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GEOPHYSICAL RESEARCH PAPERS

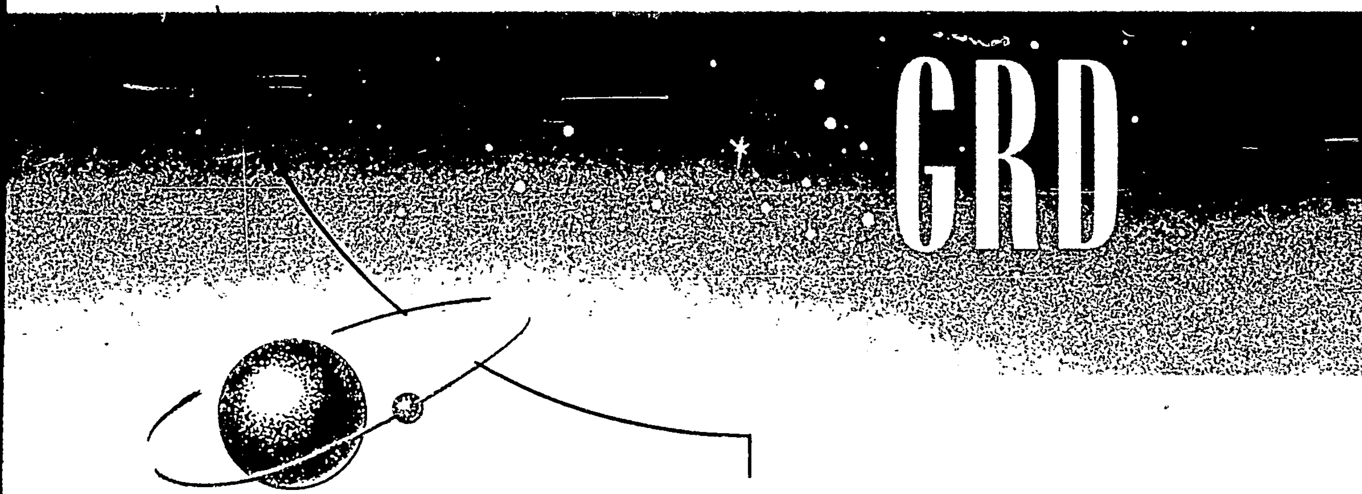
No. 59

PROJECT PRAIRIE GRASS, A FIELD PROGRAM IN DIFFUSION

VOLUME I

EDITED BY
MORTON L. BARAD

JULY 1958



GEOPHYSICS RESEARCH DIRECTORATE
AIR FORCE CAMBRIDGE RESEARCH CENTER
AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE
BEDFORD, MASSACHUSETTS

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PROJECT PRAIRIE GRASS, A FIELD PROGRAM IN DIFFUSION

Volume I

Edited by
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July 1958

Project 7657

Atmospheric Analysis Laboratory
GEOPHYSICS RESEARCH DIRECTORATE
AIR FORCE CAMBRIDGE RESEARCH CENTER
AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE
Bedford, Mass.

PREFACE

During the Summer of 1956, sixty scientists, technicians, and test support personnel participated in an experimental program in micrometeorology. This program, nicknamed Project Prairie Grass, was conducted in north-central Nebraska near the town of O'Neill. Four universities and two government agencies participated in the field program, which was conceived and directed by personnel of the Atmospheric Analysis Laboratory of the Geophysics Research Directorate, Air Force Cambridge Research Center. The participants represented Massachusetts Institute of Technology, Texas A&M Research Foundation, University of Washington, University of Wisconsin, Air Weather Service, and units of the Air Force Cambridge Research Center.

The primary objective in Project Prairie Grass was to determine the rate of diffusion of a tracer gas as a function of meteorological conditions. The purposes of this paper are (1) to describe the equipment and procedures used in dispensing and sampling of the gas, analysing gas samples, measuring meteorological parameters, and reducing and processing data; and (2) to present tabulations of the data collected. It is not the intention here to present analyses of the data, evaluate existing diffusion models, or develop new models. Such analyses have been initiated by the research teams that participated in Project Prairie Grass and by other research groups under contract with the Geophysics Research Directorate. It is expected that their findings will be published in professional journals and in contract reports. It is hoped that other scientists, using the material contained in this report, will also undertake studies of the diffusion problem.

This report is being presented in three volumes to facilitate reading of text and use of data. Volume I contains an introductory chapter which provides a background of the field program. Chapter 2 contains a description, by Texas A&M personnel, of the field site at O'Neill. The surface weather observations made by the Texas A&M group are presented in Chapter 3. Chapter 4 contains the surface synoptic charts prepared by GRD personnel. A description of the diffusion technique as well as tabulations of the diffusion data are presented in Chapter 5 by MIT personnel. Chapter 6 includes a description of the instrumentation used by MIT to measure wind speed and direction parameters, as well as tabulations of the wind data.

Volume II opens in Chapter 7 with a description of the instrumentation used by the Texas A&M group to determine mean profiles of air temperature, soil temperature, and wind speed as well as other terms necessary in calculating the heat budget at the air-earth interface. Chapter 8 includes the profile data collected during the test periods as well as during other periods during the summer. In Chapter 9, Texas A&M scientists describe a method of computing heat budget terms and present a tabulation of such terms for the test periods. Another technique for determining the heat budget terms was employed by a University of Wisconsin team. Their technique and computed heat budget terms appear in Chapter 10. A technique of determining temperature profiles by optical methods is being developed by research workers at the University of Washington. A description of the optical method technique and the data collected at O'Neill are presented in Chapter 11. The rawinsonde data collected by Air Weather Service personnel and edited by GRD personnel are presented in Chapter 12. This volume concludes with a description by GRD personnel of the instrumentation and techniques used in airplane observations of temperature and humidity; and the data collected during the gas releases are tabulated.

Volume III is not expected to be ready for publication before

the end of 1958. Present plans for this volume call for presenting (1) descriptions of the bi-vane anemometry employed by MIT in the measurement of eddy components for determining turbulence spectra and scales of turbulence; descriptions of the procedures employed by Iowa State College in reducing bi-vane data, and by GRD in computing spectra and scales of turbulence; and (2) descriptions of the sonic anemometry employed by the University of Wisconsin in determining turbulence spectra. The spectra and scale data will also be presented in Volume III.

The people who participated in Project Prairie Grass are to be congratulated for the diligence and efficiency they exhibited during the planning for and the performance of the field experiments and during the preparation of this report. They are to be commended for a spirit of cooperation, so necessary in making the program a successful one. A list of the participants follows:

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A/2c R. Hall
A/2c C. G. Thorp

Our thanks go to the residents of O'Neill, Nebraska for their valuable assistance in the solution of a variety of problems which arose in the course of the field program.

Morton L. Barad
Geophysics Research Directorate

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ABSTRACT

Project Prairie Grass was a field program designed to provide experimental data on the diffusion of a tracer gas over a range of 800 meters. In each of 70 experiments the gas was released continuously for 10 minutes at a source located near ground level. The gas releases were made over a flat prairie in Nebraska under a variety of meteorological conditions during July and August of 1956.

This paper includes a brief history of the project and detailed descriptions of the tracer technique and the meteorological equipment used in the field program. Tabulations of the diffusion data and the meteorological data collected during the gas releases are also presented. In addition, this paper contains data on the heat budget at the air-earth interface during other selected periods during the Summer of 1956.

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PROJECT PRAIRIE GRASS, A FIELD PROGRAM IN DIFFUSION

CHAPTER 1
INTRODUCTION

M. L. Barad
Geophysics Research Directorate
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Project Prairie Grass is the name given to a field program conducted near O'Neill, Nebraska during the Summer of 1956. The main objective in this program was to learn how the diffusion of a tracer gas emitted continuously at a point source near ground level varies with meteorological conditions. This report contains descriptions of the techniques and procedures employed in the program and summaries of the data collected. The purpose in this introductory chapter is to present an account of the historical background of Project Prairie Grass in order that the reader may understand why the research was undertaken and why certain techniques were employed in the field program.

There is little doubt that advances made in diffusion theory and experimentation directly aid in solving a number of practical problems in the atmospheric boundary layer. In the field of air pollution abatement, for example, advances made in diffusion research lead to more intelligent choices of plant location, design of plant buildings and stacks, periods of stack emission, etc. In the field of crop spraying, as another example, progress made through diffusion studies leads to better selection of spray altitudes, spray periods, etc.

There are, however, a number of other boundary layer problems which can also be brought nearer to solution by the insight gained through diffusion research. To solve such problems as the forecasting

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of fog, frost, or low-level wind shear, for example, an increased understanding of the basic mixing processes at work in the lower atmosphere is necessary. In attempts to understand these processes, investigators have studied the diurnal and height variations of turbulent fluxes of momentum, heat, and water vapor. Although these fluxes can be measured at a number of points in space, research workers generally find it difficult to interpret such measurements. Though one may have some success in describing the region through which the property is transported, he is usually at a loss to quantitatively define the source of the property. However, if a distinctive tracer is introduced into the atmosphere at a source which can be precisely defined as to location and strength and if concentrations of this tracer are measured downwind from this source, a means is provided of gaining greater insight into the basic mixing mechanism present in the atmosphere. It is not surprising then that micrometeorologists and hydrodynamicists interested in turbulence phenomena should apply general hypotheses to the development of diffusion theory and should seek to employ data from diffusion experiments to test their diffusion hypotheses. Diffusion theory and experimentation, then, provide more than solutions to specific air pollution problems; they provide a means of improving our understanding of turbulence phenomena.

In this analysis of the situation, the chain of activity goes from general turbulence hypotheses to a specific diffusion hypothesis to experimental verification. A study of the literature reveals that much work has been done, particularly in the past 25 years, in the development of general turbulence and diffusion hypotheses. However, very little has been done in the collection of accurate diffusion data with which to test the diffusion hypotheses.

In January of 1953, a number of university and government scientists engaged in micrometeorological research assembled in Boston to participate in the planning of the Great Plains Turbulence Field Program, a program held later that year near O'Neill, Nebraska.[1]

Although the participants at this planning session were prepared to make a variety of meteorological measurements, no one was prepared to make quantitative measurements of diffusion. It seemed that none of the participants had both a satisfactory tracer technique and the equipment necessary to collect tracer samples in a dense network of stations.

At this point the Geophysics Research Directorate decided to support the development of a tracer technique which would be suitable for studying diffusion rates over a range of about 1 km when the tracer was emitted continuously at a fixed point near ground level. Actually, the development of two tracer techniques was supported. The first involved the use of tritiated ethane, a radioactive tracer.[2] Because of the relatively high costs in manpower and material which would have been imposed if this technique had been used, it was shelved in favor of the second technique, developed by MIT at its Round Hill Field Station.* This technique called for the use of sulfur dioxide as the tracer.

It will be noted that the tracer technique was developed for continuous emission. Historically, theoretical work usually starts with diffusion from an instantaneous point source, with the growth of a small puff of smoke, for example, and then proceeds by integration to other sources such as the continuous source, line sources, etc. Yet, historically, most of the experimental work has begun with the continuous point source. There appear to be at least three reasons for preferring the continuous source over the instantaneous one. First, the engineering of the continuous source with reproducible characteristics, experiment after experiment, is generally simpler. Second, the statistical interpretation of the concentration measurements at downwind stations is simpler, particularly where time-mean concentrations are found, as they were in Project Prairie Grass. Third, the determination of what constitutes pertinent meteorological data and the provision of such data

*See Chapter 5 for a description of the technique developed by MIT.

are generally simpler. For these reasons, principally, a continuous source was chosen for Project Prairie Grass.

In the diffusion experiments an emission time of 10 minutes was chosen. This time was a compromise, arrived at after considering such factors as the cost of tracer gas, practical rates of emission, distance between the samplers closest to the source and the most distant ones, and desirability of having fairly stable time-mean diffusion patterns in the area downwind from the source.

In experiments of this sort, it is desirable that the cost of tracer material be low and that the tracer can be emitted at a fairly constant rate. It is desirable that tracer losses on ground, vegetation, and other surfaces in the area sampled be negligibly low. It is desirable that the sampling rate for each sampler be constant throughout an experiment and that this rate be uniform from sampler to sampler. If the measurements are to be used to evaluate existing hypotheses or to construct new models, it is important that there be an adequately dense network of samplers. Therefore, if hundreds of samplers are to be exposed at one time and if spares are to be available, the samplers must be relatively inexpensive. It is necessary that the analysis of samples be accurate, cover a wide range of concentrations, and be accomplished in relatively short time. It is believed that the diffusion technique developed by MIT meets these requirements very well.

By the Spring of 1955, a decision was made to shift the experimental program from the Round Hill Field Station of MIT to a site which would permit the collection of sulfur dioxide samples over greater downwind distances and over more uniform terrain and vegetation. A section of land near O'Neill, Nebraska was chosen as the site of the field program.*

*The land leased was Section 14, Township 29 North, Range 11 West, Holt County, Nebraska.

The square mile chosen had the following characteristics:

1. It was a fairly flat area, as Figure 1.1 indicates. The contour lines shown in Figure 1.1 are for 1-foot intervals. The gas source was located at the center of five concentric semicircles having radii of 50, 100, 200, 400, and 800 meters. North of the E-W line passing through the source, the topography is very flat, being within $\pm$ 3 feet of the mean elevation in that part of the section. The topography rises gently to the southwest with an average grade of about 10 feet per half-mile, and to the southeast with an average grade of about 20 feet per half-mile.

2. Logistical and technical considerations had led to the decision to sample the gas on semicircular arcs rather than on full circular arcs. In a study of the wind climatology of the O'Neill area, it was found that wind directions between 120° and 240° occur more than 50 percent of the time in July and August. On this basis, primarily, the sampling grid was laid out as shown in Figure 1.1.

3. The vegetative cover was fairly uniform as to grass type. The "hayfield" was mowed prior to the experiments, and since there was little precipitation during the months of July and August, the grass height was fairly uniform during the program.

4. The site was relatively free of obstructions to air flow. Most of the equipment used in dispensing the gas was placed in a dugout 50 m upwind of the actual source. A laboratory building and three Jamesway huts were erected over 300 m east-southeast of the source. With the exception of cup anemometers and wind vanes mounted on wooden posts near the source and 450 m north of the source, the meteorological equipment, trailers, and Jamesway huts were all located on the observation line, downwind of the 800 m sampling arc.

5. The nearest farmhouse was over 1300 m northwest of the source. As a result, there were no complaints from nonparticipants about the gas which, on a few occasions, was pungent on the observation line, about 900 m from the source.

6. Stable a-c power was brought to various points in the field. The overhead power line starting at Opportunity Road is shown in Figure 1.1.

The O'Neill area had other advantages: friendly and cooperative townspeople, an airport, and adequate housing.

In diffusion experiments of the type conducted at O'Neill, it is

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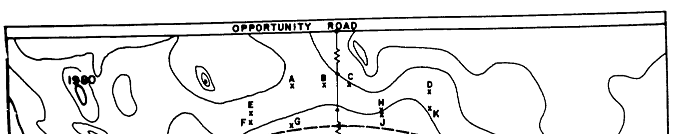

Figure 1.1 Topography of field site and layout of equipment

considered essential that a number of meteorological measurements be made to characterize the experiments and to provide measurements of parameters required for evaluating diffusion models calling for the use of these parameters. Thus, in the Prairie Grass experiments, many of the measurements were suggested by existing diffusion hypotheses. For example, the Sutton hypothesis calls for determining wind profile and gustiness parameters. The Calder-Deacon hypotheses suggest the determination of wind profile parameters and, in implying that the Richardson Number or stability ratio is useful, suggest the measurement of temperature profile. The works of Inoue and Ogura suggest the determination of turbulence spectra and scales of turbulence. Other meteorological measurements were made because there was some evidence that they might be called for in new diffusion models or in the forecasting of diffusion patterns from limited meteorological data.

For the meteorological measurements to be useful, past history in experimental micrometeorology has shown that they must be representative and very accurate. It was the overall impression of the biased participating scientists, as well as those who visited the field program, that the meteorological measurements which accompanied the diffusion experiments were of very high caliber.

REFERENCES

1. Lettau, H. H. and Davidson, B., "Exploring the Atmosphere's First Mile," Pergamon Press Inc., N. Y. (1957)

2. "Development of a Tracer Technique," Final Report, Contract No. AF19(604)-1045, Tracerlab, Inc. (1955)

CHAPTER 2
A DESCRIPTION OF THE FIELD SITE IN PROJECT PRAIRIE GRASS

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The observation site was an extensive, virtually level field previously used to pasture cattle. The field was uncultivated and covered with native prairie grasses. Prior to the first observation period, the grass was mowed and little growth occurred thereafter due to arid climatic conditions.

2.1 Location

The experimental site was located about five miles northeast of the center of O'Neill, Nebraska. Geographical coordinates are Latitude, 42° 29.6' North; Longitude, 98° 34.3' West; altitude at gas source, 1980 feet above mean sea level.

2.2 Landscape

The field is part of a nearly-level upland. The land rises moderately to the southeast to a hill about 0.6 miles from the gas source. There is no surface drainage pattern at all. Rain water soaks into the soil immediately, or accumulates in small depressions until it all infiltrates or evaporates. The drainage pattern of Redbird Creek (a tributary of the Niobrara River) has advanced southward to within about a mile of the site. To the west, south, and east, there are not even intermittent streams for several miles.

From the site, then, except for carefully placed project equipment, one has an unobstructed view for miles (Figure 2.1). Since there are no hills or mountains in the distance, there is no distinct horizon. Toward the southeast the hill forms a visibility mask at 1.5 miles. The unobstructed view is felt only when distant thunderstorms, etc., are observed. Otherwise, there is nothing to see in the distance.

*Present affiliation: U. S. Navy Electronics Laboratory

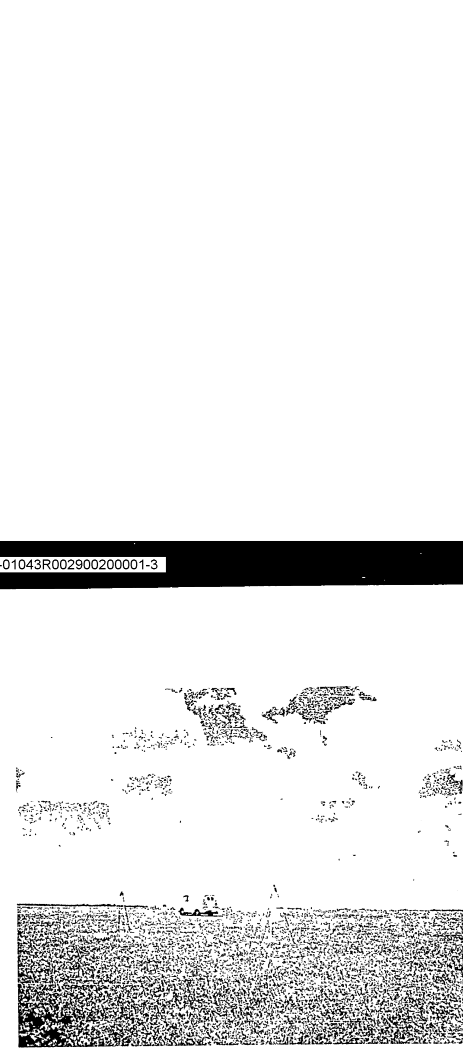

Figure 2.1 View looking southwest from center of observation line at north side of site. Photograph taken in mid-August

Land is laid out in mile-square fields, with a farmstead on many of these "country blocks." There was one farmstead, with its cluster of buildings and trees, about 1300 meters northwest of the gas source.

2.3 Soil

The site was in a hayfield on O'Neill loam, upland phase.[1] This soil has a black, top soil about 25 cm thick. It is loose and friable, and with profuse grass roots forms a tough sod. Organic matter content was determined to be 4 percent. The top soil is underlain by a brown subsoil, about 20 cm thick. Both these layers have good water-holding capacity. From a 45-cm depth to 60 cm, there is a light brown layer of compacted soil. Soil particles are plate-like and horizontal, and this layer is very difficult to cut into from above. However, a small clod of this material may easily be crumbled by lateral compression. Through this compacted layer, few grass roots penetrate.

There are decayed roots, up to 1 cm diameter, of shrubs which once grew here and which did penetrate this layer to the sand below.

Below the compacted layer, from a 60-cm depth to at least a 120-cm depth, the soil is a loose, coarse sand with much gravel. Water held here is only very slowly available to the grass, because few roots penetrate to the sand and water movement upward through the sand and the compacted layer is extremely slow.

Bulk densities of the soil were determined on 10 July, 16 July, 6 August, and 29 August near the Texas A&M instrumentation location. The best values, in grams of dry soil material per cubic centimeter of the natural soil, are given in Table 2.1.

Table 2.1. Values of bulk density

DEPTH (cm)	BULK DENSITY (gm/cm^3)
0 -10	1.05
10-20	1.15
20-30	1.25
30-40	1.34
40-50	1.35
50-60	1.36
60-70	1.41
70-80	1.47
80-90	1.54
90-100	1.60

2.4 Vegetation

The wild hay was cut on 28 June. Through July and August, the field was dominated by the brown stubble 5 to 6 cm high, with some sparse stubble up to 20 cm high. After a rain, the field had a greenish brown appearance for a day or two. This was due to a short, fine, green grass coming up, and to the greening of some species of brownish grass that was still alive. Growth of the vegetation, as a whole, was slight, and the amount of dead and living plants standing up remained fairly constant. In late August, scattered, small, green

shrubs became more conspicuous. These shrubs attained a height of approximately 18 centimeters.

There were a few small prickly pears in the field. There was scarcely any litter of plant material lying loose on top of the soil. Dried and weathered cakes of cow dung were spread about rather evenly, about one per three square meters.

2.5 Albedo

Measurements of albedo on 10-11 July; 24-25-26 July; and 8-9 August show that the albedo is lowest at solar noon, and greater near sunrise and sunset. Average values for those days are given in Table 2.2.

Table 2.2. Values of albedo

TIME (CST)	ALBEDO
0605	0.331
0705 & 1805	.254
0805 & 1705	.212
0905 & 1605	.203
1005 & 1505	.190
1105 & 1405	.187
1205 & 1305	0.184

The albedo varies somewhat with solar angle, cloudiness, moisture on the grass, and changes in the vegetation with time.

2.6 General Weather

Precipitation was measured daily from 29 June through 28 August. Maximum and minimum instrument shelter temperatures were measured from 10 July onward. These data are given in Table 2.3. On most of the days that precipitation occurred, one or more huge thunderstorms were visible from the site. These were accompanied by many cloud-to-ground lightning flashes. No lightning strikes near the site were observed, although electrical interference sometimes halted the use of the thermoelectric temperature measuring system. The only hail storm of the summer, with hailstones about 2 cm in diameter, occurred on 29 June.

Table 2.3. General weather

	Maximum Temperature (°F)	Minimum Temperature (°F)	Precipitation (in.)	Notes
29 June	-	-	0.58	Hail 2 cm in diameter
30	-	-	.00	
1 July	-	-	.23	
2	-	-	.00	
3	-	-	.00	
4	-	-	.21	
5	-	-	.00	
6	-	-	.00	
7	-	-	.00	
8	-	-	.00	
9	-	-	.00	
10	90.0	51.0	.00	Moisture determination
11	96.1	69.2	.00	
12	89.7	60.4	.01	
13	88.0	59.6	.00	
14	98.8	64.9	.08	
15	85.0	64.4	.00	
16	87.1	60.3	.00	Moisture determination
17	90.9	57.2	.00	
18	87.0	60.3	.21	
19	77.7	55.6	.04	
20	81.6	50.9	.00	
21	*	52.0	.00	
22	*	*	.00	
23	92.0	*	.00	
24	89.0	65.0	.00	
25	96.0	55.0	.00	
26	103.9	69.8	.00	
27	88.8	69.6	.00	
28	78.3	60.4	.00	
29	85.8	57.2	.00	
30	95.8	69.0	.03	
31	69.2	64.2	.04	
1 August	81.5	63.9	.32	
2	92.8	67.8	.08	
3	96.8	69.0	.19	
4	90.0	69.2	.11	
5	93.1	58.3	0.00	

*Thermometers were not reset.

Table 2.3. (cont.)

	Maximum Temperature (°F)	Minimum Temperature (°F)	Precipitation (in.)	Notes
6 August	88.2	63.0	0.06	Moisture determination
7	89.8	61.0	.00	
8	89.0	59.4	.04	
9	89.9	58.5	.01	
10	84.9	56.0	.04	
11	84.5	57.7	.00	
12	90.0	63.5	.01	
13	93.0	60.0	.00	
14	96.2	66.0	.00	
15	100.0	54.1	.25	
16	86.9	65.5	.00	
17	83.2	66.0	.00	
18	68.0	56.0	.20	
19	72.0	43.7	.00	
20	73.8	49.7	.00	
21	88.3	46.2	.00	
22	95.9	51.6	.00	
23	90.4	56.3	.00	
24	92.8	48.9	.00	
25	95.5	58.0	.00	
26	99.8	67.0	.00	
27	95.5	58.4	.01	
28	94.1	58.7	0.00	
29	-	50.3	-	Moisture determination

2.7 Soil Moisture

Soil moisture was generally deficient, and no crop of hay was produced after the mowing in late June. Moisture determinations were made on 10 July, 16 July, 6 August, and 29 August along with the bulk density determinations. The values are sufficiently accurate for estimating the heat capacity of the soil. They are not, in themselves, sufficient for specifying availability of soil moisture for evaporation and transpiration. No independent determinations of soil wilting point were made. Due to lateral variability and inadequacy of sampling, these moisture determinations do not permit the computing of changes in soil moisture content for the field.

Values of soil moisture, as percent dry weight, are given in Table 2.4.

Table 2.4. Values of soil moisture as percent dry weight

DEPTH (cm)	10 JULY	16 JULY	6 AUG	29 AUG	AVE OF 4
0-10	7.2	6.8	9.2	6.6	7.5
10-20	7.0	6.3	6.6	6.5	6.6
20-30	3.8	6.3	3.0	6.0	4.8
30-40	4.2	4.9	2.8	4.4	4.1
40-50	5.1	3.9	2.9	5.6	4.4
50-60	3.1	3.7	3.5	6.7	4.2
60-70	1.9	3.4	6.2	3.8	3.8
70-80	1.8	3.2	3.8	2.9	2.9
80-90	2.9	4.8	2.6	2.4	3.2
90-100	5.7	4.8	1.8	2.4	3.7

Most likely all of these values, except those above a 20-cm depth on 6 August, and those of the compacted layer and the sand below, represent the wilting point of the individual samples, or are very slightly higher. These soil samples at the wilting point were dusty and dirty. The loose sand below was cool (about 25°C) and moist to the touch throughout the summer. However, its actual content of water was slight. The high moisture percentages down to 20 cm on 6 August reflect an increase in available moisture from recent rains. The soil in the field, as a whole, appeared to be driest on 29 August although the sample moisture determinations do not bear this out.

Since the soil was near the wilting point all summer, average values of the heat capacity per unit volume are sufficiently accurate for all soil heat computations. These values are given in Table 2.5.

Table 2.5. Values of heat capacity per unit volume

DEPTH (cm)	ρC_p (cal/cm^{3}deg)
0-10	0.26
10-20	.28
20-30	.28
30-40	.30
40-50	.30
50-60	.30
60-70	.31
70-80	.31
80-90	.33
90-100	0.35

REFERENCES

1. Moran, W. J., et al., "Soil Survey of Holt County, Nebraska," United States Department of Agriculture (1938)

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CHAPTER 3

SURFACE WEATHER OBSERVATIONS

W. Covey, M. H. Halstead, S. Hillman,
J. D. Merryman, R. L. Richman, A. H. York

Texas A&M Research Foundation

The surface weather observations at gas release times are given in Table 3.1.

Table 3.1

Time entries on this form are ______th meridian time.
To convert to G.C.T. {add / subtract} ___ hours.
Height of barometer ________ ft (MSL)

STATION O'Neill, Neb.
MONTH July DAY ______ YEAR 1956
LAT. 42° 30' N LONG. 98° 34' W

Gas Release 1	Time (CST) 2	Ceiling (Hundreds of Feet) 3	Sky 4	Visibility (miles) 5	Weather and Obstructions to Vision 6	Sea Level Press. (mbs) 7	Temp. (°F) 8	Dew Pt. (°F) 9	Wind: Direction 10	Wind: Speed (Knots) 11A	Wind: Speed (mph) 11B	Wind: Character & Shifts 12	Altimeter Set (ins) 13	Remarks and Supplemental Coded Data 14	14A	14B	Observer's Initials 15
1	1100	30		13			73	64	S					Ac 50 Sc 30			
2	1505	15		15			75	69	SE					Cu 15			
3	2200	UNL		15			67	63	S								
4	0100	UNL		15			63	62	S								
5	1415	UNL		15			88	61	S								
6	1700	UNL		15			89	62	S								
7	1415	UNL		15			90	55	S					Clear (few)			
8	1700	UNL		15			89	59	S					Clear (few)			
9	1600	UNL		15			83	64	S					As thin			
10	1200	UNL		15			88	66	S					Thin Sc hazy			
11	0800	UNL		12			79	65	S					No haze, band of Sc on E horizon			
12	1000	UNL		12			88	68	S								
13	2000	UNL		15			68	58	S					1. Cu to 40 2 H 50			
14	2200	UNL		15			61	58	S					Clear			
15	0800	UNL		10			72	61	S					H			
16	1000	UNL		10			82	62	S					H			
17	2000	30		15			81	52	S					H Sc 35 ⊕			
18	2200	UNL		15			75	55	S					Sc 30 SW & S			
19	1100	UNL		15			85	56	S					3 Cu 50 ⊕			
20	1400	UNL		15			94	57	S					Scattered thin St			
21	2200	Unknown					84	54	S					Lightning N & NNE distant			
22	0000	Unknown					80	54	S					⊕ Cu lightning north			
23	2100	UNL		15			74	64	SE					Clear			
24	2300	UNL		15			72	65	SE								

Gas Release 16	Time (CST) 17	Dry Bulb (°F) 18	Wet Bulb (°F) 19	Relative Humidity (%) 20	Total Sky Cover 21	*Lowest Layer: Amt. 22	*Lowest Layer: Type and Dir. 23	*Lowest Layer: Height 24	Second Layer: Amt. 25	Second Layer: Type and Dir. 26	Second Layer: Height 27	Summation Total 28	Third Layer: Amt. 29	Third Layer: Type and Dir. 30	Third Layer: Height 31	Summation Total 32	Fourth Layer: Amt. 33	Fourth Layer: Type and Dir. 34	Fourth Layer: Height 35	Pressure Tendency 36	Net 3-Hr. Change 37	38	39	40
						CLOUDS AND OBSCURING PHENOMENA																		
1	1100	73	67	73	9	9	Sc ↑	30	6	Sc ↑	50	9												
2	1505	75	67	66	9	9	Cu ↑	15				9												
3	2200	67	64	85	3	3	/	30																
4	0100	63	62	95	1	1	/	30																
5	1415	89	71	40	0																			
6	1700	89	71	40	0																			
7	1415	90	68	31	0																			
8	1700	89	69	36	0																			
9	1600	83	70	52	3	3	As ↑	60																
10	1200	88	73	48	3	3	Sc ↑	60																
11	0800	79	70	62	0																			
12	1000	88	74	52	0																			
13	2000	68	62	71	2	1	Cu ↑	40	2	H ↑	50	2												
14	2200	61	58	86	0																			
15	0800	72	65	69	0																			
16	1000	83	70	51	0																			
17	2000	81	64	36	7	7	Sc /	30																
18	2200	75	63	51	1	1	Sc /	30																
19	1100	85	68	42	3	3	Cu →	50																
20	1400	95	70	28	2	2	Cu →	50																
21	2200	84	65	36	10	10	St																	
22	0000	80	64	41	6	6	Cu \																	
23	2100	75	68	71	0																			
24	2300	72	67	79	0																			

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Table 3.1 (Continued)

Time entries on this form are ______th meridian time.
To convert to G.C.T. {add / subtract} ___ hours.
Height of barometer ________ ft (MSL)

STATION O'Neill, Neb.
MONTH August DAY ______ YEAR 1956
LAT. 42° 30' N LONG. 98° 34' W

Gas Release 1	Time (CST) 2	Ceiling (Hundreds of Feet) 3	Sky 4	Visibility (miles) 5	Weather and Obstructions to Vision 6	Sea Level Press. (mbs) 7	Temp. (°F) 8	Dew Pt. (°F) 9	Wind Direction 10	Wind Speed (Knots) 11A	Wind Speed (mph) 11B	Wind Character & Shifts 12	Altimeter Set (ins) 13	Remarks and Supplemental Coded Data 14	14A	14B	Observer's Initials 15
25	1300	50		15			77	67	S					Cu overcast 50			
26	1200	35		10			87	70	S					Scu			
27	1400	UNL		15			91	70	S					Cu & Alto Cu			
28	2400	UNL		15			75	68	S					Lightning N			
29	0200	Unknown		15			77	63	S					Few stars			
30	1300	UNL		15			94	64	S/SW					Clear (few)			
31	1500	UNL		15			96	63						⊕ 2 Cu 50			
32	2000	UNL		15			72	56	S					St WNW			
33	1300			15			84	62	S								
34	1500	UNL		15			88	67	S					Clear above clouds esp. on line N			
35a	2300	UNL		15			72	64	SE					Lightning NE, SE			
35	2130	—UNL		15			69	61	SE					1 Sc ⊕			
36	2330	UNL,		15			68	60	S								
37	0300	UNL		15			69	61	S					Cu bank lightning N			
38	0500			15			69	62	S					Lightning NE/E			
39	2235	UNL		8			70	50	SE					Clear few Sc SW			
40	0007	UNL		15			69	53	S/SE					Clear			
41	0305	UNL		15			68	53	S					Clear lightning low on horizon N			
42	0505	UNL		15			73	50	SW					Cu nim gig NE (distant) forerunning Cu on E horizon going S; Incus due E, building fast			
43	1200	UNL		15			95	53	S/SE					Film Ci - Row of towering Cu to NE running NW to SE			
44	1400	UNL		15			99	53	S/SE					Cu bank to NE			
45	1705			15			96	49	S/SE					Layer of Cu with some vertical development N/NE layer of strata Cu above this			
46	1845			15			91	53	SE					Thunderstorm NW			
47	0900	UNL		15			68	44	S					Bank of St Cu from E thru S to W			

CLOUDS AND OBSCURING PHENOMENA

Gas Release 16	Time (CST) 17	Dry Bulb (°F) 18	Wet Bulb (°F) 19	Relative Humidity (%) 20	Total Sky Cover 21	Lowest Layer Amt. 22	Lowest Layer Type and Dir. 23	Lowest Layer Height 24	Second Layer Amt. 25	Second Layer Type and Dir. 26	Second Layer Height 27	Summation Total 28	Third Layer Amt. 29	Third Layer Type and Dir. 30	Third Layer Height 31	Summation Total 32	Fourth Layer Amt. 33	Fourth Layer Type and Dir. 34	Fourth Layer Height 35	Pressure Tendency 36	Net 3-Hr. Change 37	38	39	40
25	1300	76	70.2	72	10	10	Cu ↗	50																
26	1200	87	75	57	9	9	Sc ↑	35																
27	1400	91	76	50	7	4	Cu ↑	45	3	Ac	100													
28	2400	75	70	78	0																			
29	0200	77	68	63			?																	
30	1300	94	74	38	0	0	Cu ↑	60																
31	1500	9[illegible]	74	32	2	2	Cu ↑	60																
32	2000	72	62	57	1	1	St																	
33	1300	83	48	6		6	As →																	
34	1500	88	73	50	2	2	Sc																	
35a	2300	72	67	77	2	2																		
35	2130	69	64	76	1	1	Sc ↓																	
36	2330	68	63	76	0	/0																		
37	0300	69	64	76	3	3	Cu →																	
38	0500	69	64	79	8	8	Cu →																	
39	2235	70	58	49	0																			
40	0007	69	59	57																				
41	0305	69	60	58																				
42	0505	73	60	44																				
43	1200	95	68	24	10	10	Ci →		6	Ci →														
44	1400	99	69	21	8	1	Cu ←		8	Ci ←														
45	1705	96	67	20	9	3	Cu ↘		6	Sc ↘														
46	1845	91	66	28	9	4	Cu ↘		5	Sc ↓														
47	0900	68	55	42	3	3	Sc ↘	25																

Table 3.1 (Continued)

Time entries on this form are ______th meridian time.
To convert to G.C.T {add / subtract} ___ hours.
Height of barometer ________ ft (MSL)

STATION O'Neill, Neb.
MONTH August DAY ______ YEAR 1956
LAT. 42° 30' N LONG. 98° 34' W

Gas Release 1	Time (CST) 2	Ceiling (Hundreds of Feet) 3	Sky 4	Visibility (miles) 5	Weather and Obstructions to Vision 6	Sea Level Press. (mbs) 7	Temp. (°F) 8	Dew Pt. (°F) 9	Wind Direction 10	Wind Speed (Knots) 11A	Wind Speed (mph) 11B	Wind Character & Shifts 12	Altimeter Set (ins) 13	Remarks and Supplemental Coded Data 14	14A	14B	Observer's Initials 15
48s	1200	UNL		15			68	44						Puffy Cu			
48	0900	UNL		15			68	55	S					Sc bank N, E, Haze S			
49	1059	UNL		15			76	55	S					Sc bank N, NE, E, Haze S			
50	1406	UNL		15			88	53	S					Wispy Cirrus			
51	1529			15			90	55	W/SW					Wispy Cirrus & Puffy Cu			
52	1112	UNL		15			79	55	ESE					Clear			
53	2000	UNL		15			62	44	SE								
54	2202	UNL		15			66	48	S								
55	0058	UNL		15			62	51	SSE					Wind Moderate			
56	0201	UNL		15			60	47	S					Wind Moderate			
57	1728	.UNL		15			96	51	S/SW					St Cu to N & SE Haze to S			
58	1927	UNL		15			79	51	S					Alto Cu moving in from N/NE Heavy cloud bank W/NW			
59	2226	40		15			75	50	S					Dark heavy clouds to E			
60	0027	300		15			78	47	S					Star & moon partly obscured, can be seen through clouds			
61	1101	UNL		15			94	34	S/SW					Rain NE & SW, St Cu on all horizon, clear over head			
62	1400	160		10			89	53	S					Thunderstorm to NE, rainshowers to W, N, E			
63	2000	UNL		13			74	52	WSW					Bank of Sc N & NW horizon			
64	2210	UNL		15			68	54	SW					Lightning dist. NW & ENE			
65	1915	UNL.		15			78	47	S					Sc bank, W, E			

CLOUDS AND OBSCURING PHENOMENA

Gas Release 16	Time (CST) 17	Dry Bulb (°F) 18	Wet Bulb (°F) 19	Relative Humidity (%) 20	Total Sky Cover 21	Lowest Layer Amt. 22	Lowest Layer Type and Dir. 23	Lowest Layer Height 24	Second Layer Amt. 25	Second Layer Type and Dir. 26	Second Layer Height 27	Summation Total 28	Third Layer Amt. 29	Third Layer Type and Dir. 30	Third Layer Height 31	Summation Total 32	Fourth Layer Amt. 33	Fourth Layer Type and Dir. 34	Fourth Layer Height 35	Pressure Tendency 36	Net 3-Hr Change 37	38	39	40
48s	1200	68	55	42	6	6	Cu ↓	50																
48	0900	68	60	62	1	1	Sc ↑																	
49	1059	79			1	1	Sc ↑																	
50	1406.	88	67	32	1	1	Ci	230																
51	1529	90	68	31	1	1	Cu ↘	25		Ci	250													
52	1112	79	60	31	0																			
53	2000	62	52	52	0																			
54	2202	66	56	53	0																			
55	0058	62	54	59	0																			
56	0201	60	53	63	0																			
57	1728	96	68	22	0																			
58	1927	79	62	27	3	3	Ac ↘	60																
59	2226	75	61	42	5	5	Cu ↓	40																
60	0027	78	60	33	7	2	Ac	80	5	Cs	300													
61	1101	94	62	12	3	3	Sc ↑	50																
62	1400	89	67	30	8	3	Sc	30	5	Ac	160													
63	2000	75	61	45	1	1	Ci																	
64	2210	68	60	62	0	0																		
65	1915	78	60	33	2	2	Sc ↑																	

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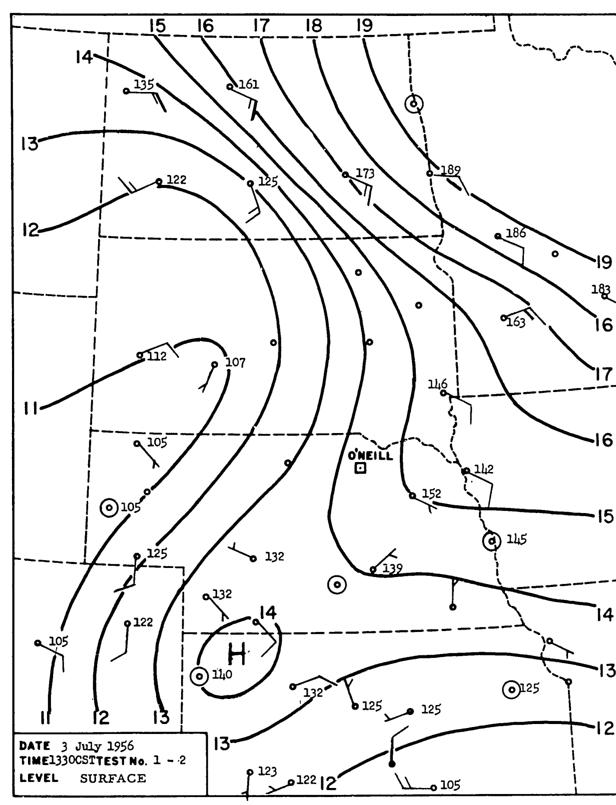
CHAPTER 4
SYNOPTIC INFORMATION

P. A. Giorgio and Lt. D. W. Stevens
Geophysics Research Directorate
Air Force Cambridge Research Center

At an early stage of the field program, it became very apparent that use of only National Weather Analysis Center facsimile maps and prognoses would not suffice for the purposes of forecasting wind direction for gas releases. Consequently, sectional, sea-level, pressure maps were plotted and analyzed, using hourly airways sequences from the network of stations lying in the area extending from approximately 93°W to 104°W Longitude and from the United States-Canadian border southward to 37°N Latitude. Occasionally, coverage was extended westward as far as approximately 120°W, and southward to about 35°N. Isobars were drawn at 1 mb intervals. These maps revealed many small-scale features of the circulation which seldom appeared on the large-scale facsimile maps, and which often exercised primary control over the airflow at O'Neill. This type of analysis greatly facilitated the wind direction forecasting problem, and enabled more effective scheduling of gas releases.

The accompanying maps were prepared from hourly airways sequences. Times were selected so that, in most cases, the map represents the sea-level pressure pattern existing midway between two gas releases. The only values plotted are the surface wind speed and direction and the sea-level pressure report from the station. Temperatures were used in some of the analyses, but omitted from the figures in the interest of clarity of reproduction. Standard analysis procedure was used, except that the isobar interval is 1 millibar. All analyses were checked for consistency with the U. S. Weather Bureau analyses for the same period. The isobar labels are the last two digits of the sea-level pressure: 13 = 1013 millibars.



