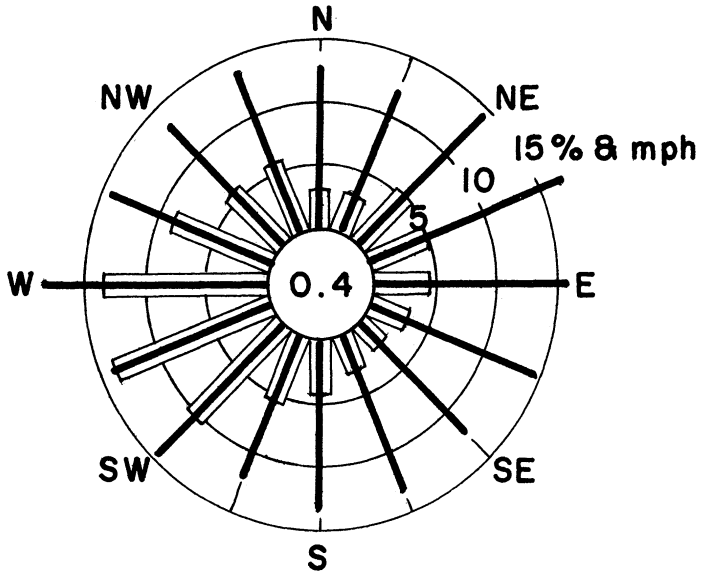
Wind Direction	Average Wind Speed, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
			Total Hours of Precipitation	Total Hours
N	12.7	158	5.0	0.4
NNE	14.8	179	5.6	0.4
NE	13.0	213	6.7	0.5
ENE	15.9	389	12.2	0.9
E	12.2	252	7.9	0.6
ESE	12.3	113	3.6	0.3
SE	10.6	129	4.1	0.3
SSE	13.2	161	5.1	0.4
S	13.8	261	8.2	0.6
SSW	14.3	326	10.2	0.7
SW	13.7	322	10.1	0.7
WSW	14.0	179	5.6	0.4
W	12.1	115	3.6	0.3
WNW	14.1	140	4.4	0.3
NW	15.4	133	4.2	0.3
NNW	14.0	91	2.9	0.2
Calm	0.0	20	0.6	0.0
Total		3181	100.0	7.3
Average	13.7			



TOLEDO MUNICIPAL AIRPORT
TOLEDO, OHIO
Annual (1 Dec.–30 Nov.) 1950-54



TOLEDO EXPRESS AIRPORT
TOLEDO, OHIO
Annual (1 Dec.–30 Nov.) 1957-58



ENRICO FERMI POWER PLANT SITE
LAGOONA BEACH, MICHIGAN
Annual (1 Dec.–30 Nov.) 1957-58

Fig. 5-C. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) with precipitation at Toledo Municipal Airport, Five-Year Summary, 1950-1954, and at Toledo Express Airport and the Enrico Fermi site, Annual Summary, 1957-1958.

TABLE XXIV-C

A COMPARISON OF RELATIVE FREQUENCY OF MEASURABLE PRECIPITATION

(.02 in. measurable at Plant Site, .01 in. measurable at Toledo)

	Enrico Fermi Site, %		Toledo Express Airport, %		Toledo Municipal Airport, %
	12/1/56-11/30/57	12/1/57-11/30/58	12/1/56-11/30/57	12/1/57-11/30/58	1/1/50-12/31/54
Winter	5.3	25.2	7.9	27.6	10.1
Spring	8.7	12.0	9.2	17.1	8.8
Summer	2.4	12.3	5.0	13.4	4.3
Fall	4.0	16.9	6.3	14.9	5.8
Annual	5.3	16.2	7.1	18.1	7.3
Avg. for 2 Years	10.8		12.7		