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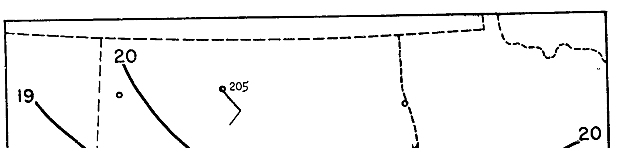

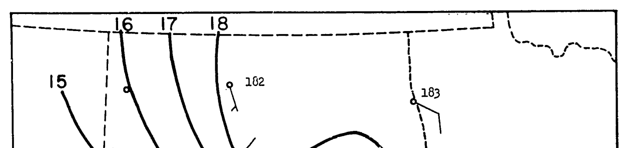

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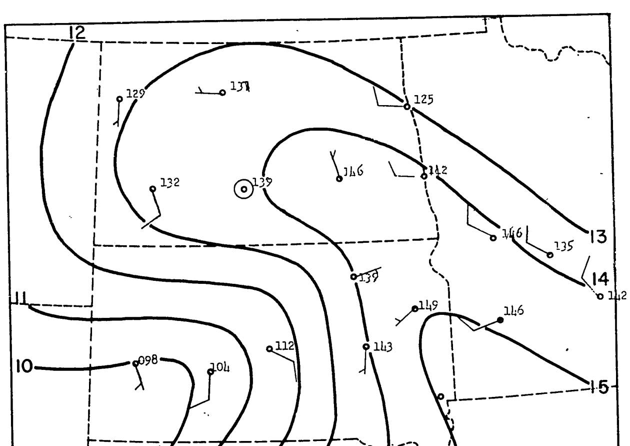
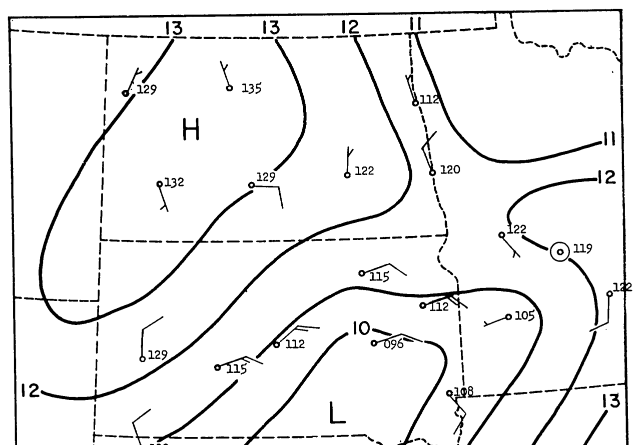
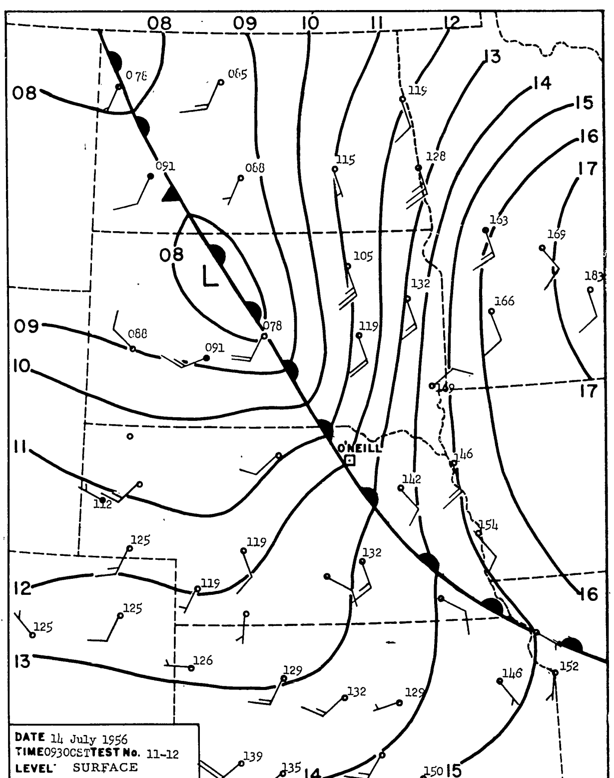
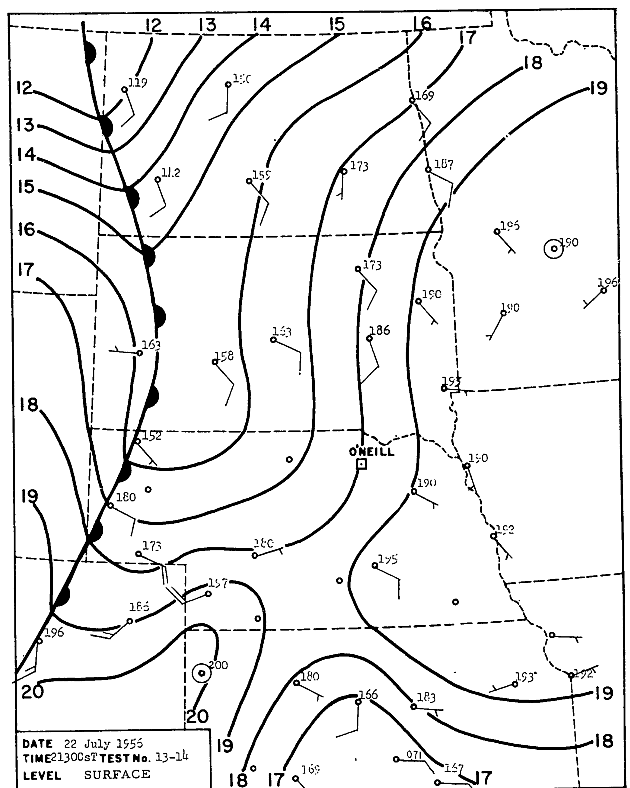


O'NEILL
10
11
12
13
14
15
16
17
DATE 10 July 1956
TIME 1530CST TEST No. 7 - 8
LEVEL SURFACE



H
L
O'NEILL
10
11
12
13
14
15
DATE 11 July 1956
TIME 1130CST TEST No. 9 - 10
LEVEL SURFACE





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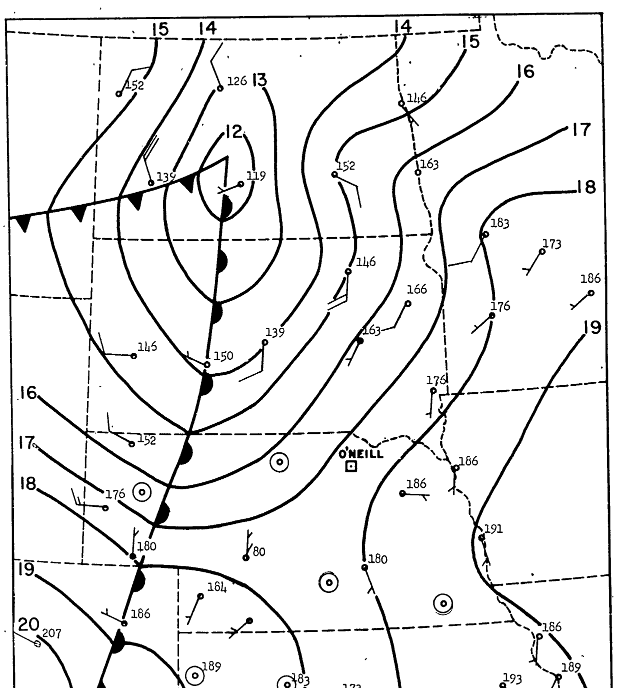

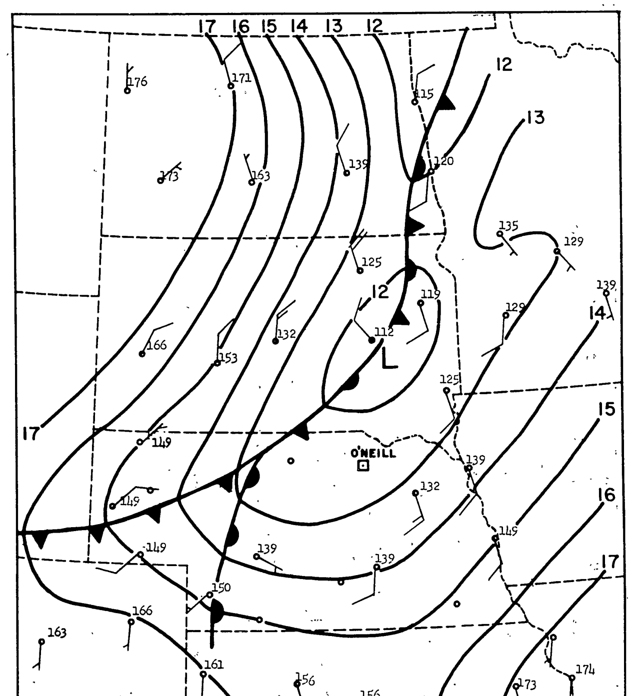

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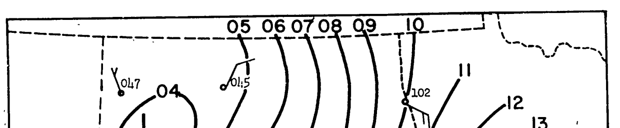
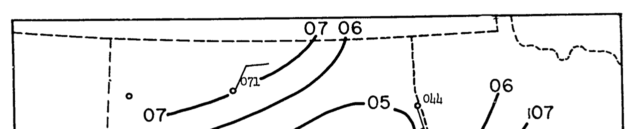
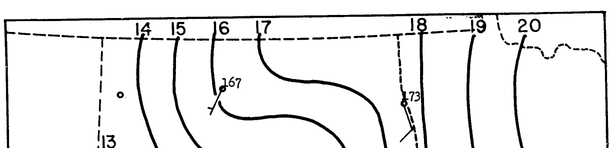
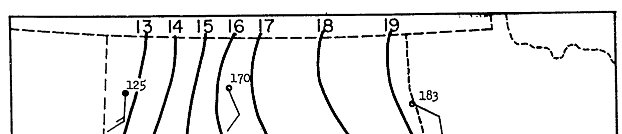


DATE 25 July 1956
TIME 1230CST TEST No. 19-20
LEVEL · SURFACE



DATE 25 July 1956
TIME 2330CST TEST No. 21-22
LEVEL SURFACE





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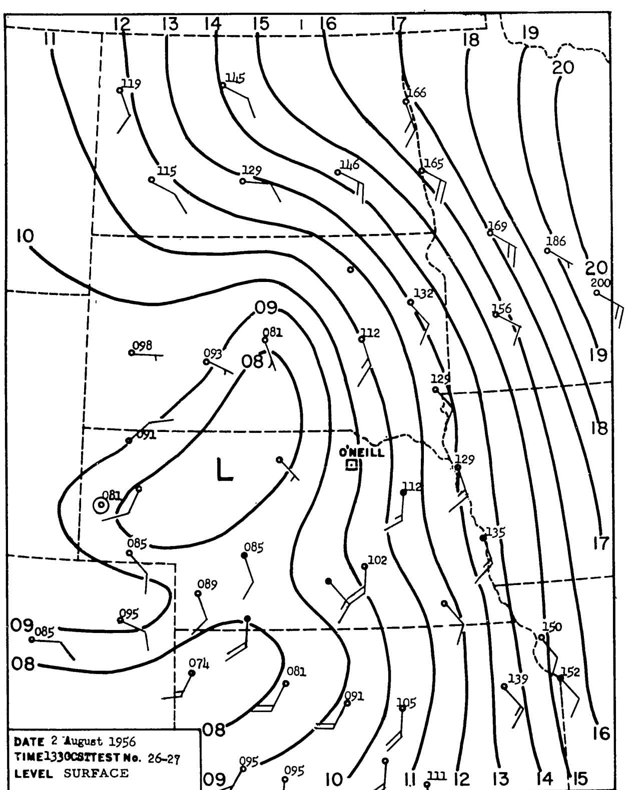

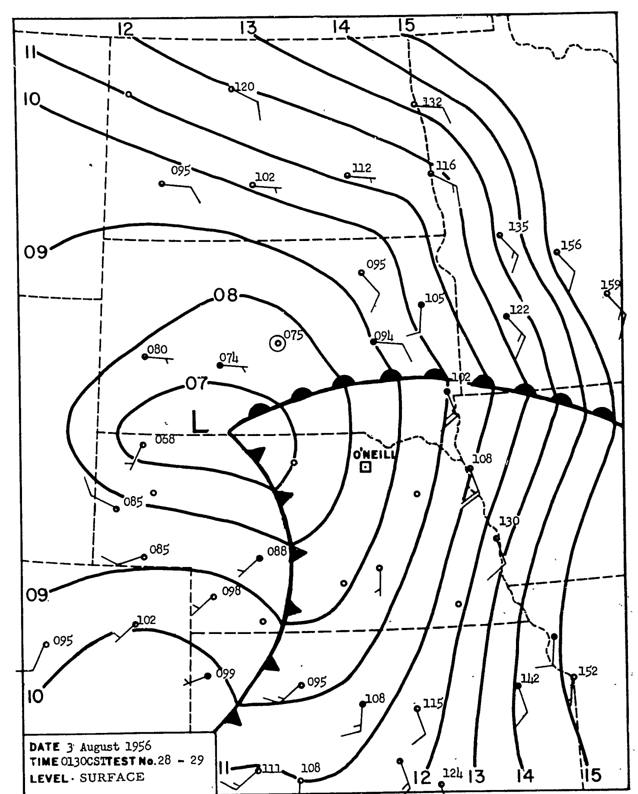

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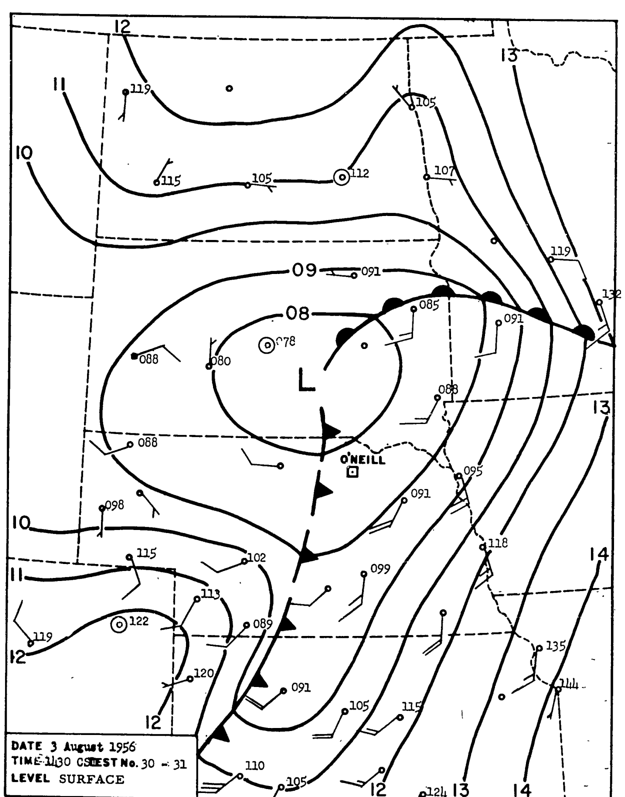
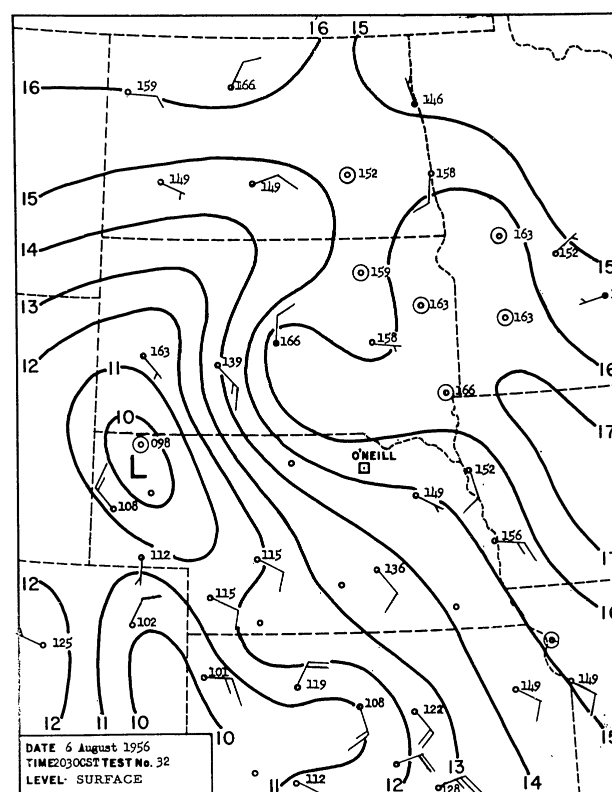
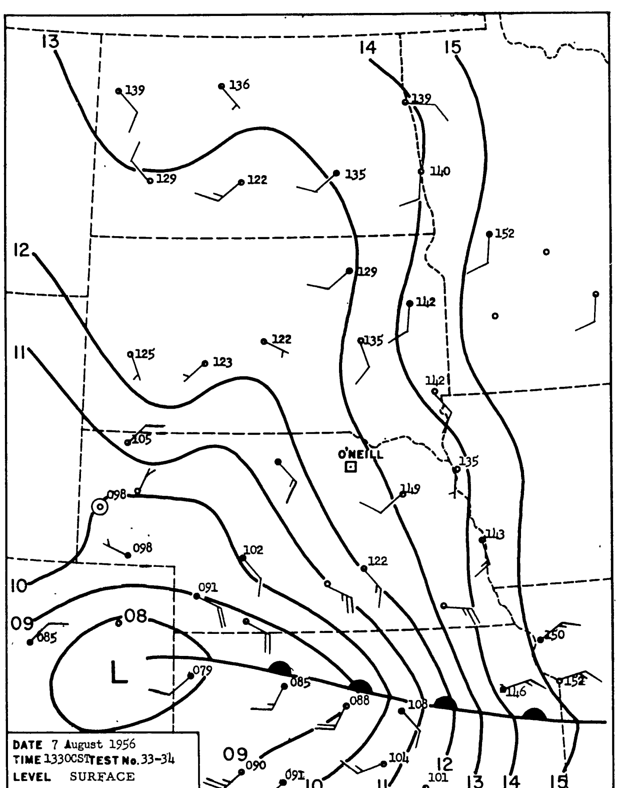
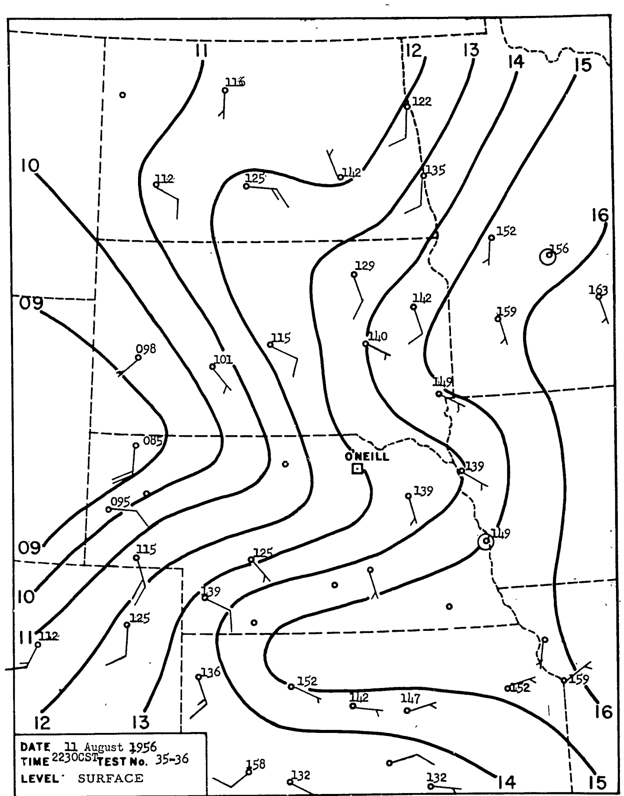

O'NEILL
DATE 3 August 1956
TIME 1130 CST TEST No. 30 - 31
LEVEL SURFACE


O'NEILL
DATE 6 August 1956
TIME 2030 CST TEST No. 32
LEVEL SURFACE





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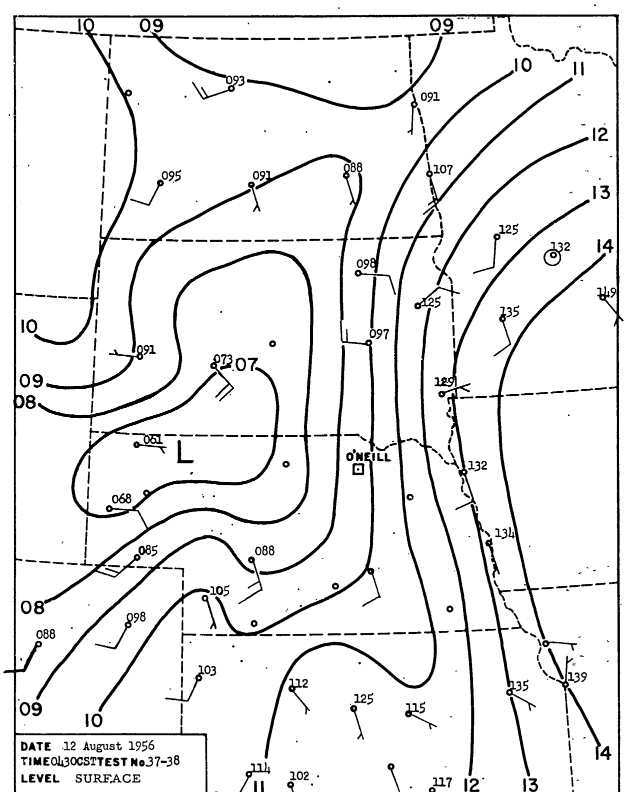

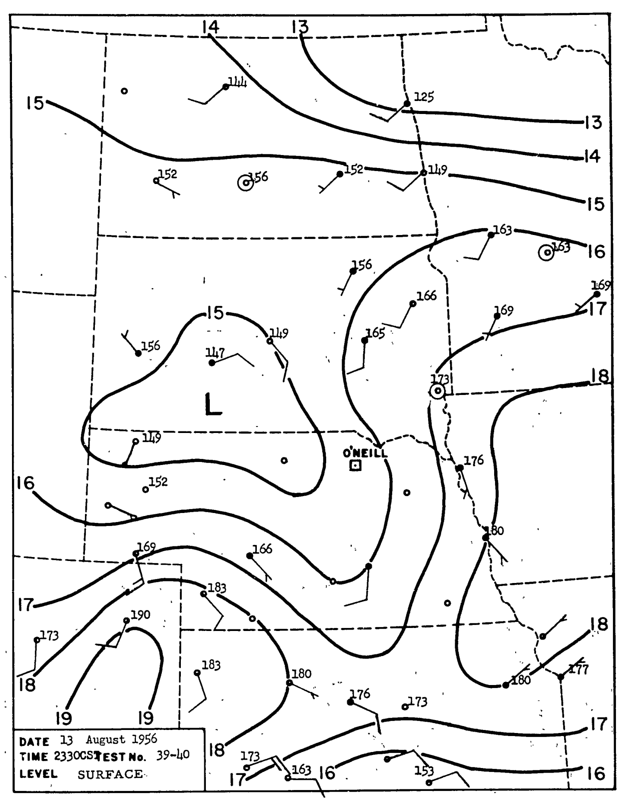

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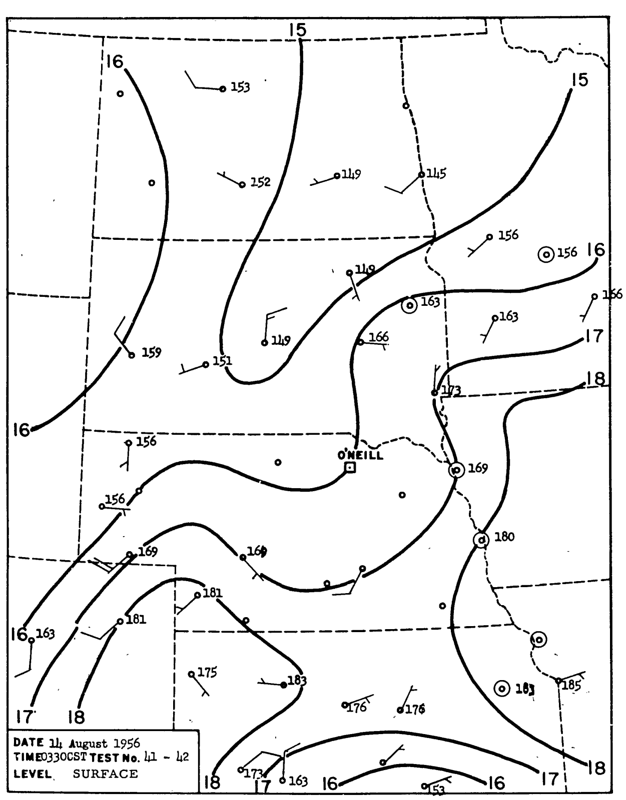

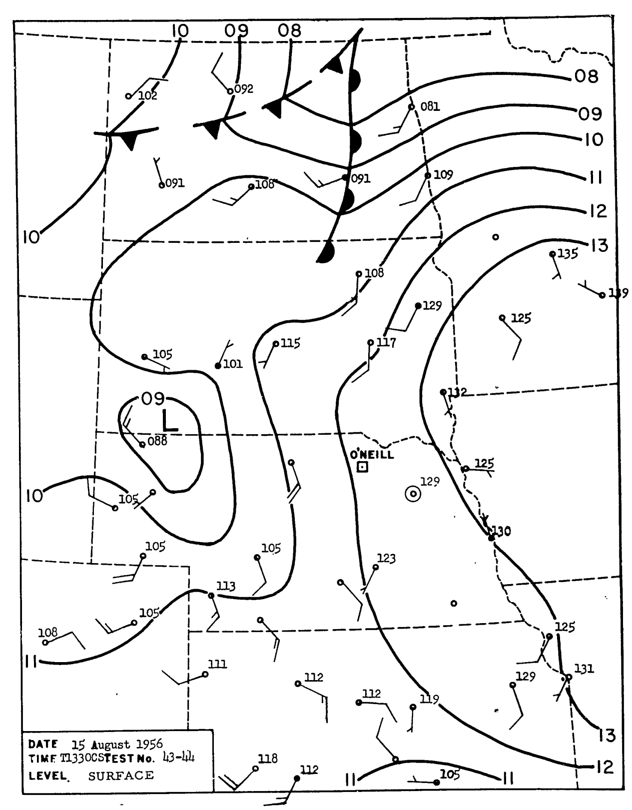

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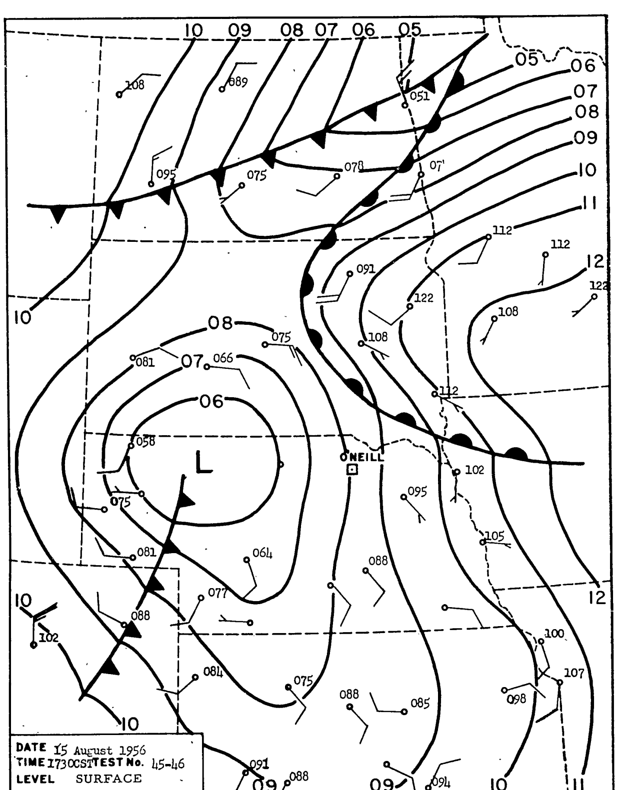
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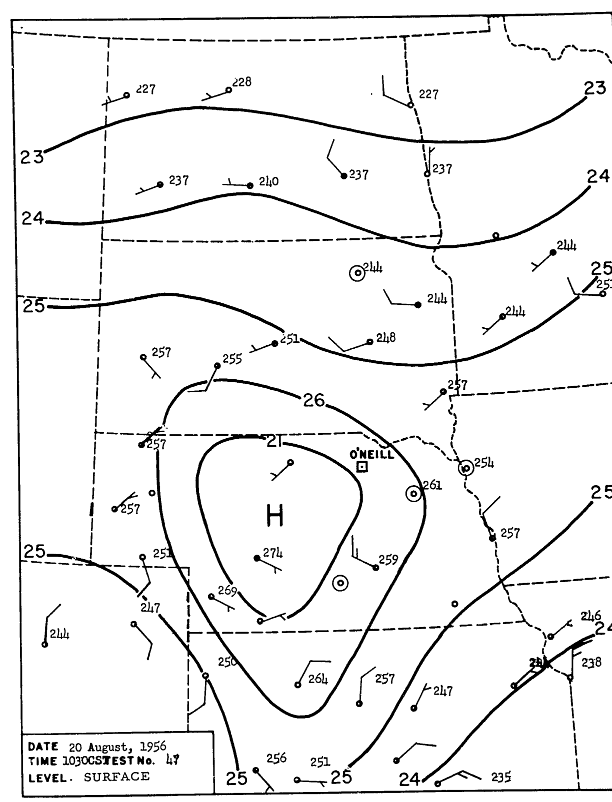
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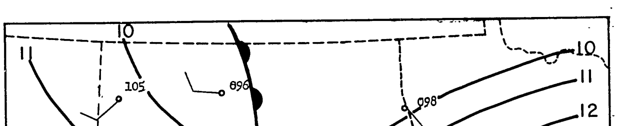
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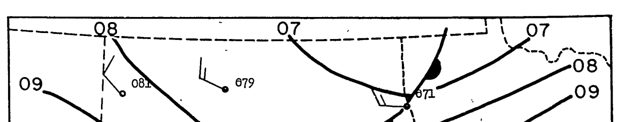
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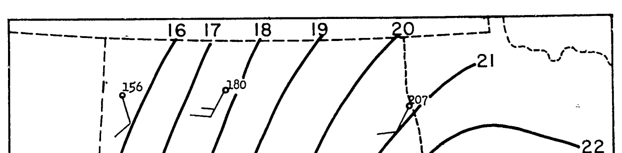

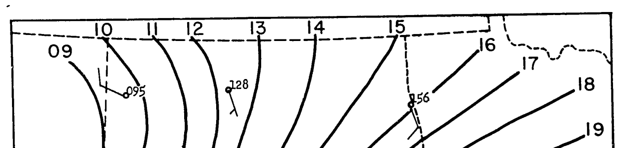

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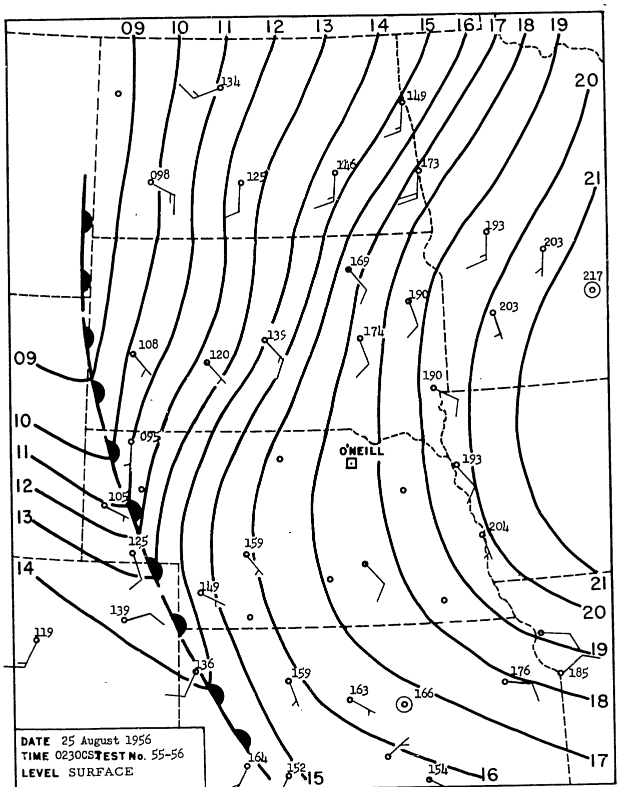
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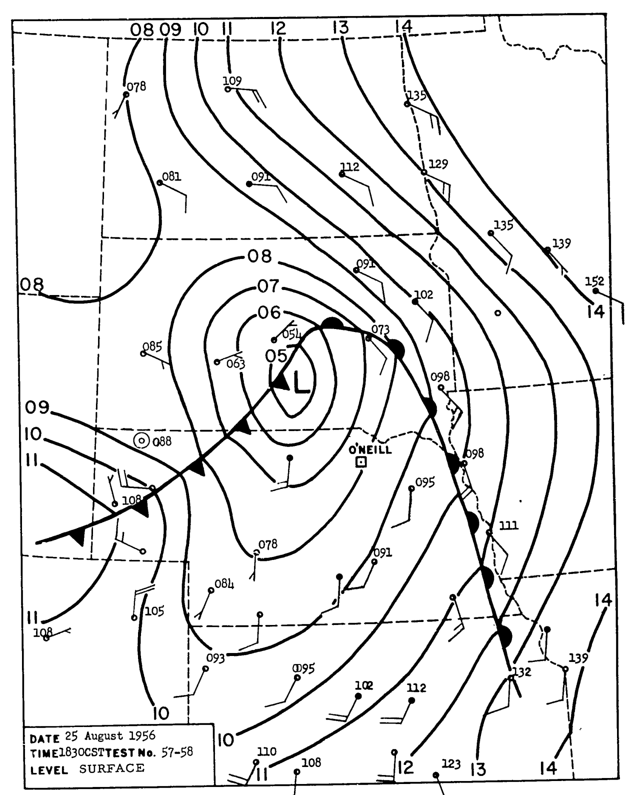
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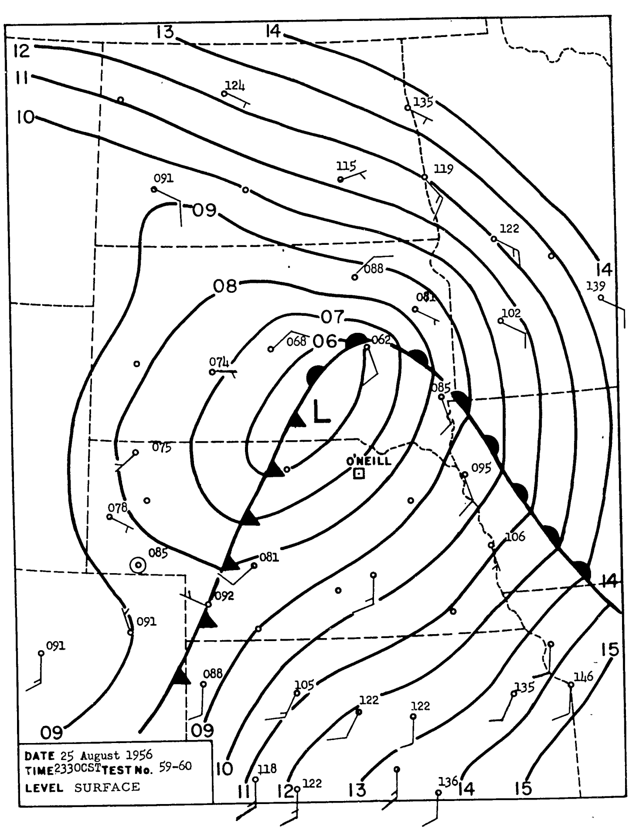

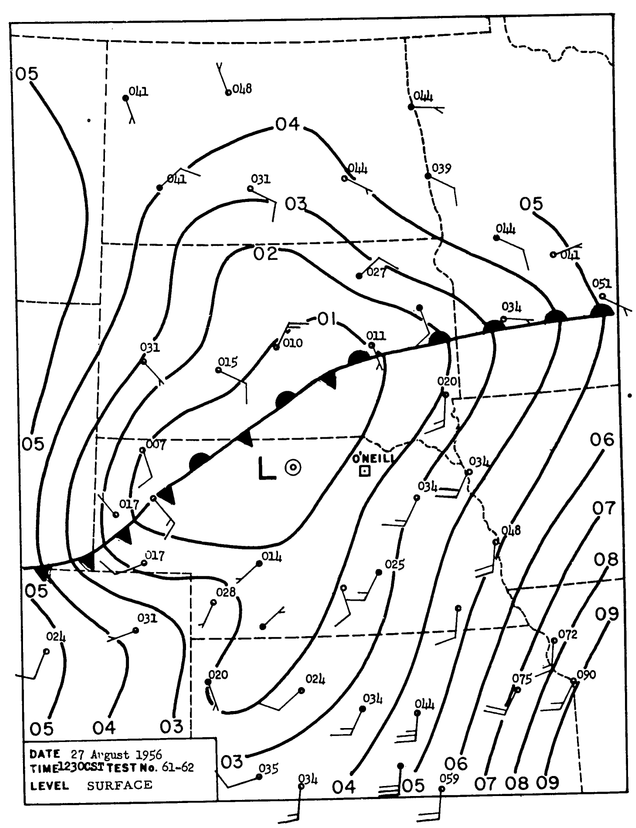

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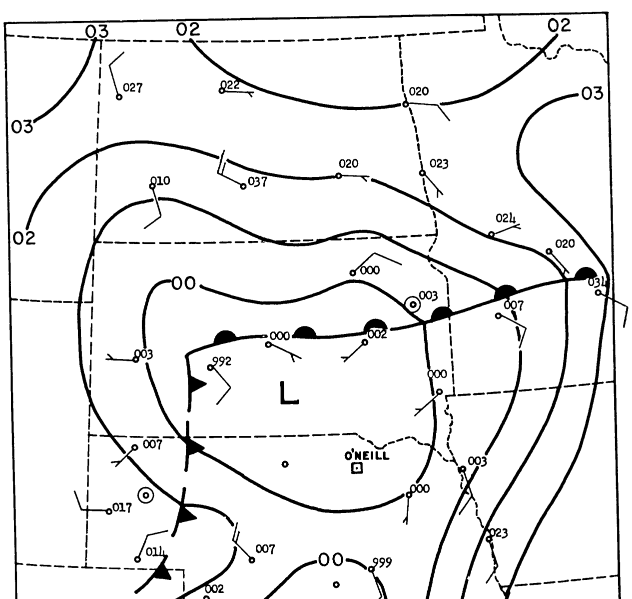
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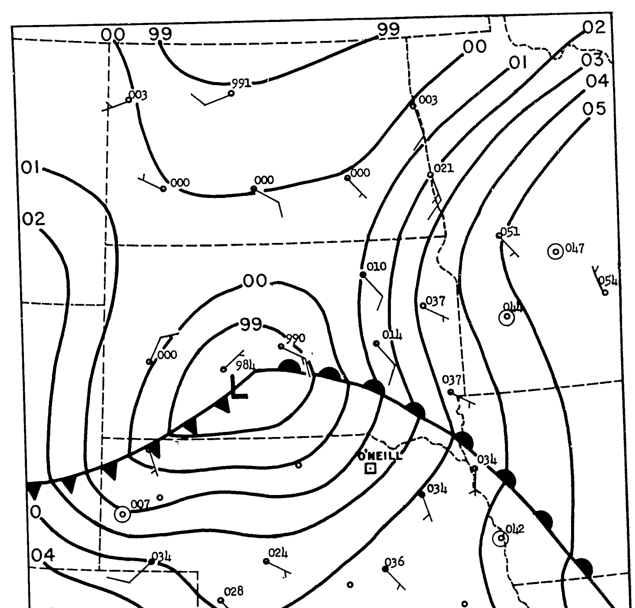
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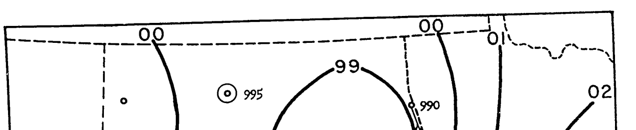

CHAPTER 5

DIFFUSION MEASUREMENTS DURING PROJECT PRAIRIE GRASS

H. E. Cramer, F. A. Record, and H. C. Vaughan
Massachusetts Institute of Technology

5.1 Introduction

The diffusion measurements obtained during Project Prairie Grass comprise average or time-mean concentrations determined at selected points downwind from a continuous point source of sulfur-dioxide gas located near ground level. Sulfur dioxide is relatively inexpensive and readily available; the sampling technique is based on firmly established and extremely simple physical principles, and is capable of resolving minute concentrations of the order of 0.01 parts per million. The sampling network utilized midget impingers mounted at a height of 1.5 m along five semicircular, concentric arcs located within 800 m of the release-point. Limited vertical sampling was carried out along the 100-m arc by means of impingers mounted at 9 levels on 6 lightweight towers. Electrically-operated vacuum units suitably positioned within the sampling network provided aspiration for the impingers. During the diffusion experiments, air was drawn into the impingers through short sections of capillary tubing and bubbled through a dilute hydrogen-peroxide solution. Sulfur dioxide present in the air samples combined with the hydrogen peroxide to form sulfuric acid. Average gas concentrations were determined from laboratory measurements of the electrical conductivity of the aspirated solutions.

Data are available for approximately 70 diffusion experiments carried out in a wide variety of weather conditions. Approximately half the data refer to unstable (daytime) thermal stratification and the remainder were obtained at night in the presence of temperature inversions. In the experiments, the sampling networks were put in operation just before the start of the gas release which lasted for 10 minutes; operation of the networks continued for several additional minutes after

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the end of the gas release to permit the wind to transport the tracer beyond the 800-m arc. A detailed description of the apparatus and techniques used during the diffusion experiments is given below.

5.2 Generation of the Tracer

The basic features of the sulfur-dioxide generator are shown schematically in Figure 5.1 and a photograph of the field installation of the generating equipment is presented in Figure 5.2. Operation of the generator may be described as follows: Liquid sulfur dioxide from an inverted 150-lb cylinder was vaporized in a specially-constructed chamber immersed in 150 gallons of hot water contained in a large circular tank. Approximately 3×10^6 calories were required to vaporize the sulfur dioxide released during each experiment. This amount of heat must be supplied from an external source to maintain a constant rate of emission consistent with efficient source operation. Otherwise, the attendant rapid cooling of the gas-liquid interface produces excessive pressure decreases throughout the system and a consequent steady decrease in the rate of emission. The requisite heat transfer was facilitated by continuous circulation of the heated water in the large tank through a 100-ft coil of copper tubing placed inside the vaporization chamber; thermostatically-controlled immersion heaters rated at 10 kw maintained the water temperature at approximately 50°C. It was frequently necessary, during the latter part of the daytime gas releases, to add liquid sulfur dioxide to the vaporization chamber to maintain the required emission rate; electric strip heaters attached to the exterior of the inverted steel cylinder aided in effecting this transfer. From the vaporizer, the gas flowed through a pressure regulator and an adjustable valve controlling the flow rate into a large ironcase meter (American Meter Company Type 500B). Total output registered on a special indicating dial at the top of the meter case. The gas meter was adjusted at the factory to read about 1 percent low with an accuracy of ± 0.5 percent. Pressure and temperature of the gas were measured both at the inlet and outlet

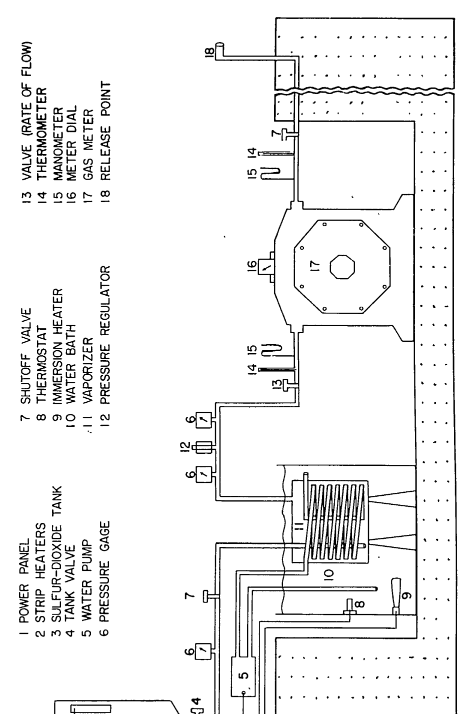

Figure 5.1 Schematic diagram of sulfur-dioxide generator.

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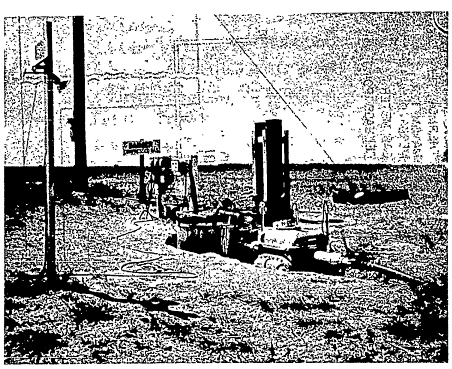

Figure 5.2 Field installation of sulfur-dioxide generating apparatus.

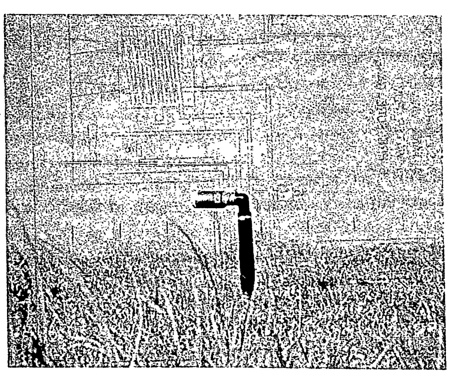

Figure 5.3 Release-point for the tracer.

of the meter to permit accurate reduction of the total amount of gas released to a source strength expressed in g sec^{-1}. As shown in Figure 5.2, the gas meter and the large water tank were set in a shallow trench to minimize the disturbance to the natural air flow immediately upwind from the release point for the sulfur-dioxide gas. The tracer was conducted from the meter outlet through a 50-m length of 2-inch plastic pipe buried just beneath the surface of the ground, and was released horizontally at a height of 46 centimeters. A photograph of the orifice is presented in Figure 5.3; the picture was taken prior to the start of the field experiments before the grass at the field site was mowed. In six experiments (Nos. 63-68), the height of the release point was adjusted to 1.5 m, the height of the samplers in the horizontal sampling network.

The rate of tracer emission was adjustable over a wide range; the maximum source strength of about 100 g sec^{-1} was utilized during the daytime releases. Uniformity of the emission rate was checked during the releases by marking the passage of each 10 cu ft of gas through the meter on an Esterline-Angus recorder; a manually-operated switch activated a sidemarker pen that put a pip at the side of the moving chart roll. During all nighttime experiments and during most daytime experiments, observed variations in the emission rate were less than 5 percent. In a few daytime gas releases, the emission rate during the last minute of source operation was from 5 to 10 percent below the initial rate.

5.3 Description of the Sampling Network

Average gas concentrations were determined at approximately six hundred individual sampling stations located within a semicircle of radius 800 m centered on the release point for the tracer. As shown in Figure 1.1, the base line of the horizontal sampling network was oriented along a true East-West line to take advantage of prevailing southerly winds. Midget impingers (Mine Safety Appliance Company) were mounted at a height of 1.5 m on steel fence posts located along five

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semicircular arcs. The posts were spaced at intervals of 2 degrees along the 50-, 100-, 200-, and 400-m arcs; at 800 m, a separation interval of 1 degree was used. The posts for each arc were numbered consecutively, Post Number 1 being located at the intersection of the arc with the western limb of the base line (that is at a true angular bearing of 270 degrees from the release point). Details of the impinger installation are shown in Figures 5.4 and 5.5, and a view of part of the fence post array along the 100-m arc appears in Figure 5.7.

Each impinger contained 10 ml of dilute (slightly acidified) hydrogen peroxide solution. Use of capillaries (see Figure 5.5) reduced the variations in flow rate between impingers to within 1 or 2 percent; otherwise, variations of the order of 10 percent were frequently present. Each section of precision bore capillary tubing (inside diameter - 0.0252 ± 0.0003 in.; length - 1.330 to 1.335 in.) was tested individually in the laboratory with a standard impinger; only those sections that were within 1.5 percent of standard were selected for field use. Air thus drawn into the impingers passed down the central glass tubes and was broken into tiny bubbles as it impinged upon the bottom of the glass flasks. Sulfur dioxide present in the air reacted with the hydrogen peroxide to form sulfuric acid. The collection efficiency of the impingers, as indicated by laboratory tests described below, was greater than 97 percent for all the Prairie Grass experiments.

Aspiration of the impingers was provided by 11 vacuum units (electric motor, pump, tank, vacuum regulator) apportioned as follows along the various arcs: one unit at 50 m; two units at 100 m (one for the vertical network described below), 200 m, and 400 m; and four units at 800 meters. One of the units used in field experiments is shown in Figure 5.6. The 1/3-hp motor, pump, and tank are sold commercially for use with farm milking machines (Sears Roebuck and Company); the diaphragm-type regulator (Fisher Governor Company Type 734A), seen at the extreme left of the photograph, maintained the line vacuum within 1 to 2 percent of the desired value during the 10-minute sampling period.

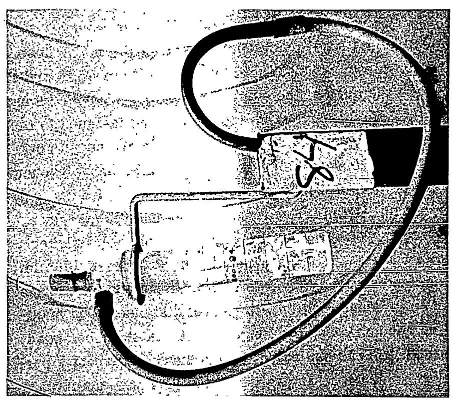

Figure 5.5 Close-up of midget impinger in operation.

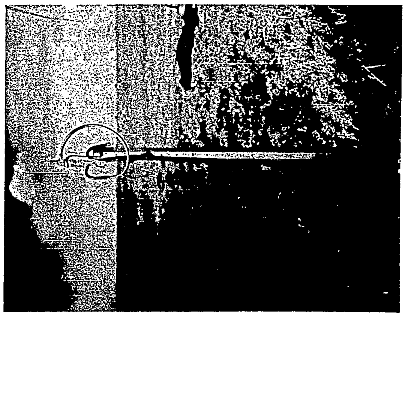

Figure 5.4 Midget impinger mounted at height of 1.5 m on steel fence post.

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A visual check on the line vacuum was provided by a mercury manometer mounted on a steel fence post. Heavy-wall rubber hose was attached to the inlets of the vacuum tanks (see Figure 5.6) and laid on the ground along the arcs of the sampling network. Copper tubing was inserted in the hose at each sampling station and fastened to the steel fence posts (see Figure 5.4). The impingers were set in ring holders attached to the tops of the posts and connected to the vacuum line by short lengths of gum rubber tubing (see Figure 5.5). An aspiration rate of 1.0 liter min^{-1} was used at 50 and 100 m; this required a line vacuum of 51 mm of mercury. A somewhat higher aspiration rate (1.5 liter min^{-1}, requiring a line vacuum of 100 mm of mercury) was used at the other arcs to compensate in part for the expected decrease in concentration with travel distance. The maximum drop in line vacuum along the longest sections of rubber hose was about 4 percent; this is equivalent to a reduction of about 2 percent in the rate of aspiration. Operation of the vacuum-pump motors was controlled from a central switchboard located along the center-line of the sampling network at a travel distance of about 450 m from the release point. Line vacuums were checked and necessary adjustments made just before the start of each diffusion experiment.

Average gas concentrations were also determined along the vertical from midget impingers mounted at nine levels on each of six towers located along the 100-m arc. The lightweight television-type towers (Alprodco, Inc.) were spaced at intervals of 14 degrees and were positioned symmetrically with respect to the center line of the horizontal sampling network. A photograph of the tower array appears in Figure 5.7. The towers were constructed of aluminum alloy with triangular cross sections measuring 8-1/2 inches on a side; each tower rested on a small cement base and was supported at three levels by 3/16-inch stranded-steel guy wires. The technique for installing the impingers on the towers is illustrated in Figure 5.8. Heavy rubber hose similar to that used in the horizontal network was

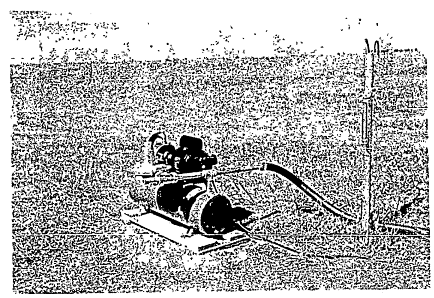

Figure 5.6 Vacuum unit used to aspirate midget impingers; mercury manometer indicating line vacuum is mounted on steel post.

Figure 5.7 Tower array at 100-m arc.

Figure 5.8 Close-up of impinger installation on tower

fitted with short lengths of solid brass rod (5/8 in. in diameter); a portion of the interior of each rod was drilled out to make the line vacuum available at a port on the side of the rods. The ports comprised short sections of 1/4-inch brass tubing silver-soldered to the brass rods. Spring clamps fastened to the ends of the brass rods served to hold the impingers securely in place. Prior to the start of a diffusion experiment, the rubber hose was raised by simple block and tackle gear; the ascent of the hose was guided by sections of aluminum track fastened to the sides of the towers and slotted to permit passage of the brass rods (see Figure 5.8). Impingers were inserted in the spring clamps and gum rubber tubing used to connect the impinger outlets to the line-vacuum ports. At the conclusion of the experiment, the rubber hose was lowered and the impingers removed for transport

to the laboratory and subsequent analysis. The rope used to raise and lower the vertical sampling apparatus appears at the extreme right of Figure 5.8. This simple technique worked very satisfactorily. A single vacuum unit located at the center of the 100-m arc provided aspiration for the impingers on the 6 towers. Concentrations were determined at 9 levels on each tower: 0.5, 1.0, 1.5, 2.5, 4.5, 7.5, 10.5, 13.5, and 17.5 meters.

5.4 Laboratory Procedure

The successful execution of the diffusion experiments depended in large measure upon careful analytic procedure and high standards of cleanliness. Any contamination of the impinger solutions seriously impaired the high degree of resolution otherwise obtainable in the measurements. A special laboratory building was erected at the field site to provide storage space for the impingers and auxiliary apparatus, as well as working space for analysis of the aspirated solutions. The building was of double-wall plywood construction, fully insulated, and painted white on the exterior to minimize the absorption of solar radiation. Incursions of dust were largely eliminated through the use of sealed windows and a single entrance on the north side of the building, sheltered from the prevailing southerly winds. An exterior view of the laboratory building appears in Figure 5.9. Suitable temperatures were maintained within the laboratory building by two air conditioners.

Diffusion experiments were scheduled in pairs, each experiment requiring the use of 599 impingers. The impingers were filled by means of pipettes that automatically metered 10 ml of solution. The filling operation is shown in Figure 5.10; the wire basket appearing in the figure contains approximately 50 impingers. After the impingers were filled with hydrogen-peroxide solution, the baskets were stored on shelves in the laboratory (see Figure 5.11) until the field crew took them to the sampling network. Much of the work of installing the impingers within the network and returning the samplers to the laboratory was performed by 12 high-school age boys from O'Neill, Nebraska.

Figure 5.11 Shelves for storage of impinger baskets.

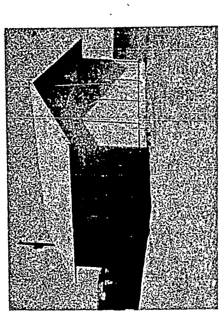

Figure 5.9 Exterior of laboratory.

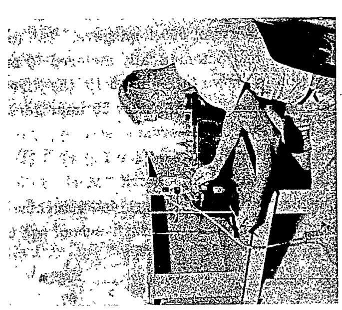

Figure 5.10 Filling impingers with solution.

Figure 5.12 Analysis team determining conductance of aspirated solutions

The following precautions were taken to avoid any mixup in the impingers: All baskets were clearly labeled with respect to the appropriate arc and the spaces for individual impingers were numbered according to the posts of the horizontal sampling network; the impingers in each basket were similarly labeled. There were two complete sets of impingers; the baskets of one set were painted blue and those of the second set were painted red. Only one set was ever permitted to leave the laboratory during preparations for a gas release. The impingers for the vertical sampling network were placed in separate baskets and clearly labeled. The field crew left the sampling network area after the impingers had been installed and waited for the conclusion of the experiment. Then, after the tracer had cleared the networks and the meteorological measurements were ended, the field crew collected the impingers and returned the baskets to the laboratory for analysis.

The analysis consisted of measuring the electrical conductance of the aspirated solutions using conductivity cells and Wheatstone bridges. The impinger baskets were placed one at a time in a constant-temperature water bath. When the bath temperature reached the prescribed value, the conductance of the solution in each impinger was measured. An analysis team is shown in Figure 5.12; the man standing has removed the top of the impinger assembly and inserted the dip-type conductivity cell into the solution; the man seated is reading the resistance on a Wheatstone bridge. This equipment was duplicated at

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the other end of the laboratory. When all the conductances had been determined and checked for accuracy, the impingers were emptied, rinsed, and refilled with solution in preparation for the next experiment. After the laboratory and field crews had become proficient, it was possible to conduct four diffusion experiments within an 8-hour period.

Reduction of the electrical conductivities to gas concentrations is based on well-known laboratory procedures.* Calibration curves may be obtained directly by determining the conductance of sulfuric acid solutions of known normality. Equivalent conductance for these solutions is tabulated in standard reference books for a wide range of normality and temperature. The relationship between the specific conductance of a solution at a temperature of 27°C and the normality of the solution is shown in Figure 5.13. The scale at the right of the figure expresses normality in terms of milligrams of sulfur dioxide per cubic meter of air for 10 ml of absorbing solution and a sample volume of air of 15 liters. The reference level for zero concentration was obtained from the average conductance of aspirated solutions contained in impingers that were clearly in sectors of the sampling network outside the limits of the gas plume. The uncertainty in the laboratory technique for determining conductance is less than 2 percent within the normal range of concentrations.

5.5 Collection Efficiency of the Midget Impingers

The apparatus shown in Figure 5.14 was used to determine collection efficiencies of the midget impingers in the laboratory. Sulfur-dioxide gas and air were metered into the vertical pipe at the left and entered the large mixing tank; the mixture was removed from the tank and drawn through the pipe and rubber hose shown at the right of the photograph by an exhauster located outside the laboratory building. Both the amount of air and sulfur dioxide were adjustable over a

*For a previous application of this method see: Dean, R. S., and others, 1944: Report submitted to the Trail Arbitral Tribunal. Bull. U. S. Bureau of Mines, No. 453.

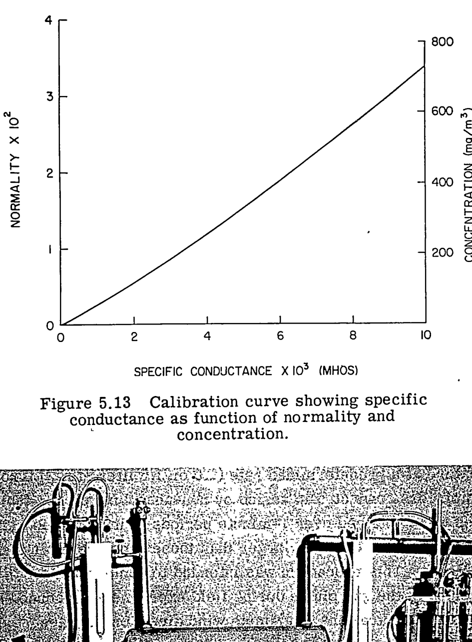

Figure 5.13 Calibration curve showing specific conductance as function of normality and concentration.

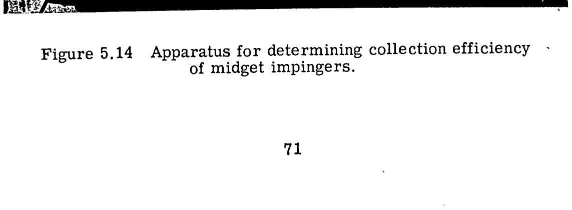

Figure 5.14 Apparatus for determining collection efficiency of midget impingers.

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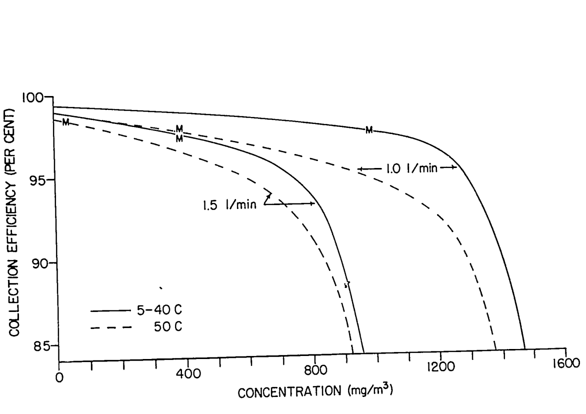

Figure 5.15 Collection efficiencies of midget impingers used in Prairie Grass diffusion experiments

wide range. The mixture was sampled through ports in the exit pipe in the following manner: The small vacuum pump in the foreground drew the mixture at a predetermined rate (1.0 or 1.5 liter min^{-1}) through four impingers connected in series by non-absorbing plastic tubing. Samples were obtained over 1-minute periods at levels of concentration approximately 10 times larger than those encountered in the field experiments. This procedure was intended to compensate for the meandering of the gas plume during field experiments produced by the larger-scale fluctuations in azimuth wind direction; in effect, the gas plume is present at an individual sampling station for only a fraction of the 10-minute sampling time. The significance of solution temperature on the measurement technique was investigated by immersing the four impingers in a water bath; the bath temperature was then varied over the range from 5° to 50°C. Conductivity measurements of the solutions in the four impingers provided concentration data used in calculating the collection efficiencies presented in Figure 5.15.

The results are directly applicable to the Project Prairie Grass diffusion experiments; the concentrations plotted in Figure 5.15 are adjusted for the 10-minute sampling periods of the field experiments (that is they are 1/10 the values determined from the laboratory tests described above). Maximum 10-minute concentrations measured during the Prairie Grass experiments are indicated in the figure by the symbol M. The data indicate that the collection efficiencies during Prairie Grass were greater than 97 percent in all cases. The sharp decrease in collection efficiency with increasing concentration exhibited by the curves is associated with the removal of hydrogen peroxide from the solution; the concentration at which this occurs can be altered by changing the amount of hydrogen peroxide in the solution. The solution used during Prairie Grass, and in the laboratory experiments for determining the collection efficiency, was prepared by adding 50 ml of 30 percent hydrogen peroxide and 10 ml of 1/10 normal sulfuric acid to 18 liters of distilled water. The solution's temperature appears to have no significant effect on collection efficiency for temperatures within the 5° to 40°C range; for temperatures of 50°C, the collection efficiency is somewhat reduced as indicated by the dashed lines in Figure 5.15.

5.6 Discussion of the Reliability of the Concentration Measurements

As pointed out, above, determining time-mean gas concentrations involves a relatively large number of individual measurement techniques and pieces of equipment. With few exceptions, the uncertainties associated with these individual procedures are all within the range of from 1 to 2 percent. It is also evident that many, if not most, of these uncertainties are probably random and tend largely to compensate one another. The accuracy of the determination of average source strength for individual gas releases depends principally upon the reliability of the gas meter and on the representativeness of the temperature measurements obtained, during the releases, at the inlet and outlet of the meter.

In calculating the weight of gas released, arithmetic means of the inlet and outlet measurements were used. For the nighttime gas releases, there is no significant difference between the two sets of data. During the daytime releases, the inlet temperature is frequently 10° to 12°C lower than the outlet temperature. In these cases, use of the average temperature might lead to uncertainties of the order of 1 to 2 percent in the calculated source strength. Changes in ambient air temperature have only a slight effect on the mechanical parts of the gas meter; the manufacturer states that the temperature coefficient for the displacement mechanism is approximately 0.05 percent per degree Fahrenheit. Over the range of temperatures encountered during the experiments, this would result in an uncertainty of about 1 percent. Duration of the gas release was controlled within limits of 1 to 2 percent. Residual sulfur dioxide remaining in the plastic pipe used to conduct the tracer from the meter to the release-point constitutes approximately 1 percent of the total volume released during nighttime experiments and about 0.5 percent of the total volume released during the daytime experiments. This appears to be a negligible source of error. The adjustment in the gas meter at the factory, resulting in dial readings approximately 1 percent too low, is offset very nicely by the collection efficiency of the impingers which averages approximately 99 percent.

Possible sources of error in the collection of gas samples exist principally in variations in the rate of aspiration and loss of solution due to evaporation. As mentioned above, laboratory tests of individual impingers and capillaries limited the variation in flow rate under standard vacuum to a range of 1 to 2 percent. In field use, line vacuum depended upon the initial adjustment based on mercury manometer readings, the sensitivity of the vacuum regulators, and the line drop along the arcs. Each of these factors contains an uncertainty of about 1 to 2 percent with respect to the aspiration rate. All concentrations were calculated on the assumption that the volume of absorbing solution in the impingers remained unchanged during the experiments. There is

actually a small reduction in volume due to loss of water vapor during aspiration. Similar loss of sulfuric acid is considered insignificant in view of its very low vapor pressure.

The water vapor loss may be estimated in two ways. The amount of water vapor required to saturate the entrained air may be calculated from a knowledge of the aspiration rate, air temperature, relative humidity, and the duration of the sampling period. The latter comprises both the actual operation time of the sampling networks during each gas release and the time required to check the line vacuum prior to the start of each release. No records were kept of the total aeration time which varied from experiment to experiment and from one arc to another. However, a period of about 18 to 30 minutes was usually required. Calculations based on the maximum aeration time of 30 minutes and an aspiration rate of 1.0 liter min^{-1} indicate, for the nighttime experiments, a median error of 2 percent and an extreme range from 0.6 to 5.0 percent. Similar calculations for the daytime experiments indicate a median error of 5.5 percent with an extreme range from 2 to 10 percent. Loss of solution by evaporation may also be estimated from differences in the conductance of aspirated solutions in impingers located outside the limits of the time-mean gas plume and the conductance of unaspirated solutions in spare impingers. These data are available for practically all the experiments and permit calculation of correction factors at each travel distance.

The principal source of uncertainty in this method is the presence of background contaminants that may affect the conductance of the aspirated solutions; it appears that this factor is generally quite small and probably does not account for more than a 1 or 2 percent variation in conductance. Approximate correction factors based on conductances are presented in Table 5.4; the results indicate a median error of 3 to 5 percent for the nighttime experiments and of 6 to 9 percent for the daytime experiments. The lower estimates refer to the concentration measurements at 50 and 100 m, and the higher estimates refer to the remaining travel distances and reflect principally the difference in rates of aspiration discussed above.

The laboratory analysis of the aspirated solutions was performed in the following manner: Baskets containing about fifty impingers were placed one at a time in the water baths. When the proper bath temperature had been attained, a dip-type conductivity cell was inserted in one impinger and the conductance determined. Then the cell was removed, excess solution was shaken off, and the cell was inserted in the next impinger, and the process repeated. This procedure entailed a slight carry-over of solution from one impinger to the next. The usual practice involved determination of conductances from one edge of the plume to a point slightly beyond the peak concentration; the analysis then continued from the other edge of the plume towards the peak. The reduction in concentration produced by the carry-over and subsequent dilution of solutions is estimated to be from 0 to 1 percent. The Wheatstone bridge had an uncertainty of about 1 percent. Errors due to the original adjustment of the conductivity cells and to changes in cell constants are believed to be about 1 or 2 percent. A change of about 7 percent was noted in the constant of one conductivity cell during the period of the experiments; conductances determined with this cell were subsequently adjusted. Electrolytic solutions have temperature coefficients of resistance of about 2 percent per degree Centigrade; since the water bath temperature was maintained constant within 0.1°C, variations in solution temperature may be neglected as a possible source of error.

Reduction of the electrical conductivities of the aspirated solutions to concentrations was based on results of laboratory determinations of the specific conductance of sulfuric acid solutions of known normality. The values thus obtained are in substantial agreement with those derived from published data. The calibration curves used in reducing the measured conductances are believed accurate to about ± 3 percent. The reference level for zero concentration was obtained from the arithmetic mean of the conductances of aspirated solutions contained in

impingers located outside the limits of the time-mean gas plume. In general, this concentration level is almost entirely due to the small amount of sulfuric acid added in preparing the dilute hydrogen-peroxide solution. It does not, therefore, indicate the presence of any significant amount of sulfur-dioxide in the atmosphere at the Prairie Grass field site. As the limit of resolution of the sampling technique is approached, the uncertainty of determination increases rapidly; for concentrations less than 0.10 mg m^{-3}, this uncertainty is approximately 25 percent.

Approximate checks on the reliability of the concentration measurements were obtained by comparing the calculated source strengths with the mass transport of sulfur-dioxide gas through a vertical cross section at a travel distance of 100 meters. This is the only distance at which vertical concentration data are available. The results indicate that the estimates for the mass transport are about 10 percent higher, on the average, than the calculated source strengths for the nighttime experiments; a similar average discrepancy of about 15 percent is noted in the case of the daytime experiments. Roughly one-third of these differences can be explained by the loss of solution due to evaporation; the remainder may be due in part to undetected systematic errors in the sampling technique, to overestimates of the mean wind speed, and to errors inherent in the method of computing the mass transport. At any rate, there is no evidence of any significant loss of sulfur dioxide due to absorption by vegetation or any other factor. It appears likely that the absolute magnitudes of the Prairie Grass diffusion measurements are accurate to within 10 percent and that the relative concentrations are accurate to within 5 percent.

Summaries of the results of the Prairie Grass diffusion measurements are presented in Tables 5.1 to 5.3. Table 5.1 summarizes the source strengths for the individual experiments calculated on the basis of the total volumes of gas released and the temperature and pressure of the gas as it passed through the meter. Ten-minute average gas concentrations measured at a height of 1.5 m at five travel distances are summarized in Table 5.2. The average concentrations determined from the vertical sampling array at 100 m are presented in Table 5.3. Slow-response meteorological data, useful in converting the concentrations to standard values, are found in Tables 5.4 and 5.5.

Table 5.1. Source strengths Q expressed in g sec^{-1} for individual Prairie Grass diffusion experiments

Run No.	Q (g sec^{-1})	Run No.	Q (g sec^{-1})	Run No.	Q (g sec^{-1})
1	81.5	24	41.2	46	99.7
2	83.9	25	101.4	47	103.1
3	56.3	26	97.6	48S	104.0
4	50.5	27	98.8	48	104.1
5	77.8	28	41.7	49	102.0
6	89.5	29	41.5	50	102.8
7	89.9	30	98.4	51	102.4
8	91.1	31	96.0	52	104.0
9	92.0	32	41.4	53	45.2
10	92.1	33	94.7	54	43.4
11	95.9	34	97.4	55	45.3
12	99.1	35S	41.8	56	45.9
13	61.1	35	38.8	57	101.5
14	49.1	36	40.0	58	40.5
15	95.5	37	40.3	59	40.2
16	93.0	38	45.4	60	38.5
17	56.5	39	40.7	61	102.1
18	57.6	40	40.5	62	102.1
19	101.8	41	39.9	65	44.1
20	101.2	42	56.4	66	43.1
21	50.9	43	98.9	67	45.0
22	48.4	44	100.7	68	42.8
23	40.9	45	100.8		

Table 5.2

Ten-minute average gas concentrations measured during Project Prairie Grass at a height of 1.5 m at five travel distances: 50, 100, 200, 400, and 800 m. Entries are in units of mg m^{-3}. Individual sampling stations at each travel distance are identified in terms of post numbers which are consecutive; Post No. 1 is located due west of the release-point (that is, at a true angular bearing of 270 degrees from the source). A 2-degree angular separation between adjacent stations was used at the four shorter travel distances and a 1-degree angular separation was used at 800 m.

Remarks

No data are presented for Runs No. 63 and 64 due to the presence of extremely light and variable winds. Data for all other experiments have been included. The measurements obtained under stable nighttime conditions should be interpreted with care. In particular, when the wind speed at a height of 2 m is < 2 m sec^{-1}, significant vertical stratification may occur in the plume; in some cases, the plume axis is found below the height of the sampling stations at the shorter travel distances. If this phenomenon is not taken into account, the measurements indicate an increase in axial concentration with increasing travel distance. The vertical concentration measurements presented in Table 5.3 are useful in resolving these problems. With regard to the tabular entries, the letter "M" indicates missing data and the blank spaces denote no measurable concentration.

Run No. 4 - Gas released for 9.5 minutes only. Concentrations have been adjusted to a 10-minute release period.

Run No. 25 - Several gnats were caught in the capillary tubes used as entrances to the samplers. All concentrations known to have been influenced have been indicated as missing.

Runs No. 30 and 31 - Background resistances unusually low and variable. Data believed not significantly affected, except for concentrations below 5 mg m^{-3}.

Run No. 45 - Concentration at Post 38 of the 50-m arc is an adjusted value.

Run No. 47 - Rate of gas release during the first 90 seconds of the run varied by perhaps ± 50 percent of the average rate for the 10-minute period.

Run No. 50 - Vacuum line to Sampler 62 of the 200-m arc became disconnected during the run. All values measured at this arc are too low.

Run No. 51 - Vacuum line to Sampler 56 of the 400-m arc is believed to have been disconnected throughout the run. All values for this arc have been adjusted to make allowance for the reduced vacuum.

Run No. 57 - Vacuum line to Sampler 47 of the 100-m arc is believed to have become disconnected. All values measured at this arc are probably too low.

Table 5.2 (Continued)

DATE 3 July 1956
TIME 1100-1110 CST

CONCENTRATION (mg m^{-3})

RUN NO. 1

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					0.145
	2						24	47	123	14.8	1.18	0.310	0.215
2	3							48					0.205
	4						25	49	109	14.7	1.23	0.295	0.215
3	5							50					0.260
	6						26	51	89.4	14.5	0.970	0.090	0.160
4	7	0.110	0.160					52					0.105
	8						27	53	92.9	14.2	0.995	0.090	0.100
5	9	1.49	0.700					54					0.090
	10						28	55	115	13.5	1.70	0.420	0.100
6	11	6.13	0.870					56					0.165
	12						29	57	122	17.0	1.99	0.520	0.190
7	13	25.3	0.765					58					0.185
	14						30	59	118	13.8	2.20	0.510	0.170
8	15	37.0	2.20					60					0.145
	16						31	61	106	14.9	2.51	0.495	0.085
9	17	50.9	2.17	0.155				62					0.100
	18						32	63	114	19.1	2.05	0.725	0.070
10	19	63.8	6.22	0.755	0.030			64					0.060
	20						33	65	108	18.4	1.57	1.12	0.075
11	21	66.9	11.6	0.675	0.015			66					0.080
	22						34	67	88.1	17.1	2.35	0.895	0.045
12	23	77.7	9.64	0.525	0.045			68					0.050
	24						35	69	70.5	17.3	2.79	1.02	0.020
13	25	89.1	9.07	0.455	0.070			70					0.030
	26					0.055	36	71	80.6	18.2	3.56	0.410	0.045
14	27	139	14.3	0.920	0.255	0.020		72					
	28					0.015	37	73	99.5	20.2	3.71	0.665	
15	29	119	11.6	1.28	0.140	0.065		74					
	30					0.010	38	75	112	25.4	3.97	0.610	
16	31	134	18.7	.995	0.270	0.000		76					
	32					0.045	39	77	123	19.8	4.08	0.650	
17	33	103	19.5	1.87	0.295	0.020		78					
	34					0.025	40	79	140	24.0	4.07	0.460	
18	35	84.0	22.0	1.77	0.160	0.025		80					
	36					0.025	41	81	120	21.7	3.34	0.340	
19	37	107	25.6	3.82	0.090	0.055		82					
	38					0.070	42	83	124	24.4	3.62	0.255	
20	39	106	23.8	4.38	0.130	0.150		84					
	40					0.155	43	85	121	19.3	2.12	0.060	
21	41	103	22.5	4.25	0.225	0.170		86					
	42					0.195	44	87	125	17.5	1.73		
22	43	95.7	11.2	2.06	0.385	0.155		88					
	44					0.150	45	89	95.0	11.6	1.56		
23	45	88.1	10.9	1.94	0.410	0.160		90					

Table 5.2 (Continued)

DATE 3 July 1956
TIME 1100-1110 CST

CONCENTRATION (mg m^{-3})

RUN NO. 1

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	60.6	8.01	0.945		
	92					
47	93	60.6	7.39	0.625		
	94					
48	95	41.1	8.42	0.215		
	96					
49	97	34.7	5.21	0.070		
	98					
50	99	20.0	1.46			
	100					
51	101	12.8	0.230			
	102					
52	103	7.32	0.345			
	104					
53	105	4.47	0.100			
	106					
54	107	3.11				
	108					
55	109	0.185				
	110					
56	111					
	112					
57	113					
	114					
58	115					
	116					
59	117					
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

Table 5.2 (Continued)

DATE 3 July 1956
TIME 1500-1510 CST

CONCENTRATION (mg m^{-3})

RUN NO. 2

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1	37.4	0.030			
	2					
2	3	38.5				
	4					0.080
3	5	23.8	2.10			0.220
	6					0.125
4	7	30.4	3.20			0.065
	8					0.050
5	9	38.6	2.00			
	10					0.055
6	11	58.4	1.77			0.075
	12					
7	13	73.3	1.88	0.220		0.070
	14					0.090
8	15	67.6	2.87	1.04	0.085	0.155
	16					0.050
9	17	56.4	8.93	1.24	0.205	0.115
	18					0.075
10	19	83.9	13.8	1.63	0.160	0.065
	20					
11	21	81.5	17.1	2.18	0.320	
	22					0.130
12	23	66.8	12.6	2.32	0.285	0.070
	24					0.025
13	25	66.9	13.5	4.21	0.125	0.040
	26					0.030
14	27	95.0	10.6	3.28	0.100	0.090
	28					0.110
15	29	118	11.3	1.67	0.105	0.160
	30					0.130
16	31	132	12.6	1.12	0.075	0.135
	32					0.065
17	33	129	21.8	2.19	0.065	0.025
	34					0.050
18	35	141	28.5	3.73	0.140	
	36					0.315
19	37	190	38.3	3.70	0.210	0.130
	38					0.140
20	39	175	35.6	4.05	0.250	0.005
	40					0.120
21	41	154	35.9	4.17	0.195	0.195
	42					0.275
22	43	192	26.9	4.33	0.270	0.200
	44					0.295
23	45	175	27.3	3.67	0.430	0.225

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					0.210
24	47	146	23.9	3.80	0.355	0.165
	48					0.200
25	49	124	25.5	4.61	0.350	0.160
	50					0.165
26	51	124	25.4	4.71	0.400	0.100
	52					0.105
27	53	135	29.7	4.77	0.450	0.055
	54					0.120
28	55	148	31.2	3.43	1.13	0.120
	56					0.130
29	57	163	36.9	3.90	1.14	0.115
	58					0.060
30	59	144	45.9	4.56	1.06	0.085
	60					
31	61	147	36.3	9.87	0.710	
	62					
32	63	174	42.3	6.29	0.400	
	64					
33	65	153	47.9	4.28	0.670	
	66					
34	67	163	44.7	2.85	0.050	
	68					
35	69	135	44.3	2.52	0.040	
	70					
36	71	128	14.9	1.42	0.095	
	72					
37	73	100	7.38	0.400		
	74					
38	75	74.0	0.265	0.050		
	76					
39	77	34.4	0.450	0.085		
	78					
40	79	6.61	0.160			
	80					
41	81	2.59	0.075			
	82					
42	83	0.805	0.050			
	84					
43	85					
	86					
44	87					
	88					
45	89					
	90					

Table 5.2 (Continued)

DATE 5 July 1956
TIME 2200-2210 CST

CONCENTRATION (mg m^{-3})

RUN NO. 3

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					0.060
11	21							66					0.260
	22						34	67					0.275
12	23							68					0.245
	24						35	69					0.235
13	25							70					0.215
	26						36	71					0.205
14	27							72					0.250
	28						37	73					0.200
15	29							74					0.195
	30						38	75	0.175				0.180
16	31							76					0.205
	32						39	77	0.435	0.035	0.025		0.215
17	33							78					0.200
	34						40	79	0.640	0.030	0.025		0.215
18	35							80					0.215
	36						41	81	1.43	0.035	0.025	0.030	0.210
19	37							82					0.235
	38						42	83	2.16	0.035	0.025	0.030	0.220
20	39							84					0.195
	40						43	85	3.68	0.085	0.015	0.035	0.195
21	41							86					0.205
	42						44	87	5.84	0.375	0.005	0.025	0.190
22	43							88					0.200
	44						45	89	7.61	1.28	0.005	0.025	0.200
23	45							90					0.215

Table 5.2 (Continued)

DATE 5 July 1956
TIME 2200-2210 CST

CONCENTRATION (mg m^{-3})

RUN NO. 3

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	9.69	2.79	0.015		0.235		136					0.630
	92					0.220	69	137	30.9	43.5	19.8	5.84	0.560
47	93	11.6	4.25	0.110	0.010	0.205		138					0.580
	94					0.245	70	139	29.1	44.3	25.0	6.78	0.470
48	95	12.1	6.48	0.320	0.020	0.265		140					0.255
	96					0.260	71	141	33.2	47.6	28.6	8.77	0.140
49	97	15.2	5.85	1.03	0.010	0.235		142					0.025
	98					0.245	72	143	32.3	50.9	30.0	12.1	
50	99	19.5	11.7	2.25	0.020	0.200		144					
	100					0.220	73	145	27.8	57.3	37.6	14.1	
51	101	22.1	13.5	3.87	0.020	0.185		146					
	102					0.155	74	147	21.9	45.6	41.0	16.3	
52	103	22.1	14.6	4.97	0.020	0.125		148					
	104					0.120	75	149	24.6	56.6	53.1	16.6	
53	105	22.7	16.7	6.55	0.035	0.125		150					
	106					0.140	76	151	19.1	50.0	61.5	14.7	
54	107	25.1	17.6	8.49	0.055	0.120		152					
	108					0.125	77	153	18.8	54.6	67.2	15.4	
55	109	24.6	19.2	10.6	0.120	0.105		154					
	110					0.075	78	155	19.1	58.7	65.7	16.7	
56	111	27.0	21.5	11.0	0.170	0.115		156					
	112					0.075	79	157	14.3	58.7	71.7	15.1	
57	113	27.9	23.9	10.4	0.275	0.110		158					
	114					0.115	80	159	17.1	42.5	56.4	14.0	
58	115	28.4	23.7	11.6	0.385	0.105		160					
	116					0.100	81	161	17.4	43.1	51.2	14.4	
59	117	34.1	24.8	11.1	0.690	0.085		162					
	118					0.105	82	163	15.3	54.5	63.4	16.9	
60	119	41.6	23.4	12.3	0.860	0.085		164					
	120					0.040	83	165	9.98	70.8	63.4	17.6	
61	121	38.4	24.3	12.2	1.15	0.065		166					
	122					0.090	84	167	8.34	99.0	60.9	18.4	
62	123	42.5	23.9	13.6	1.57	0.105		168					
	124					0.145	85	169	14.4	103	55.1	0.250	
63	125	41.1	24.6	13.9	1.24	0.155		170					
	126					0.200	86	171	24.2	140	65.5	10.1	
64	127	44.6	26.3	14.3	2.62	0.185		172					
	128					0.290	87	173	32.6	207	68.7	0.830	
65	129	39.3	28.8	16.4	2.93	0.375		174					
	130					0.330	88	175	32.4	246	80.0	0.010	
66	131	33.9	34.5	15.8	3.77	0.445		176					
	132					0.485	89	177	28.1	226	76.9	0.010	
67	133	33.2	36.3	16.9	4.60	0.545		178					
	134					0.645	90	179	29.7	201	58.7	0.010	
68	135	29.7	39.8	19.4	4.99	0.625		180					
							91	181	13.7	181	18.1	0.005	

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Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 4

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1	1.37	0.535	0.345	0.030	0.005		46					0.025
	2						24	47	1.93	1.27	1.27	3.57	0.020
2	3	1.53	0.470	0.335	0.075			48					0.035
	4						25	49	2.23	1.48	1.36	4.25	0.025
3	5	1.42	0.500	0.315	0.130	0.015		50					0.020
	6					0.020	26	51	2.48	1.63	1.45	4.56	0.010
4	7	1.23	0.525	0.310	0.190	0.005		52					0.025
	8					0.020	27	53	2.78	1.94	1.55	4.56	0.030
5	9	1.31	0.530	0.350	0.235	0.015		54					0.045
	10					0.020	28	55	3.09	1.88	1.65	5.09	0.050
6	11	1.42	0.575	0.350	0.375	0.005		56					0.050
	12						29	57	3.71	2.04	1.80	5.24	0.035
7	13	1.51	0.545	0.420	0.450	0.010		58					0.030
	14						30	59	4.53	2.42	2.03	5.41	0.030
8	15	1.66	0.580	0.440	0.585			60					0.020
	16						31	61	5.13	2.49	2.13	5.83	0.035
9	17	1.59	0.625	0.490	0.665			62					0.040
	18						32	63	5.78	3.03	2.24	6.08	0.045
10	19	1.43	0.645	0.510	0.795			64					0.060
	20						33	65	6.88	3.17	2.32	6.21	0.020
11	21	1.66	0.705	0.550	0.960	0.005		66					0.050
	22					0.020	34	67	7.89	3.62	2.49	6.54	0.040
12	23	1.54	0.785	0.615	1.06			68					0.050
	24						35	69	9.09	3.63	2.57	6.48	0.035
13	25	1.64	0.815	0.655	1.28	0.035		70					0.050
	26					0.010	36	71	10.3	4.17	2.55	6.87	0.060
14	27	1.47	0.860	0.700	1.33	0.065		72					0.065
	28					0.090	37	73	12.6	5.26	2.57	7.36	0.075
15	29	1.83	0.910	0.700	1.53	0.010		74					0.075
	30					0.030	38	75	14.1	5.75	2.55	7.38	0.090
16	31	1.89	0.910	0.750	1.75	0.110		76					0.085
	32					0.010	39	77	14.6	6.38	2.49	8.01	0.055
17	33	1.69	1.26	0.815	1.98	0.140		78					0.080
	34					0.095	40	79	12.9	6.41	2.58	8.94	0.060
18	35	1.78	1.19	0.855	2.18	0.010		80					0.060
	36						41	81	12.2	6.09	2.69	9.43	0.080
19	37	1.77	1.19	0.950	2.23			82					0.040
	38						42	83	10.8	5.29	2.91	9.96	0.025
20	39	1.82	1.15	1.04	2.33	0.005		84					0.055
	40						43	85	9.54	5.01	2.96	11.2	0.095
21	41	1.93	1.27	1.12	2.60	0.010		86					0.055
	42						44	87	9.09	4.42	3.17	12.7	0.050
22	43	1.93	1.38	1.11	2.83	0.005		88					0.105
	44						45	89	9.09	3.38	3.15	15.1	0.090
23	45	2.10	1.32	1.26	3.07	0.060		90					0.100

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Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 4

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	8.81	3.81	3.39	17.3	0.120		136					10.7
	92					0.115	69	137	84.8	194	115	47.8	8.37
47	93	10.5	3.66	3.47	20.5	0.140		138					5.11
	94					0.135	70	139	78.0	218	152	66.7	1.53
48	95	14.3	3.71	3.61	24.1	0.135		140					0.220
	96					0.080	71	141	69.6	174	151	8.48	
49	97	27.0	4.80	3.95	24.5	0.095		142					
	98					0.065	72	143	62.8	140	65.5	0.135	
50	99	54.5	7.93	4.84	23.3	0.110		144					
	100					0.110	73	145	58.1	87.8	2.02		
51	101	98.8	10.7	7.34	23.3	0.140		146					
	102					0.120	74	147	53.1	42.6	0.050		
52	103	135	14.8	13.7	24.2	0.095		148					
	104					0.085	75	149	32.2	4.58			
53	105	153	36.5	25.8	27.4	0.105		150					
	106					0.135	76	151	9.90	0.170			
54	107	169	91.1	35.4	30.9	0.125		152					
	108					0.160	77	153	0.535	0.045			
55	109	186	161	70.6	29.8	0.245		154					
	110					0.285	78	155	0.275				
56	111	177	199	104	26.6	0.285		156					
	112					0.300	79	157	0.065				
57	113	196	221	133	26.7	0.355		158					
	114					0.465	80	159	0.040				
58	115	208	216	105	24.8	0.460		160					
	116					0.585	81	161					
59	117	238	213	80.2	22.3	0.670		162					
	118					0.715	82	163					
60	119	267	202	66.7	17.7	0.935		164					
	120					1.22	83	165					
61	121	261	212	55.1	15.6	1.66		166					
	122					2.22	84	167					
62	123	268	210	48.3	14.8	2.91		168					
	124					3.61	85	169					
63	125	235	186	50.2	14.9	4.33		170					
	126					4.85	86	171					
64	127	221	177	49.2	13.8	5.61		172					
	128					6.37	87	173					
65	129	196	182	59.6	15.9	6.84		174					
	130					8.18	88	175					
66	131	159	159	68.2	17.1	9.01		176					
	132					10.1	89	177					
67	133	135	161	73.6	20.1	10.6		178					
	134					11.2	90	179					
68	135	107	163	77.3	27.7	11.4		180					
							91	181					

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TIME 1400-1410 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 5

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49	0.315				
3	5							50					
	6						26	51	2.69				
4	7							52					
	8						27	53	8.84				
5	9							54					
	10						28	55	13.1	0.360			
6	11							56					
	12						29	57	10.9	2.82			
7	13							58					
	14						30	59	10.8	4.71			
8	15							60					
	16						31	61	13.7	3.17	0.085		
9	17							62					
	18						32	63	17.9	2.28	0.675		
10	19							64					
	20						33	65	18.6	2.87	1.42	0.040	
11	21							66					
	22						34	67	17.3	5.00	1.17	0.080	
12	23							68					
	24						35	69	15.3	5.97	1.28	0.395	
13	25							70					
	26						36	71	18.3	6.45	1.66	0.520	
14	27							72					0.035
	28						37	73	32.7	9.42	2.35	0.710	0.045
15	29							74					0.070
	30						38	75	55.7	13.4	4.39	0.650	0.110
16	31							76					0.130
	32						39	77	71.9	21.9	5.97	1.18	0.155
17	33							78					0.205
	34						40	79	91.5	27.2	9.19	1.75	0.200
18	35							80					0.190
	36						41	81	115	36.3	10.0	1.81	0.320
19	37							82					0.315
	38						42	83	150	45.3	10.0	1.60	0.205
20	39							84					0.175
	40						43	85	197	48.2	9.69	1.75	0.280
21	41							86					0.395
	42						44	87	203	53.3	11.1	1.97	0.420
22	43							88					0.445
	44						45	89	174	55.7	14.8	2.82	0.480
23	45							90					0.390

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Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 5

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc.	50m	100m	200m	400m	800m
46	91	159	47.0	11.8	2.26	0.370		136					
	92					0.440	69	137					
47	93	156	44.4	10.4	1.75	0.320		138					
	94					0.285	70	139					
48	95	159	40.1	8.87	1.26	0.360		140					
	96					0.280	71	141					
49	97	137	28.5	5.30	1.18	0.240		142					
	98					0.155	72	143					
50	99	103	19.1	5.04	1.00	0.105		144					
	100					0.075	73	145					
51	101	67.4	11.8	2.50	0.365	0.035		146					
	102						74	147					
52	103	39.9	5.09	0.950	0.040			148					
	104						75	149					
53	105	16.4	1.56	0.335				150					
	106						76	151					
54	107	8.01	0.415	0.040				152					
	108						77	153					
55	109	2.87	0.050					154					
	110						78	155					
56	111	1.23	0.040					156					
	112						79	157					
57	113	0.570	0.055					158					
	114						80	159					
58	115	0.075						160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

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TIME 1700-1710 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO.6

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65	0.040				
	66					
34	67	0.455				
	68					
35	69	1.85	0.060			
	70					
36	71	5.37	0.605			
	72					
37	73	18.9	2.45	0.200		
	74					
38	75	46.1	9.84	1.52	0.035	
	76					0.025
39	77	81.5	23.0	2.72	0.235	0.035
	78					0.055
40	79	118	34.4	6.42	0.690	0.095
	80					0.135
41	81	188	47.3	11.5	1.85	0.150
	82					0.255
42	83	240	62.9	14.6	3.25	0.440
	84					0.835
43	85	261	80.6	17.5	3.50	0.755
	86					0.755
44	87	251	80.3	24.2	4.00	0.765
	88					0.865
45	89	263	70.2	19.0	4.24	0.885
	90					0.795

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Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 6

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	218	59.3	14.3	3.27	0.960
	92					1.03
47	93	182	65.3	13.7	3.23	1.12
	94					0.920
48	95	146	45.2	11.9	3.23	0.720
	96					0.520
49	97	133	35.1	10.5	2.05	0.570
	98					0.460
50	99	106	31.4	6.12	1.43	0.320
	100					0.255
51	101	72.5	16.5	3.95	0.615	0.075
	102					0.020
52	103	46.7	8.66	2.63	0.175	0.020
	104					0.155
53	105	19.5	3.66	0.835	0.020	
	106					
54	107	8.64	1.65	0.095		
	108					
55	109	3.02	0.445			
	110					
56	111	0.610	0.060			
	112					
57	113	0.065				
	114					
58	115					
	116					
59	117					
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

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DATE 10 July 1956
TIME 1400-1410 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 7

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m	POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
1	1							46					
	2						24	47	35.4	5.18			
2	3							48					
	4						25	49	35.1	8.25	0.005		
3	5							50					
	6						26	51	48.6	7.88	0.020		
4	7							52					
	8						27	53	55.1	9.68	0.395		
5	9							54					
	10						28	55	62.1	11.6	1.28		
6	11							56					
	12						29	57	73.1	13.8	3.60		
7	13							58					
	14						30	59	70.1	11.1	2.35		
8	15							60					
	16						31	61	55.1	10.1	1.74		
9	17							62					
	18						32	63	54.3	8.42	2.11		
10	19							64					
	20						33	65	46.1	6.83	3.18		
11	21							66					
	22						34	67	54.0	7.26	2.14		
12	23							68					
	24						35	69	43.1	5.60	1.21	0.035	
13	25							70					
	26						36	71	38.4	5.12	0.975	0.035	
14	27							72					
	28						37	73	29.0	5.69	0.645	0.140	
15	29							74					
	30						38	75	29.3	8.46	0.435	0.100	
16	31	0.015						76					
	32						39	77	39.6	7.88	0.465	0.165	
17	33	0.015						78					
	34						40	79	49.1	11.3	0.905	0.400	
18	35	0.130						80					
	36						41	81	85.7	18.6	2.86	0.210	
19	37	0.830	0.035					82					
	38						42	83	63.5	18.8	4.21	0.270	
20	39	1.76	0.035					84					0.035
	40						43	85	82.4	22.4	4.49	0.380	0.050
21	41	6.98	0.260					86					0.035
	42						44	87	97.8	23.3	4.57	0.550	0.060
22	43	15.2	0.930					88					0.045
	44						45	89	87.9	M	4.64	0.700	0.045
23	45	26.3	1.79	0.030				90					0.080