TABLE XXV-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1957
(Annual)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	10	1	2	13	19.0	6.0	7.0	4.1	1.9	2.1	0.1	0.0	0.0
NNE	16	8	2	26	18.6	9.9	8.5	6.5	15.1	2.1	0.2	0.1	0.0
NE	17	8	1	26	20.9	16.4	25.0	6.9	15.1	1.1	0.2	0.1	0.0
ENE	35	5	5	45	19.2	7.8	10.2	14.2	9.4	5.3	0.5	0.1	0.1
E	28	6	11	45	30.3	6.7	10.7	11.4	11.3	11.7	0.4	0.1	0.1
ESE	9	1	5	15	12.9	11.0	11.4	3.7	1.9	5.3	0.1	0.0	0.1
SE	10		19	29	16.2		17.4	4.1		20.2	0.1		0.3
SSE	11	1	12	24	12.4	14.0	15.5	4.5	1.9	12.8	0.2	0.0	0.2
S	18	2	6	26	14.2	11.5	6.2	7.3	3.8	6.4	0.3	0.0	0.1
SSW	23	5	10	38	15.1	15.0	13.5	9.3	9.4	10.6	0.3	0.1	0.1
SW	13	5	4	22	14.8	14.4	9.5	5.3	9.4	4.3	0.2	0.1	0.1
WSW	14	7	6	27	14.6	13.4	8.3	5.7	13.2	6.4	0.2	0.1	0.1
W	5	2	3	10	9.6	9.5	8.7	2.0	3.8	3.2	0.1	0.0	0.0
WNW	23		3	26	14.8		9.0	9.3		3.2	0.3		0.0
NW	6	1	2	9	11.3	12.0	10.0	2.4	1.9	2.1	0.1	0.0	0.0
NNW	8	1	3	12	18.9	7.0	12.0	3.2	1.9	3.2	0.1	0.0	0.0
Calm													
Totals	246	53	94	393				99.9	100.0	100.0	3.4	0.7	1.2
Average					17.8	11.7	12.4						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXVI-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 December 1957 - 30 November 1958
(Annual)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	32	6	1	39	12.9	10.7	7.0	5.6	1.6	0.4	0.4	0.1	0.0
NNE	24	7	3	34	13.8	9.4	7.7	4.2	1.9	1.2	0.3	0.1	0.0
NE	56	10	9	75	17.8	12.3	13.7	9.9	2.7	3.5	0.8	0.1	0.1
ENE	38	11	13	62	18.7	14.9	15.2	6.7	3.0	5.1	0.5	0.2	0.2
E	37	13	7	57	17.8	14.5	12.4	6.5	3.5	2.7	0.5	0.2	0.1
ESE	21	6	17	44	16.8	11.7	13.4	3.7	1.6	6.7	0.3	0.1	0.2
SE	16	8	7	31	14.2	10.0	11.7	2.8	2.2	2.7	0.2	0.1	0.1
SSE	16	7	17	40	12.6	15.0	12.5	2.8	1.9	6.7	0.2	0.1	0.2
S	10	11	23	44	11.7	11.6	10.3	1.8	3.0	9.0	0.1	0.2	0.3
SSW	12	29	21	62	11.9	12.0	13.2	2.1	7.8	8.2	0.2	0.4	0.3
SW	12	50	47	109	12.8	15.0	14.5	2.1	13.5	18.4	0.2	0.7	0.7
WSW	38	70	42	150	14.4	15.9	13.2	6.7	18.9	16.5	0.5	1.0	0.6
W	80	60	25	165	15.0	13.3	10.0	14.1	16.2	9.8	1.1	0.8	0.4
WNW	66	30	9	105	15.1	15.0	7.3	11.6	8.1	3.5	0.9	0.4	0.1
NW	51	26	6	83	14.2	13.3	6.0	9.0	7.0	2.4	0.7	0.4	0.1
NNW	56	20	8	84	13.7	15.3	10.8	9.9	5.4	3.1	0.8	0.3	0.1
Calm		6		6		0.0			1.6			0.1	
Totals	565	370	255	1190				99.5	99.9	99.9	7.7	5.3	3.5
Average					15.1	13.8	12.3						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXVII-C

ASSOCIATION OF HOURS OF CONTINUOUS PRECIPITATION WITH LAPSE RATE AND WIND DIRECTION AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1957
(Annual)