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Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 7

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m	POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91	79.4	19.4	3.23	0.760	0.065		136					
	92					0.040	69	137	68.0	11.2	1.25		
47	93	67.4	17.4	4.41	0.680	0.035		138					
	94					0.020	70	139	39.0	6.90	0.840		
48	95	54.3	15.5	3.47	0.390	0.025		140					
	96					0.035	71	141	32.7	3.29	0.380		
49	97	46.4	11.7	2.28	0.305	0.045		142					
	98					0.025	72	143	28.4	3.45			
50	99	40.7	10.2	1.89	0.360	0.035		144					
	100					0.040	73	145	21.6	5.96	0.110		
51	101	53.9	11.3	1.78	0.430	0.040		146					
	102					0.040	74	147	24.6	3.24			
52	103	56.7	11.8	1.81	0.480	0.010		148					
	104					0.025	75	149	18.5	0.755			
53	105	58.2	11.7	1.65	0.380	0.035		150					
	106					0.035	76	151	12.0	0.175			
54	107	41.6	8.82	1.92	0.265	0.030		152					
	108					0.060	77	153	17.3				
55	109	30.5	6.77	1.67	0.385	0.050		154					
	110					0.045	78	155	14.9				
56	111	33.5	5.69	1.85	0.450	0.065		156					
	112					0.040	79	157	7.98				
57	113	32.9	5.91	1.53	0.285	0.070		158					
	114					0.025	80	159	1.20				
58	115	39.6	5.73	1.55	0.220	0.045		160					
	116					0.065	81	161	0.115				
59	117	51.2	7.79	1.23	0.170	0.040		162					
	118					0.045	82	163	0.085				
60	119	61.1	9.71	1.39	0.175	0.045		164					
	120					0.020	83	165	0.040				
61	121	57.0	13.5	2.51	0.140	0.010		166					
	122					0.010	84	167	0.015				
62	123	47.9	14.4	5.14	0.125	0.030		168					
	124					0.050	85	169	0.030				
63	125	54.3	16.1	3.69	0.070	0.025		170					
	126					0.035	86	171	0.020				
64	127	53.4	17.0	3.42	0.375			172					
	128						87	173	0.035				
65	129	65.1	19.5	4.18	0.490			174					
	130						88	175	0.045				
66	131	70.4	19.4	2.89	0.135			176					
	132						89	177	0.025				
67	133	65.6	21.2	2.44	0.060			178					
	134						90	179	0.020				
68	135	73.8	14.4	1.66				180					
							91	181					

DATE 10 July 1956
TIME 1700-1710 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 8

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63	0.025				
	64					
33	65	0.030				
	66					
34	67	0.030				
	68					
35	69	0.010				
	70					
36	71	0.025				
	72					
37	73	0.170				
	74					
38	75	5.34	0.025			
	76					
39	77	14.6	0.130	0.035		
	78					
40	79	18.2	1.79	0.100		
	80					
41	81	20.7	4.71	0.580		
	82					
42	83	27.0	6.23	1.46	0.205	
	84					0.045
43	85	54.9	11.5	2.75	0.440	0.060
	86					0.060
44	87	101	23.6	3.03	0.610	0.150
	88					0.190
45	89	186	51.2	6.49	1.10	0.205
	90					0.290

DATE 10 July 1956
TIME 1700-1710 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 8

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91	260	73.1	11.8	2.34	0.355
	92					0.445
47	93	341	89.9	23.6	3.74	0.585
	94					0.525
48	95	422	115	25.7	3.79	0.535
	96					0.675
49	97	381	111	26.4	3.97	0.695
	98					0.695
50	99	326	92.1	23.9	4.25	0.495
	100					0.545
51	101	267	68.3	17.7	3.35	0.635
	102					0.725
52	103	204	50.6	13.1	2.71	0.605
	104					0.495
53	105	140	41.1	10.5	1.80	0.545
	106					0.425
54	107	91.1	24.0	5.04	1.15	0.300
	108					0.300
55	109	62.7	9.33	2.97	1.15	0.220
	110					0.165
56	111	61.2	8.55	2.46	0.530	0.160
	112					0.055
57	113	36.3	6.87	2.49	0.200	0.045
	114					0.030
58	115	23.0	7.26	1.31	0.070	0.020
	116					
59	117	14.0	3.45	0.330		
	118					
60	119	10.9	1.86	0.180		
	120					
61	121	10.4	0.735			
	122					
62	123	10.1	1.08			
	124					
63	125	8.46	0.975			
	126					
64	127	5.42	0.975			
	128					
65	129	2.06	1.01			
	130					
66	131	1.29	0.135			
	132					
67	133	0.440	0.070			
	134					
68	135	0.235				

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	136					
69	137	0.035				
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

DATE 11 July 1956
TIME 1000-1010 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO.9

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73					
15	29							74					
	30						38	75					
16	31							76					
	32						39	77					
17	33							78					
	34						40	79					
18	35							80					
	36						41	81					
19	37							82					
	38						42	83	0.025				
20	39							84					
	40						43	85	0.250				
21	41							86					
	42						44	87	1.50				
22	43							88					
	44						45	89	5.66	0.290			
23	45							90					

DATE 11 July 1956
TIME 1000-1010 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO.9

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	20.4	2.30					136					0.035
	92						69	137	19.8	6.78	1.16	0.258	0.045
47	93	39.8	5.79					138					0.020
	94						70	139	12.8	4.28	0.515	0.125	0.015
48	95	44.9	9.18	0.120				140					
	96						71	141	11.3	1.48	0.200	0.115	
49	97	56.1	17.3	1.68				142					
	98						72	143	5.39	0.590	0.165	0.015	
50	99	67.2	26.9	4.67	0.175			144					
	100					0.035	73	145	2.21	0.090	0.040	0.010	
51	101	93.5	28.2	8.93	1.00	0.055		146					
	102					0.135	74	147	1.00	0.020			
52	103	115	32.9	9.83	2.48	0.255		148					
	104					0.415	75	149	0.150				
53	105	148	42.6	12.5	2.90	0.520		150					
	106					0.460	76	151					
54	107	183	56.1	14.2	2.14	0.440		152					
	108					0.470	77	153					
55	109	200	55.7	11.3	2.26	0.470		154					
	110					0.450	78	155					
56	111	198	45.9	10.9	2.29	0.405		156					
	112					0.375	79	157					
57	113	171	44.4	12.2	2.53	0.450		158					
	114					0.470	80	159					
58	115	159	48.5	12.6	2.68	0.510		160					
	116					0.340	81	161					
59	117	130	41.3	10.6	2.63	0.245		162					
	118					0.315	82	163					
60	119	123	38.7	9.73	1.85	0.380		164					
	120					0.385	83	165					
61	121	114	34.5	8.46	2.12	0.395		166					
	122					0.450	84	167					
62	123	102	26.0	6.50	1.57	0.405		168					
	124					0.295	85	169					
63	125	72.9	17.6	4.78	0.925	0.200		170					
	126					0.150	86	171					
64	127	48.6	11.5	3.31	0.825	0.115		172					
	128					0.080	87	173					
65	129	41.0	8.63	2.97	0.595	0.085		174					
	130					0.130	88	175					
66	131	32.9	7.04	2.29	0.655	0.155		176					
	132					0.145	89	177					
67	133	26.9	8.31	2.48	0.675	0.095		178					
	134					0.060	90	179					
68	135	25.2	8.90	2.75	0.535	0.050		180					
							91	181					

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DATE 11 JULY 1956
TIME 1200 - 1210 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 10

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91					
	92					
47	93					
	94					
48	95	0.175				
	96					
49	97	0.590				
	98					
50	99	3.69				
	100					
51	101	8.78				
	102					
52	103	15.5				
	104					
53	105	25.5				
	106					
54	107	36.3	0.070			
	108					
55	109	39.0	0.890			
	110					
56	111	47.6	1.86			
	112					
57	113	38.1	4.20	0.195		
	114					
58	115	38.7	8.73	0.485	0.110	
	116					
59	117	32.3	9.17	0.605	0.150	
	118					
60	119	38.7	10.3	0.825	0.095	
	120					0.040
61	121	52.5	8.72	1.51	0.250	0.040
	122					0.050
62	123	61.7	12.2	2.25	0.540	0.070
	124					0.070
63	125	90.0	17.7	4.28	0.590	0.055
	126					0.050
64	127	124	30.0	6.95	0.560	0.90
	128					0.110
65	129	161	37.4	11.4	0.820	0.090
	130					0.120
66	131	179	39.2	8.18	2.70	0.165
	132					0.175
67	133	165	39.9	10.4	1.98	0.155
	134					0.150
68	135	164	43.1	10.1	1.28	0.125

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	136					0.055
69	137	170	41.1	6.21	1.22	0.065
	138					0.095
70	139	158	29.7	6.88	0.860	0.125
	140					0.115
71	141	137	24.3	7.76	0.690	0.090
	142					0.100
72	143	117	24.3	7.74	0.700	0.070
	144					0.130
73	145	117	24.2	5.34	0.780	0.135
	146					
74	147	102	24.3	2.96	0.630	
	148					
75	149	97.5	27.6	3.32	0.600	
	150					
76	151	110	28.2	4.05	0.120	
	152					
77	153	88.2	21.2	2.06	0.120	
	154					
78	155	80.7	11.4	1.19	0.190	
	156					
79	157	57.8	10.6	0.785	0.325	
	158					
80	159	45.2	8.61	1.02	0.150	
	160					
81	161	31.2	6.84	1.82	0.035	
	162					
82	163	25.8	3.80	1.74		
	164					
83	165	20.3	1.85	0.775		
	166					
84	167	17.7	1.36	0.030		
	168					
85	169	12.8	1.16			
	170					
86	171	6.30	0.935			
	172					
87	173	3.68	0.490			
	174					
88	175	1.50	0.055			
	176					
89	177	0.335				
	178					
90	179					
	180					
91	181					

DATE 14 July 1956
TIME 0800-0810 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 11

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65					
	66					
34	67					
	68					
35	69					
	70					
36	71					
	72					
37	73	0.065				
	74					
38	75	0.535	0.025			
	76					
39	77	2.39	0.180	0.070		
	78					
40	79	6.95	0.610	0.055		
	80					
41	81	16.7	1.61	0.175	0.020	
	82					
42	83	33.6	4.37	0.845	0.185	
	84					
43	85	63.9	14.6	2.86	0.440	
	86					0.020
44	87	113	28.4	6.47	1.35	0.095
	88					0.235
45	89	167	49.7	11.8	1.76	0.340
	90					430

DATE 14 July 1956
TIME 0800-0810 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 11

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	209	72.3	20.5	3.64	0.480
	92					0.950
47	93	263	87.0	28.9	6.67	1.27
	94					1.67
48	95	273	89.3	29.5	7.61	1.68
	96					1.72
49	97	269	83.0	27.7	7.10	1.42
	98					1.02
50	99	251	75.3	23.0	4.57	0.820
	100					0.590
51	101	204	56.6	11.6	2.46	0.383
	102					0.225
52	103	124	32.0	5.86	0.775	0.170
	104					0.085
53	105	68.3	13.8	1.54	0.245	0.015
	106					0.020
54	107	35.4	4.59	0.475	0.030	
	108					
55	109	19.4	0.600	0.030	0.020	
	110					
56	111	5.87	0.070	0.020		
	112					
57	113	0.990	0.025			
	114					
58	115	0.080				
	116					
59	117	0.045				
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

DATE 14 July 1956
TIME 1000-1010 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 12

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65					
	66					
34	67					
	68					
35	69					
	70					
36	71					
	72					
37	73					
	74					
38	75					
	76					
39	77	0.115				
	78					
40	79	1.39				
	80					
41	81	4.95	0.105			
	82					
42	83	5.28	1.50			
	84					
43	85	10.3	3.23			
	86					
44	87	20.1	5.00	0.095		
	88					
45	89	39.8	8.40	1.75	0.030	
	90					

Table 5.2 (Continued)

DATE 14 July 1956
TIME 1000-1010 CST

CONCENTRATION (mg m^{-3})

RUN NO.12

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	67.7	18.9	3.76	0.320			136					
	92					0.040	69	137					
47	93	84.0	25.7	6.96	1.49	0.115		138					
	94					0.380	70	139					
48	95	92.7	24.5	7.67	1.78	0.470		140					
	96					0.480	71	141					
49	97	86.7	26.3	7.02	1.67	0.450		142					
	98					0.440	72	143					
50	99	109	36.0	9.17	2.13	0.510		144					
	100					0.630	73	145					
51	101	130	47.0	16.0	3.55	0.770		146					
	102					0.970	74	147					
52	103	173	57.2	18.2	5.03	1.22		148					
	104					1.46	75	149					
53	105	216	61.5	20.6	5.46	1.49		150					
	106					1.58	76	151					
54	107	218	58.7	19.1	4.97	1.54		152					
	108					1.34	77	153					
55	109	186	60.0	19.6	4.18	1.04		154					
	110					0.580	78	155					
56	111	168	53.9	17.2	3.44	0.310		156					
	112					0.130	79	157					
57	113	129	44.6	10.7	2.08	0.075		158					
	114					0.060	80	159					
58	115	107	31.4	5.25	0.340			160					
	116						81	161					
59	117	78.2	13.6	2.83				162					
	118						82	163					
60	119	48.8	5.03	0.735				164					
	120						83	165					
61	121	27.2	2.70	0.040				166					
	122						84	167					
62	123	12.1	0.590					168					
	124						85	169					
63	125	12.7	0.085					170					
	126						86	171					
64	127	0.235						172					
	128						87	173					
65	129	0.330						174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 22 July 1956
TIME 2000-2010 CST

CONCENTRATION (mg m^{-3})

RUN NO.13

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73					
15	29							74					
	30						38	75					
16	31							76					
	32						39	77	0.065				
17	33							78					
	34						40	79	0.100				
18	35							80					
	36						41	81	0.395	0.455			
19	37							82					
	38						42	83	0.790	2.22			
20	39							84					
	40						43	85	3.45	6.96			
21	41							86					
	42						44	87	10.3	13.8			
22	43							88					
	44						45	89	24.6	120	0.365		
23	45							90					

Table 5.2 (Continued)

DATE 22 July 1956
TIME 2000 - 2010 CST

CONCENTRATION (mg m^{-3})

RUN NO. 13

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	103	246	30.2				136					
	92						69	137					
47	93	87.3	281	87.1				138					
	94						70	139					
48	95	114	419	287	7.25			140					
	96						71	141					
49	97	174	330	490	53.0	0.035		142					
	98					0.460	72	143					
50	99	174	227	253	113	7.93		144					
	100					20.9	73	145					
51	101	161	146	141	58.8	17.6		146					
	102					17.9	74	147					
52	103	141	104	118	51.5	17.7		148					
	104					15.7	75	149					
53	105	105	82.4	127	60.3	18.4		150					
	106					24.3	76	151					
54	107	83.3	76.4	130	77.0	32.7		152					
	108					47.2	77	153					
55	109	60.0	65.4	138	98.3	74.6		154					
	110					90.1	78	155					
56	111	40.4	49.1	122	131	104		156					
	112					74.3	79	157					
57	113	25.5	36.5	78.3	115	44.5		158					
	114					0.375	80	159					
58	115	16.5	24.9	35.0	30.3	0.030		160					
	116					0.025	81	161					
59	117	13.1	14.0	8.83	0.275			162					
	118						82	163					
60	119	10.8	5.39	1.33	0.020			164					
	120						83	165					
61	121	5.70	1.41	0.050				166					
	122						84	167					
62	123	2.87	0.175					168					
	124						85	169					
63	125	1.09						170					
	126						86	171					
64	127	0.295						172					
	128						87	173					
65	129	0.075						174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 22 July 1956
TIME 2200-2210 CST

CONCENTRATION (mg m^{-3})

RUN NO.14

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49	0.110				
3	5							50					
	6						26	51	0.145				
4	7							52					
	8						27	53	0.210				
5	9							54					
	10						28	55	0.260				
6	11							56					
	12						29	57	0.315				
7	13							58					
	14						30	59	0.390				
8	15							60					
	16						31	61	0.600	0.040			
9	17							62					
	18						32	63	2.70	0.080			
10	19							64					
	20						33	65	18.3	0.115			
11	21							66					
	22						34	67	45.6	0.355			
12	23							68					
	24						35	69	68.9	7.53	0.015		
13	25							70					
	26						36	71	143	61.4	0.085		
14	27							72					
	28						37	73	255	168	4.84		
15	29							74					
	30						38	75	455	312	46.4	0.020	
16	31							76					
	32						39	77	611	570	131	3.32	
17	33							78					
	34						40	79	680	822	402	23.1	
18	35							80					
	36						41	81	702	707	402	146	0.450
19	37							82					2.13
	38						42	83	552	339	93.8	115	7.37
20	39							84					17.0
	40						43	85	426	67.4	5.87	25.8	21.6
21	41							86					5.77
	42						44	87	228	7.50	1.83	14.4	4.42
22	43							88					3.92
	44						45	89	101	3.15	1.49	8.18	2.78
23	45							90					2.75

Table 5.2 (Continued)

DATE 22 July 1956
TIME 2200-2210 CST

CONCENTRATION (mg m^{-3})

RUN NO. 14

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	9.69	2.54	1.20	0.335	2.83		136					
	92					2.28	69	137					
47	93	4.28	2.07	1.13	3.47	2.64		138					
	94					2.90	70	139					
48	95	3.68	1.80	0.930	1.79	3.17		140					
	96					3.33	71	141					
49	97	3.51	2.00	0.830	1.18	3.43		142					
	98					3.49	72	143					
50	99	3.44	1.95	0.850	0.860	2.96		144					
	100					1.88	73	145					
51	101	3.41	1.86	0.900	0.620	1.76		146					
	102					1.38	74	147					
52	103	4.05	1.94	1.02	0.450	1.28		148					
	104					1.22	75	149					
53	105	3.90	2.07	1.23	0.460	0.775		150					
	106					0.480	76	151					
54	107	3.81	2.19	1.29	0.465	0.460		152					
	108					0.305	77	153					
55	109	3.51	2.03	1.10	0.385	0.185		154					
	110					0.150	78	155					
56	111	2.81	1.79	0.940	0.300	0.090		156					
	112					0.060	79	157					
57	113	2.12	1.62	0.760	0.240	0.025		158					
	114						80	159					
58	115	1.50	1.34	0.570	0.155			160					
	116						81	161					
59	117	1.06	0.985	0.415	0.090			162					
	118						82	163					
60	119	0.725	0.730	0.180				164					
	120						83	165					
61	121	0.450	0.330	0.030				166					
	122						84	167					
62	123	0.180	0.055					168					
	124						85	169					
63	125	0.070						170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 23 July 1956
TIME 0800-0810 CST

CONCENTRATION (mg m^{-3})

RUN NO.15

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73	0.025				
15	29							74					
	30						38	75	1.25				
16	31							76					
	32						39	77	7.40				
17	33							78					
	34						40	79	9.69				
18	35							80					
	36						41	81	16.2	0.025			
19	37							82					
	38						42	83	28.2	0.190			
20	39							84					
	40						43	85	29.7	1.21			
21	41							86					
	42						44	87	31.1	4.38			
22	43							88					
	44						45	89	20.6	5.06			
23	45							90					

DATE 23 July 1956
TIME 0800-0810 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO.15

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91	19.7	13.5			
	92					
47	93	29.1	6.12	0.165		
	94					
48	95	41.1	4.11	0.435		
	96					
49	97	70.1	7.17	0.740	0.035	
	98					
50	99	99.6	15.6	0.950	0.030	
	100					
51	101	146	21.6	2.26	0.110	
	102					
52	103	197	38.6	3.89	0.335	
	104					0.065
53	105	245	53.3	5.74	0.500	0.150
	106					0.205
54	107	291	75.9	8.52	0.930	0.365
	108					0.410
55	109	336	75.9	14.5	1.23	0.470
	110					0.460
56	111	414	80.4	21.1	2.44	0.390
	112					0.360
57	113	414	107	21.7	3.91	0.465
	114					0.535
58	115	408	100	20.6	4.78	0.495
	116					0.450
59	117	353	88.2	21.6	3.76	0.445
	118					0.415
60	119	249	76.5	19.6	2.25	0.410
	120					0.310
61	121	222	61.5	15.0	2.32	0.245
	122					0.175
62	123	201	48.0	12.3	2.09	0.270
	124					0.245
63	125	125	38.4	9.61	0.530	0.220
	126					0.270
64	127	111	30.6	7.59	0.520	0.220
	128					0.255
65	129	86.1	19.7	6.90	0.780	0.140
	130					0.045
66	131	46.2	17.1	4.94	1.11	
	132					
67	133	34.4	11.9	4.11	0.415	
	134					
68	135	16.5	4.95	0.870	0.070	

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	136					
69	137	4.31	2.76	0.135		
	138					
70	139	0.860	0.200			
	140					
71	141	0.040				
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

DATE 23 July 1956
TIME 1000-1010 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO.16

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65	1.10				
	66					
34	67	10.3				
	68					
35	69	20.0	0.035			
	70					
36	71	29.9	0.110			
	72					
37	73	39.9	0.550			
	74					
38	75	48.0	2.25			
	76					
39	77	64.1	7.17	0.025		
	78					
40	79	84.8	12.3	0.030		
	80					
41	81	125	20.7	0.375		
	82					
42	83	136	21.6	1.71		
	84					
43	85	143	30.3	1.74		
	86					
44	87	179	32.7	2.69		
	88					
45	89	182	34.4	3.82	0.085	
	90					

DATE 23 July 1956
TIME 1000-1010 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 16

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	165	29.7	5.14	0.075	0.015		136					
	92					0.030	69	137	3.08	0.140	0.015		
47	93	143	26.9	6.36	0.625	0.030		138					
	94					0.040	70	139	1.33	0.035			
48	95	155	24.0	6.39	0.345	0.045		140					
	96					0.045	71	141	0.055	0.025			
49	97	121	21.6	5.16	0.340	0.045		142					
	98					0.035	72	143	0.025				
50	99	118	22.8	3.62	0.190	0.030		144					
	100					0.015	73	145					
51	101	116	21.9	2.54	0.150	0.025		146					
	102					0.015	74	147					
52	103	103	15.6	1.86	0.245	0.045		148					
	104					0.050	75	149					
53	105	93.9	15.5	1.27	0.190	0.045		150					
	106					0.030	76	151					
54	107	82.1	13.8	0.635	0.215	0.040		152					
	108					0.040	77	153					
55	109	80.9	12.8	1.04	0.235	0.045		154					
	110					0.080	78	155					
56	111	81.3	11.8	1.89	0.190	0.070		156					
	112					0.075	79	157					
57	113	71.7	10.8	1.32	0.585	0.040		158					
	114					0.055	80	159					
58	115	61.2	9.26	2.41	0.715	0.050		160					
	116					0.065	81	161					
59	117	84.3	15.3	2.89	0.905	0.035		162					
	118					0.075	82	163					
60	119	99.0	24.9	4.03	0.955	0.045		164					
	120					0.030	83	165					
61	121	87.0	22.5	4.40	0.625			166					
	122						84	167					
62	123	74.7	23.1	4.42	0.695			168					
	124						85	169					
63	125	58.8	15.9	350	0.380			170					
	126						86	171					
64	127	48.6	10.8	2.49	0.135			172					
	128						87	173					
65	129	35.7	8.49	0.865				174					
	130						88	175					
66	131	27.8	3.08	0.475				176					
	132						89	177					
67	133	22.8	1.38	0.240				178					
	134						90	179					
68	135	14.8	0.930	0.025				180					
							91	181					

DATE 23 July 1956
TIME 2000-2010 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO.17

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73	0.160				
15	29							74					
	30						38	75	1.40	0.030			
16	31							76					
	32						39	77	20.1	0.345			
17	33							78					
	34						40	79	54.3	2.96	0.110	0.025	
18	35							80					
	36						41	81	159	20.1	1.84	0.150	
19	37							82					0.085
	38						42	83	302	76.2	13.4	2.03	0.435
20	39							84					1.86
	40						43	85	518	177	46.8	13.1	4.94
21	41							86					8.09
	42						44	87	633	269	83.2	26.9	9.74
22	43							88					9.04
	44						45	89	645	254	86.2	25.7	6.28
23	45							90					2.98

Table 5.2 (Continued)

DATE 23 July 1956
TIME 2000 - 2010 CST

CONCENTRATION (mg m^{-3})

RUN NO.17

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	561	164	46.0	8.63	0.755		136					
	92					0.285	69	137					
47	93	330	90.6	14.4	1.11	0.035		138					
	94						70	139					
48	95	195	33.2	2.70				140					
	96						71	141					
49	97	106	8.93	0.245				142					
	98						72	143					
50	99	29.4	1.00					144					
	100						73	145					
51	101	8.72	0.090					146					
	102						74	147					
52	103	1.19						148					
	104						75	149					
53	105	0.235						150					
	106						76	151					
54	107							152					
	108						77	153					
55	109							154					
	110						78	155					
56	111							156					
	112						79	157					
57	113							158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 23 July 1956
TIME 2200-2210 CST

CONCENTRATION (mg m^{-3})

RUN NO. 18

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73					
15	29							74					
	30						38	75					
16	31							76					
	32						39	77	0.095				
17	33							78					
	34						40	79	0.645				
18	35							80					
	36						41	81	5.57	0.095			
19	37							82					
	38						42	83	29.6	1.59	0.025		
20	39							84					
	40						43	85	106	17.1	0.730		
21	41							86					
	42						44	87	218	69.6	14.3	0.640	
22	43							88					
	44						45	89	368	158	50.9	11.7	0.040
23	45							90					0.665

Table 5.2 (Continued)

DATE 23 July 1956
TIME 2200 -2210 CST

CONCENTRATION (mg m^{-3})

RUN NO.18

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	584	257	95.0	32.3	5.04
	92					11.6
47	93	620	242	82.4	29.5	14.0
	94					11.3.
48	95	615	177	51.4	17.9	8.49
	96					8.34
49	97	467	152	52.0	16.8	9.35
	98					6.86
50	99	321	118	31.6	8.56	2.38
	100					0.435
51	101	206	42.2	6.64	0.695	0.080
	102					0.075
52	103	72.6	6.66	0.545	0.055	0.035
	104					
53	105	17.4	0.783	0.065		
	106					
54	107	3.15	0.085			
	108					
55	109	1.49				
	110					
56	111	0.025				
	112					
57	113					
	114					
58	115					
	116					
59	117					
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

Table 5.2 (Continued)

DATE 25 July 1956
TIME 1100-1110 CST

CONCENTRATION (mg m^{-3})

RUN NO.19

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					
24	47	2.52				
	48					
25	49	4.13				
	50					
26	51	11.3	0.225			
	52					
27	53	21.0	1.91	0.025		
	54					
28	55	33.5	4.38	0.330		
	56					
29	57	48.6	8.57	0.745		
	58					
30	59	57.2	14.2	1.86	0.180	
	60					
31	61	76.2	20.4	3.36	0.620	
	62					
32	63	108	27.9	5.65	0.520	
	64					0.045
33	65	144	39.2	8.21	0.735	0.090
	66					0.105
34	67	141	41.3	12.1	1.73	0.090
	68					0.125
35	69	164	41.3	10.5	2.30	0.135
	70					0.185
36	71	182	33.8	6.79	2.09	0.230
	72					0.365
37	73	213	47.0	4.72	0.980	0.210
	74					0.220
38	75	218	54.8	6.41	0.655	0.225
	76					0.190
39	77	210	51.0	6.60	1.08	0.185
	78					0.175
40	79	192	51.0	8.21	1.89	0.160
	80					0.245
41	81	198	47.9	11.3	1.81	0.260
	82					0.370
42	83	180	47.1	13.4	1.88	0.285
	84					0.215
43	85	152	49.7	11.4	2.13	0.135
	86					0.135
44	87	142	36.9	10.8	1.87	0.090
	88					0.075
45	89	107	27.3	7.28	0.445	0.035
	90					0.015

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Table 5.2 (Continued)

DATE 25 July 1956
TIME 1100 - 1110 CST

CONCENTRATION (mg m^{-3})

RUN NO.19

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	62.3	21.8	3.50	0.090			136					
	92						69	137					
47	93	44.3	13.2	1.16				138					
	94						70	139					
48	95	30.3	4.53	0.390				140					
	96						71	141					
49	97	23.0	1.59	0.110				142					
	98						72	143					
50	99	16.8	0.970					144					
	100						73	145					
51	101	10.2	0.140					146					
	102						74	147					
52	103	2.85	0.025					148					
	104						75	149					
53	105	0.930						150					
	106						76	151					
54	107	0.115						152					
	108						77	153					
55	109	0.045						154					
	110						78	155					
56	111							156					
	112						79	157					
57	113							158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 25 July 1956
TIME 1300-1310 CST

CONCENTRATION (mg m^{-3})

RUN NO. 20

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57	0.180				
7	13							58					
	14						30	59	1.23				
8	15							60					
	16						31	61	2.79	0.060			
9	17							62					
	18						32	63	5.60	0.615			
10	19							64					
	20						33	65	9.57	2.36	0.015		
11	21							66					
	22						34	67	20.4	2.75	0.350		
12	23							68					0.025
	24						35	69	45.6	8.22	1.94	0.105	0.050
13	25							70					0.125
	26						36	71	89.0	18.6	4.47	1.09	0.235
14	27							72					0.350
	28						37	73	130	38.0	8.95	1.90	0.470
15	29							74					0.660
	30						38	75	149	51.0	12.9	2.76	0.795
16	31							76					0.735
	32						39	77	162	52.2	14.7	3.42	0.735
17	33							78					0.565
	34						40	79	170	47.1	15.9	3.06	0.495
18	35							80					0.460
	36						41	81	170	46.5	11.4	2.88	0.305
19	37							82					0.525
	38						42	83	171	46.5	10.7	2.08	0.445
20	39							84					0.400
	40						43	85	170	39.6	9.22	2.33	0.335
21	41							86					0.315
	42						44	87	146	36.6	8.74	1.97	0.355
22	43							88					0.430
	44						45	89	134	30.2	8.95	1.42	0.380
23	45							90					0.230

Table 5.2 (Continued)

DATE 25 July 1956
TIME 1300 - 1310 CST

CONCENTRATION (mg m^{-3})

RUN NO. 20

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	120	33.9	8.16	1.47	0.205		136					
	92					0.210	69	137					
47	93	114	32.7	6.56	1.25	0.110		138					
	94					0.075	70	139					
48	95	99.9	27.9	5.62	1.01	0.060		140					
	96					0.065	71	141					
49	97	83.4	20.4	4.28	0.675	0.095		142					
	98					0.050	72	143					
50	99	57.9	9.77	2.47	0.270			144					
	100						73	145					
51	101	35.6	6.24	1.49	0.030			146					
	102						74	147					
52	103	26.1	3.68	0.325				148					
	104						75	149					
53	105	21.2	0.925	0.045				150					
	106						76	151					
54	107	11.2	0.095					152					
	108						77	153					
55	109	1.88						154					
	110						78	155					
56	111	0.225						156					
	112						79	157					
57	113							158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 25 July 1956
TIME 2200-2210 CST

CONCENTRATION (mg m^{-3})

RUN NO. 21

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67	0.230				
12	23							68					
	24						35	69	0.925				
13	25							70					
	26						36	71	2.55	0.025			
14	27							72					
	28						37	73	6.63	0.380			
15	29							74					
	30						38	75	15.6	2.39	0.040		
16	31							76					
	32						39	77	39.3	8.70	0.975	0.095	
17	33							78					0.020
	34						40	79	66.5	22.5	5.29	1.11	0.215
18	35							80					0.595
	36						41	81	131	41.0	11.6	3.22	0.915
19	37							82					1.26
	38						42	83	210	65.9	19.1	4.72	1.11
20	39							84					1.46
	40						43	85	267	91.7	27.1	8.37	2.31
21	41							86					3.03
	42						44	87	275	96.6	29.6	9.03	3.26
22	43							88					2.95
	44						45	89	255	91.5	27.6	8.43	1.99
23	45							90					0.955

Table 5.2 (Continued)

DATE 25 July 1956
TIME 2200 -2210 CST

CONCENTRATION (mg m^{-3})

RUN NO.21

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	201	66.3	17.1	2.18	0.280
	92					0.075
47	93	129	34.7	4.98	0.485	
	94					
48	95	76.2	12.0	1.51	0.035	
	96					
49	97	35.6	1.83	0.140		
	98					
50	99	10.6	0.415			
	100					
51	101	1.36	0.085			
	102					
52	103	0.110				
	104					
53	105	0.025				
	106					
54	107	0.045				
	108					
55	109					
	110					
56	111					
	112					
57	113					
	114					
58	115					
	116					
59	117					
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

Table 5.2 (Continued)

DATE 26 July 1956
TIME 0000-0010 CST

CONCENTRATION (mg m^{-3})

RUN NO.22

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65	0.235				
	66					
34	67	1.56				
	68					
35	69	4.65	0.035			
	70					
36	71	11.7	0.865			
	72					
37	73	27.0	4.22	0.060		
	74					
38	75	59.0	11.4	1.04		
	76					
39	77	117	30.8	5.92	0.230	
	78					0.015
40	79	170	55.8	14.4	2.37	0.040
	80					0.305
41	81	213	78.5	25.5	7.11	0.685
	82					2.13
42	83	224	81.8	27.7	8.64	2.51
	84					2.31
43	85	200	60.3	16.3	4.75	1.74
	86					0.865
44	87	143	33.8	7.45	1.71	0.450
	88					0.205
45	89	84.6	16.7	3.75	0.695	0.075
	90					0.020

Table 5.2 (Continued)

DATE 26 July 1956
TIME 0000 - 0010 CST
CONCENTRATION (mg m^{-3})
RUN NO.22

POST NO. Inner Arcs	800m arc	ARC 50m	100m	200m	400m	800m
46	91	37.4	6.78	0.895	0.065	
	92					
47	93	18.5	2.24	0.265		
	94					
48	95	7.08	0.480	0.070		
	96					
49	97	2.60	0.080	0.020		
	98					
50	99	0.750				
	100					
51	101	0.185				
	102					
52	103	0.030				
	104					
53	105					
	106					
54	107					
	108					
55	109					
	110					
56	111					
	112					
57	113					
	114					
58	115					
	116					
59	117					
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO. Inner Arcs	800m arc	ARC 50m	100m	200m	400m	800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

Table 5.2 (Continued)

DATE 29 July 1956
TIME 2100-2110 CST
CONCENTRATION (mg m^{-3})
RUN NO.23

POST NO. Inner Arcs	800m arc	ARC 50m	100m	200m	400m	800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19	0.060				
	20					
11	21	0.670				
	22					
12	23	3.42	0.045			
	24					
13	25	9.87	1.18			
	26					
14	27	33.6	5.04	0.120		
	28					
15	29	69.6	15.6	1.66	0.050	
	30					
16	31	95.0	32.9	7.95	0.740	0.035
	32					0.165
17	33	124	43.7	13.7	1.51	0.260
	34					0.595
18	35	145	52.8	18.1	4.81	1.24
	36					1.87
19	37	170	61.7	19.5	6.36	2.09
	38					1.66
20	39	176	55.2	16.8	3.94	1.34
	40					1.15
21	41	136	40.4	10.6	2.71	0.875
	42					0.485
22	43	94.7	23.7	5.82	1.77	0.345
	44					0.125
23	45	54.9	14.3	4.49	0.810	

POST NO. Inner Arcs	800m arc	ARC 50m	100m	200m	400m	800m
	46					
24	47	24.5	8.39	2.20	0.245	
	48					
25	49	16.4	3.84	0.555	0.045	
	50					
26	51	7.53	1.42	0.080		
	52					
27	53	3.60	0.360	0.025		
	54					
28	55	1.48	0.080	0.025		
	56					
29	57	0.300				
	58					
30	59	0.185				
	60					
31	61	0.045				
	62					
32	63					
	64					
33	65					
	66					
34	67					
	68					
35	69					
	70					
36	71					
	72					
37	73					
	74					
38	75					
	76					
39	77					
	78					
40	79					
	80					
41	81					
	82					
42	83					
	84					
43	85					
	86					
44	87					
	88					
45	89					
	90					

Table 5.2 (Continued)

DATE 29 July 1956
TIME 2300-2310 CST

CONCENTRATION (mg m^{-3})

RUN NO.24

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					0.110
	2						24	47	101	34.8	10.9	2.60	0.345
2	3							48					0.795
	4						25	49	124	45.3	14.9	5.00	1.23
3	5							50					1.60
	6						26	51	158	50.4	17.0	5.58	1.81
4	7							52					1.92
	8						27	53	152	50.7	16.0	5.43	1.68
5	9							54					1.19
	10						28	55	144	46.5	14.9	4.24	0.645
6	11							56					0.435
	12						29	57	125	39.2	9.56	1.68	0.185
7	13							58					0.110
	14						30	59	86.4	22.4	4.05	0.420	0.035
8	15							60					
	16						31	61	51.5	10.0	1.73	0.055	
9	17							62					
	18						32	63	29.6	4.32	0.215		
10	19							64					
	20						33	65	13.3	0.990			
11	21							66					
	22						34	67	4.37	0.155			
12	23							68					
	24						35	69	1.44				
13	25							70					
	26						36	71	0.250				
14	27							72					
	28						37	73	0.025				
15	29	0.040						74					
	30						38	75					
16	31	0.130						76					
	32						39	77					
17	33	0.510	0.020					78					
	34						40	79					
18	35	0.830	0.120					80					
	36						41	81					
19	37	3.62	0.310					82					
	38						42	83					
20	39	10.0	0.800	0.050				84					
	40						43	85					
21	41	31.1	2.25	0.245				86					
	42						44	87					
22	43	53.4	9.21	1.07	0.050			88					
	44						45	89					
23	45	79.7	21.9	4.30	0.755			90					

Table 5.2 (Continued)

DATE 1 August 1956
TIME 1300-1310 CST

CONCENTRATION (mg m^{-3})

RUN NO. 25

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51	0.830				
4	7							52					
	8						27	53	7.61				
5	9							54					
	10						28	55	19.2	0.100			
6	11							56					
	12						29	57	27.3	1.67		0.020	
7	13							58					
	14						30	59	28.8	3.33	0.015	0.030	0.045
8	15							60					0.060
	16						31	61	20.6	8.73	0.730	0.050	0.050
9	17							62					0.105
	18						32	63	26.4	8.45	1.64	0.100	0.075
10	19							64					M
	20						33	65	47.6	9.05	2.64	0.125	0.045
11	21							66					0.050
	22						34	67	74.7	12.7	2.03	0.370	0.060
12	23							68					0.110
	24						35	69	96.0	17.3	2.13	0.330	0.090
13	25							70					0.075
	26						36	71	129	21.9	1.25	0.440	0.055
14	27							72					0.035
	28						37	73	212	23.6	1.89	1.46	0.030
15	29							74					0.035
	30						38	75	264	41.0	3.19	0.900	M
16	31							76					0.020
	32						39	77	299	38.9	3.11	1.30	M
17	33							78					0.025
	34						40	79	305	40.1	2.81	1.10	0.025
18	35							80					0.060
	36						41	81	296	37.5	5.08	0.800	0.105
19	37							82					0.065
	38						42	83	255	33.5	3.19	0.450	0.170
20	39							84					0.175
	40						43	85	206	31.8	4.32	0.600	0.185
21	41							86					0.125
	42						44	87	186	27.2	2.86	0.540	0.060
22	43							88					0.055
	44						45	89	156	20.1	0.960	0.470	0.065
23	45							90					0.065

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Table 5.2 (Continued)

DATE 1 August 1956
TIME 1300 - 1310 CST

CONCENTRATION (mg m^{-3})

RUN NO. 25

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
						M
46	91	170	14.8	1.15	0.425	0.045
	92					0.055
47	93	156	15.6	1.56	M	0.065
	94					0.065
48	95	161	17.3	2.29	0.275	0.075
	96					0.115
49	97	102	20.3	0.645	0.395	0.080
	98					0.105
50	99	116	27.3	3.55	0.485	0.165
	100					0.200
51	101	112	29.9	5.16	0,755	0.145
	102					0.220
52	103	91.7	24.8	8.14	0.685	0.040
	104					0.225
53	105	91.5	22.5	7.34	0.595	0.235
	106					0.230
54	107	85.5	18.0	3.11	0.685	0.040
	108					0.165
55	109	92.1	13.7	3.74	M	0.095
	110					0.085
56	111	85.2	13.7	0.855	0.815	
	112					0.045
57	113	74.7	11.9	0.735	0.715	0.050
	114					
58	115	53.4	14.9	0.715	1.11	
	116					
59	117	73.5	12.9	2.42	1.16	
	118					
60	119	80.4	13.3	3.02	1.19	
	120					
61	121	80.7	17.3	3.92	0.805	
	122					
62	123	119	26.4	3.69	0.675	
	124					
63	125	148	26.4	5.41	0.370	
	126					
64	127	105	28.8	4.87	0.300	
	128					
65	129	66.9	16.7	6.42	0.340	
	130					
66	131	34.1	19.2	5.99	0.465	
	132					
67	133	8.19	18.5	0.515	0.155	
	134					
68	135	23.9	5.80	0.320		

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					
69	137	9.95	1.62	0.040		
	138					
70	139	0.660				
	140					
71	141	0.135				
	142					
72	143	0.025				
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

Table 5.2 (Continued)

DATE 2 August 1956
TIME 1200-1210 CST

CONCENTRATION (mg m^{-3})

RUN NO. 26

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63	0.030				
	64					
33	65	1.62				
	66					
34	67	2.69				
	68					
35	69	8.09				
	70					
36	71	17.0	0.510			
	72					
37	73	34.7	5.84	0.080		
	74					
38	75	46.5	13.8	0.560		
	76					
39	77	59.1	17.1	1.22	0.025	
	78					
40	79	73.8	21.8	1.53	0.055	
	80					
41	81	79.4	22.8	3.23	0.305	
	82					
42	83	93.2	23.7	6.62	0.490	0.035
	84					0.075
43	85	127	28.5	6.92	1.26	0.145
	86					0.145
44	87	133	35.9	7.52	2.16	0.190
	88					0.280
45	89	121	33.5	9.60	2.18	0.440
	90					0.540

Table 5.2 (Continued)

DATE 2 August 1956
TIME 1200-1210 CST

CONCENTRATION (mg m^{-3})

RUN NO. 26

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	123	37.4	10.1	2.18	0.365		136					
	92					0.385	69	137					
47	93	121	38.4	10.3	2.07	0.340		138					
	94					0.325	70	139					
48	95	114	36.3	11.6	2.48	0.280		140					
	96					0.280	71	141					
49	97	126	41.6	12.2	2.54	0.285		142					
	98					0.310	72	143					
50	99	139	48.5	12.9	2.75	0.335		144					
	100					0.445	73	145					
51	101	144	47.1	11.8	1.92	0.465		146					
	102					0.360	74	147					
52	103	158	42.6	10.6	1.59	0.260		148					
	104					0.265	75	149					
53	105	148	39.5	9.90	0.925	0.300		150					
	106					0.360	76	151					
54	107	121	33.6	6.92	1.23	0.310		152					
	108					0.370	77	153					
55	109	96.8	25.8	5.68	1.47	0.355		154					
	110					0.355	78	155					
56	111	70.1	18.6	4.28	1.60	0.415		156					
	112					0.320	79	157					
57	113	50.4	13.1	4.13	1.13	0.185		158					
	114					0.150	80	159					
58	115	34.7	7.13	2.57	0.745	0.085		160					
	116					0.055	81	161					
59	117	24.6	6.12	0.990	0.255			162					
	118						82	163					
60	119	21.5	6.21	1.22	0.240			164					
	120						83	165					
61	121	16.4	6.03	1.56	0.155			166					
	122						84	167					
62	123	11.8	5.15	1.56	0.235			168					
	124						85	169					
63	125	7.17	3.39	1.29	0.190			170					
	126						86	171					
64	127	5.57	3.18	1.34	0.130			172					
	128						87	173					
65	129	3.90	1.97	0.980	0.050			174					
	130						88	175					
66	131	1.49	0.910	0.590				176					
	132						89	177					
67	133	0.190	0.245	0.125				178					
	134						90	179					
68	135			0.030				180					
							91	181					

Table 5.2 (Continued)

DATE 2 August 1956
TIME 1400-1410 CST

CONCENTRATION (mg m^{-3})

RUN NO.27

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61	0.030				
9	17							62					
	18						32	63	0.540				
10	19							64					
	20						33	65	1.79	0.240			
11	21							66					
	22						34	67	7.08	1.64	0.205		
12	23							68					
	24						35	69	12.2	4.01	0.690		
13	25							70					
	26						36	71	18.8	6.57	2.57	0.080	
14	27							72					0.050
	28						37	73	24.5	10.1	4.29	0.890	0.060
15	29							74					0.130
	30						38	75	40.2	14.4	3.78	0.990	0.165
16	31							76					0.170
	32						39	77	59.1	17.4	4.56	1.07	0.185
17	33							78					0.255
	34						40	79	93.9	19.8	6.23	1.23	0.390
18	35							80					0.590
	36						41	81	133	32.1	7.81	2.48	0.710
19	37							82					0.800
	38						42	83	159	49.1	12.4	3.73	0.840
20	39							84					0.870
	40						43	85	200	60.0	17.7	4.73	0.980
21	41							86					0.930
	42						44	87	221	73.1	19.7	4.17	0.940
22	43							88					0.750
	44						45	89	221	57.3	17.8	3.66	0.670
23	45							90					0.520

Table 5.2 (Continued)

DATE 2 August 1956
TIME 1400-1410 CST

CONCENTRATION (mg m^{-3})

RUN NO.27

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91	188	45.3	13.7	2.33	0.405
	92					0.505
47	93	164	41.4	9.77	2.36	0.355
	94					0.350
48	95	164	49.8	11.7	2.40	0.355
	96					0.355
49	97	150	50.1	14.2	2.39	0.330
	98					0.225
50	99	132	44.6	13.1	1.56	0.185
	100					0.165
51	101	132	36.2	9.37	1.00	0.145
	102					0.120
52	103	141	36.3	5.06	0.355	0.100
	104					0.060
53	105	123	23.0	3.86	0.050	0.050
	106					0.025
54	107	101	19.2	1.69		
	108					
55	109	63.3	10.8	0.535		
	110					
56	111	34.4	5.49	0.025		
	112					
57	113	22.1	1.55			
	114					
58	115	7.86	0.415			
	116					
59	117	3.27				
	118					
60	119	0.940				
	120					
61	121	0.210				
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

Table 5.2 (Continued)

DATE 3 August 1956
TIME 0000-0010 CST

CONCENTRATION (mg m^{-3})

RUN NO.28

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65	0.070				
	66					
34	67	0.180				
	68					
35	69	12.0	0.370			
	70					
36	71	42.5	5.81	0.065		
	72					
37	73	100	20.4	1.03	0.045	
	74					
38	75	152	45.6	8.24	0.120	
	76					
39	77	218	79.8	22.4	2.28	
	78					0.055
40	79	299	115	33.9	10.4	0.370
	80					2.35
41	81	378	156	42.8	18.2	6.79
	82					10.1
42	83	488	192	57.9	21.1	8.65
	84					6.87
43	85	450	179	59.5	19.0	4.72
	86					2.57
44	87	408	144	46.9	13.5	0.925
	88					0.250
45	89	326	98.3	24.3	4.93	0.065
	90					0.030

DATE 3 August 1956
TIME 0000-0010 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 28

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91	209	52.2	13.9	0.755	
	92					
47	93	107	17.4	4.82	0.020	
	94					
48	95	50.7	5.75	0.490	0.020	
	96					
49	97	21.3	1.10	0.030		
	98					
50	99	5.91	0.115			
	100					
51	101	0.610				
	102					
52	103					
	104					
53	105					
	106					
54	107					
	108					
55	109					
	110					
56	111					
	112					
57	113					
	114					
58	115					
	116					
59	117					
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

DATE 3 AUGUST 1956
TIME 0200-0210 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 29

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91					
	92					
47	93					
	94					
48	95	0.025				
	96					
49	97	0.020				
	98					
50	99	0.070				
	100					
51	101	0.170				
	102					
52	103	0.790				
	104					
53	105	2.43	0.025			
	106					
54	107	6.93	0.205			
	108					
55	109	16.7	1.23	0.015		
	110					
56	111	44.6	6.32	0.370		
	112					
57	113	91.5	16.5	1.94	0.180	
	114					0.025
58	115	127	35.7	8.63	1.27	0.085
	116					0.230
59	117	167	63.0	19.9	5.45	0.745
	118					1.40
60	119	234	79.5	27.6	9.18	2.18
	120					2.60
61	121	234	87.8	24.2	7.37	2.48
	122					1.78
62	123	248	74.9	21.8	5.66	1.54
	124					1.24
63	125	191	71.1	21.9	7.62	1.56
	126					1.82
64	127	186	51.5	13.3	4.48	1.78
	128					1.60
65	129	152	41.7	12.6	2.90	1.10
	130					0.905
66	131	146	45.6	12.6	3.24	0.795
	132					0.625
67	133	128	40.5	11.2	3.55	0.795
	134					0.835
68	135	112	35.6	10.6	2.65	0.835

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	136					1.06
69	137	115	43.5	15.4	4.18	0.970
	138					1.41
70	139	101	46.8	16.7	5.97	1.80
	140					1.44
71	141	81.0	30.8	8.31	3.09	1.23
	142					0.880
72	143	38.1	11.1	2.93	0.715	0.435
	144					0.150
73	145	15.6	3.47	0.735	0.125	0.035
	146					0.010
74	147	4.13	0.845	0.180	0.055	
	148					
75	149	0.920	0.305	0.115	0.025	
	150					
76	151	0.380	0.135	0.055		
	152					
77	153	0.185	0.055	0.015		
	154					
78	155	0.100				
	156					
79	157	0.040				
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

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DATE 3 August 1956
TIME 1300-1310 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 30

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65					
	66					
34	67	0.250				
	68					
35	69	1.79				
	70					
36	71	3.68				
	72					
37	73	6.29				
	74					
38	75	9.72				
	76					
39	77	12.6	1.92			
	78					
40	79	17.6	0.675			
	80					
41	81	26.0	1.68			
	82					
42	83	38.3	5.52	0.870		
	84					
43	85	50.9	17.1	2.83		
	86					
44	87	70.8	20.7	3.77	0.740	
	88					
45	89	88.4	26.9	5.19	1.19	
	90					0.430

DATE 3 August 1956
TIME 1300-1310 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 30

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	91.7	25.8	5.12	1.27	0.500
	92					0.210
47	93	98.0	28.2	7.60	1.01	0.180
	94					0.190
48	95	100	29.3	6.61	0.880	0.190
	96					0.160
49	97	115	27.8	8.59	1.29	0.020
	98					0
50	99	141	32.9	9.49	2.21	0.020
	100					0.250
51	101	141	41.0	9.49	2.23	0.280
	102					0.360
52	103	146	52.2	12.5	2.99	0.440
	104					0.320
53	105	203	66.2	17.5	2.57	0.380
	106					0.690
54	107	221	67.8	17.0	3.02	0.620
	108					0.600
55	109	203	54.3	15.0	2.36	0.630
	110					0.660
56	111	177	51.2	12.0	2.68	0.440
	112					0.150
57	113	150	41.1	10.1	1.91	0.250
	114					0.200
58	115	125	34.8	8.89	1.36	
	116					
59	117	94.2	25.1	5.61	0.680	
	118					
60	119	71.6	17.1	2.12	0.610	
	120					
61	121	39.3	9.48	1.36	0.470	
	122					
62	123	35.7	6.32	2.42	0.640	
	124					
63	125	21.3	5.46	2.08	0.460	
	126					
64	127	18.8	5.12	1.73		
	128					
65	129	11.8	2.31			
	130					
66	131	4.56	0.735			
	132					
67	133	1.64				
	134					
68	135	0.660				

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

Table 5.2 (Continued)

DATE 3 AUGUST 1956
TIME 1500 - 1510 CST

CONCENTRATION (mg m^{-3})

RUN NO. 31

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91							136					0.590
	92						69	137	158	51.3	14.5	3.02	0.710
47	93							138					0.780
	94						70	139	170	56.3	17.5	3.81	1.03
48	95							140					1.62
	96						71	141	177	59.0	14.8	4.04	1.67
49	97							142					1.46
	98						72	143	135	44.3	15.4	4.41	1.30
50	99							144					1.23
	100						73	145	85.7	33.5	14.0	3.62	1.23
51	101							146					0.760
	102						74	147	54.9	22.4	7.15	1.60	0.190
52	103							148					0.230
	104						75	149	37.8	11.8	2.97	0.910	0.310
53	105	0.405	0.375					150					
	106						76	151	22.1	5.37	1.63	0.290	
54	107	1.58	0.765					152					
	108						77	153	11.4	3.80	0.900		
55	109	2.15	1.82	0.560				154					
	110						78	155	4.37	2.46			
56	111	11.7	3.59	1.75	0.610	0.550		156					
	112					1.06	79	157	4.02	0.960			
57	113	24.2	7.26	3.44	0.880	0.310		158					
	114					0.090	80	159	1.89	0.225			
58	115	39.2	12.6	4.17	1.42	0.830		160					
	116					0.800	81	161	0.735				
59	117	55.8	17.3	5.42	1.48	1.40		162					
	118					0.600	82	163					
60	119	85.1	22.7	6.87	2.05	0.400		164					
	120					0.780	83	165					
61	121	124	31.2	9.81	2.69	0.620		166					
	122					0.690	84	167					
62	123	155	41.1	11.0	3.35	0.320		168					
	124					0.710	85	169					
63	125	137	37.2	9.11	2.15	0.940		170					
	126					0.790	86	171					
64	127	129	34.4	8.31	1.18	0.950		172					
	128					0.380	87	173					
65	129	116	37.2	8.31	0.890	0.660		174					
	130					0.160	88	175					
66	131	135	36.6	7.81	1.00	0.660		176					
	132					0.660	89	177					
67	133	152	33.6	7.33	1.36	0.720		178					
	134					0.740	90	179					
68	135	165	40.1	10.3	2.79	0.850		180					
							91	181					

Table 5.2 (Continued)

DATE 6 August 1956
TIME 2000-2010 CST

CONCENTRATION (mg m^{-3})

RUN NO. 32

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63	0.085				
10	19							64					
	20						33	65	0.090				
11	21							66					
	22						34	67	0.565				
12	23							68					
	24						35	69	3.12	0.075			
13	25							70					
	26						36	71	7.22	0.660			
14	27							72					
	28						37	73	32.1	6.39			
15	29							74					
	30						38	75	78.5	31.5	0.750		
16	31							76					
	32						39	77	207	57.3	14.5	0.395	
17	33							78					0.015
	34						40	79	356	162	53.1	7.17	0.115
18	35							80					1.66
	36						41	81	615	434	129	46.8	6.18
19	37							82					19.7
	38						42	83	729	624	285	121	41.1
20	39							84					58.6
	40						43	85	707	518	205	60.3	31.3
21	41							86					5.20
	42						44	87	608	240	45.2	3.98	0.270
22	43							88					0.030
	44						45	89	369	58.8	1.83	0.045	0.010
23	45							90					0.015

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Table 5.2 (Continued)

DATE 6 August 1956
TIME 2000 - 2010 CST

CONCENTRATION (mg m^{-3})

RUN NO. 32

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	132	6.35	0.015				136					
	92						69	137					
47	93	44.9	0.435	0.010				138					
	94						70	139					
48	95	8.55	0.050	0.010				140					
	96						71	141					
49	97	0.850						142					
	98						72	143					
50	99	0.080						144					
	100						73	145					
51	101							146					
	102						74	147					
52	103							148					
	104						75	149					
53	105							150					
	106						76	151					
54	107							152					
	108						77	153					
55	109							154					
	110						78	155					
56	111							156					
	112						79	157					
57	113							158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 7 August 1956
TIME 1300-1310 CST

CONCENTRATION (mg m^{-3})

RUN NO. 33

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65	0.790				
11	21							66					
	22						34	67	2.33	0.070			
12	23							68					
	24						35	69	4.78	0.820	0.090		
13	25							70					
	26						36	71	12.0	2.88	0.240		
14	27							72					
	28						37	73	27.8	5.90	0.935		
15	29							74					
	30						38	75	40.4	11.1	1.86	0.175	
16	31							76					
	32						39	77	51.3	18.9	4.20	0.465	
17	33							78					
	34						40	79	55.7	21.6	5.94	0.925	0.030
18	35							80					0.080
	36						41	81	60.8	17.7	4.23	1.13	0.085
19	37							82					0.100
	38						42	83	59.9	15.6	3.76	0.675	0.145
20	39							84					0.125
	40						43	85	57.2	17.6	4.01	0.725	0.140
21	41							86					0.160
	42						44	87	71.3	21.5	4.62	1.02	0.195
22	43							88					0.335
	44						45	89	106	24.6	6.44	1.42	0.425
23	45							90					0.465

DATE 7 August 1956
TIME 1300 - 1310 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO.33

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	138	48.3	7.67	2.28	0.590		136					
	92					0.640	69	137					
47	93	158	50.9	10.9	3.01	0.520		138					
	94					0.440	70	139					
48	95	191	59.1	16.6	2.62	0.420		140					
	96					0.710	71	141					
49	97	207	63.6	17.5	3.95	0.740		142					
	98					0.680	72	143					
50	99	180	62.7	19.1	3.59	0.660		144					
	100					0.560	73	145					
51	101	158	52.4	13.8	3.03	0.500		146					
	102					0.230	74	147					
52	103	128	40.2	7.93	1.23	0.070		148					
	104						75	149					
53	105	85.5	20.1	4.26	0.590			150					
	106						76	151					
54	107	49.2	9.77	1.38	0.080			152					
	108						77	153					
55	109	23.9	2.88	0.415				154					
	110						78	155					
56	111	7.95	0.880	0.045				156					
	112						79	157					
57	113	2.43	0.135					158					
	114						80	159					
58	115	0.485	0.025					160					
	116						81	161					
59	117	0.200						162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

DATE 7 August 1956
TIME 1500-1510 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 34

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47	60.8	15.9	2.22	0.135	
2	3							48					
	4						25	49	99.6	24.9	6.95	0.525	0.045
3	5							50					0.080
	6						26	51	130	34.7	11.4	1.44	0.180
4	7							52					0.320
	8						27	53	152	45.5	14.4	3.28	0.570
5	9							54					0.700
	10						28	55	180	60.2	16.1	3.83	0.870
6	11							56					1.17
	12						29	57	201	68.7	18.3	4.48	1.06
7	13							58					1.18
	14						30	59	192	64.1	20.0	4.65	1.12
8	15							60					1.27
	16						31	61	162	59.7	18.6	5.10	1.30
9	17							62					1.04
	18						32	63	162	51.0	15.7	4.23	0.970
10	19							64					0.720
	20						33	65	130	40.5	11.9	2.61	0.390
11	21							66					0.100
	22						34	67	102	26.1	5.12	0.805	0.045
12	23							68					0.030
	24						35	69	70.2	13.3	1.42	0.155	0.015
13	25							70					
	26						36	71	46.1	5.99	0.250	0.040	
14	27							72					
	28						37	73	25.5	3.02	0.025	0.015	
15	29							74					
	30						38	75	11.5	0.595	0.020		
16	31							76					
	32						39	77	6.68	0.040	0.025		
17	33							78					
	34						40	79	3.69				
18	35	0.065						80					
	36						41	81	0.525				
19	37	0.380						82					
	38						42	83	0.070				
20	39	3.96						84					
	40						43	85	0.040				
21	41	12.7	0.495					86					
	42						44	87					
22	43	19.2	3.12	0.040				88					
	44						45	89					
23	45	33.3	6.54	0.700	0.015			90					

Table 5.2 (Continued)

DATE 7 August1956
TIME 2303-2313 CST CONCENTRATION (mg m^{-3}) RUN NO. 35-S

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					1.19
	2						24	47	339	133	45.0	12.5	2.94
2	3							48					4.35
	4						25	49	387	136	43.1	14.7	5.27
3	5							50					5.29
	6						26	51	366	130	35.2	11.7	4.17
4	7							52					2.76
	8						27	53	296	91.5	24.1	8.41	1.54
5	9							54					0.985
	10						28	55	185	52.1	13.6	3.15	0.520
6	11							56					
	12						29	57	99.6	24.8	3.53	0.610	
7	13							58					
	14						30	59	49.4	6.87	0.510	0.055	
8	15							60					
	16						31	61	20.9	0.580	0.055		
9	17							62					
	18						32	63	5.87	0.095	0.025		
10	19							64					
	20						33	65	0.705				
11	21							66					
	22						34	67	0.135				
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73					
15	29							74					
	30						38	75					
16	31	0.055						76					
	32						39	77					
17	33	0.415						78					
	34						40	79					
18	35	0.385						80					
	36						41	81					
19	37	3.53	0.190					82					
	38						42	83					
20	39	15.5	1.35	0.035				84					
	40						43	85					
21	41	58.7	8.64	0.600				86					
	42						44	87					
22	43	136	34.1	5.29	0.335			88					
	44					0.055	45	89					
23	45	231	81.6	24.1	4.41	0.265		90					

Table 5.2 (Continued)

DATE 11 August1956
TIME 2130-2140 CST CONCENTRATION (mg m^{-3}) RUN NO. 35

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47	182	6.81			
2	3							48					
	4						25	49	87.0	0.490			
3	5							50					
	6						26	51	24.2				
4	7							52					
	8						27	53	3.78				
5	9							54					
	10						28	55	0.440				
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23	0.225						68					
	24						35	69					
13	25	2.15	0.105			0.065		70					
	26					3.23	36	71					
14	27	14.3	2.07	1.59	0.435	13.8		72					
	28					10.2	37	73					
15	29	59.3	16.4	14.7	13.0	10.2		74					
	30					6.74	38	75					
16	31	168	61.4	45.8	32.8	5.77		76					
	32					7.41	39	77					
17	33	359	180	75.6	37.4	5.91		78					
	34					4.75	40	79					
18	35	312	228	145	41.9	3.52		80					
	36					3.21	41	81					
19	37	591	575	253	76.2	2.47		82					
	38					1.03	42	83					
20	39	641	575	200	50.5	0.225		84					
	40					0.130	43	85					
21	41	660	405	81.1	8.45	0.080		86					
	42						44	87					
22	43	552	198	14.8	0.420			88					
	44						45	89					
23	45	366	54.6	0.755				90					

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DATE 11 August 1956
TIME 2330-2340 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 36

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47	0.090				
2	3							48					
	4						25	49	0.095				
3	5							50					
	6						26	51	0.105	0.035			
4	7							52					
	8						27	53	0.140	0.045			
5	9							54					
	10						28	55	0.135	0.085			
6	11							56					
	12						29	57	0.185	0.075			
7	13							58					
	14						30	59	2.95	0.130	0.040		
8	15							60					
	16						31	61	12.0	0.140	0.040		
9	17							62					
	18						32	63	83.5	2.19	0.025		
10	19							64					
	20						33	65	251	24.3	0.220		
11	21							66					
	22						34	67	492	161	6.51	0.055	
12	23							68					
	24						35	69	747	405	71.4	0.445	
13	25							70					0.045
	26						36	71	830	540	203	17.9	0.160
14	27							72					0.760
	28						37	73	794	431	152	64.6	2.63
15	29							74					6.85
	30						38	75	660	266	79.2	38.9	15.5
16	31							76					29.8
	32						39	77	423	130	59.2	31.3	38.6
17	33							78					21.9
	34						40	79	210	53.3	26.0	20.7	2.34
18	35							80					
	36						41	81	76.2	10.3	3.25	1.08	
19	37							82					
	38						42	83	21.9	0.580	0.054		
20	39							84					
	40						43	85	5.45				
21	41							86					
	42						44	87	1.74				
22	43							88					
	44						45	89					
23	45	0.075						90					

DATE 12 August 1956
TIME 0300-0310 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 37

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73					
15	29							74					
	30						38	75					
16	31							76					
	32						39	77	0.055				
17	33							78					
	34						40	79	0.795	0.025			
18	35							80					
	36						41	81	3.09	0.325			
19	37							82					
	38						42	83	11.8	1.53	0.040		
20	39							84					
	40						43	85	27.8	6.53	0.780	0.045	
21	41							86					
	42						44	87	53.0	17.6	4.53	0.860	0.050
22	43							88					0.230
	44						45	89	99.3	37.1	10.3	3.06	0.795
23	45							90					1.41

DATE 12 August 1956
TIME 0300-0310 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 37

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	173	55.8	16.4	5.54	1.94		136					
	92					1.98	69	137					
47	93	176	60.9	18.5	4.29	1.55		138					
	94					1.44	70	139					
48	95	224	78.0	18.9	5.40	1.34		140					
	96					1.46	71	141					
49	97	224	74.1	22.9	7.39	2.08		142					
	98					2.02	72	143					
50	99	170	57.6	18.5	4.61	1.62		144					
	100					0.975	73	145					
51	101	128	36.6	8.01	2.03	0.480		146					
	102					0.150	74	147					
52	103	68.9	15.5	3.31	0.520	0.025		148					
	104						75	149					
53	105	28.4	6.42	0.905	0.100			150					
	106						76	151					
54	107	15.5	1.56	0.085				152					
	108						77	153					
55	109	7.86	0.490	0.080				154					
	110						78	155					
56	111	3.53	0.130					156					
	112						79	157					
57	113	1.39	0.055					158					
	114						80	159					
58	115	0.055						160					
	116						81	161					
59	117	0.020						162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

DATE 12 August 1956
TIME 0500-0510 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 38

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61	0.020				
9	17							62					
	18						32	63	0.350				
10	19							64					
	20						33	65	1.74				
11	21							66					
	22						34	67	5.48	0.210			
12	23							68					
	24						35	69	19.4	1.08	0.020		
13	25							70					
	26						36	71	54.6	5.00	0.270		
14	27							72					
	28						37	73	126	19.8	1.85	0.055	
15	29							74					
	30						38	75	219	57.6	11.5	1.36	0.075
16	31							76					0.520
	32						39	77	333	118	33.0	7.90	1.66
17	33							78					3.85
	34						40	79	330	153	51.4	18.7	6.01
18	35							80					6.44
	36						41	81	360	134	46.9	13.7	4.63
19	37							82					1.91
	38						42	83	273	87.3	17.4	3.44	0.580
20	39							84					0.085
	40						43	85	170	31.5	4.61	0.430	
21	41							86					
	42						44	87	84.3	7.55	0.980	0.050	
22	43							88					
	44						45	89	30.3	1.97	0.140	0.025	
23	45							90					

DATE 12 August 1956
TIME 0500-0510 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 38

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	2.64	0.300					136					
	92						69	137					
47	93	1.38	0.050					138					
	94						70	139					
48	95	0.210						140					
	96						71	141					
49	97	0.030						142					
	98						72	143					
50	99							144					
	100						73	145					
51	101							146					
	102						74	147					
52	103							148					
	104						75	149					
53	105							150					
	106						76	151					
54	107							152					
	108						77	153					
55	109							154					
	110						78	155					
56	111							156					
	112						79	157					
57	113							158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

DATE 13 August 1956
TIME 2230-2240 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 39

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					M
	2						24	47	362	117	36.8	8.24	M
2	3							48					M
	4						25	49	470	140	42,7	17.0	M
3	5							50					3.70
	6						26	51	425	161	54.2	20.1	2.16
4	7							52					1.56
	8						27	53	378	130	49.6	10.7	1.83
5	9							54					1.36
	10						28	55	249	79.7	20.6	3.43	0.835
6	11							56					M
	12						29	57	155	37.5	4.42	0.540	M
7	13							58					M
	14						30	59	92.2	13.1	1.95	0.080	
8	15							60					
	16						31	61	38.6	2.13	0.180		
9	17							62					
	18						32	63	11.6	0.310			
10	19							64					
	20						33	65	2.62	0.015			
11	21							66					
	22						34	67	0.445				
12	23							68					
	24						35	69	0.005				
13	25							70					
	26						36	71					
14	27							72					
	28						37	73					
15	29							74					
	30						38	75					
16	31							76					
	32						39	77					
17	33	0.225	0.040					78					
	34						40	79					
18	35	1.22	0.110					80					
	36						41	81					
19	37	7.83	0.340	0.050				82					
	38						42	83					
20	39	30.3	1.86	0.210	0.060			84					
	40					M	43	85					
21	41	91.8	11.1	0.350	0.075	M		86					
	42					M	44	87					
22	43	182	39.6	4.62	0.045	M		88					
	44					M	45	89					
23	45	276	98.4	23.8	1.38	M		90					

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Table 5.2 (Continued)

DATE 14 August1956.
TIME 0030-0040 CST

CONCENTRATION (mg m^{-3})

RUN NO.40

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69	0.295				
13	25							70					
	26						36	71	0.640				
14	27							72					
	28						37	73	2.85	0.080			
15	29							74					
	30						38	75	11.6	0.455	0.025		
16	31							76					
	32						39	77	24.9	2.97	0.180	M	
17	33							78					
	34						40	79	64.8	14.2	2.33	M	
18	35							80					0.035
	36						41	81	156	42.2	11.5	M	0.260
19	37							82					0.735
	38						42	83	227	76.4	25.8	M	1.38
20	39							84					1.64
	40						43	85	318	105	27.9	M	1.72
21	41							86					1.57
	42						44	87	312	99.9	26.8	M	1,55
22	43							88					1.49
	44						45	89	281	77.1	24.3	M	1.56
23	45							90					1.38

Table 5.2 (Continued)

DATE 14 August1956
TIME 0030-0040 CST

CONCENTRATION (mg m^{-3})

RUN NO.40

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	215	75.6	18.5	4.95	1.34		136					
	92					1.28	69	137					
47	93	201	53.7	17.7	3.73	1.36		138					
	94					1.15	70	139					
48	95	204	52.7	16.6	5.05	0.900		140					
	96					1.22	71	141					
49	97	168	55.8	14.5	4.80	1.36		142					
	98					1.62	72	143					
50	99	180	74.1	23.7	5.85	1.79		144					
	100					2.21	73	145					
51	101	185	76.4	32.7	14.6	3.33		146					
	102					5.99	74	147					
52	103	125	49.1	14.5	5.85	6.48		148					
	104					2.80	75	149					
53	105	68.3	16.1	2.15	0.375	0.465		150					
	106					0.045	76	151					
54	107	33.0	2.19	0.085				152					
	108						77	153					
55	109	10.7	0.195					154					
	110						78	155					
56	111	1.35						156					
	112						79	157					
57	113	0.150						158					
	114						80	159					
58	115	0.025						160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 14 AUGUST 1956
TIME 0300 - 0310 CST

CONCENTRATION (mg m^{-3})

RUN NO. 41

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91							136					
	92						69	137					
47	93							138					
	94						70	139					
48	95	0.260						140					
	96						71	141					
49	97	2.60	0.185					142					
	98						72	143					
50	99	22.7	1.92	0.125				144					
	100						73	145					
51	101	74.7	18.6	2.27	0.235			146					
	102					0.010	74	147					
52	103	198	59.7	17.6	4.32	0.240		148					
	104					1.34	75	149					
53	105	378	142	48.8	16.7	4.33		150					
	106					8.57	76	151					
54	107	450	189	67.8	25.0	9.92		152					
	108					6.43	77	153					
55	109	362	144	39.0	9.00	1.72		154					
	110					0.400	78	155					
56	111	236	64.7	9.81	0.675	0.055		156					
	112						79	157					
57	113	106	15.0	0.765				158					
	114						80	159					
58	115	33.6	2.10	0.035				160					
	116						81	161					
59	117	4.97	0.295					162					
	118						82	163					
60	119	0.270						164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 14 AUGUST 1956
TIME 0500 - 0510 CST

CONCENTRATION (mg m^{-3})

RUN NO. 42

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91							136					
	92						69	137	1.05	0.055			
47	93							138					
	94						70	139	0.075				
48	95							140					
	96						71	141					
49	97							142					
	98						72	143					
50	99							144					
	100						73	145					
51	101	0.580						146					
	102						74	147					
52	103	0.945						148					
	104						75	149					
53	105	2.61						150					
	106						76	151					
54	107	9.68	0.440					152					
	108						77	153					
55	109	21.0	2.88	0.075	0.005			154					
	110						78	155					
56	111	50.3	5.87	1.07	0.045			156					
	112						79	157					
57	113	106	25.2	5.24	1.07	0.070		158					
	114					0.280	80	159					
58	115	183	53.6	15.6	3.49	0.725		160					
	116					1.31	81	161					
59	117	242	83.9	25.3	7.12	1.70		162					
	118					2.13	82	163					
60	119	276	100	31.5	7.77	1.98		164					
	120					1.95	83	165					
61	121	254	84.8	23.4	5.59	2.11		166					
	122					2.11	84	167					
62	123	204	56.1	15.5	5.16	1.94		168					
	124					1.76	85	169					
63	125	127	41.3	12.6	4.17	1.36		170					
	126					0.815	86	171					
64	127	103	32.3	8.56	1.94	0.310		172					
	128					0.070	87	173					
65	129	76.2	17.1	2.76	0.455	0.020		174					
	130						88	175					
66	131	48.6	4.52	0.595	0.060			176					
	132						89	177					
67	133	19.7	1.23	0.090				178					
	134						90	179					
68	135	5.18	0.225					180					
							91	181					

DATE 15 August 1956
TIME 1200-1210 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3}) RUN NO. 43

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					0.055
	2						24	47	2.43	0.240	0.025	0.275	0.080
2	3							48					0.125
	4						25	49	3.71	0.625	0.245	0.515	0.095
3	5							50					0.075
	6						26	51	10.4	1.91	0.965	0.615	0.085
4	7							52					0.100
	8						27	53	26.1	3.42	1.72	0.565	0.090
5	9							54					0.095
	10						28	55	38.7	5.30	1.80	0.575	0.105
6	11							56					0.090
	12						29	57	49.4	8.58	2.63	0.735	0.035
7	13							58					0.060
	14						30	59	64.5	21.3	3.79	0.825	0.085
8	15							60					0.075
	16						31	61	81.2	33.2	5.27	1.29	0.050
9	17							62					0.095
	18						32	63	111	36.6	7.65	1.02	0.165
10	19							64					0.145
	20						33	65	126	39.0	9.47	0.935	0.075
11	21							66					0.060
	22						34	67	114	26.4	6.31	0.735	0.090
12	23							68					0.065
	24						35	69	116	20.6	3.97	0.745	0.075
13	25							70					0.075
	26						36	71	123	23.3	5.13	0.625	0.070
14	27							72					0.080
	28						37	73	114	26.4	6.93	0.715	0.070
15	29							74					0.100
	30						38	75	137	40.4	7.09	1.47	0.120
16	31							76					0.135
	32						39	77	153	42.3	11.9	1.82	0.250
17	33							78					0.255
	34						40	79	189	46.5	14.7	2.40	0.305
18	35							80					0.450
	36						41	81	219	51.2	16.9	2.63	0.450
19	37							82					0.490
	38						42	83	249	58.2	14.0	2.45	0.540
20	39							84					0.490
	40						43	85	225	57.3	11.6	2.10	0.460
21	41					0.055		86					0.410
	42					0.060	44	87	200	48.8	10.5	2.07	0.330
22	43	0.025				0.070		88					0.275
	44					0.115	45	89	177	40.8	7.21	1.76	0.205
23	45	0.465			0.080	0.080		90					0.205

DATE 15 August 1956
TIME 1200-1210 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3}) RUN NO. 43

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	135	30.9	6.81	1.36	0.220		136					
	92					0.240	69	137					
47	93	121	30.5	7.09	0.910	0.235		138					
	94					0.155	70	139					
48	95	114	19.5	5.55	0.710	0.155		140					
	96					0.125	71	141					
49	97	81.6	23.6	4.99	0.490	0.100		142					
	98					0.070	72	143					
50	99	66.0	18.6	3.12	0.325	0.050		144					
	100					0.015	73	145					
51	101	49.8	11.1	1.24	0.135	0.030		146					
	102						74	147					
52	103	31.5	6.83	0.125				148					
	104						75	149					
53	105	8.55	2.22	0.045				150					
	106						76	151					
54	107	4.77	0.520					152					
	108						77	153					
55	109	4.40	0.035					154					
	110						78	155					
56	111	1.77						156					
	112						79	157					
57	113	1.49						158					
	114						80	159					
58	115	0.045						160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 15 August 1956
TIME 1400-1410 CST

CONCENTRATION (mg m^{-3})

RUN NO.44

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47	41.4	9.18	1.33	0.320	
2	3							48					
	4						25	49	36.0	7.85	1.03	0.405	
3	5							50					0.060
	6						26	51	35.1	6.30	1.84	0.300	0.080
4	7							52					0.080
	8						27	53	58.7	9.24	3.99	0.675	0.125
5	9							54					0.145
	10						28	55	98.5	21.3	5.47	1.25	0.125
6	11							56					0.240
	12						29	57	120	28.1	7.16	1.54	0.185
7	13							58					0.205
	14						30	59	153	36.3	6.67	1.30	0.220
8	15							60					0.240
	16						31	61	148	40.4	7.34	1.03	0.215
9	17							62					0.215
	18						32	63	150	42.9	12.2	1.23	0.200
10	19							64					0.130
	20						33	65	156	46.2	15.1	2.94	0.150
11	21							66					0.210
	22						34	67	143	45.9	13.2	2.77	0.385
12	23							68					0.505
	24						35	69	162	44.0	12.2	2.46	9.565
13	25	0.065						70					0.575
	26						36	71	162	44.6	9.87	2.60	0.545
14	27	1.56						72					0.575
	28						37	73	188	39.8	9.37	2.54	0.585
15	29	4.01	0.040					74					0.605
	30						38	75	191	49.8	10.9	3.12	0.465
16	31	5.48	0.375					76					0.455
	32						39	77	168	53.9	12.4	2.72	0.445
17	33	11.9	1.23	0.195				78					0.345
	34						40	79	135	39.5	9.87	1.96	0.310
18	35	16.1	4.16	1.18				80					0.290
	36						41	81	109	31.1	7.67	1.98	0.240
19	37	27.0	9.24	2.75	0.030			82					0.210
	38						42	83	89.0	18.9	6.17	1.77	0.165
20	39	32.0	15.2	2.55	0.125			84					0.135
	40						43	85	70.1	12.6	3.60	0.835	0.195
21	41	42.9	14.7	3.44	0.385			86					0.160
	42						44	87	69.3	10.5	1.81	0.555	0.150
22	43	48.8	15.3	5.24	0.265			88					0.170
	44						45	89	46.5	6.35	1.18	0.195	0.195
23	45	48.5	12.4	2.75	0.405			90					0.105

Table 5.2 (Continued)

DATE 15 August 1956
TIME 1400-1410 CST

CONCENTRATION (mg m^{-3})

RUN NO.44

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	23.6	2.78	0.355	0.060			136					
	92						69	137					
47	93	18.5	1.36	0.085	0.055			138					
	94						70	139					
48	95	8.43	0.500	0.070	0.030			140					
	96						71	141					
49	97	6.17	0.090					142					
	98						72	143					
50	99	2.87						144					
	100						73	145					
51	101	0.355						146					
	102						74	147					
52	103							148					
	104						75	149					
53	105							150					
	106						76	151					
54	107							152					
	108						77	153					
55	109							154					
	110						78	155					
56	111							156					
	112						79	157					
57	113							158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

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Table 5.2 (Continued)

DATE 15 August 1956
TIME 1700-1710 CST

CONCENTRATION (mg m^{-3})

RUN NO. 45

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45	0.040				

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					
24	47	0.065				
	48					
25	49	0.520				
	50					
26	51	3.08	0.040			
	52					
27	53	11.5	0.140			
	54					
28	55	27.8	0.790	0.085		
	56					
29	57	45.8	3.24	0.660		
	58					
30	59	71.7	11.3	1.04	0.075	
	60					
31	61	114	25.5	5.40	0.740	0.060
	62					0.115
32	63	168	48.9	11.6	3.98	0.295
	64					0.695
33	65	204	73.2	21.5	4.95	1.06
	66					1.80
34	67	246	86.9	28.6	7.12	2.50
	68					2.94
35	69	266	99.0	31.4	8.93	2.20
	70					1.84
36	71	291	98.6	29.8	7.24	1.43
	72					1.82
37	73	285	86.3	24.2	6.85	2.27
	74					2.81
38	75	297 *	99.3	28.6	8.37	2.29
	76					1.90
39	77	362	114	41.4	6.56	1.50
	78					0.735
40	79	288	105	28.1	3.39	0.330
	80					0.125
41	81	215	58.4	10.9	1.17	0.060
	82					0.025
42	83	150	32.7	3.97	0.420	0.010
	84					
43	85	105	18.0	1.45	0.075	
	86					
44	87	65.7	8.06	0.450		
	88					
45	89	34.2	1.47	0.025		
	90					

Table 5.2 (Continued)

DATE 15 August 1956
TIME 1700-1710 CST

CONCENTRATION (mg m^{-3})

RUN NO.45

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	10.9	0.170			
	92					
47	93	1.88	0.035			
	94					
48	95	0.545				
	96					
49	97					
	98					
50	99					
	100					
51	101					
	102					
52	103					
	104					
53	105					
	106					
54	107					
	108					
55	109					
	110					
56	111					
	112					
57	113					
	114					
58	115					
	116					
59	117					
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

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Table 5.2 (Gontinued)

DATE 15 August 1956
TIME 1845-1855 CST

CONCENTRATION (mg m^{-3})

RUN NO.46

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					1.01
	2						24	47	434	114	27.8	4.84	1.12
2	3							48					1.81
	4						25	49	363	111	32.8	8.48	2.62
3	5							50					3.08
	6						26	51	267	92.1	32.0	11.0	2.83
4	7							52					1.74
	8						27	53	206	72.5	22.1	6.63	0.895
5	9							54					0.445
	10						28	55	147	41.0	11.8	1.44	0.110
6	11							56					0.060
	12						29	57	99.0	28.4	4.29	0.235	0.015
7	13							58					
	14						30	59	54.5	17.1	0.480		
8	15							60					
	16						31	61	37.1	4.79			
9	17							62					
	18						32	63	18.9	0.265			
10	19							64					
	20						33	65	11.4	0.130			
11	21							66					
	22						34	67	1.88	0.040			
12	23							68					
	24						35	69	0.370	0.140			
13	25							70					
	26						36	71	0.160	0.155			
14	27	0.065	0.110	0.055				72					
	28						37	73					
15	29	0.535	0.125	0.055				74					
	30						38	75					
16	31	4.59	0.325	0.085				76					
	32						39	77					
17	33	16.4	2.09	0.420	0.050			78					
	34						40	79					
18	35	59.3	13.5	3.53	0.715	0.095		80					
	36					0.445	41	81					
19	37	177	58.8	17.6	3.95	1.10		82					
	38					3.22	42	83					
20	39	384	131	53.1	15.0	6.08		84					
	40					6.33	43	85					
21	41	512	198	60.8	20.9	3.63		86					
	42					3.11	44	87					
22	43	564	188	47.8	12.6	4.01		88					
	44					3.06	45	89					
23	45	546	142	33.3	9.79	1.86		90					

Table 5.2 (Continued)

DATE 20 AUGUST 1956
TIME 1000 - 1010 CST

CONCENTRATION (mg m^{-3})

RUN NO. 47

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
								136					
46	91						69	137	49.2	6.32	1.49	0.405	0.035
	92							138					0.040
47	93						70	139	68.1	7.22	1.29	0.515	0.075
	94							140					0.090
48	95						71	141	67.5	11.3	2.09	0.445	0.095
	96							142					0.110
49	97						72	143	92.7	18.0	2.69	0.625	0.105
	98							144					0.100
50	99						73	145	139	24.8	3.72	0.745	0.100
	100							146					0.110
51	101						74	147	182	35.4	3.67	0.685	0.140
	102							148					0.200
52	103						75	149	213	47.6	6.46	1.06	0.240
	104							150					0.205
53	105						76	151	218	42.6	9.49	1.38	0.205
	106							152					0.180
54	107						77	153	224	42.8	7.33	1.29	0.180
	108							154					0.165
55	109						78	155	260	42.3	6.02	2.00	0.175
	110							156					0.125
56	111						79	157	263	47.6	5.51	1.36	0.110
	112							158					0.145
57	113						80	159	278	47.4	7.70	1.42	0.165
	114							160					0.165
58	115						81	161	293	45.8	7.09	1.12	0.105
	116							162					0.085
59	117						82	163	284	53.3	6.65	0.975	0.100
	118							164					0.125
60	119						83	165	221	45.5	7.84	1.02	0.120
	120							166					0.145
61	121	0.480					84	167	192	41.6	8.33	0.955	0.085
	122							168					0.055
62	123	2.18					85	169	158	41.7	7.40	1.38	0.080
	124							170					0.065
63	125	4.61	0.080				86	171	122	39.0	9.39	0.845	
	126							172					
64	127	9.56	1.20	0.040			87	173	85.2	26.0	5.86	0.695	
	128							174					
65	129	19.7	6.32	0.625			88	175	42.3	15.6	4.10	0.565	
	130							176					
66	131	25.7	6.00	0.415	0.135		89	177	37.1	10.2	3.34	0.415	
	132							178					
67	133	33.5	4.92	0.735	0.155		90	179	22.2	7.46	2.54	0.435	
	134							180					
68	135	37.1	5.61	0.795	0.225		91	181	21.3	4.43	1.32	0.470	

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Table 5.2 (Continued)

DATE 20 August 1956
TIME 1233-1243 CST

CONCENTRATION (mg m^{-3})

RUN NO. 48-S

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47	1.92				
2	3							48					
	4						25	49	1.85				
3	5							50					
	6						26	51	1.83				
4	7							52					
	8						27	53	3.03				
5	9							54					
	10						28	55	4.89				
6	11							56					
	12						29	57	4.74				
7	13							58					
	14						30	59	5.51				
8	15							60					
	16						31	61	5.97				
9	17							62					
	18						32	63	13.3	0.040			
10	19							64					
	20						33	65	19.2	0.130			
11	21							66					
	22						34	67	26.9	0.620			
12	23							68					
	24						35	69	27.3	1.01			
13	25							70					
	26						36	71	31.5	3.66			
14	27							72					
	28						37	73	35.3	4.35			
15	29							74					
	30						38	75	39.6	4.88			
16	31	0.045						76					
	32						39	77	51.8	8.52			
17	33	0.070						78					
	34						40	79	49.5	10.1	0.150		
18	35	0.155						80					
	36						41	81	57.0	10.3	0.255		
19	37	0.245						82					
	38						42	83	55.2	12.8	0.260		
20	39	0.355						84					
	40						43	85	74.7	9.38	0.455		
21	41	0.595						86					
	42						44	87	62.3	9.03	1.11		
22	43	1.15						88					
	44						45	89	57.0	8.40	1.12		
23	45	1.25						90					

Table 5.2 (Continued)

DATE 20 August 1956
TIME 1233-1243 CST

CONCENTRATION (mg m^{-3})

RUN NO.48-S

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	71.0	5.60	0.695				136					0.070
	92						69	137	143	40.4	6.51	1.18	0.185
47	93	76.2	7.35	0.675				138					0.095
	94						70	139	125	45.2	11.6	2.12	0.140
48	95	58.8	4.98	0.645				140					0.145
	96						71	141	115	36.0	8.93	1.31	0.180
49	97	50.6	3.45	0.745				142					0.140
	98						72	143	85.4	29.3	9.83	1.27	0.120
50	99	47.3	4.40	0.945				144					0.060
	100						73	145	78.6	22.5	5.11	1.16	0.045
51	101	46.4	6.66	1.22				146					0.090
	102						74	147	57.0	14.4	2.52	0.745	0.040
52	103	39.2	7.91	0.945	0.020			148					0.035
	104						75	149	39.6	15.0	3.23	0.525	
53	105	37.1	5.58	0.905	0.065			150					
	106						76	151	45.2	16.2	2.64	0.340	
54	107	39.5	5.72	0.905	:			152					
	108						77	153	42.8	9.56	1.80	0.130	
55	109	38.6	7.38	1.05	0.105			154					
	110						78	155	33.5	6.45	2.42		
56	111	42.8	7.98	0.865	0.190			156					
	112						79	157	16.8	7.13	0.695		
57	113	54.8	8.48	0.935	0.215			158					
	114						80	159	17.6	3.27	0.185		
58	115	80.6	9.41	1.44	0.235			160					
	116						81	161	19.5	1.39	0.030		
59	117	74.0	9.62	0.955	0.255			162					
	118						82	163	10.2	0.355			
60	119	66.2	8.16	1.07	0.050			164					
	120						83	165	1.21				
61	121	60.8	7.62	0.895	0.010			166					
	122						84	167	0.150				
62	123	74.0	6.66	1.29	0.025			168					
	124						85	169	0.065				
63	125	78.6	4.91	0.755	0.075			170					
	126						86	171	0.055				
64	127	89.9	8.16	0.915	0.275			172					
	128						87	173	0.040				
65	129	97.8	18.9	3.08	0.535			174					
	130						88	175					
66	131	101	22.8	2.23	0.365			176					
	132						89	177					
67	133	130	26.0	2.02	0.045			178					
	134					0.045	90	179					
68	135	140	24.6	3.13	0.725	0.115		180					
							91	181					

Table 5.2 (Continued)

DATE 21 AUGUST 1956
TIME 0900 - 0910 CST

CONCENTRATION (mg m^{-3})

RUN NO. 48

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91							136					
	92						69	137	41.4	8.79	1.11	0.020	
47	93							138					
	94						70	139	26.2	3.06	0.055		
48	95	0.030						140					
	96						71	141	17.6	0.730	0.025		
49	97	0.545						142					
	98						72	143	7.58	0.065			
50	99	2.40						144					
	100						73	145	1.52				
51	101	6.29	0.065					146					
	102						74	147	0.215				
52	103	12.3	0.480					148					
	104						75	149	0.010				
53	105	20.0	3.20					150					
	106						76	151					
54	107	29.4	5.13	0.085				152					
	108						77	153					
55	109	36.9	6.15	0.700	0.020			154					
	110						78	155					
56	111	40.7	7.25	1.20	0.110	0.040		156					
	112					0.055	79	157					
57	113	53.9	13.8	1.82	0.400	0.115		158					
	114					0.200	80	159					
58	115	83.0	21.8	4.71	0.950	0.285		160					
	116					0.325	81	161					
59	117	97.5	31.7	8.12	1.54	0.395		162					
	118					0.390	82	163					
60	119	155	39.3	10.5	2.07	0.410		164					
	120					0.460	83	165					
61	121	130	48.0	14.1	3.05	0.640		166					
	122					0.760	84	167					
62	123	186	56.6	17.1	3.45	0.960		168					
	124					1.01	85	169					
63	125	209	65.0	17.0	3.64	0.990		170					
	126					1.24	86	171					
64	127	127	65.6	15.5	4.66	1.31		172					
	128					0.970	87	173					
65	129	224	59.7	13.8	4.68	0.630		174					
	130					0.345	88	175					
66	131	158	39.9	11.6	3.32	0.135		176					
	132					0.025	89	177					
67	133	105	26.3	8.81	0.990			178					
	134						90	179					
68	135	62.1	18.0	3.54	0.085			180					
							91	181					

Table 5.2 (Continued)

DATE 21 August 1956
TIME 1100-1110 CST

CONCENTRATION (mg m^{-3})

RUN NO.49

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71	0.110				
14	27							72					
	28						37	73	0.175				
15	29							74					
	30						38	75	0.430				
16	31							76					
	32						39	77	4.19	0.265			
17	33							78					
	34						40	79	7.10	1.14			
18	35							80					
	36						41	81	9.99	2.78	0.215		
19	37							82					
	38						42	83	8.72	3.53	1.75	0.040	
20	39							84					
	40						43	85	16.5	4.89	1.85	0.620	
21	41							86					
	42						44	87	29.9	9.45	2.31	0.850	0.070
22	43							88					0.145
	44						45	89	49.5	12.4	3.63	1.35	0.160
23	45							90					0.125

Table 5.2 (Continued)