Wind Direction	Average Duration in Hours of Continuous Precipitation			
	Lapse Rate Categories			Respect to Wind Direction
	S	W	I	
N	8.0	3.0		5.5
NNE	3.5	5.0		4.6
NE	1.5	5.0		4.3
ENE	5.6		5.0	4.2
E	5.2	9.5	3.0	6.4
ESE	4.0		5.5	5.0
SE	4.0		6.3	5.5
SSE	4.3	1.0	2.7	2.9
S	3.0		2.0	2.3
SSW	1.5	1.6	3.5	2.0
SW	3.0	1.0	2.0	2.7
WSW	1.6	2.7	5.5	2.5
W	1.5	1.0		1.4
WNW	10.0			10.0
NW	1.5		2.0	1.6
NNW	4.0		5.0	4.5
Calm	—	—	—	—
Average	3.5	3.2	3.6	3.5

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXVIII-C

ASSOCIATION OF HOURS OF CONTINUOUS PRECIPITATION WITH LAPSE RATE AND WIND DIRECTION AT THE ENRICO FERMI SITE

1 December 1957 - 30 November 1958
(Annual)

Wind Direction	Average Duration in Hours of Continuous Precipitation			
	Lapse Rate Categories			Respect to Wind Direction
	S	W	I	
N	1.5	2.5	12.0	4.0
NNE	10.2	4.0	1.0	8.3
NE	8.6		1.0	7.8
ENE	2.0		18.0	10.0
E	10.7	5.0		10.1
ESE	5.5	14.0	4.0	7.7
SE	5.0	6.0	18.0	8.8
SSE	7.0	4.0	8.3	6.4
S	2.0	5.2	2.3	2.8
SSW	2.5	4.8	3.8	4.6
SW	6.5	7.2	4.1	5.9
WSW	3.5	5.2	6.8	5.5
W	5.7	4.5	10.0	5.6
WNW	6.7	2.8	6.3	5.4
NW	4.3	5.3		4.4
NNW	9.4	6.7		7.9
Calm	—	—	—	—
Average	6.6	6.2	7.1	5.9

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXIX-C

PERCENTAGE OCCURRENCE OF CONTINUOUS HOURS OF PRECIPITATION WITHIN LAPSE-RATE CATEGORIES AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1957
(Annual)

Duration of Continuous Precipitation (hr)	S	W	I	Total
1	25.9	5.6	10.2	41.7
2	9.3	2.8	2.8	14.9
3	4.6	1.9	1.9	8.4
4	1.9	0.9	2.8	5.6
5	4.6	1.9	4.6	11.1
6	1.9		3.7	5.6
7	1.9		0.9	2.8
8	0.9	0.9	0.9	2.7
9	0.9			0.9
10				
11	0.9	0.9		1.8
12	0.9			0.9
13				
14	0.9		0.9	1.8
15				
>15	1.9			1.9
Totals	56.5	14.9	28.7	100.1

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXX-C

PERCENTAGE OCCURRENCE OF CONTINUOUS HOURS OF PRECIPITATION WITHIN LAPSE-RATE CATEGORIES AT THE ENRICO FERMI SITE

1 December 1957 - 30 November 1958
(Annual)

Duration of Continuous Precipitation (hr)	S	W	I	Total
1	5.3	7.8	2.4	15.5
2	9.7	5.8	2.4	17.9
3	3.9	3.9	3.4	11.2
4	4.4	3.4	2.4	10.2
5	4.4	4.4	1.5	10.3
6	1.9	1.9	1.0	4.8
7	1.5	2.4	1.5	5.4
8	1.5	1.5	1.0	4.0
9	1.0	0.5	0.5	2.0
10	0.5	1.0	0.5	2.0
11	2.4	1.5	0.5	4.4
12	1.5	0.5	1.5	3.5
13	0.5			0.5
14	1.0		0.5	1.5
15	0.5	1.0		1.5
>15	2.9	1.5	1.5	5.9
Totals	42.9	37.1	20.6	100.6

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXXI-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1958
(2-Year Summary)

Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	10.8	13.3	54	3.0	0.3
NNE	13.6	13.2	67	3.7	0.4
NE	15.7	15.2	106	5.8	0.6
ENE	14.7	16.6	117	6.4	0.7
E	14.7	18.4	112	6.1	0.7
ESE	12.1	14.1	61	3.3	0.4
SE	12.1	14.4	68	3.7	0.4
SSE	10.8	13.5	78	4.3	0.5
S	10.9	13.0	90	4.9	0.5
SSW	12.3	12.9	124	6.8	0.7
SW	13.4	14.2	170	9.3	1.0
WSW	13.6	13.9	225	12.3	1.3
W	12.6	17.9	204	11.2	1.2
WNW	12.7	14.3	149	8.2	0.9
NW	12.3	13.1	95	5.2	0.6
NNW	11.2	13.9	101	5.5	0.6
Calm	0.0	0.0	6	0.3	0.0
Totals			1826	100.0	10.8
Average	12.7	14.7			