DATE 21 August 1956
TIME 1100-1110 CST
CONCENTRATION (mg m^{-3})
RUN NO. 49

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	67.1	17.9	5.15	1.15	0.065		136					
	92					0.075	69	137	0.605				
47	93	54.0	18.8	4.48	0.755	0.110		138					
	94					0.115	70	139					
48	95	68.7	21.2	3.99	0.285	0.080		140					
	96					0.095	71	141					
49	97	101	21.5	3.92	0.505	0.115		142					
	98					0.085	72	143					
50	99	128	26.0	5.08	0.945	0.155		144					
	100					0.175	73	145					
51	101	140	35.1	8.35	1.83	0.270		146					
	102					0.275	74	147					
52	103	155	38.6	10.5	2.28	0.415		148					
	104					0.535	75	149					
53	105	164	44.3	10.8	2.55	0.515		150					
	106					0.545	76	151					
54	107	173	57.3	11.8	2.21	0.525		152					
	108					0.585	77	153					
55	109	189	60.0	15.4	2.62	0.625		154					
	110					0.535	78	155					
56	111	201	66.8	15.0	3.00	0.465		156					
	112					0.525	79	157					
57	113	209	65.1	18.7	3.32	0.575		158					
	114					0.555	80	159					
58	115	200	57.3	15.8	2.48	0.455		160					
	116					0.535	81	161					
59	117	161	38.9	10.9	2.25	0.445		162					
	118					0.320	82	163					
60	119	121	34.2	9.38	1.46	0.300		164					
	120					0.300	83	165					
61	121	105	26.7	6.56	1.50	0.225		166					
	122					0.215	84	167					
62	123	71.7	18.6	3.37	1.09	0.205		168					
	124					0.135	85	169					
63	125	56.6	13.8	2.74	0.645	0.065		170					
	126					0.035	86	171					
64	127	37.7	9.33	2.84	0.360	0.035		172					
	128					0.035	87	173					
65	129	20.0	4.59	1.46	0.175	0.030		174					
	130						88	175					
66	131	9.42	0.970	0.565	0.075			176					
	132						89	177					
67	133	6.33	0.285	0.095				178					
	134						90	179					
68	135	2.90	0.075					180					
							91	181					

Table 5.2 (Continued)

DATE 21 AUGUST 1956
TIME 1400 - 1410 CST
CONCENTRATION (mg m^{-3})
RUN NO. 50

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91							136					0.440
	92						69	137	107	31.7	7.69	2.46	0.360
47	93	0.060						138					0.350
	94						70	139	73.1	20.0	3.45	1.04	0.300
48	95	0.580						140					0.190
	96						71	141	42.2	10.1	1.62	0.375	0.130
49	97	3.20						142					0.085
	98						72	143	27.0	5.31	0.680	0.045	0.045
50	99	14.2	0.075					144					
	100						73	145	24.8	1.20	0.055		
51	101	19.2	0.450	0.025				146					
	102						74	147	9.62	0.180			
52	103	17.1	2.00	0.140				148					
	104						75	149	4.32	0.150			
53	105	22.8	4.23	0.260	0.015			150					
	106						76	151	3.45	0.050			
54	107	25.4	7:52	0.370	0.050			152					
	108						77	153	2.43				
55	109	45.5	9.72	1.95	0.040			154					
	110					0.045	78	155	0.790				
56	111	66.0	15.9	3.45	0.190	0.075		156					
	112					0.080	79	157	0.345				
57	113	88.5	25.7	4.76	1.12	0.195		158					
	114					0.280	80	159	0.050				
58	115	112	30.9	7.12	1.94	0.280		160					
	116					0.285	81	161					
59	117	136	32.7	8.55	1.92	0.255		162					
	118					0.215	82	163					
60	119	156	42.8	7.98	1.62	0.190		164					
	120					0.160	83	165					
61	121	159	46.1	7.46	1.37	0.145		166					
	122					0.150	84	167					
62	123	165	42.8	M	1.65	0.150		168					
	124					0.160	85	169					
63	125	201	47.0	7.56	1.88	0.180		170					
	126					0.255	86	171					
64	127	231	51.2	9.76	2.30	0.370		172					
	128					0.340	87	173					
65	129	243	64.7	14.3	2.12	0.310		174					
	130					0.390	88	175					
66	131	237	77.0	18.3	2.74	0.430		176					
	132					0.490	89	177					
67	133	227	72.5	15.0	3.63	0.450		178					
	134					0.600	90	179					
68	135	162	55.2	14.3	3.83	0.470		180					
							91	181					

Table 5.2 (Continued)

DATE 21 AUGUST 1956
TIME 1530 - 1540 CST

CONCENTRATION (mg m^{-3})

RUN NO. 51

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91					
	92					
47	93					
	94					
48	95	0.025				
	96					
49	97	0.040				
	98					
50	99	0.060				
	100					
51	101	0.085				
	102					
52	103	0.095				
	104					
53	105	0.065				
	106					
54	107	0.090				
	108					
55	109	0.105				
	110					
56	111	0.155				
	112					
57	113	0.205				
	114					
58	115	1.14				
	116					
59	117	2.61				
	118					
60	119	3.48				
	120					
61	121	4.28				
	122					
62	123	5.48	0.110			
	124					
63	125	8.19	1.74			
	126					
64	127	11.7	3.54			
	128					
65	129	17.0	4.01	0.155		
	130					
66	131	36.3	3.89	1.14	0.010	
	132					
67	133	54.6	7.07	1.68	0.205	
	134					
68	135	91.1	16.8	1.55	0.400	

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					0.045
69	137	80.6	25.5	1.98	0.520	0.135
	138					0.135
70	139	84.9	30.8	4.70	0.760	0.230
	140					0.225
71	141	80.3	22.2	5.45	1.13	0.185
	142					0.160
72	143	60.6	14.8	4.60	1.03	0.145
	144					0.210
73	145	71.6	14.2	3.97	0.860	0.210
	146					0.135
74	147	99.3	17.1	4.68	1.21	0.155
	148					0.210
75	149	150	27.3	5.81	1.80	0.300
	150					0.315
76	151	201	47.3	9.33	2.47	0.410
	152					0.450
77	153	227	68.7	12.7	3.12	0.430
	154					0.410
78	155	246	71.0	18.4	2.72	0.285
	156					0.235
79	157	267	68.1	18.6	2.97	0.240
	158					0.185
80	159	219	70.2	15.3	2.10	0.230
	160					0.290
81	161	191	55.7	10.6	1.43	0.320
	162					0.155
82	163	155	39.5	6.33	1.66	0.120
	164					0.095
83	165	119	34.7	9.33	2.81	0.035
	166					
84	167	97.2	34.1	8.40	1.53	
	168					
85	169	75.3	23.3	5.35	0.730	
	170					
86	171	62.7	14.6	3.29	0.045	
	172					
87	173	38.0	9.39	2.16		
	174					
88	175	27.6	6.09	0.650		
	176					
89	177	14.4	4.98	0.080		
	178					
90	179	9.39	3.02			
	180					
91	181	8.61	0.450			

Table 5.2 (Continued)

DATE 24 August 1956
TIME 1117-1127 CST

CONCENTRATION (mg m^{-3})

RUN NO.52

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1	21.2	5.24	0.135		
	2					
2	3	27.3	12.7	0.480		
	4					
3	5	32.0	12.2	1.25		
	6					
4	7	41.1	12.0	1.59		
	8					
5	9	35.3	9.68	1.90		
	10					
6	11	43.4	9.59	1.28		
	12					
7	13	40.8	9.78	1.63		
	14					
8	15	42.6	10.5	1.72		0.060
	16					0.035
9	17	45.0	11.7	1.88	0.055	0.030
	18					0.025
10	19	45.6	9.06	1.56	0.090	
	20					0.020
11	21	73.8	7.10	1.68	0.150	
	22					
12	23	92.6	9.93	1.26	0.360	0.030
	24					
13	25	99.5	22.2	0.790	0.330	0.035
	26					0.055
14	27	108	29.6	0.700	0.290	0.025
	28					0.035
15	29	129	26.9	2.28	0.295	
	30					0.005
16	31	137	21.2	3.71	0.420	
	32					0.015
17	33	137	19.8	4.89	0.800	0.010
	34					0.015
18	35	80.3	17.9	4.81	1.05	
	36					
19	37	88.4	19.5	4.71	0.970	0.015
	38					0.030
20	39	73.1	21.3	5.98	0.480	0.055
	40					0.060
21	41	78.5	21.9	4.05	0.440	0.080
	42					0.015
22	43	84.0	23.1	3.14	0.450	0.015
	44					0.030
23	45	90.8	15.5	3.54	0.740	0.100

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					0.015
24	47	104	18.3	2.45	0.570	0.040
	48					0.050
25	49	112	21.2	2.39	0.350	0.040
	50					0.035
26	51	94.1	24.5	3.27	0.200	0.040
	52					0.040
27	53	104	20.1	5.13	0.100	0.050
	54					0.040
28	55	145	20.1	4.35	0.085	0.060
	56					0.050
29	57	176	30.3	3.92	0.380	
	58					
30	59	168	29.0	2.68	0.360	
	60					0.010
31	61	153	27.9	1.57	0.155	
	62					0.035
32	63	140	18.5	0.940	0.025	0.005
	64					
33	65	110	8.84	0.350	0.050	
	66					
34	67	76.8	7.05	0.070		
	68					
35	69	51.2	4.53			
	70					
36	71	44.6	3.84			
	72					
37	73	42.6	3.15			
	74					
38	75	50.9	2.91			
	76					
39	77	43.4	1.92			
	78					
40	79	24.9	0.215			
	80					
41	81	7.88	0.015			
	82					
42	83	5.45	0.015			
	84					
43	85	3.23	0.010			
	86					
44	87	2.34				
	88					
45	89	0.325				
	90					

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Table 5.2 (Continued)

DATE 24 August 1956
TIME 2000-2010 CST

CONCENTRATION (mg m^{-3})

RUN NO. 53

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47	155	4.53			
2	3							48					
	4						25	49	37.8	0.115			
3	5							50					
	6						26	51	2.76				
4	7							52					
	8						27	53	0.035				
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27	0.110						72					
	28						37	73					
15	29	2.60						74					
	30						38	75					
16	31	23.1	0.710	0.050				76					
	32						39	77					
17	33	109	16.7	0.775	0.035			78					
	34						40	79					
18	35	218	102	21.0	0.925			80					
	36					0.150	41	81					
19	37	608	305	115	31.7	4.41		82					
	38					24.7	42	83					
20	39	786	534	233	86.2	34.2		84					
	40					25.6	43	85					
21	41	923	488	162	50.3	12.8		86					
	42					2.52	44	87					
22	43	755	258	28.4	3.48	0.210		88					
	44					0.025	45	89					
23	45	410	47.1	0.955				90					

Table 5.2 (Continued)

DATE 24 August 1956
TIME 2200-2210 CST

CONCENTRATION (mg m^{-3})

RUN NO.54

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					3.60
	2						24	47	374	156	62.0	22.3	7.92
2	3							48					9.51
	4						25	49	422	171	55.8	19.3	6.62
3	5							50					2.64
	6						26	51	356	105	25.0	4.82	0.800
4	7							52					0.050
	8						27	53	215	43.4	6.38	0.670	0.065
5	9							54					0.080
	10						28	55	105	13.2	1.11	0.555	0.085
6	11							56					0.015
	12						29	57	40.1	2.31	0.205		0.070
7	13							58					
	14						30	59	5.87	0.350			
8	15							60					
	16						31	61	1.37				
9	17							62					
	18						32	63	0.070				
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73					
15	29							74					
	30						38	75					
16	31							76					
	32						39	77					
17	33	0.240						78					
	34						40	79					
18	35	0.780						80					
	36						41	81					
19	37	6.81	0.190	0.135				82					
	38						42	83					
20	39	29.1	2.04	0.180				84					
	40						43	85					
21	41	80.1	13.8	1.11	0.050			86					
	42						44	87					
22	43	152	44.4	8.01	0.880	0.040		88					
	44					0.155	45	89					
23	45	261	99.3	32.2	7.12	1.04		90					

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DATE 25 August 1956
TIME 0100-0110 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO.55

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47	0.485	0.010			
2	3							48					
	4						25	49	0.635	0.020			
3	5							50					
	6						26	51	2.45	0.030			
4	7							52					
	8						27	53	8.16	0.190			
5	9							54					
	10						28	55	20.6	1.01	0.035		
6	11							56					
	12						29	57	44.7	5.49	0.430		
7	13							58					
	14						30	59	86.9	18.5	2.53	0.345	0.025
8	15							60					0.115
	16						31	61	145	44.7	13.4	2.10	0.365
9	17							62					0.885
	18						32	63	192	66.8	22.4	5.54	1.85
10	19							64					2.49
	20						33	65	219	84.2	27.2	7.83	2.83
11	21							66					2.39
	22						34	67	218	82.7	26.3	7.35	1.81
12	23							68					1.19
	24						35	69	192	65.6	18.7	3.45	0.615
13	25							70					0.275
	26						36	71	156	38.0	6.09	0.860	0.085
14	27							72					0.020
	28						37	73	97.2	14.9	1.36	0.045	
15	29							74					
	30						38	75	50.1	4.04	0.335		
16	31							76					
	32						39	77	14.3	0.805	0.090		
17	33							78					
	34						40	79	1.61	0.300			
18	35							80					
	36						41	81	0.580	0.080			
19	37							82					
	38						42	83	0.160				
20	39							84					
	40						43	85	0.050				
21	41							86					
	42						44	87					
22	43							88					
	44						45	89					
23	45	0.330						90					

DATE 25 August 1956
TIME 0300-0310 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 56

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47	0.335	0.130			
2	3							48					
	4						25	49	2.90	0.155	0.020		
3	5							50					
	6						26	51	8.55	0.405	0.035		
4	7							52					
	8						27	53	33.0	3.50	0.245		
5	9							54					
	10						28	55	77.9	14.1	2.13	0.055	
6	11							56					
	12						29	57	156	40.5	9.01	1.18	0.050
7	13							58					0.195
	14						30	59	216	74.0	22.7	4.90	0.745
8	15							60					2.08
	16						31	61	284	110	33.0	11.3	3.76
9	17							62					4.50
	18						32	63	308	110	36.3	12.6	4.74
10	19							64					4.20
	20						33	65	279	91.7	28.7	8.46	2.48
11	21							66					0.905
	22						34	67	218	70.2	16.7	2.89	0.230
12	23							68					0.075
	24						35	69	147	36.9	5.58	0.510	0.025
13	25							70					
	26						36	71	92.7	13.0	0.915	0.030	
14	27							72					
	28						37	73	41.3	2.81	0.095	0.010	
15	29							74					
	30						38	75	10.8	0.370			
16	31							76					
	32						39	77	2.40				
17	33							78					
	34						40	79	0.310				
18	35							80					
	36						41	81					
19	37							82					
	38						42	83					
20	39							84					
	40						43	85					
21	41	0.085						86					
	42						44	87					
22	43	0.115	0.070					88					
	44						45	89					
23	45	0.200	0.120					90					

Table 5.2 (Continued)

DATE 25 August 1956
TIME 1730-1740 CST

CONCENTRATION (mg m^{-3})

RUN NO. 57

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65					
	66					
34	67					
	68					
35	69					
	70					
36	71					
	72					
37	73					
	74					
38	75					
	76					
39	77	0.145				
	78					
40	79	0.260				
	80					
41	81	0.550				
	82					
42	83	2.31				
	84					
43	85	3.27				
	86					
44	87	5.69	0.145			
	88					
45	89	6.68	0.550			
	90					

Table 5.2 (Continued)

DATE 25 August 1956
TIME 1730-1740 CST

CONCENTRATION (mg m^{-3})

RUN NO. 57

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91	15.6	2.96	0.590		
	92					
47	93	32.7	M	1.41	0.020	
	94					
48	95	58.5	9.00	4.19	0.520	
	96					
49	97	81.9	15.3	5.04	1.37	
	98					
50	99	132	29.1	7.35	1.53	0.110
	100					0.335
51	101	171	44.7	11.0	2.49	0.690
	102					0.740
52	103	224	57.8	18.2	3.60	0.910
	104					1.13
53	105	270	74.6	30.0	6.16	1.25
	106					1.79
54	107	282	79.4	29.2	8.82	1.96
	108					2.27
55	109	281	75.3	26.4	7.33	1.93
	110					1.33
56	111	243	59.6	20.4	4.40	0.910
	112					0.730
57	113	201	51.6	17.5	3.36	0.590
	114					0.590
58	115	159	47.9	12.6	2.78	0.630
	116					0.640
59	117	142	37.2	12.6	2.94	0.820
	118					0.930
60	119	118	28.7	8.61	2.73	0.660
	120					0.460
61	121	86.7	17.7	5.27	2.16	0.320
	122					0.100
62	123	54.0	8.70	4.28	1.19	
	124					
63	125	42.2	7.37	2.54	0.250	
	126					
64	127	24.6	4.47	0.510	0.045	
	128					
65	129	10.7	1.37	0.035	0.020	
	130					
66	131	4.82	1.28	0.020		
	132					
67	133	0.850	0.030			
	134					
68	135	0.165				

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	136					
69	137	0.060				
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

Table 5.2 (Continued)

DATE 25 August 1956
TIME 1930-1940 CST

CONCENTRATION (mg m^{-3})

RUN NO. 58

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65					
	66					
34	67					
	68					
35	69					
	70					
36	71					
	72					
37	73					
	74					
38	75					
	76					
39	77					
	78					
40	79	0.020				
	80					
41	81	0.560				
	82					
42	83	6.68				
	84					
43	85	60.2	2.96	0.035		
	86					0.040
44	87	279	48.9	4.34	0.800	3.10
	88					24.5
45	89	557	293	80.9	43.8	59.4
	90					48.2

Table 5.2 (Continued)

DATE 25 August 1956
TIME 1930 - 1940 CST

CONCENTRATION (mg m^{-3})

RUN NO. 58

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91	1000	660	311	140	12.0
	92					0.215
47	93	794	575	221	27.1	
	94					
48	95	633	318	37.9	0.090	
	96					
49	97	410	52.1	0.550		
	98					
50	99	150	2.93	0.020		
	100					
51	101	21.6				
	102					
52	103	1.10				
	104					
53	105	0.090				
	106					
54	107					
	108					
55	109					
	110					
56	111					
	112					
57	113					
	114					
58	115					
	116					
59	117					
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

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DATE 25 August 1956
TIME 2230-2240 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 59

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69	0,110				
13	25							70					
	26						36	71	0,165				
14	27							72					
	28						37	73	0,330				
15	29							74					
	30						38	75	1.36				
16	31							76					
	32						39	77	14,3	0,300			
17	33							78					
	34						40	79	100	7.01	0.090		
18	35							80					
	36						41	81	332	77.0	7.43	0.325	
19	37							82					0.165
	38						42	83	567	303	88.8	22.1	3.43
20	39							84					20.3
	40						43	85	723	524	239	101	39.4
21	41							86					22.3
	42						44	87	707	419	134	26.4	3.55
22	43							88					0.295
	44						45	89	552	174	22.1	0.835	0.030
23	45							90					

DATE 25 August 1956
TIME 2230 - 2240 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 59

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	239	23,6	0.870				136					
	92						69	137					
47	93	67.2	2.51					138					
	94						70	139					
48	95	11.8	0.305					140					
	96						71	141					
49	97	4.43	0.055					142					
	98						72	143					
50	99	0.265						144					
	100						73	145					
51	101							146					
	102						74	147					
52	103							148					
	104						75	149					
53	105							150					
	106						76	151					
54	107							152					
	108						77	153					
55	109							154					
	110						78	155					
56	111							156					
	112						79	157					
57	113							158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

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Table 5.2 (Continued)

DATE 26 August 1956
TIME 0030-0040 CST
CONCENTRATION (mg m^{-3})
RUN NO. 60

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1					
	2					
2	3					
	4					
3	5					
	6					
4	7					
	8					
5	9					
	10					
6	11					
	12					
7	13					
	14					
8	15					
	16					
9	17					
	18					
10	19					
	20					
11	21					
	22					
12	23					
	24					
13	25					
	26					
14	27					
	28					
15	29					
	30					
16	31					
	32					
17	33					
	34					
18	35					
	36					
19	37					
	38					
20	39					
	40					
21	41					
	42					
22	43					
	44					
23	45					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	46					
24	47					
	48					
25	49					
	50					
26	51					
	52					
27	53					
	54					
28	55					
	56					
29	57					
	58					
30	59					
	60					
31	61					
	62					
32	63					
	64					
33	65					
	66					
34	67					
	68					
35	69					
	70					
36	71					
	72					
37	73					
	74					
38	75					
	76					
39	77					
	78					
40	79					
	80					
41	81					
	82					
42	83					
	84					
43	85					
	86					
44	87	0.015	0.010			
	88					
45	89	0.045	0.070			
	90					

Table 5.2 (Continued)

DATE 26 August 1956
TIME 0030 - 0040 CST
CONCENTRATION (mg m^{-3})
RUN NO. 60

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	0.125	0.515			
	92					
47	93	0.210	0.480			
	94					
48	95	0.870	0.375	0.070		
	96					
49	97	4.07	0.470	0.120		
	98					
50	99	22.5	1.73	0.275		
	100					
51	101	65.0	8.12	0.795	0.030	
	102					
52	103	130	33.2	6.40	0.540	
	104					0.085
53	105	237	83.1	26.4	5.18	0.545
	106					1.79
54	107	302	118	43.6	15.1	4.15
	108					6.07
55	109	281	114	40.2	10.8	4.75
	110					2.44
56	111	212	53.4	13.3	3.20	0.815
	112					0.135
57	113	110	27.2	2.98	0.270	0.050
	114					
58	115	44.7	4.94	0.330		
	116					
59	117	10.6	0.415			
	118					
60	119	1.76	0.060			
	120					
61	121	0.220	0.045			
	122					
62	123	0.140				
	124					
63	125	0.110				
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

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Table 5.2 (Continued)

DATE 27 August 1956
TIME 1100-1110 CST
CONCENTRATION (mg m^{-3})
RUN NO.61

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m	POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73					
15	29							74					
	30						38	75					
16	31							76					
	32						39	77					
17	33							78					
	34						40	79	0.325				
18	35							80					
	36						41	81	4.53				
19	37							82					
	38						42	83	9.57				
20	39							84					
	40						43	85	18.9	0.095			
21	41							86					
	42						44	87	20.9	1.85			
22	43							88					
	44						45	89	19.8	4.85	0.075		
23	45							90					

Table 5.2 (Continued)

DATE 27 August1956
TIME 1100 - 1110 CST
CONCENTRATION (mg m^{-3})
RUN NO. 61

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m	POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91	29.3	6.36	0.870	0.025			136					
	92						69	137	18.2	5.22	1.38	0.085	
47	93	46.2	9.03	3.75	0.070			138					
	94						70	139	22.7	5.37	1.37		
48	95	60.9	17.3	3.34	1.04	0.030		140					
	96					0.080	71	141	17.1	5.67	0.780		
49	97	72.9	21.8	4.08	1.15	0.125		142					
	98					0.265	72	143	12.3	4.05	0.140		
50	99	87.3	25.4	7.13	1.89	0.390		144					
	100					0.625	73	145	8.09	0.865			
51	101	104	32.0	9.73	3.19	0.965		146					
	102					0.845	74	147	2.24	0.055			
52	103	133	35.3	12.2	3.39	0.685		148					
	104					0.615	75	149	0.050				
53	105	201	41.3	12.4	3.05	0.595		150					
	106					0.545	76	151	0.045				
54	107	161	42.6	14.5	3.16	0.555		152					
	108					0.600	77	153					
55	109	161	48.8	16.1	3.65	0.775		154					
	110					0.905	78	155					
56	111	159	55.7	17.3	4.33	0.955		156					
	112					0.845	79	157					
57	113	143	54.3	15.5	3.21	0.735		158					
	114					0.595	80	159					
58	115	148	43.8	10.4	2.31	0.510		160					
	116					0.450	81	161					
59	117	128	39.6	9.83	2.05	0.425		162					
	118					0.320	82	163					
60	119	106	30.0	9.23	2.36	0.420		164					
	120					0.280	83	165					
61	121	85.4	29.4	8.42	2.09	0.230		166					
	122					0.185	84	167					
62	123	71.1	19.5	7.39	1.11	0.180		168					
	124					0.170	85	169					
63	125	59.0	16.7	4.93	1.05	0.085		170					
	126					0.080	86	171					
64	127	42.5	13.3	4.83	1.10	0.080		172					
	128					0.105	87	173					
65	129	40.2	11.7	4.26	0.925	0.145		174					
	130					0.145	88	175					
66	131	35.6	8.87	2.66	0.665	0.135		176					
	132					0.060	89	177					
67	133	26.1	6.08	1.50	0.480			178					
	134						90	179					
68	135	21.3	4.67	1.29	0.445			180					
							91	181					

Table 5.2 (Continued)

DATE 27 AUGUST 1956
TIME 1400 - 1410 CST

CONCENTRATION (mg m^{-3})

RUN NO. 62

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91							136					
	92						69	137	29.1	4.11	0.045		
47	93							138					
	94						70	139	14.6	2.60			
48	95	0.160						140					
	96						71	141	7.20	0.615			
49	97	0.780						142					
	98						72	143	4.05	0.390			
50	99	2.66	0.065					144					
	100						73	145	3.39	0.170			
51	101	6.89	1.03					146					
	102						74	147	2.24	0.095			
52	103	14.2	3.68					148					
	104						75	149	1.32	0.160			
53	105	50.1	6.03	0.245		0.015		150					
	106					0.040	76	151	0.380	0.105			
54	107	99.6	15.2	1.21		0.075		152					
	108					0.185	77	153	0.065	0.070			
55	109	145	28.2	3.93	0.050	0.330		154					
	110					0.220	78	155	0.230				
56	111	179	49.4	8.78	0.585	0.210		156					
	112					0.210	79	157	0.170				
57	113	231	76.4	16.2	1.45	0.430		158					
	114					0.645	80	159	0.175				
58	115	296	88.4	21.5	3.71	0.745		160					
	116					1.06	81	161	0.165				
59	117	335	113	32.9	7.33	1.45		162					
	118					1.50	82	163	0.180				
60	119	378	115	33.8	8.08	1.93		164					
	120					1.46	83	165	0.160				
61	121	333	98.4	31.4	7.63	1.72		166					
	122					1.44	84	167	0.120				
62	123	266	81.0	25.5	7.94	1.27		168					
	124					0.835	85	169	0.115				
63	125	170	67.7	16.0	7.66	0.605		170					
	126					0.350	86	171					
64	127	168	45.0	9.79	1.75	0.190		172					
	128					0.125	87	173					
65	129	144	31.7	5.82	0.745	0.075		174					
	130					0.075	88	175					
66	131	113	16.4	2.92	0.320	0.095		176					
	132					0.085	89	177					
67	133	80.3	7.01	1.79	0.050	0.075		178					
	134					0.090	90	179					
68	135	54.2	6.59	0.445		0.090		180					
							91	181					

Table 5.2 (Continued)

DATE 29 August 1956
TIME 1930-1940 CST

CONCENTRATION (mg m^{-3})

RUN NO. 65

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59	0.045				
8	15							60					
	16						31	61	0.065				
9	17							62					
	18						32	63	0.150				
10	19							64					
	20						33	65	0.215				
11	21							66					
	22						34	67	0.370				
12	23							68					
	24						35	69	0.945				
13	25							70					
	26						36	71	2.94	0.045			
14	27							72					
	28						37	73	12.3	0.550			
15	29							74					
	30						38	75	39.3	5.81	0.170		
16	31							76					
	32						39	77	93.5	19.4	2.17	0.120	
17	33							78					0.015
	34						40	79	174	60.9	14.8	2.37	0.290
18	35							80					1.47
	36						41	81	281	116	37.8	12.7	3.42
19	37							82					6.12
	38						42	83	354	153	56.2	21.1	7.02
20	39							84					6.08
	40						43	85	312	118	38.7	11.4	3.32
21	41							86					0.925
	42						44	87	213	63.0	13.7	1.70	0.185
22	43							88					0.030
	44						45	89	118	20.3	2.09	0.095	
23	45							90					

Table 5.2 (Continued)

DATE 29 August 1956
TIME 1930-1940 CST

CONCENTRATION (mg m^{-3})

RUN NO.65

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	49.4	3.90	0.145				136					
	92						69	137					
47	93	16.2	0.415					138					
	94						70	139					
48	95	2.36						140					
	96						71	141					
49	97	0.310						142					
	98						72	143					
50	99							144					
	100						73	145					
51	101							146					
	102						74	147					
52	103							148					
	104						75	149					
53	105							150					
	106						76	151					
54	107							152					
	108						77	153					
55	109							154					
	110						78	155					
56	111							156					
	112						79	157					
57	113							158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 29 August 1956
TIME 2130-2140 CST

CONCENTRATION (mg m^{-3})

RUN NO.66

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47	0.430				
2	3							48					
	4						25	49	0.445				
3	5							50					
	6						26	51	0.365	0.055			
4	7							52					
	8						27	53	0.305	0.100			
5	9							54					
	10						28	55	0.280	0.205			
6	11							56					
	12						29	57	0.315	0.245			
7	13							58					
	14						30	59	0.885	0.270	0.150		
8	15							60					
	16						31	61	4.64	0.495	0.080		
9	17							62					
	18						32	63	24.9	1.64	0.555		
10	19							64					
	20						33	65	76.4	28.8	4.58	0.190	
11	21							66					
	22						34	67	158	78.9	28.1	5.65	0.025
12	23							68					0.130
	24						35	69	159	106	45.9	17.1	1.09
13	25							70					4.80
	26						36	71	218	82.1	29.9	13.1	7.72
14	27							72					6.88
	28						37	73	203	60.0	19.8	6.24	5.21
15	29							74					4.13
	30						38	75	215	64.4	20.5	7.00	2.68
16	31							76					2.85
	32						39	77	278	98.9	31.6	11.2	3.29
17	33							78					4.88
	34						40	79	359	155	57.7	23.2	7.50
18	35	0.060						80					7.17
	36						41	81	390	176	66.9	19.3	2.61
19	37	0.130						82					0.445
	38						42	83	321	138	30.0	2.86	0.035
20	39	0.200						84					
	40						43	85	234	47.3	4.34	0.030	
21	41	0.275						86					
	42						44	87	114	9.41	0.225		
22	43	0.350						88					
	44						45	89	37.2	0.960	0.060		
23	45	0.395						90					

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Table 5.2 (Continued)

DATE 29 August 1956
TIME 2130-2140 CST

CONCENTRATION (mg m^{-3})

RUN NO. 66

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	3.02						136					
	92						69	137					
47	93	0.085						138					
	94						70	139					
48	95							140					
	96						71	141					
49	97							142					
	98						72	143					
50	99							144					
	100						73	145					
51	101							146					
	102						74	147					
52	103							148					
	104						75	149					
53	105							150					
	106						76	151					
54	107							152					
	108						77	153					
55	109							154					
	110						78	155					
56	111							156					
	112						79	157					
57	113							158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

Table 5.2 (Continued)

DATE 30 August 1956
TIME 0030-0040 CST

CONCENTRATION (mg m^{-3})

RUN NO. 67

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57					
7	13							58					
	14						30	59					
8	15							60					
	16						31	61					
9	17							62					
	18						32	63					
10	19							64					
	20						33	65					
11	21							66					
	22						34	67					
12	23							68					
	24						35	69					
13	25							70					
	26						36	71					
14	27							72					
	28						37	73					
15	29							74					
	30						38	75					
16	31							76					
	32						39	77	0.065				
17	33							78					
	34						40	79	0.175				
18	35							80					
	36						41	81	0.870	0.035			
19	37							82					
	38						42	83	2.60	0.160	0.040		
20	39							84					
	40						43	85	10.6	2.16	0.070		
21	41							86					
	42						44	87	39.0	7.08	0.720	0.070	
22	43							88					
	44						45	89	84.2	23.7	3.72	0.380	
23	45							90					.075

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DATE 30 August 1956
TIME 0030-0040 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 67

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
46	91	150	52.1	13.0	2.27	0.410		136					
	92					1.46	69	137					
47	93	222	78.8	25.0	8.46	2.77		138					
	94					3.62	70	139					
48	95	281	124	41.1	13.8	4.37		140					
	96					5.99	71	141					
49	97	306	126	48.3	17.3	6.10		142					
	98					4.61	72	143					
50	99	275	109	36.3	10.4	1.81		144					
	100					0.390	73	145					
51	101	186	55.2	14.8	1.78	0.120		146					
	102						74	147					
52	103	105	21.0	2.61	0.065			148					
	104						75	149					
53	105	40.8	4.55	0.195				150					
	106						76	151					
54	107	14.5	0.545					152					
	108						77	153					
55	109	3.75	0.110					154					
	110						78	155					
56	111	0.935	0.105					156					
	112						79	157					
57	113	0.165	0.235					158					
	114						80	159					
58	115							160					
	116						81	161					
59	117							162					
	118						82	163					
60	119							164					
	120						83	165					
61	121							166					
	122						84	167					
62	123							168					
	124						85	169					
63	125							170					
	126						86	171					
64	127							172					
	128						87	173					
65	129							174					
	130						88	175					
66	131							176					
	132						89	177					
67	133							178					
	134						90	179					
68	135							180					
							91	181					

DATE 30 August 1956
TIME 0230-0240 CST

Table 5.2 (Continued)

CONCENTRATION (mg m^{-3})

RUN NO. 68

POST NO.		ARC					POST NO.		ARC				
Inner Arcs	800m arc	50m	100m	200m	400m	800m	Inner Arcs	800m arc	50m	100m	200m	400m	800m
1	1							46					
	2						24	47					
2	3							48					
	4						25	49					
3	5							50					
	6						26	51					
4	7							52					
	8						27	53					
5	9							54					
	10						28	55					
6	11							56					
	12						29	57	0.105				
7	13							58					
	14						30	59	0.130				
8	15							60					
	16						31	61	0.175				
9	17							62					
	18						32	63	0.255				
10	19							64					
	20						33	65	0.435	0.055			
11	21							66					
	22						34	67	0.790	0.035	0.030		
12	23							68					
	24						35	69	3.21	0.450	0.035		
13	25							70					
	26						36	71	17.0	0.780	0.030		
14	27							72					
	28						37	73	38.6	4.56	M		
15	29							74					
	30						38	75	102	19.7	1.88	0.045	
16	31							76					
	32						39	77	188	56.6	9.27	0.450	
17	33							78					
	34						40	79	320	110	28.5	4.31	0.100
18	35							80					0.255
	36						41	81	480	173	47.3	13.9	0.890
19	37							82					M
	38						42	83	581	275	77.5	22.0	8.09
20	39							84					14.2
	40						43	85	561	306	120	41.1	20.2
21	41							86					21.8
	42						44	87	470	231	85.9	35.2	14.6
22	43							88					5.60
	44						45	89	336	105	28.9	10.2	0.980
23	45							90					0.090

Table 5.2 (Continued)

DATE 30 August 1956
TIME 0230-0240 CST

CONCENTRATION (mg m^{-3})

RUN NO. 68

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
46	91	146	23.4	4.45	0.935	
	92					
47	93	57.0	3.60	0.220	0.015	
	94					
48	95	14.6	0.355	0.020		
	96					
49	97	3.11				
	98					
50	99	0.390				
	100					
51	101					
	102					
52	103					
	104					
53	105					
	106					
54	107					
	108					
55	109					
	110					
56	111					
	112					
57	113					
	114					
58	115					
	116					
59	117					
	118					
60	119					
	120					
61	121					
	122					
62	123					
	124					
63	125					
	126					
64	127					
	128					
65	129					
	130					
66	131					
	132					
67	133					
	134					
68	135					

POST NO. Inner Arcs	POST NO. 800m arc	ARC 50m	ARC 100m	ARC 200m	ARC 400m	ARC 800m
	136					
69	137					
	138					
70	139					
	140					
71	141					
	142					
72	143					
	144					
73	145					
	146					
74	147					
	148					
75	149					
	150					
76	151					
	152					
77	153					
	154					
78	155					
	156					
79	157					
	158					
80	159					
	160					
81	161					
	162					
82	163					
	164					
83	165					
	166					
84	167					
	168					
85	169					
	170					
86	171					
	172					
87	173					
	174					
88	175					
	176					
89	177					
	178					
90	179					
	180					
91	181					

Table 5.3

Ten-minute average gas concentrations measured along the vertical during Project Prairie Grass; entries are in units of mg m^{-3}. Samplers were located at nine levels on each of six towers positioned along the 100-m arc of the horizontal sampling network. Individual towers were located equidistant between the pairs of fence posts listed below:

TOWER NO.	POST NOS.
1	28-29
2	35-36
3	42-43
4	49-50
5	56-57
6	63-64

Remarks

The vertical sampling network was first placed in operation during Run No. 13 on 22 July 1956. No data are available for Runs No. 23, 28, 35, 53, 63, and 64. All towers were outside the time-mean plume during Runs No. 23, 35, and 53. The letter "M" indicates missing data, and blank spaces in the table signify no measurable concentration. The value of the concentration at the 0.5-m level on Tower No. 4 for Run No. 13 was estimated.

Table 5.3 (Continued)

CONCENTRATION (mg m^{-3})

Tower No.	Height (m)	Run No. 13	14	15	16	17	18	19	20	21
1	17.5							0.250		
	13.5							1.43		
	10.5							2.42		
	7.5							3.09		
	4.5							3.80		
	2.5							5.91		
	1.5							7.34		
	1.0							7.31		
	0.5							7.01		
2	17.5				0.025			3.12	0.130	
	13.5				0.045			5.40	0.385	
	10.5				0.140			7.11	0.975	
	7.5				0.275			14.2	3.26	
	4.5		0.175		0.055			25.1	7.58	
	2.5		8.34		0.035			35.0	11.9	
	1.5		23.0		0.095			40.7	13.1	
	1.0		28.5		0.060			41.6	13.4	
	0.5		29.6		0.050			41.9	13.3	
3	17.5		0.280	0.085	8.87	0.280		1.07	0.440	0.090
	13.5			0.580	6.57	M		3.89	2.01	0.720
	10.5		0.330	0.175	6.56	6.09		8.21	5.19	4.29
	7.5			0.170	10.9	18.9	0.250	16.8	13.3	15.3
	4.5		2.22	0.360	18.9	55.4	2.04	29.6	26.1	42.9
	2.5		76.2	0.245	25.4	92.6	5.16	41.4	39.9	70.8
	1.5	3.18	174	0.285	28.5	115	6.02	M	45.6	83.7
	1.0	42.9	237	0.235	29.6	126	5 87	54.2	46.5	90.5
	0.5	61.8	297	0.400	29.0	132	6.02	56.7	47.7	96.3
4	17.5		0.415	2.84	13.6		0.085	0.030	1.29	
	13.5		1.46	4.16	16.5	0.040	1.23	0.095	3.33	
	10.5		0.095	7.46	15.9	0.130	2.76	0.215	5.87	0.080
	7.5		0.090	7.29	17.1	0.580	3.59	0.726	7.52	0.255
	4.5		0.070	9.24	22.8	2.66	41.0	1 25	10.7	0.585
	2.5	28.7	0.860	11.3	23.4	3.45	101	1.47	14.1	0.835
	1.5	239	1.97	10.6	23.1	3.66	135	1.31	15.9	1.05
	1.0	675	2.42	10.8	23.7	4.14	153	1.43	16.4	1.18
	0.5	2200*	2.67	10.8	23.6	3.56	165	1.53	17.1	1.29
5	17.5		0.070	5.21	1.55					
	13.5			11.8	2.73					
	10.5			19.2	3.81					
	7.5			30.2	7.37					
	4.5		0.100	58.8	9,17					
	2.5	1.14	0.540	74.7	8.58					
	1.5	34.5	1.56	83.1	10.4					
	1.0	83.3	2.09	81.3	11.0					
	0.5	158	2.45	106	11.8					
6	17.5		0.145	4.67	1.53					
	13.5		0.105	8.22	4.44					
	10.5		0.090	8.99	7.10					
	7.5			14.5	11.0					
	4.5			19.8	12.1					
	2.5		0.100	29.0	14.3					
	1.5			36.3	13.7					
	1.0		0.085	38.9	13.4					
	0.5			42.2	14.5					

*ESTIMATED VALUE

Table 5.3 (Continued)

CONCENTRATION (mg m^{-3})

Tower No.	Height (m)	Run No. 22	24	25	26	27	29	30	31	32
1	17.5		0.110	0.195						
	13.5		1.00	0.650						
	10.5		3.71	0.230						
	7.5		10.7	0.630						
	4.5		25.8	0.565						
	2.5		38.9	0.525						
	1.5		44.3	0.970						
	1.0		47.4	1.06						
	0.5		50.1	0.865						
2	17.5	0.040		6.51	0.015	0.005				
	13.5	0.080		5.61	0.035	0.150				
	10.5	0.130		11.5	0.065	0.225				
	7.5	0.225		15.5	0.170	0.370				
	4.5	0.325		17.9	0.130	0.980				
	2.5	0.215		20.3	0.035	3.92				0.150
	1.5	0.340		20.7	0.035	5.37				0.190
	1.0	0.175		20.3	0.025	5.96				0.205
	0.5	0.150		19.8	0.015	6.56				0.125
3	17.5	0.200		10.4	1.20	1.68		1.09		
	13.5	1.33		14.0	3.24	4.40		2.22		
	10.5	4.31		21.3	6.20	7.05		3.56		
	7.5	12.6		24.2	7.85	16.8		5.16		0.375
	4.5	33.6		28.2	15.3	30.9		7.98		38.1
	2.5	60.8		29.6	22.2	44.6		10.6		330
	1.5	76.8		28.7	25.2	54.6		10.4		651
	1.0	81.8		30.5	27.0	60.6		10.6		830
	0.5	86.9		31.4	29.1	64.5		10.9		951
4	17.5			3.38	0.920	1.33		1.16		
	13.5			6.35	2.39	M		2.34		
	10.5			7.94	3.54	M		4.17		
	7.5			8.90	10.2	12.8		7.11		
	4.5			9.32	22.4	25.8		15.0		
	2.5			15.9	35.6	39.3		23.1		
	1.5			19.1	44.1	44.7		29.3		0.055
	1.0			20.4	46.5	47.4		32.4		0.200
	0.5			23.0	50.4	49.4		35.6		7.02
5	17.5			1.64	0.400	0.145		1.36		
	13.5			2.30	1.16	M		2.22		
	10.5			2.01	1.94	M	0.120	6.11		
	7.5			7.38	4.37	2.34	1.07	14.3	0.150	
	4.5			9.74	7.59	2.55	5.36	28.5	0.705	
	2.5			13.0	11.7	2.55	9.89	39.2	2.90	
	1.5			13.4	15.5	2.84	11.9	46.4	4.64	
	1.0			12.8	17.1	2.86	12.8	48.6	5.25	
	0.5			12.6	19.1	3.12	12.2	49.5	4.91	
6	17.5			2.00	0.115		M		1.91	
	13.5			4.04	0.045		M	0.095	4.56	
	10.5			5.69	0.040		M	0.110	8.19	
	7.5			8.15	0.695		M	0.895	13.8	
	4.5			13.4	1.45		M	2.72	21.5	
	2.5			20.1	2.51		57.6	4.43	32.7	
	1.5			29.3	2.85		67.7	5.64	33.8	
	1.0			30.6	3.20		68.9	6.44	35.7	
	0.5			34.1	3.54		74.1	7.11	38.4	

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Table 5.3 (Continued)
CONCENTRATION (mg m^{-3})

Tower No.	Height (m)	Run No. 33	34	35S	36	37	38	39	40	41
1	17.5		1.59							
	13.5		2.40	0.070				0.335		
	10.5		5.88	1.04				1.76		
	7.5		17.4	3.92				8.91		
	4.5		38.1	16.8				28.2		
	2.5		59.3	30.2				11.3		
	1.5		68.7	36.2				61.8		
	1.0		73.2	38.7				67.1		
	0.5		78.6	41.3				66.3		
2	17.5		0.085							
	13.5	0.045	0.730				0.035			
	10.5	0.175	2.60				0.180			
	7.5	0.310	4.38		0.590		0.815			
	4.5	0.530	6.98		54.8		2.15			
	2.5	1.50	8.10		296		2.13			
	1.5	1.67	8.78		492		2.36			
	1.0	1.70	9.08		584		2.36			
	0.5	1.19	8.94		660		2.43			
3	17.5	0.295					0.055		0.005	
	13.5	1.10					0.580		0.150	
	10.5	2.00				0.315	2.55		1.88	
	7.5	5.19				0.880	8.99		12.7	
	4.5	8.36				1.94	29.1		38.1	
	2.5	13.3				2.96	49.7		67.7	
	1.5	16.5				3.18	58.1		86.0	
	1.0	18.9				3.18	61.8		95.1	
	0.5	20.0				3.27	61.4		104	
4	17.5	0.710				0.180				
	13.5	2.58				0.710				
	10.5	6.81				3.53			0.610	
	7.5	15.9				13.0			4.65	0.020
	4.5	35.3				35.4			22.4	0.420
	2.5	56.1				57.2			47.4	0.510
	1.5	64.7				64.8			59.9	0.780
	1.0	69.0				71.9			65.4	0.660
	0.5	73.2				75.6			68.3	0.780
5	17.5									
	13.5									
	10.5	0.045								0.585
	7.5	0.195								3.45
	4.5	0.260				0.065				17.1
	2.5	0.350				0.110				31.5
	1.5	0.250				0.110				36.3
	1.0	0.200				0.070				36.5
	0.5	0.190				0.075				36.8
6	17.5									
	13.5									
	10.5									
	7.5									
	4.5									
	2.5									
	1.5									
	1.0									
	0.5									

Table 5.3 (Continued)
CONCENTRATION (mg m^{-3})

Tower No.	Height (m)	Run No. 42	43	44	45	46	47	48S	48	49
1	17.5		0.630	1.01		0.135				
	13.5		2.42	3.54	0.340	0.180				
	10.5		3.95	7.08	0.440	0.730				
	7.5		5.04	13.1	0.670	3.66				
	4.5		5.87	17.6	1.91	12.6				
	2.5		6.05	22.5	1.58	24.2				
	1.5		5.97	25.1	1.44	32.1				
	1.0		6.29	27.2	1.45	37.7				
	0.5		6.57	29.7	1.64	41.0				
2	17.5		2.27	0.600	0.135			0.950		
	13.5		5.49	3.03	1.32			0.740		
	10.5		8.85	6.02	4.50			1.27		
	7.5		13.8	11.6	14.0			1.91		
	4.5		17.0	24.2	41.3	0.020		2.00		
	2.5		18.3	36.0	75.5	0.035		2.37		
	1.5		19.5	43.2	96.9	0.045		2.42		
	1.0		21.2	48.2	107	0.035		2.46		
	0.5		21.5	48.5	113	0.060		2.13		
3	17.5		2.88	1.37	0.355			7.50		0.020
	13.5		6.38	1.89	0.835			9.05		0.055
	10.5		11.4	4.71	1.50			9.71		0.040
	7.5		19.5	8.27	4.67			11.8		0.345
	4.5		38.3	12.7	12.5			11.4		1.10
	2.5		51.9	14.7	19.7			11.8		2.96
	1.5		54.6	15.0	24.2			10.7		3.99
	1.0		57.8	14.9	26.0			10.9		4.88
	0.5		60.6	14.6	27.0			11.3		5.07
4	17.5		0.150	0.160				3.35		0.630
	13.5		0.930	0.320				4.01		1.71
	10.5		2.49	0.270				4.59		4.85
	7.5		4.61	0.070				3.75		9.42
	4.5		12.8	0.015				4.41		17.6
	2.5		19.2	0.020				3.83		21.8
	1.5		23.0	0.035				3.36		24.3
	1.0		24.2	0.015				3.24		25.1
	0.5		25.1	0.050				3.24		24.8
5	17.5							5.42	0.070	0.580
	13.5	0.185						4.95	0.750	1.70
	10.5	1.32						5.42	1.74	5.21
	7.5	3.08						6.36	4.76	15.2
	4.5	8.28						6.18	7.10	38.9
	2.5	12.9						8.73	9.15	50.4
	1.5	15.5						8.43	10.6	66.3
	1.0	15.9						8.31	10.8	68.6
	0.5	16.4						8.69	11.3	73.1
6	17.5	0.050					0.065	6.32	0.880	1.22
	13.5	0.345					0.375	6.65	5.09	1.74
	10.5	1.86					0.460	6.41	10.5	2.72
	7.5	7.13					0.865	6.56	25.1	5.21
	4.5	18.9					0.530	4.19	43.8	7.80
	2.5	32.9					0.155	5.18	59.7	11.6
	1.5	37.4					0.250	5.70	66.6	12.8
	1.0	39.5					0.440	6.06	69.5	14.0
	0.5	43.1					0.410	6.32	72.8	14.9

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Table 5.3 (Continued)

CONCENTRATION (mg m^{-3})

Tower No.	Height (m)	Run No.								
		50	51	52	54	55	56	57	58	59
1	17.5			6.29						
	13.5			10.9		0.025	0.250			
	10.5			15.2	0.125	0.335	1.28			
	7.5			17.9	0.945	1.14	6.09			
	4.5			22.1	2.84	2.40	13.8			
	2.5			25.2	6.78	3.29	16.2			
	1.5			24.9	6.63	3.26	26.3			
	1.0			25.5	7.10	3.30	26.9			
	0.5			24.3	7.10	3.00	27.3			
2	17.5			1.10		0.200	0.030			
	13.5			1.58		1.07	0.160			
	10.5			1.64		3.86	1.43			
	7.5			4.50		10.4	5.24			
	4.5			5.28		26.0	12.5			
	2.5			5.54		44.4	19.7			
	1.5			3.48		54.0	23.1			
	1.0			3.48		58.4	23.7			
	0.5			4.55		60.5	20.7			
3	17.5									
	13.5									
	10.5									
	7.5									1.40
	4.5								0.225	47.6
	2.5								0.500	239
	1.5								0.420	399
	1.0								0.295	485
	0.5								0.235	546
4	17.5							0.175		
	13.5							1.62		
	10.5							3.56		
	7.5							6.81		
	4.5							14.6	0.355	
	2.5							21.5	5.81	
	1.5							27.6	13.3	
	1.0							31.1	17.4	
	0.5							32.7	20.0	
5	17.5	0.940						0.795		
	13.5	2.81						2.33		
	10.5	5.66						6.27		
	7.5	8.70						15.0		
	4.5	13.4						35.6		
	2.5	18.3						55.5		
	1.5	20.7						67.1		
	1.0	20.9						69.3		
	0.5	21.3						72.6		
6	17.5	0.700						0.055		
	13.5	2.13						0.455		
	10.5	6.39	0.320					0.690		
	7.5	15.2	0.805					1.76		
	4.5	29.1	2.27					3.12		
	2.5	41.1	2.66					7.16		
	1.5	46.4	2.78					8.19		
	1.0	49.1	2.75					8.70		
	0.5	53.4	2.69					9.18		

Table 5.3 (Continued)

CONCENTRATION (mg m^{-3})

Tower No.	Height (m)	Run No.								
		60	61	62	65	66	67	68		
1	17.5									
	13.5									
	10.5									
	7.5									
	4.5					0.065				
	2.5					0.230				
	1.5					0.185				
	1.0					0.225				
	0.5					0.210				
2	17.5									
	13.5									
	10.5									
	7.5					2.04		0.115		
	4.5					25.5		0.430		
	2.5					76.5		0.490		
	1.5					106		0.390		
	1.0					118		0.330		
	0.5					116		0.415		
3	17.5									
	13.5		0.085		0.925			0.020		
	10.5		0.205		4.80	0.065		0.220		
	7.5		0.300		20.4	3.21	0.120	7.23		
	4.5		0.250		64.2	30.0	0.275	71.7		
	2.5		0.070		120	73.5	0.805	200		
	1.5		0.045		145	93.9	0.865	281		
	1.0		0.065		158	100	0.955	330		
	0.5		0.070		164	103	1.17	362		
4	17.5		0.245				0.025			
	13.5	0.020	1.62				0.400			
	10.5	0.065	4.37	0.080			3.50			
	7.5	0.385	9.29	0.170			16.7			
	4.5	0.500	15.9	0.145			53.7			
	2.5	0.745	22.1				92.7			
	1.5	0.985	23.7				120			
	1.0	0.940	23.4				129			
	0.5	0.785	23.7				143			
5	17.5	0.005	0.165	2.09						
	13.5	0.480	0.705	4.83						
	10.5	1.97	2.69	9.53						
	7.5	8.00	8.63	15.6						
	4.5	23.0	25.2	21.8						
	2.5	38.3	42.8	50.1						
	1.5	47.4	54.0	60.9						
	1.0	49.7	59.3	67.7						
	0.5	50.7	M	71.9						
6	17.5		0.070	5.46						
	13.5		0.200	8.89						
	10.5		0.950	14.6						
	7.5		2.16	21.0						
	4.5		7.61	37.5						
	2.5		13.5	57.6						
	1.5		14.7	61.8						
	1.0		15.5	61.8						
	0.5		17.0	63.0						

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Table 5.4. Correction factors by which concentration data presented in Tables 5.2 and 5.3 should be multiplied to compensate for evaporational loss of impinger solution during aspiration. Tower data corrections are the same as those for the 100-m arc. Blank spaces signify missing data.