TABLE XXXII-C

THE ASSOCIATION OF PRECIPITATION WITH WINDS AT THE TOLEDO EXPRESS AIRPORT

1 December 1956 - 30 November 1958
(2-Year Summary)

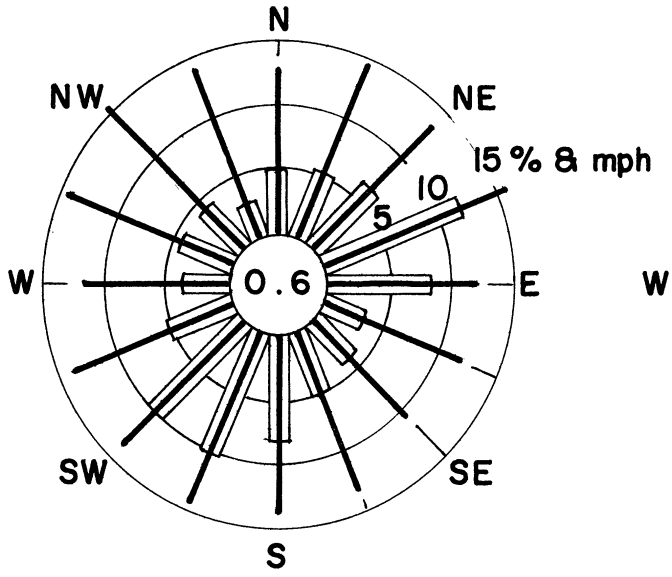
Wind Direction	Average Wind Speed, mph	Average Wind Speed During Precipitation, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
				Total Hours of Precipitation	Total Hours
N	9.8	12.2	121	5.4	0.7
NNE	9.9	11.5	96	4.3	0.5
NE	9.8	11.6	120	5.4	0.7
ENE	11.3	13.0	135	6.1	0.8
E	11.4	13.2	156	7.0	0.9
ESE	8.8	8.5	55	2.5	0.3
SE	8.1	9.4	73	3.3	0.4
SSE	9.6	12.2	104	4.7	0.6
S	10.4	12.3	171	7.7	1.0
SSW	12.0	13.5	144	6.5	0.8
SW	13.5	14.2	207	9.3	1.2
WSW	13.2	13.4	278	12.5	1.6
W	11.8	12.7	188	8.4	1.1
WNW	11.3	11.9	144	6.5	0.8
NW	10.1	11.5	126	5.7	0.7
NNW	10.2	12.3	103	4.6	0.6
Calm	0.0	0.0	5	0.2	0.0
Totals			2226	100.1	12.7
Average	11.1	12.4			