	ARC (m)				
RUN NO.	50	100	200	400	800
1	0.97	0.96	0.90	0.93	0.96
2			0.92	0.93	0.96
3	0.99	1.00	0.99	0.98	1.00
4	0.98	0.99	0.98	0.99	1.00
5	0.93	0.93	0.90	0.91	0.91
6	0.93	0.93	0.90	0.89	0.92
7	0.95	0.93	0.91	0.90	0.92
8	0.94	0.93	0.90	0.89	0.92
9	0.93	0.94	0.92	0.93	0.93
10	0.95	0.94	0.92	0.92	0.93
11	0.96	0.96	0.95	0.95	0.95
12	0.95	0.95	0.93	0.93	0.92
13	0.97	0.97	0.95	0.95	0.95
14	0.99	0.99	0.97	0.97	0.98
15	0.94	0.96	0.95	0.95	0.96
16	0.96	0.96	0.94	0.94	0.95
17	0.95	0.95	0.93	0.92	0.93
18	0.98	0.97	0.97	0.95	0.97
19	0.93	0.93	0.91	0.90	0.91
20	0.92	0.93	0.89	0.88	0.89
21	0.98	0.97	0.94	0.95	0.93
22	0.99	0.98	0.95	0.96	0.94
23	0.95	0.94	0.93	0.93	0.94
24	0.94	0.95	0.94	0.93	0.94
25	0.94	0.94	0.94	0.94	0.94
26	0.95	0.95	0.93	0.93	0.93
27	0.94	0.94	0.92	0.92	0.92
28	0.99	1.00	0.97	0.98	0.97
29	0.97	0.98	0.97	0.97	0.97
30					
31					
32	0.97	0.93	0.93	0.92	0.93
33	0.94	0.94	0.93	0.93	0.93
34	0.93	0.93	0.89	0.91	0.91
35	0.94	0.94	0.94	0.94	0.94
35S	0.96	0.98	0.98	0.97	0.98
36	0.96	0.96	0.95	0.94	0.96
37	0.99	0.99	0.97	0.98	0.98
38	0.98	0.99	0.98	0.98	0.98
39	0.94	0.95	0.93	0.93	0.95

Table 5.4 (Continued)

	ARC (m)				
RUN NO.	50	100	200	400	800
40	0.96	0.98	0.96	0.94	0.94
41	0.97	0.97	0.96	0.95	0.96
42	0.96	0.97	0.96	0.97	0.97
43	0.91	0.90	0.87	0.87	0.87
44	0.91	0.92	0.87	0.85	0.88
45	0.92	0.92	0.88	0.87	0.88
46	0.92	0.93	0.92	0.92	0.92
47	0.93	0.94	0.93	0.93	0.93
48	0.96	0.96	0.95	0.96	0.96
48S	0.93	0.94	0.92	0.93	0.88
49	0.97	0.95	0.94	0.93	0.94
50	0.92	0.93	0.93	0.92	0.92
51	0.96	0.95	0.92	0.91	0.90
52	0.93	0.93	0.90	0.89	0.90
53	0.99	0.97	0.96	0.95	0.96
54	0.98	0.96	0.96	0.97	0.97
55	0.95	0.97	0.96	0.95	0.96
56	0.99	0.98	0.98	0.98	0.97
57	0.91	0.93	0.88	0.88	0.88
58	0.95	0.96	0.93	0.93	0.91
59	0.97	0.97	0.93	0.93	0.92
60	0.95	0.94	0.93	0.92	0.93
61	0.89	0.92	0.88	0.88	0.92
62		0.91	0.87	0.88	0.96
63					
64					
65	0.94	0.95	0.93	0.93	
66	0.94	0.98	0.97	0.94	0.95
67	0.97	0.97	0.95	0.95	
68	0.96	0.97	0.96	0.96	0.94

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CHAPTER 6
SLOW-RESPONSE METEOROLOGICAL OBSERVATIONS DURING PROJECT PRAIRIE GRASS

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6.1 Introduction

During the Project Prairie Grass diffusion experiments, mean wind speed and fluctuations in azimuth wind direction were measured at a height of 2 m above the ground at two locations. Closely-matched cup anemometers of conventional design were used to obtain wind speed data; fluctuations in wind direction were measured by means of airfoil-type vanes (subsequently replaced by flat-plate vanes). One pair of these instruments was installed along the base line of the sulfur-dioxide sampling network; the cup anemometer was mounted on a wood post set in the ground at a point 25 m directly west of the release-point for the tracer; the azimuth vane and recorder were similarly located directly east of the release-point. The second pair of instruments was located about 450 m north (downwind) of the release-point and approximately 30 m directly west of the center line of the horizontal sampling network; the lateral separation between the two posts supporting the instruments was about 10 meters. The recorder was mounted on a panel, located on the center line of the sampling network at 450 m, with the manual switches for operating the vacuum-pump motors. The cup anemometer and azimuth vane assemblies are shown in Figures 6.1 and 6.2. The azimuth vane and recorder installed along the base line of the sampling network appear in Figure 6.3. Detailed descriptions of the instrumentation and the treatment of the observations are presented in the remaining sections.

6.2 Description of Instrumentation

The cup anemometers are almost identical with those used previously in the Great Plains Turbulence Field Program.[1] The cup

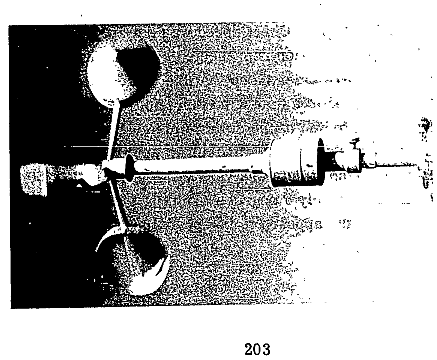

Figure 6.1 Cup anemometer assembly.

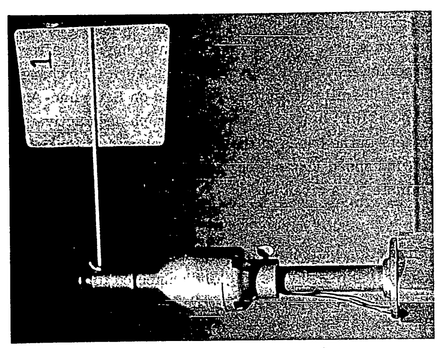

Figure 6.2 Azimuth vane assembly.

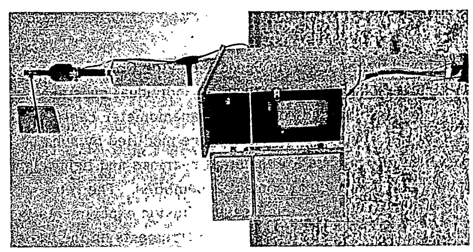

Figure 6.3 Azimuth wind-direction vane and recorder installation along base line of sulfur-dioxide sampling network.

wheels, manufactured by the Electric Speed Indicator Company, are 11.3 inches in diameter and weigh 370 grams. Individual cups are conically shaped and have beaded edges. The anemometer cases, manufactured by the H. J. Green Company, were modified by substituting powdered bronze bearings for the steel bearings and lightweight electrical contacts for the original contact assemblies. The two anemometers used during the Prairie Grass diffusion experiments were selected from a total of eleven similar instruments on the basis of extensive field-matching tests. Results of these tests indicated an average difference in calibration of about 0.25 percent, over a wide range of mean wind speeds, between the two instruments. After the first twenty experiments, the two anemometers were interchanged. Passage of each 1/60-mile of air was recorded on Esterline-Angus chart rolls (Type 4310E) by means of chronograph pens activated by electrical contacts in the bases of the anemometers. The relationship between mean wind speed $\overline{V}$ in m sec^{-1} and the average number of contacts per minute $\underline{N}$ is given by

$$V = 0.538 + 0.507\ N.$$

The wind direction instruments comprised airfoil-type vanes (later replaced by flat-plate types) rigidly connected to 360-degree potentiometers. The latter, purchased from the Technology Instrument Company (Type ST-20), were center-tapped and had an internal resistance of 5000 ohms. Data were recorded on portable Esterline-Angus center-zero milliammeters. Chart speed was set at 12 inches per minute and full-scale deflection represented an azimuth range of 200 degrees. The vanes were oriented so that the center of the recorder chart-rolls corresponded to a true wind direction of 180 degrees, the orientation of the center line of the sulfur-dioxide sampling network. Exact correspondence proved very difficult to achieve. Despite careful adjustments, subsequent data analysis indicates that the 450 m vane tended to read approximately 8 degrees too high; the absolute orientation of the base-line vane appears to be approximately correct.

Accessory electrical components included a Raytheon voltage-regulator transformer (Type VR-6111) and a 25-v rectifier power supply adjustable for any desired output within 14 to 25 volts. Critical damping was provided by a 1,250-ohm resistor in series with the galvanometer coil of the recorder. To ensure synchronous operation of the wind speed and wind direction instruments, both recorders were activated by a master switch located in the instrument truck at the northern end of the field site. An additional marking pen was used in the base-line recorder to provide information on the rate of release of the tracer. Wiring diagrams for this instrumentation are presented in Figures 6.4 and 6.5.

During the first 34 diffusion experiments, airfoil-type vanes were used to measure fluctuations in azimuth wind direction. These were constructed of balsa wood ribs covered with model airplane fabric. Due to repeated exposure to strong winds and light rain showers, the airfoils became asymmetrical; this deformation introduced an uncertainty of 3 to 6 degrees depending upon the wind speed, in the indicated mean wind direction. After Experiment No. 34 these airfoils were replaced with flat metal plates (see Figure 6.2). At the conclusion of the Prairie Grass field experiments, reduction of the data revealed the response of the potentiometers in the azimuth vanes was not linear over the 200-degree range; this occurred as a result of shunting effects in the galvanometer coils. Calibration curves for each vane assembly were subsequently determined in laboratory tests and these were used in evaluating the data abstracted from the chart rolls.

6.3 Data Abstraction and Analysis

The slow-response meteorological instrumentation was operated for 20-minute sampling periods centered on the midpoint of the 10-minute gas release. Values of mean wind speed, mean wind direction, and standard deviations of wind direction have been calculated both for the 20-minute sampling periods and for the 10-minute periods identified with the release of the tracer. The 10-minute observations at 450 m have been adjusted to correspond as closely as possible to the time that

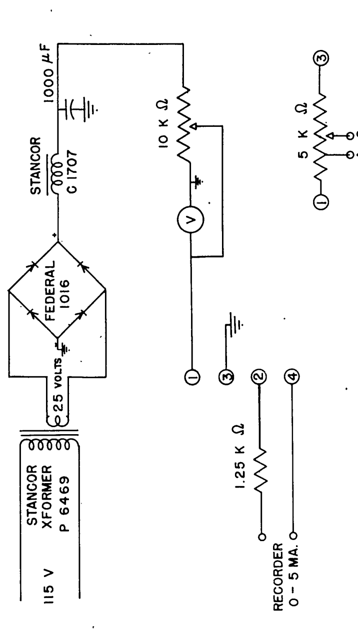

Figure 6.4 Wiring diagram for azimuth wind-direction assembly.

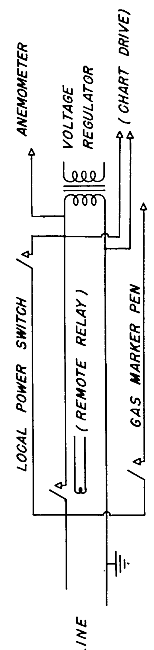

Figure 6.5 Wiring diagram for remote operation of recorders used in obtaining slow-response meteorological observations.

the tracer was actually present; this was accomplished by delaying the start of the 10-minute period by $450/\overline{V}$ sec, where $\overline{V}$ is the mean wind speed at the base line in m sec^{-1}. When $\overline{V}$ was less than 1.5 m sec^{-1}, the last 10 minutes of chart record at 450 m were utilized. Mean wind speed values were determined by substituting the average number of pips per minute, obtained from the chart records, in the calibration equation given above. Azimuth wind-direction data were abstracted from the charts at 2.5-sec intervals; these data were then grouped in 2-degree class intervals identified with the angular positions of sampling stations in the first four arcs of the sulfur-dioxide sampling network. The results comprise frequency distributions of azimuth wind direction for both 10- and 20-minute sampling periods.

Mean wind speeds, azimuth wind directions, and standard deviations of azimuth wind direction for both 10- and 20-minute sampling periods are summarized in Table 6.1. Frequency distributions of azimuth wind direction for both 10- and 20-minute periods are presented in Table 6.2. It is felt that the wind speed data are accurate to within 2 to 5 percent for mean wind speeds greater than 2.0 m sec^{-1}; for lower mean wind speeds, particularly during nighttime experiments in the presence of stable thermal stratification, the uncertainty is greatly increased (the starting speed of the anemometers is approximately 0.8 m sec^{-1}). The relative accuracy of the mean wind directions is thought to be of the order of 2 to 5 degrees; the absolute values obtained for wind direction, as noted above, may be in error by 10 degrees. Standard deviations of azimuth wind direction are considered accurate within 10 percent, except in the case of mean wind speeds below 2 m sec^{-1} where the uncertainty is considerably larger. In about 40 percent of the cases, the 20-minute standard deviation of azimuth wind direction is slightly lower than the 10-minute value; these small differences are not considered statistically significant. For the few cases in which the 20-minute standard deviations are more than 10 percent lower than the 10-minute values, inspection of the original chart records reveals the presence of long-period inhomogeneities in the turbulent structure.

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REFERENCE

1. Cramer, H. E., G. C. Gill, and F. A. Record, "Standard Cup Anemometers – Massachusetts Institute of Technology" in "Exploring the Atmosphere's First Mile," Pergamon Press, N. Y., Vol. 1, 145-148, 1957.

Table 6.1

Summary of slow-response meteorological measurements made by the Massachusetts Insititute of Technology during the Project Prairie Grass diffusion experiments

Tabular entries comprise mean wind speeds (m sec^{-1}), mean wind directions (degree), and standard deviations of azimuth wind direction (degree); data are based on measurements made at height of 2 m along base line of sulfur-dioxide sampling network and at travel distance of 450 m from the release-point for the tracer. Results are presented for 10- and 20-minute sampling periods. With respect to the measurements made along the base line, the duration of the 10-minute period coincides with that of the gas release. At 450 m, the start of the 10-minute period was delayed by $450/\overline{V}$ sec, as explained in the text. Entries marked with asterisks are estimates based on incomplete records; these are explained below. Blank spaces signify missing data. It appears that the mean wind directions obtained from the 450-m vane are about 8 degrees too large; more reasonable values may be secured by subtracting this amount from each of the tabular entries.

Explanation of incomplete or missing data

Experiment No.	Explanation
1	No wind direction data and no wind speed data for 450 m. First 5 min of record at base line missing; portions of remainder of record on slow speed.
2	No wind direction data available.
3	No slow-response data - light, variable winds.
6	Base-line chart records missing.
25	Last 9 1/2 min of chart record missing at 450 m.
27	Last 2 1/2 min of chart record missing at 450 m.
29	No data available at 450 m.
36	Last 4 min of record missing at base line.
40	First 5 min of wind speed record at 450 m is missing.
48S	No wind direction data presented - off scale.
52	No wind direction data at 450 m - off scale.
58	First 3-1/2 min of record during gas release missing from base-line chart.
63, 64	No slow-response data available - light, variable winds.

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Table 6.1 (Continued)

Gas release No.	1	2	3	4	5	6	7
Date	3 July		5 July	6 July			10 July
Time (CST)	1055	1455	2155	0055	1355	1655	1355
Wind speed (m/sec)							
Source (10 min)	2.62*	2.01		1.40	6.47		4.19
450 m (10 min)		2.57		1.65	5.96	5.86	4.14
Source (20 min)	2.49*	2.14		1.58	6.57		4.19
450 m (20 min)		2.19		1.76	6.45	6.65	4.55
Wind direction (deg)							
Source (10 min)				216	176		188
450 m (10 min)				223	186	191	194
Source (20 min)				207	176		197
450 m (20 min)				226	184	190	200
Standard deviation of wind direction (deg)							
Source (10 min)				7.4	9.5		25.6
450 m (10 min)				7.6	9.1	7.1	27.1
Source (20 min)				9.7	11.1		31.7
450 m (20 min)				9.2	9.7	7.7	23.9

Gas release No.	8	9	10	11	12	13	14
Date	10 July	11 July		14 July		22 July	
Time (CST)	1655	0955	1155	0755	0955	1955	2155
Wind speed (m/sec)							
Source (10 min)	4.85	6.88	4.60	7.03	8.35	1.25	1.91
450 m (10 min)	4.75	7.13	4.65	7.74	8.25	1.81	1.81
Source (20 min)	4.70	6.83	4.52	7.61	8.07	1.37	1.75
450 m (20 min)	4.80	7.13	4.65	7.76	8.14	1.65	1.81
Wind direction (deg)							
Source (10 min)	184	204	225	184	194	190	170
450 m (10 min)	193	214	214	196	200	206	186
Source (20 min)	176	206	217	185	192	192	172
450 m (20 min)	181	214	217	196	199	206	186
Standard deviation of wind direction (deg)							
Source (10 min)	10.2	10.2	16.8	7.2	7.9	3.2	3.6
450 m (10 min)	9.6	10.2	14.1	6.8	5.1	2.4	3.1
Source (20 min)	16.3	9.5	18.3	6.9	9.9	5.0	4.3
450 m (20 min)	19.1	9.1	15.4	6.7	6.9	2.5	5.9

Table 6.1 (Continued)

Gas release No.	15	16	17	18	19	20	21
Date	23 July				25 July		
Time (CST)	0755	0955	1955	2155	1055	1255	2155
Wind speed (m/sec)							
Source (10 min)	3.43	3.23	3.33	3.53	5.81	8.60	6.12
450 m (10 min)	3.43	3 28	3.48	3.43	5.76	8.35	5.76
Source (20 min)	3.25	3.02	3 33	3.45	5.81	8.52	5.53
450 m (20 min)	3.40	3.12	3.48	3.50	5.79	8.42	5.73
Wind direction (deg)							
Source (10 min)	209	192	184	187	166	178	181
450 m (10 min)	211	216	188	195	174	184	186
Source (20 min)	209	201	182	189	166	177	179
450 m (20 min)	212	212	186	196	174	183	185
Standard deviation of wind direction (deg)							
Source (10 min)	12.8	18.5	5.6	5.3	11.6	8.3	6.6
450 m (10 min)	11.0	18.9	5.2	4.7	10.1	7.9	5.7
Source (20 min)	12 4	23.4	5.5	5.7	12.4	8.3	6.2
450 m (20 min)	9.6	18.7	5.4	4.9	9.5	8.2	5.9

Gas release No.	22	23	24	25	26	27	28
Date	25 July	29 July		1 Aug.	2 Aug.		
Time (CST)	2355	2055	2255	1255	1155	1355	2355
Wind speed (m/sec)							
Source (10 min)	6.42	5.91	6.22	2.77	6.77	6.57	2.62
450 m (10 min)	6.78	6.27	5.76	2.92*	6.57	6.57	2.62
Source (20 min)	6.67	6.12	5.91	2.90	6.37	6.67	2.77
450 m (20 min)	6.82	6.22	5.81	2.91*	6.29	6.39*	2.67
Wind direction (deg)							
Source (10 min)	176	128	141	177	190	184	174
450 m (10 min)	184	134	150	188*	197	190	183
Source (20 min)	176	128	141	176	186	185	174
450 m (20 min)	184	133	150	187*	192	190*	181
Standard deviation of wind direction (deg)							
Source (10 min)	5.8	7.3	7.1	24.8	13.2	9.2	6.4
450 m (10 min)	5.1	5.2	6.2	16.0*	10.2	8.6	5.9
Source (20 min)	5.6	7.2	6.4	21.4	12.1	9.2	6.0
450 m (20 min)	4.7	5.5	6.2	15.5*	11.2	8.5*	5.3

Table 6.1 (Continued)

Gas release No.	29	30	31	32	33	34	35S
Date	3 Aug.			6 Aug.	7 Aug.		
Time (CST)	0155	1255	1455	1955	1255	1455	2257
Wind speed (m/sec)							
Source (10 min)	3.48	6.82	7.33	2.21	8.50	9.00	4.04
450 m (10 min)		6.72	7.43	2.01	8.30	9.26	3.99
Source (20 min)	3.68	6.65	7.64	2.19	7.89	8.30	3.99
450 m (20 min)		6.55	7.76	2.24	7.99	9.36	3.91
Wind direction (deg)							
Source (10 min)	220	196	225	171	181	146	135
450 m (10 min)		209	223	185	190	161	150
Source (20 min)	222	201	216	170	179	145	136
450 m (20 min)		211	221	185	189	156	149
Standard deviation of wind direction (deg)							
Source (10 min)	8.0	10.3	10.9	3.6	10.5	7.3	5.0
450 m (10 min)		11.5	7.7	5.8	9.0	8.7	5.4
Source (20 min)	12.7	12.3	14.2	5.2	9.2	7.5	6.4
450 m (20 min)		10.8	10.7	3.4	8.9	9.6	5.9
Gas release No.	35	36	37	38	39	40	41
Date	11 Aug.		12 Aug.		13 Aug.	14 Aug.	
Time (CST)	2125	2325	0255	0455	2225	0025	0255
Wind speed (m/sec)							
Source (10 min)	1.86	1.86	4.64	4.14	3.12	3.08	4.04
450 m (10 min)	1.75	2.06	4.70	4.49	2.21	2.36	4.19
Source (20 min)	1.86	1.87*	4.57	4.09	3.10	3.15	4.06
450 m (20 min)	1.65	1.88	4.62	4.39	2.46	2.45*	4.09
Wind direction (deg)							
Source (10 min)	132	160	187	170	140	180	198
450 m (10 min)	105	169	190	175	131	188	201
Source (20 min)	131	158*	186	170	139	179	198
450 m (20 min)	109	167	190	175	133	182	201
Standard deviation of wind direction (deg)							
Source (10 min)	3.3	3.8	7.0	5.0	5.8	9.0	5.0
450 m (10 min)	5.1	4.2	7.0	4.6	6.8	10.4	4.5
Source (20 min)	3.6	4.2*	6.8	5.6	8.8	10.5	5.0
450 m (20 min)	7.1	4.4	6.6	4.7	6.7	11.8	4.7

Table 6.1 (Continued)

Gas release No.	42	43	44	45	46	47	48S
Date	14 Aug.	15 Aug.				20 Aug.	
Time (CST)	0455	1155	1355	1655	1840	0955	1225
Wind speed (m/sec)							
Source (10 min)	5.81	4.95	5.71	6.12	5.15	3.58	3.38
450 m (10 min)	6.88	5.10	6.01	6.12	5.26	3.58	2.41
Source (20 min)	5.99	4.95	5.71	5.66	5.20	3.45	3.17
450 m (20 min)	6.32	5.05	6.14	5.89	5.38	3.48	2.90
Wind direction (deg)							
Source (10 min)	212	170	158	163	134	243	
450 m (10 min)	215	179	167	168	133	225	
Source (20 min)	212	170	158	161	134	236	
450 m (20 min)	215	177	161	167	135	235	
Standard deviation of wind direction (deg)							
Source (10 min)	6.6	12.2	12.7	6.9	7.7	13.9	
450 m (10 min)	5.9	10.3	14.0	7.2	8.2	12.6	
Source (20 min)	6.6	13.7	13.7	8.2	7.6	20.0	
450 m (20 min)	5.3	11.7	18.1	8.4	8.6	18.0	
Gas release No.	48	49	50	51	52	53	54
Date	21 Aug.				24 Aug.		
Time (CST)	0855	1055	1355	1525	1110	1955	2155
Wind speed (m/sec)							
Source (10 min)	8.04	6.27	6.57	6.12	4.29	2.51	4.04
450 m (10 min)	8.55	6.67	6.78	6.67	4.75	2.41	4.04
Source (20 min)	7.94	6.39	6.47	5.96	4.32	2.46	4.11
450 m (20 min)	8.40	6.85	6.77	6.77	4.75	2.39	4.06
Wind direction (deg)							
Source (10 min)	214	199	215	245	132	132	140
450 m (10 min)	213	202	214	237		131	142
Source (20 min)	212	198	216	244	129	133	140
450 m (20 min)	213	201	217	243		132	143
Standard deviation of wind direction (deg)							
Source (10 min)	8.1	11.9	10.9	10.8	17.7	3.9	5.9
450 m (10 min)	6.9	10.9	9.0	11.4		2.5	6.1
Source (20 min)	8.1	11.1	10.7	12.6	16.5	3.6	5.7
450 m (20 min)	6.7	10.9	10.4	12.5		2.7	5.8

Table 6.1 (Continued)

Gas release No.	55	56	57	58	59	60	61
Date	25 Aug.					26 Aug.	
Time (CST)	0055	0255	1725	1925	2225	0135	1055
Wind speed (m/sec)							
Source (10 min)	5.41	4.34	6.67	1.91*	2.62	4.90	7.99
450 m (10 min)	5.86	4.75	6.82	2.36	2.67	5.00	7.64
Source (20 min)	5.28	4.44	6.90	1.96*	2.62	4.87	7.64
450 m (20 min)	5.94	4.70	6.98	2.39	2.72	4.87	7.61
Wind direction (deg)							
Source (10 min)	156	153	200	178*	174	198	203
450 m (10 min)	162	156	206	185	181	202	204
Source (20 min)	155	152	198	179*	173	199	206
450 m (20 min)	162	154	205	186	180	202	209
Standard deviation of wind direction (deg)							
Source (10 min)	5.8	6.1	8.0	4.1*	5.2	5.9	11.0
450 m (10 min)	6.0	7.2	7.8	3.3	3.6	6.5	9.0
Source (20 min)	6.1	7.8	8.2	4.1*	4.6	5.5	10.9
450 m (20 min)	5.5	8.6	8.1	3.3	3.5	5.3	9.5
Gas release No.	62			65	66	67	68
Date	26 Aug.			29 Aug.		30 Aug.	
Time (CST)	1355			1925	2125	0025	0225
Wind speed (m/sec)							
Source (10 min)	5.15			4.44	3.08	4.34	2.82
450 m (10 min)	5.41			4.44	3.33	4.70	2.77
Source (20 min)	5.00			4.24	3.17	4.42	2.82
450 m (20 min)	5.30			4.37	3.43	4.67	2.95
Wind direction (deg)							
Source (10 min)	212			178	166	185	174
450 m (10 min)	214			174	171	190	181
Source (20 min)	213			173	165	182	173
450 m (20 min)	215			177	172	187	179
Standard deviation of wind direction (deg)							
Source (10 min)	8.8			5.0	6.9	5.4	5.3
450 m (10 min)	6.9			5.4	5.1	5.2	5.3
Source (20 min)	9.4			5.4	6.4	6.6	6.2
450 m (20 min)	7.6			4.8	5.0	6.2	5.9

Table 6.2

Frequency distributions of azimuth wind direction obtained by the Massachusetts Institute of Technology during Project Prairie Grass diffusion experiments

Frequency distributions of azimuth wind direction are based on measurements at height of 2 m along base line of sampling network and at travel distance of 450 meters. Data were read from chart records at intervals of 2.5 seconds; entries are total number of cases occurring within 2-degree class intervals expressed in terms of post numbers for horizontal sampling network. For example, Post No. 1 includes wind directions from 089 to 090 degrees; Post No. 46 includes wind directions from 179 to 180 degrees; Post No. 91 includes wind directions from 269 to 270 degrees. Selection of 10-minute sampling periods is explained in the text. As noted in the text and in the explanatory material for Table 6.1, the 450-m data should probably be shifted about 8 degrees or four post numbers towards lower values. Explanation of incomplete or missing data is presented in Table 6.1.

Explanation of incomplete or missing data

Gas Release No.	
1,2,3	No wind direction data are available.
6	No wind direction data for the source.
25	No frequency distributions at 450 m - short record.
27	Last 2-1/2 min of chart record at 450 m is missing.
29	No frequency distributions at 450 m - short record.
36	20-min frequency distribution at source is based on 16 min of record (last 4 min missing).
52	No wind direction data available at 450 m - off scale.

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Gas Release No.

58 Wind direction distributions at source are based on 16-1/2 min of record - 3-1/2 min missing at start of gas release.

63,64 No frequency distributions presented - light and variable winds.

Table 6.2 (Continued)

DATE 6 July 1956 TIME 0055-0115 CST RUN NO. 4

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47			1	
2					48				
3					49				
4					50				
5					51			3	
6					52			13	
7					53			27	
8					54			23	
9					55			32	
10					56	2		44	
11					57	8		35	
12					58	18	2	49	2
13					59	9	1	24	1
14					60	29	3	45	3
15					61	10	6	14	6
16					62	21	4	22	4
17					63	9	41	11	41
18					64	16	10	17	14
19					65	14	7	15	30
20					66	19	32	19	52
21					67	54	30	54	42
22					68	25	14	25	35
23					69	5	6	5	32
24					70		29		55
25					71		12		12
26					72		14		26
27					73		21		30
28					74		9		26
29					75				17
30					76				10
31					77				4
32					78				4
33					79				32
34					80				2
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

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Table 6.2 (Continued)

DATE 6 July 1956 TIME 1355-1415 CST RUN NO. 5

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	23	21	39	42
2					48	17	18	29	22
3					49	19	24	27	45
4					50	13	13	26	30
5					51	6	18	12	28
6					52	9	16	12	32
7					53	1	11	7	18
8					54	4	15	6	27
9					55	1	8	3	15
10					56	1	6	3	9
11					57		5	1	8
12					58		5	1	6
13					59		2		2
14					60		2		2
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29	1				75				
30			1		76				
31	1		3		77				
32			5	2	78				
33	1		11		79				
34	2		8	5	80				
35	4		20	1	81				
36	4		9	1	82				
37	9		21	2	83				
38	8		18	4	84				
39	5	4	19	5	85				
40	6	2	18	5	86				
41	10	6	32	11	87				
42	24	8	47	16	88				
43	14	8	18	21	89				
44	15	16	22	26	90				
45	18	20	31	41	91				
46	25	18	36	43					

Table 6.2 (Continued)

DATE 6 July 1956 TIME 1655-1715 CST RUN NO. 6

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47		24		48
2					48		14		31
3					49		23		46
4					50		14		35
5					51		26		45
6					52		22		49
7					53		29		45
8					54		25		42
9					55		19		27
10					56		7		24
11					57		9		13
12					58		3		6
13					59		4		4
14					60		1		6
15					61		1		1
16					62				
17					63				1
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40				3	86				
41					87				
42				1	88				
43		2		10	89				
44		3		9	90				
45		5		11	91				
46		9		18					

Table 6.2 (Continued)

DATE 10 July 1956 TIME 1355-1415 CST RUN NO. 7

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	17	6	24	5
2					48	9	3	12	11
3					49	6	11	14	15
4					50	6	4	16	9
5					51	3	6	7	8
6					52	4	8	9	12
7					53	3	2	10	9
8					54	5	6	7	9
9					55	9	4	12	11
10					56	7	7	10	16
11					57	5	9	9	16
12					58	9	11	12	24
13					59	5	8	12	14
14					60	7	8	14	24
15					61	4	5	7	18
16					62	8	8	11	20
17					63	6	14	10	35
18					64	3	7	8	17
19		1		1	65	4	3	7	10
20	1		1		66	13	2	21	6
21	1	3	1	3	67	6	2	13	14
22	1		1		68	2	4	9	13
23	4	2	4	2	69	2	6	6	18
24	2	3	2	3	70	2	5	4	13
25	1	1	1	1	71	3	7	5	12
26	2	1	2	1	72	2	4	2	9
27	2	3	2	3	73	1	5	1	6
28	2	1	2	1	74	1		3	1
29	2	1	3	1	75	1	1	3	1
30	4	1	5	2	76		1		1
31	2	4	7	4	77	1	2	4	2
32	1	5	4	6	78		1	2	1
33	2	2	9	2	79		3	2	3
34	2	1	5	1	80			1	
35	4	1	8	2	81			3	
36	1	1	7	1	82		1	5	1
37	6	2	13	3	83				
38	4	5	9	8	84			4	
39	6	1	8	5	85			4	
40	1	4	2	7	86			8	
41	6		11	2	87			1	
42	11	4	13	9	88			6	
43	4	4	5	7	89			3	
44	8	7	10	11	90			3	
45	6	4	8	7	91			4	
46	3	3	8	3					

Table 6.2 (Continued)

DATE 10 July 1956 TIME 1655-1715 CST RUN NO. 8

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	23	12	46	22
2					48	13	15	25	22
3					49	27	9	32	15
4					50	15	8	26	18
5					51	14	13	25	23
6					52	14	17	15	32
7					53	10	15	19	19
8					54	8	16	13	22
9					55	3	32	6	37
10					56	8	14	7	17
11					57		20	4	24
12					58	2	20	1	21
13					59	2	6	1	7
14					60		6	1	6
15					61	2	2	2	2
16					62		1		1
17					63	2		2	
18				1	64				
19				2	65				
20			1		66				
21			1		67				
22			1	5	68				
23			5	1	69				
24			3	1	70				
25			1	7	71				
26			5	5	72				
27			6	2	73				
28			6	5	74				
29			4	9	75				
30			8	6	76				
31			11	7	77				
32	1		11	6	78				
33			8	2	79				
34			6	9	80				
35	1		9	5	81				
36			3	8	82				
37	1		8	8	83				
38	2		7	10	84				
39	4	1	7	1	85				
40	3	1	3	10	86				
41	13		21	7	87				
42	21	2	32	4	88				
43	11	1	18	14	89				
44	15	9	28	21	90				
45	10	10	18	11	91				
46	16	10	23	24					

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Table 6.2 (Continued)

DATE 11 July 1956 TIME 0955-1015 CST RUN NO. 9

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	1		1	
2					48	4		4	
3					49	2	1	4	1
4					50	4		5	
5					51	7	1	9	1
6					52	7	4	12	4
7					53	17		26	1
8					54	15	5	19	5
9					55	15	6	20	6
10					56	18	6	27	7
11					57	15	17	35	28
12					58	28	17	61	30
13					59	29	13	47	28
14					60	14	8	42	34
15					61	9	7	24	27
16					62	13	19	36	40
17					63	5	28	16	63
18					64	5	14	19	24
19					65	5	14	21	26
20					66	5	15	13	31
21					67	6	9	11	19
22					68	7	22	12	38
23					69	3	10	5	13
24					70	5	8	7	14
25					71		11	1	21
26					72		4		8
27					73		1		4
28					74	1		1	
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46	1		1						

Table 6.2 (Continued)

DATE 11 July 1956 TIME 1155-1215 CST RUN NO. 10

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47		2	3	3
2					48	1	3	6	4
3					49	2	2	8	2
4					50	3	2	9	2
5					51	5	6	13	10
6					52		3	7	7
7					53	6	5	12	9
8					54	3	5	12	8
9					55	4	3	13	7
10					56	7	11	14	11
11					57	2	8	13	17
12					58	3	9	11	15
13					59	4	9	11	12
14					60	7	12	19	22
15					61	3	14	14	18
16					62	8	13	16	29
17					63	7	19	14	33
18					64	6	18	19	27
19					65	7	11	21	25
20					66	8	9	22	23
21					67	8	8	16	24
22					68	12	10	23	31
23					69	17	9	28	21
24					70	13	10	23	20
25					71	11	8	13	13
26					72	15	7	18	18
27					73	6	4	7	8
28					74	16	2	19	6
29					75	9	7	9	10
30					76	6	6	6	7
31					77	12	5	13	8
32					78	8		9	1
33					79	4	1	6	5
34					80	2		3	1
35					81	8		8	1
36					82	2		6	2
37					83	2		2	
38			1		84	2		2	7
39			1		85				1
40					86	1		1	4
41					87				
42					88	1		1	
43					89				
44			1		90				1
45			2		91				
46		1	3	1					

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Table 6.2 (Continued)

DATE 14 July 1956 TIME 0755-0815 CST RUN NO. 11

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47	26	3	63	7
2					48	21	9	50	16
3					49	23	10	52	24
4					50	23	7	45	26
5					51	16	22	32	44
6					52	22	25	33	49
7					53	13	26	28	53
8					54	6	18	12	44
9					55	3	35	16	60
10					56	3	17	6	38
11					57	1	24	1	36
12					58		16		29
13					59		15		24
14					60		9		16
15					61		2		4
16					62				2
17					63		1		2
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40			1		86				
41	5		5		87				
42	14		20		88				
43	6		15		89				
44	16		28		90				
45	19	1	29	1	91				
46	24		42	2					

Table 6.2 (Continued)

DATE 14 July 1956 TIME 0955-1015 CST RUN NO. 12

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47	8		33	6
2					48	12		26	4
3					49	9		23	4
4					50	14	1	23	9
5					51	25	10	41	21
6					52	31	9	42	26
7					53	11	24	28	46
8					54	29	27	41	44
9					55	17	32	26	63
10					56	19	37	30	58
11					57	21	36	28	53
12					58	18	31	26	56
13					59	4	17	7	30
14					60	4	8	17	14
15					61	3	4	2	17
16					62	2	2	6	11
17					63		2	2	9
18					64			1	
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38			1		84				
39			1		85				
40			1		86				
41	2		5		87				
42			7		88				
43	1		6		89				
44	4		17		90				
45	3		19	4	91				
46	4		17	4					

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Table 6.2 (Continued)

DATE 22 July 1956 TIME 1955-2015 CST RUN NO. 13

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48			1	
49	18		46	
50	74		80	
51	67		162	
52	21		56	
53	34		43	
54	26		35	2
55			10	5
56			12	9
57		38	4	49
58		81	23	114
59		74	9	179
60		22	6	82
61		19		41
62		6		4
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				

Table 6.2 (Continued)

DATE 22 July 1956 TIME 2155-2215 CST RUN NO. 14

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36	1		1	
37	1		1	
38	19		22	
39	39		55	
40	33		52	
41	55		97	
42	49		110	
43	28		42	
44	14		46	2
45			23	57
46	1	6	15	47
47		22	13	44
48		67	2	82
49		68		75
50		46		53
51		19		33
52		7		17
53		4		21
54		1		24
55				14
56				6
57				4
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				

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Table 6.2 (Continued)

DATE 23 July 1956 TIME 1755-1815 CST RUN NO. 15

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	7		12	
2					48	4	1	8	1
3					49	1	2	3	3
4					50	5	3	7	3
5					51	3	4	9	5
6					52	3	9	13	10
7					53	3	6	9	10
8					54	5	9	16	9
9					55	2	9	12	7
10					56	5	9	8	31
11					57	8	5	15	36
12					58	5	8	27	30
13					59	13	4	31	43
14					60	25	28	45	37
15					61	12	11	27	27
16					62	18	13	39	55
17					63	15	23	26	30
18					64	15	15	31	28
19					65	16	15	29	15
20					66	15	13	27	20
21					67	16	17	21	29
22					68	7	16	12	18
23					69	17	12	19	12
24					70	11	3	15	8
25					71	1	2	3	8
26					72	1	1	3	2
27					73	1		1	
28					74				
29					75	1	1	1	
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42	1		1		88				
43			1		89				
44	1		2		90				
45	3		4		91				
46		1	2	1					

Table 6.2 (Continued)