TABLE XXXIII-C

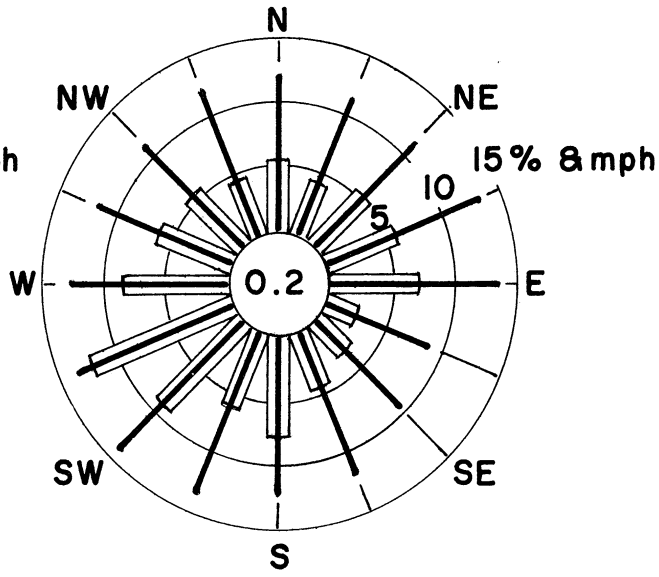
THE ASSOCIATION OF PRECIPITATION WITH WIND
AT THE TOLEDO MUNICIPAL AIRPORT

1 January 1950 - 31 December 1954
(Annual Summary)

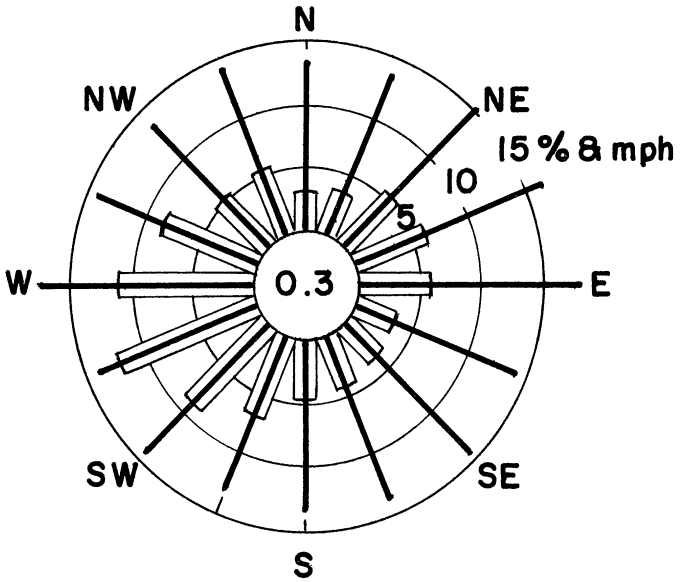
Wind Direction	Average Wind Speed, mph	No. of Observations During Precipitation	Hours of Precipitation as Percentage of	
			Total Hours of Precipitation	Total Hours
N	12.7	158	5.0	0.4
NNE	14.8	179	5.6	0.4
NE	13.0	213	6.7	0.5
ENE	15.9	389	12.2	0.9
E	12.2	252	7.9	0.6
ESE	12.3	113	3.6	0.3
SE	10.6	129	4.1	0.3
SSE	13.2	161	5.1	0.4
S	13.8	261	8.2	0.6
SSW	14.3	326	10.2	0.7
SW	13.7	322	10.1	0.7
WSW	14.0	179	5.6	0.4
W	12.1	115	3.6	0.3
WNW	14.1	140	4.4	0.3
NW	15.4	133	4.2	0.3
NNW	14.0	91	2.9	0.2
Calm	0.0	20	0.6	0.0
Total		3181	100.0	7.3
Average	13.7			



TOLEDO MUNICIPAL AIRPORT
TOLEDO, OHIO
Annual (1 Dec.-30 Nov.) 1950-54



TOLEDO EXPRESS AIRPORT
TOLEDO, OHIO
2 yr. sum (1 Dec.-30 Nov.) 1956-58



ENRICO FERMI POWER PLANT SITE
LAGOONA BEACH, MICHIGAN
2yr. sum (1 Dec.-30 Nov.) 1956-58

Fig. 6-C. Percentage frequency of occurrence of winds from 16 directions (rectangles) and corresponding wind speed in mph (heavy lines) with precipitation at Toledo Municipal Airport, Five-Year Summary, 1950-1954, and at Toledo Express Airport and the Enrico Fermi site, Two-Year Summary, 1956-1958.

TABLE XXXIV-C

LAPSE RATE DURING PRECIPITATION PERIODS ASSOCIATED WITH WIND DIRECTION AND MEAN WIND SPEED AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1958
(2-Year Summary)

Wind Direction	Hourly Lapse Rates			Compass Totals	Mean Wind Speed			Percent Frequency of Lapse Rate					
								Observations Within Categories			Total Observations		
	S	W	I		S	W	I	S	W	I	S	W	I
N	42	7	3	52	14.4	10.0	7.0	5.2	1.7	0.9	0.3	0.0	0.0
NNE	40	15	5	60	15.7	9.7	8.0	4.9	3.5	1.4	0.3	0.1	0.0
NE	73	18	10	101	18.5	14.1	14.8	9.0	4.2	2.9	0.5	0.1	0.1
ENE	73	16	18	107	18.9	12.7	13.8	9.0	3.8	5.1	0.5	0.1	0.1
E	65	19	18	102	23.2	12.0	11.4	8.0	4.5	5.1	0.5	0.1	0.1
ESE	30	7	22	59	16.6	11.6	13.0	3.7	1.7	6.3	0.2	0.0	0.2
SE	26	8	26	60	15.0	10.0	15.8	3.2	1.9	7.4	0.2	0.1	0.2
SSE	27	8	29	64	12.5	14.9	13.7	3.3	1.9	8.3	0.2	0.1	0.2
S	28	13	29	70	13.3	11.6	9.4	3.4	3.1	8.3	0.2	0.1	0.2
SSW	35	34	31	100	14.0	12.4	13.3	4.3	8.0	8.9	0.2	0.2	0.2
SW	25	55	51	131	13.8	15.0	14.1	3.1	13.0	14.6	0.2	0.4	0.4
WSW	52	77	48	177	14.4	15.6	12.6	6.4	18.2	13.7	0.4	0.5	0.3
W	85	62	28	175	14.7	13.2	9.8	10.5	14.6	8.0	0.6	0.4	0.2
WNW	89	30	12	131	15.0	15.0	7.8	10.9	7.1	3.4	0.6	0.2	0.1
NW	57	27	8	92	13.9	13.3	7.0	7.0	6.4	2.3	0.4	0.2	0.1
NNW	64	21	11	96	14.4	14.9	11.1	7.9	5.0	3.1	0.5	0.1	0.1
Calm		6		6		0.0			1.4			0.0	
Totals	811	423	349	1583				99.8	100.0	99.7	5.8	2.7	2.5
Average					15.9	13.7	12.4						

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXXV-C

ASSOCIATION OF HOURS OF CONTINUOUS PRECIPITATION WITH LAPSE RATE AND WIND DIRECTION AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1958
(2-Year Summary)

Wind Direction	Average Duration in Hours of Continuous Precipitation			
	Lapse Rate Categories			Respect to Wind Direction
	S	W	I	
N	3.7	2.7	12.0	3.2
NNE	7.9	4.5	1.0	6.8
NE	7.2	5.0	3.0	6.4
ENE	5.1		11.5	6.4
E	11.1	6.8	3.0	8.1
ESE	5.2	14.0	5.0	6.9
SE	4.3	6.0	8.6	6.8
SSE	5.5	3.3	4.1	4.4
S	2.7	3.0	2.1	2.6
SSW	2.1	2.8	3.7	2.8
SW	3.8	6.7	3.9	5.1
WSW	2.5	4.8	6.3	4.6
W	4.8	4.2	10.0	5.0
WNW	7.1	2.8	6.3	5.7
NW	3.3	5.3	2.5	3.6
NNW	7.2	6.7	5.0	6.9
Calm	—	—	—	—
Average	5.2	4.8	5.1	5.1

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.

TABLE XXXVI-C

PERCENTAGE OCCURRENCE OF CONTINUOUS HOURS OF PRECIPITATION WITHIN LAPSE-RATE CATEGORIES AT THE ENRICO FERMI SITE

1 December 1956 - 30 November 1958
(2-Year Summary)

Duration of Continuous Precipitation (hr)	S	W	I	Total
1	12.4	7.0	5.1	24.5
2	9.5	4.8	2.5	16.8
3	4.1	3.2	2.8	10.1
4	3.5	2.5	2.5	8.5
5	4.5	3.5	2.5	10.5
6	1.9	1.3	1.9	5.1
7	1.6	1.6	1.3	4.5
8	1.3	1.3	1.0	3.6
9	1.0	0.3	0.3	1.6
10	0.3	0.6	0.3	1.2
11	1.9	1.3	0.3	3.5
12	1.3	0.3	1.0	2.6
13	0.3			0.3
14	1.0		0.6	1.6
15	0.3	0.6		0.9
>15	2.5	1.0	1.0	4.5
Totals	47.4	29.3	23.1	99.8

Code:
S = A lapse rate in excess of the dry adiabatic lapse rate.
W = A positive lapse rate that is less than the dry adiabatic lapse rate.
I = A temperature increase with height.