DATE 23 July 1956 TIME 0955-1015 CST RUN NO. 16

Post No.	10 - min		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	12	1	18	13
2					48	8	2	12	5
3					49	12	1	16	12
4					50	15	3	22	6
5					51	13		17	6
6					52	14	8	19	11
7					53	11	4	13	7
8					54	10	6	15	13
9					55	7	3	12	6
10					56	4	3	8	7
11					57	3	11	3	16
12					58	3	10	9	18
13					59	4	4	10	5
14					60	8	15	14	28
15					61		12	3	17
16					62	3	12	8	20
17					63		13	5	37
18					64	4	3	11	16
19					65	10	17	18	29
20					66	12	13	22	17
21					67	9	11	19	26
22					68	5	14	15	28
23					69	4	5	14	17
24					70		7	12	20
25					71		5	6	7
26					72	1	6	11	10
27					73	1	11	4	11
28					74	1	3	2	3
29					75		4	5	4
30					76		1	7	1
31		1	2	1	77		2	2	2
32			1		78		2	11	3
33			1		79		3	3	5
34	1		1		80		2	2	2
35	1		2		81			2	1
36	3		3		82		1	3	2
37	4	1	5	1	83				
38	4	1	4	1	84		2		3
39	5		5		85			1	
40	6	2	9	2	86		3		3
41	13	1	15	2	87				
42	4	1	10	1	88		1		1
43	6	3	8	6	89		2		2
44	5	1	12	4	90				
45	6		7	6	91				
46	8	3	19	6					

Table 6.2 (Continued)

DATE 23 July 1956 TIME 1955-2015 CST RUN NO. 17

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	46	23	90	60
2					48	36	33	68	67
3					49	26	41	39	84
4					50	24	37	35	59
5					51	17	34	26	49
6					52	8	20	13	39
7					53	7	22	8	31
8					54	4	7	4	12
9					55	2	5	2	8
10					56				
11					57		2		4
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38	1		2		84				
39			2		85				
40					86				
41	2	—	9	3	87				
42	4	1	12	1	88				
43	6	2	18	7	89				
44	13	2	41	9	90				
45	13	5	47	17	91				
46	31	6	63	29					

Table 6.2 (Continued)

DATE 23 July 1956 TIME 1955-2015 CST RUN NO. 18

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	28		41	
2					48	25		42	1
3					49	31	7	60	12
4					50	32	13	59	22
5					51	38	19	64	31
6					52	25	32	51	58
7					53	17	36	45	68
8					54	8	48	29	77
9					55	7	30	39	72
10					56	1	19	11	43
11					57		27	2	50
12					58		7	4	26
13					59				8
14					60		2		10
15					61			1	
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44	4		4		90				
45	6		7		91				
46	18		20						

Table 6.2 (Continued)

DATE 25 July 1956 TIME 1055-1115 CST RUN NO. 19

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	13	13	18	43
2					48	8	6	13	16
3					49	3	7	11	20
4					50	6	8	10	17
5					51	1	4	3	10
6					52	1	3	1	4
7					53	1		1	
8					54		2		2
9					55		1		1
10					56	1		1	
11					57				
12					58		2		2
13					59				
14					60		1		1
15					61				
16					62				
17					63				
18					64				
19			1		65				
20					66				
21			2		67				
22					68				
23			1		69				
24			3		70				
25					71				
26	1		7		72				
27	1		3	1	73				
28	2		8		74				
29	3		7	1	75				
30	10		13	3	76				
31	6	4	13	7	77				
32	12	3	20	5	78				
33	4	1	11	2	79				
34	14	2	18	6	80				
35	17	8	26	8	81				
36	12	2	24	5	82				
37	25	11	31	15	83				
38	5	13	20	21	84				
39	26	7	41	7	85				
40	7	18	23	32	86				
41	8	30	27	48	87				
42	13	14	45	32	88				
43	11	22	17	48	89				
44	15	21	33	39	90				
45	9	23	16	51	91				
46	6	14	11	33					

Table 6.2 (Continued)

DATE 25 July 1956 TIME 1255-1315 CST RUN NO. 20

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	19	34	39	56
2					48	16	18	22	33
3					49	11	17	21	50
4					50	7	18	15	29
5					51	8	16	11	30
6					52	5	14	12	24
7					53	3	11	6	17
8					54	2	12	4	21
9					55	4	7	5	8
10					56	1	3	2	4
11					57				4
12					58	1		1	6
13					59	1		2	
14					60				1
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35			5		81				
36	1		3	1	82				
37	1	1	8	1	83				
38	1	1	13	2	84				
39	15	4	30	7	85				
40	7	3	15	7	86				
41	19	6	38	12	87				
42	19	2	50	17	88				
43	17	11	19	27	89				
44	33	12	63	27	90				
45	24	25	54	55	91				
46	25	25	42	41					

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Table 6.2 (Continued)

DATE 25 July 1956 TIME 2155-2215 CST RUN NO. 21

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	30	25	55	70
2					48	23	28	33	55
3					49	24	47	33	74
4					50	18	28	24	48
5					51	4	31	5	48
6					52	7	19	8	28
7					53	6	12	7	20
8					54	1	5	1	9
9					55	1	4	1	5
10					56		1		1
11					57	1	1	1	1
12					58		2		2
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35			2		81				
36					82				
37	1		4		83				
38	1		2		84				
39	3		7	1	85				
40	2		4	2	86				
41	11		19	1	87				
42	11	2	33	10	88				
43	12	5	36	14	89				
44	27	6	88	14	90				
45	31	10	61	34	91				
46	26	14	55	43					

Table 6.2 (Continued)

DATE 25 July 1956 TIME 2355-0015 CST RUN NO. 22

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	23	37	53	75
2					48	17	32	29	78
3					49	4	43	13	97
4					50	3	24	9	42
5					51	1	27	1	40
6					52	1	9	2	12
7					53		5		7
8					54		3		3
9					55				
10					56				
11					57				
12					58		1		1
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36	1		1		82				
37			3		83				
38	6		7		84				
39	6		13		85				
40	12	1	20	1	86				
41	21	1	41	1	87				
42	35		62	4	88				
43	14	3	27	10	89				
44	41	8	81	15	90				
45	24	26	57	52	91				
46	31	20	60	40					

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Table 6.2 (Continued)

DATE 29 July 1956 TIME 2055-2115 CST RUN NO. 23

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8			1		54				
9					55				
10					56				
11	1		4		57				
12	2		3		58				
13	2		5		59				
14	8		16	1	60				
15	3		8	1	61				
16	31	1	51	5	62				
17	13	1	22	4	63				
18	24	6	50	21	64				
19	29	12	56	30	65				
20	32	9	73	18	66				
21	27	17	53	59	67				
22	16	55	24	99	68				
23	20	32	49	50	69				
24	11	44	16	74	70				
25	1	31	7	55	71				
26	7	11	12	17	72				
27	5	11	13	19	73				
28	4	3	5	7	74				
29		4		8	75				
30	2		3		76				
31			1	1	77				
32	1	1	1	1	78				
33					79				
34	1	1	1	1	80				
35		1		1	81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 29 July 1956 TIME 2255-2315 CST RUN NO. 24

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8					54				
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19	1		4		65				
20	9		13		66				
21	11		20	1	67				
22	7		11	1	68				
23	25	1	40	2	69				
24	27	2	51	4	70				
25	14	5	28	6	71				
26	31	8	69	14	72				
27	22	17	61	36	73				
28	31	10	62	23	74				
29	15	23	24	52	75				
30	15	39	40	63	76				
31	12	36	17	73	77				
32	9	32	13	62	78				
33	3	11	4	25	79				
34	4	23	6	48	80				
35	1	17	2	36	81				
36	2	6	2	11	82				
37		6		9	83				
38		1		5	84				
39		1		5	85				
40				2	86				
41		1		1	87				
42					88				
43					89				
44					90				
45					91				
46									

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Table 6.2 (Continued)

DATE 1 August 1956 TIME 1255-1315 CST RUN NO. 25

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	4		19	
2					48	4		17	
3					49	6		15	
4					50	2		9	
5					51	6		16	
6					52	3		9	
7					53	7		10	
8					54	4		5	
9					55	4		9	
10					56	9		10	
11					57	2		4	
12					58	17		19	
13					59	6		8	
14					60	9		14	
15					61	5		7	
16					62	5		6	
17	2		2		63	9		11	
18					64	3		6	
19					65				
20	1		1		66	1		3	
21	3		3		67				
22	1		2		68	1		1	
23	2		3		69				
24	4		4		70				
25	2		2		71				
26	2		3		72				
27	1		1		73				
28	8		11		74				
29	4		8		75				
30	5		8		76				
31	5		10		77				
32	5		14		78				
33	6		13		79				
34	1		5		80				
35	11		18		81				
36	6		10		82				
37	9		21		83				
38	8		19		84				
39	4		9		85				
40	3		21		86				
41	9		24		87				
42	10		20		88				
43	6		16		89				
44	7		15		90				
45	6		10		91				
46	1		8						

Table 6.2 (Continued)

DATE 2 August 1956 TIME 1155-1215 CST RUN NO. 26

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	17	10	36	29
2					48	8	5	17	21
3					49	11	11	26	38
4					50	19	7	46	29
5					51	12	23	28	39
6					52	17	15	35	30
7					53	12	17	25	29
8					54	12	24	20	36
9					55	9	16	15	22
10					56	8	9	13	17
11					57	8	14	8	18
12					58	11	21	14	26
13					59	5	11	5	13
14					60	3	17	4	21
15					61	3	3	3	4
16					62	3	8	3	11
17					63	4	5	4	6
18					64		5		6
19					65	4	2	4	4
20					66	4	1	4	1
21					67	2		2	
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34			1		80				
35			1		81				
36	2		3	1	82				
37			1		83				
38			5	1	84				
39	4		8		85				
40	4	1	8	4	86				
41	7		18	2	87				
42	6	1	25	12	88				
43	6	1	17	11	89				
44	15	1	35	7	90				
45	14	4	27	17	91				
46	10	8	18	24					

Table 6.2 (Continued)

DATE 2 August 1956 TIME 1355-1415 CST RUN NO. 27

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	24	22	52	36
2					48	17	25	38	38
3					49	24	18	34	41
4					50	22	18	37	34
5					51	16	12	37	25
6					52	17	21	32	37
7					53	14	18	26	25
8					54	9	22	21	34
9					55	5	14	14	23
10					56	4	9	9	13
11					57	5	13	8	24
12					58	2	5	3	11
13					59	1	6	3	7
14					60		6	4	7
15					61	1		3	2
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35	1		1		81				
36	1		1		82				
37	2		2		83				
38	2		3		84				
39	3		5		85				
40	2	1	5	1	86				
41	6	1	10	3	87				
42	12	2	21	4	88				
43	13	6	14	12	89				
44	13	3	36	5	90				
45	8	4	25	13	91				
46	16	14	35	22					

Table 6.2 (Continued)

DATE 2 August 1956 TIME 1255-0015 CST RUN NO. 28

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	19	42	31	79
2					48	11	19	19	41
3					49	5	33	9	60
4					50	3	21	4	34
5					51	1	13	1	15
6					52	1	8	2	11
7					53		7		7
8					54		2		3
9					55		1		1
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34	1		1		80				
35			1		81				
36	4		4		82				
37	6		15		83				
38	3		8		84				
39	9	2	27	2	85				
40	17		38	1	86				
41	40	3	72	7	87				
42	29	4	72	12	88				
43	18	10	39	28	89				
44	34	18	70	36	90				
45	20	33	37	92	91				
46	19	24	32	52					

Table 6.2 (Continued)

DATE 3 August 1956 TIME 0155-0215 CST RUN NO. 29

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8					54				
9					55			3	
10					56			5	
11					57	1		7	
12					58	6		15	
13					59	3		15	
14					60	10		31	
15					61	12		28	
16					62	19		39	
17					63	25		34	
18					64	16		24	
19					65	23		32	
20					66	19		19	
21					67	26		26	
22					68	21		23	
23					69	14		14	
24					70	9		10	
25					71	10		11	
26					72	13		22	
27					73	5		11	
28					74	4		28	
29					75	3		24	
30					76	1		10	
31					77			22	
32					78			11	
33					79			8	
34					80			6	
35					81				
36					82			1	
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 3 August 1956 TIME 1255-1315 CST RUN NO. 30

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	8	2	12	2
2					48	13	5	15	6
3					49	8	4	12	4
4					50	9	2	11	3
5					51	13	3	23	4
6					52	18	7	28	7
7					53	16	11	26	13
8					54	22	7	29	12
9					55	16	7	30	14
10					56	26	3	40	12
11					57	13	15	19	36
12					58	12	14	37	34
13					59	16	6	26	20
14					60	3	25	24	51
15					61	6	12	19	28
16					62	6	18	19	32
17					63	6	25	21	49
18					64	4	15	16	30
19					65	2	10	11	20
20					66		8	8	15
21					67		19	7	32
22					68	1	5	12	16
23					69		7	5	16
24					70		1	4	5
25					71		4	1	8
26					72		2	1	4
27					73		2		4
28					74			1	
29					75			1	3
30					76				
31					77		1		2
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42	2		3		88				
43	2		2		89				
44	4		4		90				
45	4		4		91				
46	10		11						

Table 6.2 (Continued)

DATE 3 August 1956 TIME 1455-1515 CST RUN NO. 31

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47			2	
2					48			1	1
3					49			3	1
4					50			4	4
5					51			6	
6					52			11	1
7					53			8	3
8					54			10	6
9					55	1		17	4
10					56	2		23	1
11					57	1		9	5
12					58	6	2	27	8
13					59	6	2	13	6
14					60	8	5	23	12
15					61	5	6	18	21
16					62	8	5	25	13
17					63	13	13	23	31
18					64	12	12	34	29
19					65	12	20	21	31
20					66	12	19	19	34
21					67	11	33	17	45
22					68	16	39	24	62
23					69	15	21	20	46
24					70	13	21	16	27
25					71	19	11	22	22
26					72	20	7	22	16
27					73	9	10	9	14
28					74	20		20	2
29					75	17	8	17	10
30					76	3	1	3	4
31					77	5	3	5	12
32					78	2	1	2	5
33					79	2	1	3	1
34					80				2
35					81	1		1	1
36					82	1		1	
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46			1						

Table 6.2 (Continued)

DATE 6 August 1956 TIME 1955-2015 CST RUN NO. 32

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47		38	2	83
2					48		47		97
3					49		65		115
4					50		43		81
5					51		23		39
6					52		1	1	5
7					53		2	2	3
8					54				1
9					55				1
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26			1		72				
27					73				
28			1		74				
29					75				
30					76				
31					77				
32					78				
33			2		79				
34			1		80				
35			8		81				
36			12		82				
37	5		20		83				
38	2		18		84				
39	22		54		85				
40	25		48		86				
41	58		97		87				
42	55		108		88				
43	39		49	1	89				
44	26		41	2	90				
45	8	8	12	23	91				
46		13	2	29					

Table 6.2 (Continued)

DATE 7 August 1956 TIME 1255-1310 CST RUN NO. 33

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32	1		1	
33	2		2	
34	2		2	
35	5		5	
36	6		8	1
37	2		7	
38	1		3	
39	5		17	
40	4	2	11	3
41	5	1	19	1
42	9	8	43	11
43	10	2	24	14
44	16	8	53	18
45	17	6	37	16
46	21	11	45	24

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
47	20	13	40	36
48	15	17	27	31
49	22	17	34	30
50	16	22	25	42
51	20	15	26	34
52	12	20	15	34
53	9	16	12	35
54	10	18	11	38
55	5	23	6	39
56	3	14	3	19
57		14	0	31
58	2	9	2	16
59		2		2
60		2		3
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				

Table 6.2 (Continued)

DATE 7 August 1956 TIME 1455-1515 CST RUN NO. 34

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17			1	
18				
19	1		2	
20	2		7	
21	4		10	
22	5		7	2
23	7		24	2
24	12		29	7
25	6	4	17	11
26	15	1	51	9
27	25	6	49	15
28	32		62	11
29	11	6	22	32
30	24	6	41	20
31	36	13	57	34
32	20	14	33	45
33	20	6	26	13
34	7	25	17	48
35	7	17	16	36
36	2	19	3	32
37	2	16	2	28
38	1	24	1	34
39	1	17	1	23
40		24	1	31
41		17		18
42		13		14
43		7		8
44		5		5
45				1
46				

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
47				
48				
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				

Table 6.2 (Continued)

DATE 7 August 1956 TIME 2255-2315 CST RUN NO. 35-S

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8					54				
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16	1		5		62				
17	2		4		63				
18	4		10		64				
19	4		18		65				
20	15		32		66				
21	30		53		67				
22	13		24	1	68				
23	58		86		69				
24	41	1	62	4	70				
25	14	3	26	15	71				
26	33	6	72	18	72				
27	12	17	24	35	73				
28	8	12	28	24	74				
29	3	40	9	88	75				
30	1	36	9	63	76				
31	1	38	12	60	77				
32		29	3	50	78				
33		12	2	28	79				
34		20		40	80				
35		14		23	81				
36		9		17	82				
37		2		11	83				
38		1		2	84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 11 August 1956 TIME 2125-2145 CST RUN NO. 35

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1		3		3	47				
2		5		11	48				
3		3		6	49				
4		8		14	50				
5		11		12	51				
6		5		9	52				
7		30		30	53				
8		26		26	54				
9		3		3	55				
10		108		108	56				
11		25		25	57				
12		12		121	58				
13				10	59				
14				17	60				
15	1		1	52	61				
16	2		3	28	62				
17			4		63				
18			28	1	64				
19	4		48		65				
20	30		46		66				
21	52		88		67				
22	50		173		68				
23	77		31		69				
24	17		38		70				
25	5		18		71				
26	2				72				
27			1		73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

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Table 6.2 (Continued)

DATE 11 August 1956 TIME 2325-2345 CST RUN NO. 36

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8					54				
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27			1		73				
28					74				
29					75				
30			2		76				
31	2		14		77				
32	8		18	2	78				
33	10		41		79				
34	26		50	5	80				
35	72	1	105	12	81				
36	38	3	46	24	82				
37	50	9	63	32	83				
38	18	23	23	76	84				
39	10	37	11	84	85				
40	4	37	6	104	86				
41		57		55	87				
42	2	35	3	43	88				
43		18		22	89				
44		16	1	16	90				
45		2		2	91				
46		2		2					

Table 6.2 (Continued)

DATE 12 August 1956 TIME 0255-0315 CST RUN NO. 37

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	24	13	58	24
2					48	26	22	53	38
3					49	26	33	49	61
4					50	26	20	60	45
5					51	29	18	54	58
6					52	19	27	36	56
7					53	23	22	30	45
8					54	7	23	14	39
9					55	13	23	15	36
10					56	4	5	8	15
11					57	1	3	3	12
12					58	2	2	3	2
13					59	1	2	1	3
14					60		2		1
15					61				1
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36			1		82				
37					83				
38					84				
39					85				
40					86				
41	3	2	5	4	87				
42	2	1	10	3	88				
43	7	1	10	1	89				
44	8	1	20	3	90				
45	6	9	22	17	91				
46	13	11	28	14					

Table 6.2 (Continued)

DATE 12 August 1956 TIME 0455-0515 CST RUN NO. 38

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47	5	9	9	18
2					48	1	9	3	15
3					49		5	1	10
4					50				2
5					51				1
6					52			1	1
7					53			1	
8					54				
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32			2		78				
33					79				
34			2		80				
35	4		9		81				
36	6		8		82				
37	16		33	1	83				
38	11	1	34	4	84				
39	28	1	52	8	85				
40	29	17	49	40	86				
41	48	22	89	42	87				
42	35	29	83	71	88				
43	30	51	31	97	89				
44	16	31	50	66	90				
45	9	42	14	73	91				
46	1	23	7	31					

Table 6.2 (Continued)

DATE 13 August 1956 TIME 2225-2245 CST RUN NO. 39

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8					54				
9		1		1	55				
10					56				
11					57				
12	1	1	1	1	58				
13					59				
14		3		3	60				
15		1	1	1	61				
16		10		11	62				
17		1	1	1	63				
18		30	11	30	64				
19	2	22	11	27	65				
20	2	33	40	41	66				
21	9	25	34	46	67				
22	8	34	19	89	68				
23	39	18	61	47	69				
24	21	28	25	76	70				
25	21	12	26	44	71				
26	38	2	41	5	72				
27	33	7	43	23	73				
28	30	1	48	5	74				
29	6	5	13	10	75				
30	16	2	31	7	76				
31	6	3	26	6	77				
32	2	1	13	1	78				
33	3		14	1	79				
34			8	1	80				
35	1		5		81				
36			2		82				
37	1		2		83				
38				1	84				
39	1		1		85				
40			1		86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

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Table 6.2 (Continued)

DATE 14 August 1956 TIME 0025-0045 CST RUN NO. 40

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47	20	16	29	21
2					48	17	10	28	15
3					49	15	15	31	18
4					50	12	7	29	11
5					51	13	13	32	19
6					52	3	8	16	17
7					53	8	14	26	27
8					54	6	17	12	28
9					55	4	20	6	23
10					56	5	21	8	24
11					57		12	1	15
12					58	1	6	2	7
13					59		1		1
14					60		1		1
15					61		1		1
16					62				1
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30				1	76				
31			1		77				
32					78				
33					79				
34	1		2		80				
35			4	3	81				
36	2		3	1	82				
37	2		17	3	83				
38	2		7	8	84				
39	7	3	26	17	85				
40	4	1	21	24	86				
41	22	7	45	34	87				
42	18	7	50	37	88				
43	20	6	11	29	89				
44	26	15	33	32	90				
45	17	19	20	36	91				
46	15	20	18	25					

Table 6.2 (Continued)

DATE 14 August 1956 TIME 0255-0315 CST RUN NO. 41

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47	1		2	
2					48	2		2	1
3					49	2		3	3
4					50	7		15	2
5					51	11		22	4
6					52	7	3	17	10
7					53	27	8	59	26
8					54	27	16	65	31
9					55	44	19	94	75
10					56	42	44	74	61
11					57	34	27	58	90
12					58	20	51	34	99
13					59	11	40	19	34
14					60	5	15	10	23
15					61		14	1	12
16					62		2		5
17					63		1	1	2
18					64			1	
19					65			1	1
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46			1						

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Table 6.2 (Continued)

DATE 14 August 1956 TIME 0455-0515 CST RUN NO. 42

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47				
2					48				
3					49				
4					50			1	
5					51				
6					52			1	
7					53	2	1	2	1
8					54	2	1	3	1
9					55	3		4	
10					56	6	1	9	2
11					57	5	2	11	3
12					58	19	9	34	13
13					59	14	5	28	11
14					60	28	9	52	25
15					61	25	12	52	31
16					62	33	27	66	50
17					63	26	48	56	108
18					64	26	28	41	69
19					65	17	34	42	59
20					66	16	24	34	45
21					67	7	20	18	28
22					68	4	13	9	22
23					69	4	3	7	4
24					70	1	1	4	2
25					71	1		2	1
26					72	1	1	1	1
27					73		1		1
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 15 August 1956 TIME 1155-1215 CST RUN NO. 43

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	24	20	41	33
2					48	7	13	14	21
3					49	6	14	8	31
4					50	3	9	10	21
5					51	6	8	10	14
6					52	2	4	3	11
7					53	1	4	2	12
8					54	2	5	3	10
9					55	1	1	3	3
10					56	1	1	2	1
11					57		2	1	2
12					58		5	1	8
13					59		1	1	1
14					60	1	1	3	1
15					61		1	2	1
16					62				
17					63				
18					64				
19					65			1	
20					66				
21					67				
22					68				
23			2		69				
24	1		2		70				
25					71				
26			2		72				
27			2		73				
28	4		8	1	74				
29				4	75				
30	5		9	2	76				
31	7		17	4	77				
32	8		11	4	78				
33	7	3	18	4	79				
34	11	1	24	9	80				
35	5		16	7	81				
36	7	3	14	10	82				
37	14	7	25	13	83				
38	15	10	18	16	84				
39	17	4	33	13	85				
40	8	11	14	23	86				
41	13	6	30	19	87				
42	9	15	30	31	88				
43	11	17	20	34	89				
44	22	20	37	37	90				
45	10	31	22	46	91				
46	12	23	20	32					

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Table 6:2 (Continued)

DATE 15 August 1956 TIME 1355-1415 CST RUN NO. 44

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	3	9	6	14
2					48	2	5	2	6
3				1	49		11	2	12
4					50		2	1	4
5					51		1		1
6				1	52				2
7					53		1		1
8				1	54		3		3
9				1	55				1
10				1	56				
11					57		1		1
12				1	58		1		1
13				1	59		1		1
14				1	60				
15					61				
16			1	2	62		1		1
17			0	3	63				
18			3	6	64				
19		1	0	5	65				
20			2	1	66				
21	5	1	8	5	67				
22	2	3	9	13	68				
23	5	1	16	4	69				
24	2		8	7	70				
25	4	1	4	9	71				
26	5	3	7	8	72				
27	4	3	10	8	73				
28	14	4	23	7	74				
29	4	1	8	7	75				
30	14	6	20	16	76				
31	10	13	21	26	77				
32	12	6	19	14	78				
33	16	5	27	6	79				
34	9	10	15	21	80				
35	18	3	32	12	81				
36	12	12	21	17	82				
37	11	10	18	22	83				
38	13	16	23	20	84				
39	17	10	39	16	85				
40	5	20	13	40	86				
41	21	15	41	28	87				
42	10	15	27	28	88				
43	4	9	12	17	89				
44	10	13	24	18	90				
45	5	15	11	26	91				
46	3	8	6	11					

Table 6.2 (Continued)

DATE 15 August 1956 TIME 1655-1715 CST RUN NO. 45

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	2	5	2	7
2					48		3		4
3					49		3		4
4					50				1
5					51				
6					52				
7					53		1		2
8					54				
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19			1		65				
20					66				
21					67				
22			1		68				
23			2		69				
24			1		70				
25			2	1	71				
26			1	1	72				
27			2	5	73				
28	1		6	2	74				
29		1	6	3	75				
30	1		12	2	76				
31	2	2	15	9	77				
32	5	3	15	7	78				
33	16	2	38	2	79				
34	16	10	33	22	80				
35	38	8	64	12	81				
36	15	4	29	11	82				
37	38	19	70	38	83				
38	20	22	39	49	84				
39	20	33	41	46	85				
40	14	32	21	62	86				
41	14	21	21	47	87				
42	18	31	33	48	88				
43	7	16	7	35	89				
44	8	12	10	30	90				
45	3	7	5	20	91				
46	2	5	2	9					

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Table 6.2 (Continued)

DATE 15 August 1956 TIME 1840-1900 CST RUN NO. 46

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8					54				
9					55				
10					56				
11					57				
12	1		1		58				
13					59				
14	1	3	2	3	60				
15	1	2	2	3	61				
16	5	7	14	12	62				
17	4	3	12	6	63				
18	8	15	24	27	64				
19	22	36	23	51	65				
20	16	15	43	18	66				
21	23	23	45	40	67				
22	39	30	32	45	68				
23	19	17	65	33	69				
24	14	12	40	35	70				
25	24	19	26	39	71				
26	15	8	53	23	72				
27	25	12	40	39	73				
28	2	10	27	21	74				
29	8	17	5	38	75				
30	1	3	6	20	76				
31	3	3	6	12	77				
32	4	4	8	8	78				
33	3		4	3	79				
34	1		1	2	80				
35	1	1		1	81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 20 August 1956 TIME 0955-1015 CST RUN NO. 47

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	•	1	1	1
2					48			1	
3					49		1	4	1
4					50		1	7	1
5					51			6	
6					52		2	4	2
7					53		2	4	2
8					54		2	5	2
9					55		1	7	1
10					56			6	
11					57		5	3	6
12					58	3	4	6	4
13					59		2	3	4
14					60		8	2	9
15					61	3	3	5	5
16					62	1	2	4	5
17					63	3	9	7	14
18					64	3	8	6	12
19					65	3	9	9	11
20					66		9	5	11
21					67	4	14	11	18
22					68	4	21	6	26
23					69	2	15	9	18
24					70	9	18	18	20
25					71	6	24	13	31
26					72	16	24	25	34
27					73	4	10	10	25
28					74	11	4	21	8
29					75	12	15	36	26
30					76	4	11	12	21
31					77	16	5	32	20
32					78	16	2	31	9
33					79	13	5	20	26
34					80	5	1	6	15
35					81	20		24	8
36					82	25		29	14
37					83			4	5
38					84	25	1	34	6
39					85	6		7	5
40					86	7		9	3
41					87	6		4	5
42					88	2		1	9
43					89			8	6
44					90	7		1	7
45			1		91	1		3	4
46					Off Scale	2	1	1	16

Table 6.2 (Continued)

DATE 21 August 1956 TIME 0855-0915 CST RUN NO. 48

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47				
2					48			1	
3					49				
4					50				
5					51				
6					52	2		4	1
7					53	1		6	2
8					54	4	2	7	5
9					55	3	2	10	4
10					56	8	6	25	8
11					57	2	10	15	15
12					58	9	18	29	29
13					59	13	9	32	26
14					60	29	23	58	42
15					61	9	26	31	44
16					62	32	19	53	40
17					63	14	42	29	89
18					64	35	30	59	53
19					65	17	20	30	39
20					66	14	14	26	36
21					67	15	3	24	15
22					68	13	8	16	17
23					69	7	2	10	6
24					70	7	3	7	4
25					71	5	1	6	1
26					72	1	1	1	1
27					73		1		1
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 21 August 1956 TIME 1055-1115 CST RUN NO. 49

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	10	6	18	14
2					48	6	5	19	10
3					49	6		16	12
4					50	8	9	12	12
5					51	13	6	24	17
6					52	8	10	17	20
7					53	8	15	28	27
8					54	3	11	19	21
9					55	22	16	39	34
10					56	15	14	37	31
11					57	14	19	24	44
12					58	20	23	49	48
13					59	19	13	26	25
14					60	20	18	38	30
15					61	12	18	20	28
16					62	14	9	25	16
17					63	7	15	10	29
18					64	6	5	8	12
19					65	4	3	5	8
20					66	2	9	5	10
21					67	3	2	4	2
22					68		2		3
23					69		2		2
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37	1		1		83				
38					84				
39		1		1	85				
40					86				
41	2	1	2	1	87				
42	3	1	4	2	88				
43	2		4		89				
44	5	4	6	4	90				
45	3	2	8	14	91				
46	4	1	10	2					

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Table 6.2 (Continued)

DATE 21 August 1956 TIME 1355-1415 CST RUN NO. 50

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	1		1	
2					48	1		1	
3					49				
4					50			1	1
5					51	2		3	2
6					52		1	2	2
7					53	2	1	2	4
8					54	4	5	4	4
9					55	10	4	14	7
10					56	7	5	13	8
11					57	7	10	13	14
12					58	13	16	25	26
13					59	9	8	21	13
14					60	16	27	31	29
15					61	17	27	24	42
16					62	15	16	35	25
17					63	10	21	21	37
18					64	15	9	30	29
19					65	14	18	29	28
20					66	11	12	34	25
21					67	16	13	28	29
22					68	17	16	31	50
23					69	18	9	34	24
24					70	13	13	30	32
25					71	5	8	13	18
26					72	10		23	9
27					73	4	1	6	5
28					74	1		2	1
29					75			4	2
30					76	1		1	4
31					77	1		2	1
32					78			1	2
33					79				3
34					80				
35					81				1
36					82				1
37					83				
38					84				1
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 21 August 1956 TIME 1525-1545 CST RUN NO. 51

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8					54				
9					55				
10					56				
11					57				
12					58			1	
13					59				
14					60				
15					61				
16					62				
17					63			2	
18					64	3	4	5	4
19					65	1	4	7	4
20					66	1	7	6	8
21					67	3	8	8	8
22					68	2	19	9	13
23					69	3	12	11	15
24					70	4	10	6	19
25					71	6	19	9	19
26					72	12	15	22	31
27					73	8	17	13	20
28					74	11	7	29	26
29					75	22	21	33	36
30					76	6	13	18	13
31					77	14	18	30	27
32					78	14	9	39	32
33					79	17	8	26	31
34					80	15	8	21	13
35					81	18	4	28	28
36					82	25	11	37	26
37					83	10	9	15	14
38					84	17	5	32	25
39					85	9	5	13	7
40					86	6	2	10	24
41					87	4	3	8	5
42					88	4		18	9
43					89	1	1	3	4
44					90	2	1	10	10
45					91	1		4	1
46					Off Scale	1		4	4

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Table 6.2 (Continued)

DATE 24 August 1956 TIME 1110-1130 CST RUN NO. 52

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1			2		47				
2			1		48				
3					49				
4	2		2		50				
5	1		2		51				
6			2		52				
7	1		3		53				
8	6		9		54				
9	5		9		55				
10	7		8		56				
11	9		25		57				
12	10		27		58				
13	5		15		59				
14	9		21		60				
15	3		12		61				
16	12		34		62				
17	8		18		63				
18	8		26		64				
19	6		14		65				
20	16		35		66				
21	12		24		67				
22	5		9		68				
23	15		27		69				
24	8		21		70				
25	2		2		71				
26	13		20		72				
27	5		10		73				
28	6		12		74				
29	3		4		75				
30	6		10		76				
31	14		16		77				
32	6		10		78				
33	4		4		79				
34	6		9		80				
35	3		9		81				
36	8		5		82				
37	6		8		83				
38	3		5		84				
39	5		5		85				
40	2		3		86				
41			1		87				
42					88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 24 August 1956 TIME 1955-2015 CST RUN NO. 53

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8					54				
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16	1		1		62				
17	1		2		63				
18	3	1	5	2	64				
19	7	15	12	20	65				
20	30	31	41	29	66				
21	61	92	112	137	67				
22	27	83	63	123	68				
23	65	11	128	72	69				
24	26	7	67	90	70				
25	8		21	5	71				
26	9		21	1	72				
27	1		2		73				
28			1		74				
29			1		75				
30	1		1		76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

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Table 6.2 (Continued)

DATE 24 August 1956 TIME 2155-2215 CST RUN NO. 54

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16	1		1	
17				
18			1	
19	1		1	
20	5		8	1
21	11	6	20	8
22	9	11	14	14
23	24	10	51	11
24	25	21	55	38
25	18	32	30	50
26	45	24	90	47
27	36	39	72	67
28	41	21	74	48
29	4	28	17	75
30	9	16	22	48
31	4	12	11	31
32	1	11	4	19
33	2	2		9
34	2	5	5	8
35		2		5
36				
37			1	
38	2		2	
39			1	
40				
41				
42				
43				
44				
45				
46				

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
47				
48				
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				

Table 6.2 (Continued)

DATE 25 August 1956 TIME 0055-0115 CST RUN NO. 55

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24			1	
25				
26			7	
27	3	2	6	2
28	6		17	
29	3		6	
30	10	4	22	7
31	21	5	40	8
32	22	9	55	19
33	36	5	62	12
34	34	22	67	46
35	39	28	76	55
36	18	23	40	45
37	23	40	36	83
38	10	37	15	77
39	9	24	15	52
40	2	21	6	35
41	1	11	3	23
42	1	2	2	5
43	1	3	2	6
44	1	2	1	2
45		1		1
46		1		1

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
47				
48				
49		1		1
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				

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Table 6.2 (Continued)

DATE 25 August 1956 TIME 0255-0315 CST RUN NO.56

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47				
2					48				
3					49				
4					50				
5					51				
6					52				
7					53				
8					54				
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18			1		64				
19					65				
20		1	2	1	66				
21		1	1	1	67				
22					68				
23	1		8	3	69				
24	2		14	7	70				
25		4	2	15	71				
26	5		19	8	72				
27	3	3	18	18	73				
28	8	3	24	16	74				
29	9	8	13	32	75				
30	18	13	31	26	76				
31	49	24	78	46	77				
32	26	26	41	36	78				
33	36	12	47	15	79				
34	27	29	52	50	80				
35	22	33	50	48	81				
36	10	24	16	37	82				
37	11	22	34	43	83				
38	6	20	8	35	84				
39	4	6	13	14	85				
40	1	5	3	15	86				
41	2	3	4	8	87				
42		3		5	88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 25 August 1956 TIME 1725-1745 CST RUN NO. 57

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47	1		7	
2					48	1		7	
3					49	9	1	23	3
4					50	5	-	11	12
5					51	14	3	36	9
6					52	15	6	32	13
7					53	18	8	40	18
8					54	19	7	39	21
9					55	19	19	42	40
10					56	30	17	49	34
11					57	13	22	30	41
12					58	37	30	60	50
13					59	15	12	28	27
14					60	18	26	30	57
15					61	6	22	12	38
16					62	5	17	8	28
17					63	4	16	5	35
18					64	5	14	6	19
19					65		6	1	16
20					66		4	1	6
21					67	2	6	2	7
22					68		4		5
23					69	1		1	
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43			1		89				
44					90				
45			2		91				
46	3		6						

Table 6.2 (Continued)

DATE 25 August 1956 TIME 1925-1945 CST RUN NO. 58

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	24	36	71	53
2					48	6	56	22	78
3					49	4	79	17	137
4					50	2	35	5	89
5					51		11	2	63
6					52		6	2	25
7					53	2	2	3	11
8					54		2		5
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37					83				
38					84				
39					85				
40			1		86				
41	4		7		87				
42	7		15		88				
43	19		34		89				
44	46		88		90				
45	25	6	63	9	91				
46	27	7	75	7					

Table 6.2 (Continued)

DATE 25 August 1956 TIME 2225-2245 CST RUN NO. 59

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	16	61	23	102
2					48	4	25	4	47
3					49	4	16	5	28
4					50	1	6	1	12
5					51	1	3	1	4
6					52		1		1
7					53	1		1	
8					54				
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37	2		5		83				
38	3		4		84				
39	12		31		85				
40	13		24		86				
41	25		68	3	87				
42	34	2	111	9	88				
43	46	7	72	17	89				
44	57	15	86	44	90				
45	12	60	21	123	91				
46	9	44	22	88					

Table 6.2 (Continued)

DATE 25 August 1956 **TIME** 0135-0155 **CST** **RUN NO.** 60

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				1
45	1		1	
46				

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
47	3		5	
48	3	1	3	2
49	4		5	2
50	8	1	9	2
51	8	1	13	4
52	22	7	35	9
53	19	11	29	16
54	35	13	53	24
55	37	32	78	60
56	34	21	79	41
57	18	50	56	98
58	26	47	64	96
59	12	20	24	38
60	5	20	12	50
61	2	8	8	17
62	3	2	4	5
63		5		9
64				2
65		1	1	2
66				
67				1
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				

Table 6.2 (Continued)

DATE 26 August 1956 **TIME** 1055-1115 **CST** **RUN NO.** 61

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46		1	1	1

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
47	3		4	
48	4		4	
49	6	4	9	5
50	9		10	2
51	3	8	5	8
52	12	9	15	7
53	16	10	24	14
54	11	16	19	19
55	23	30	40	36
56	16	7	32	11
57	19	23	38	32
58	23	36	41	46
59	19	11	23	18
60	17	24	50	47
61	10	12	22	21
62	6	12	22	30
63	8	12	25	62
64	5	5	18	24
65	5	3	18	27
66	3		10	16
67	5	6	9	24
68	4	3	10	15
69	5	4	11	7
70	2	3	7	6
71	2		4	1
72	2	1	4	1
73			1	
74	2		3	
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				

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Table 6.2 (Continued)

DATE 26 August 1956 TIME 1355-1415 CST RUN NO. 62

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47				
2					48				
3					49	1		1	
4					50	1		1	
5					51				
6					52	4		4	
7					53	5	1	7	4
8					54	3		5	1
9					55	5	2	10	8
10					56	9	3	18	5
11					57	6	10	12	17
12					58	23	11	39	17
13					59	17	10	29	16
14					60	21	28	31	40
15					61	15	19	32	29
16					62	21	27	41	50
17					63	21	33	40	63
18					64	20	21	31	37
19					65	17	21	48	41
20					66	23	12	37	34
21					67	9	16	26	38
22					68	8	18	20	38
23					69	6	6	18	17
24					70		2	7	13
25					71	4		7	7
26					72			5	3
27					73			1	
28					74			3	
29					75	1		4	
30					76				
31					77			1	
32					78				
33					79				
34					80				
35					81			1	
36					82				
37					83				
38					84				
39					85				
40					86				
41					87				
42					88				
43					89				
44					90				
45					91				
46									

Table 6.2 (Continued)

DATE 29 August 1956 TIME 1925-1945 CST RUN NO. 65

Post	10 - min.		20 - min.		Post	10 - min.		20 - min.	
No.	Source	450 m	Source	450 m	No.	Source	450 m	Source	450 m
1					47	34	7	10	53
2					48	11	7	9	18
3					49	8	4	4	13
4					50	5	1	3	7
5					51	5	1	1	6
6					52				1
7					53				
8					54			1	
9					55	1			1
10					56	1			1
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31			1		77				
32		1	1		78				
33					79				
34			1		80				
35					81				
36		1	2	1	82				
37		6	10		83				
38	1	1	8	1	84				
39	1	17	39	4	85				
40	5	10	28	6	86				
41	8	39	76	24	87				
42	17	44	87	49	88				
43	23	25	47	53	89				
44	30	39	82	77	90				
45	56	17	32	110	91				
46	34	20	37	54					

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Table 6.2 (Continued)

DATE 29 August 1956 TIME 2125-2145 CST RUN NO. 66

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	2	3	2	6
2					48		1		4
3					49				3
4					50				1
5					51				
6					52				
7					53				
8					54				
9					55				
10					56				
11					57				
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29	1		2		75				
30	1		3		76				
31	1		1		77				
32	7		12		78				
33	7		14		79				
34	9		22		80				
35	18		50		81				
36	16	6	39	7	82				
37	22	9	65	13	83				
38	17	23	39	31	84				
39	29	22	55	25	85				
40	25	24	39	42	86				
41	31	33	59	66	87				
42	23	32	38	73	88				
43	13	32	18	77	89				
44	12	35	14	73	90				
45	3	15	4	38	91				
46	3	5	3	20					

Table 6.2 (Continued)

DATE 30 August 1956 TIME 0025-0045 CST RUN NO. 67

Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m	Post No.	10 - min. Source	10 - min. 450 m	20 - min. Source	20 - min. 450 m
1					47	34	12	59	47
2					48	34	19	63	41
3					49	42	21	56	62
4					50	27	25	35	47
5					51	26	50	36	77
6					52	14	33	18	45
7					53	9	32	10	39
8					54	7	22	7	27
9					55	2	12	2	15
10					56		2		4
11					57		1		2
12					58		2		2
13					59				
14					60				
15					61				
16					62		1		1
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34					80				
35					81				
36					82				
37	1		1		83				
38			4		84				
39			2	1	85				
40			9		86				
41	1		14	2	87				
42	2		14	2	88				
43	4		20	8	89				
44	8	1	42	10	90				
45	9	4	32	28	91				
46	20	3	55	19					

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Table 6.2 (Continued)

DATE 30 August 1956 TIME 0025-0245 CST RUN NO. 68

Post No.	10 - min.		20 - min.		Post No.	10 - min.		20 - min.	
	Source	450 m	Source	450 m		Source	450 m	Source	450 m
1					47	6	42	23	60
2					48	7	28	12	43
3					49	3	27	7	40
4					50		15	3	21
5					51	2	8	2	12
6					52		3		3
7					53		4		4
8					54				
9					55				
10					56				
11					57		1		1
12					58				
13					59				
14					60				
15					61				
16					62				
17					63				
18					64				
19					65				
20					66				
21					67				
22					68				
23					69				
24					70				
25					71				
26					72				
27					73				
28					74				
29					75				
30					76				
31					77				
32					78				
33					79				
34			1		80				
35			7	1	81				
36			9		82				
37	8		24	1	83				
38	2	1	11	2	84				
39	16		24	2	85				
40	8	1	26	9	86				
41	35	2	65	25	87				
42	41	5	86	43	88				
43	36	12	50	41	89				
44	44	20	63	47	90				
45	21	36	35	70	91				
46	11	35	31	55					

GEOPHYSICAL RESEARCH PAPERS

No. 1. Isotropic and Non-Isotropic Turbulence in the Atmospheric Surface Layer, Heinz Lettau, Geophysics Research Directorate, December 1949.

No. 2. Effective Radiation Temperatures of the Ozonosphere over New Mexico, Adel, Geophysics R-D, December 1949.

No. 3. Diffraction Effects in the Propagation of Compressional Waves in the Atmosphere, Norman A. Haskell, Geophysics Research Directorate, March 1950.

No. 4. Evaluation of Results of Joint Air Force-Weather Bureau Cloud Seeding Trials Conducted During Winter and Spring 1949, Charles E. Anderson, Geophysics Research Directorate, May 1950.

No. 5. Investigation of Stratosphere Winds and Temperatures From Acoustical Propagation Studies, Albert P. Crary, Geophysics Research Directorate, June 1950.

No. 6. Air-Coupled Flexural Waves in Floating Ice, F. Press, M. Ewing, A. P. Crary, S. Katz, and J. Oliver, Geophysics Research Directorate, November 1950.

No. 7. Proceedings of the Conference on Ionospheric Research (June 1949), edited by Bradford B. Underhill and Ralph J. Donaldson, Jr., Geophysics Research Directorate, December 1950.

No. 8. Proceedings of the Colloquium on Mesospheric Physics, edited by N. C. Gerson, Geophysics Research Directorate, July 1951.

No. 9. The Dispersion of Surface Waves on Multi-Layered Media, Norman A. Haskell, Geophysics Research Directorate, August 1951.

No. 10. The Measurement of Stratospheric Density Distribution with the Searchlight Technique, L. Elterman, Geophysics Research Directorate, December 1951.

No. 11. Proceedings of the Conference on Ionospheric Physics (July 1950) Part A, edited by N. C. Gerson and Ralph J. Donaldson, Jr., Geophysics Research Directorate, April 1952.

No. 12. Proceedings of the Conference on Ionospheric Physics (July 1950) Part B, edited by Ludwig Katz and N. C. Gerson, Geophysics Research Directorate, April 1952.

No. 13. Proceedings of the Colloquium on Microwave Meteorology, Aerosols and Cloud Physics, edited by Ralph J. Donaldson, Jr., Geophysics Research Directorate, May 1952.

No. 14. Atmospheric Flow Patterns and Their Representation by Spherical-Surface Harmonics, B. Haurwitz and Richard A. Craig, Geophysics Research Directorate, July 1952.

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No. 16. Notes on the Theory of Large-Scale Disturbances in Atmospheric Flow With Applications to Numerical Weather Prediction, Philip Duncan Thompson, Major, U. S. Air Force, Geophysics Research Directorate, July 1952.

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No. 17. The Observed Mean Field of Motion of the Atmosphere, Yale Mintz and Gordon Dean, Geophysics Research Directorate, August 1952.

No. 18. The Distribution of Radiational Temperature Change in the Northern Hemisphere During March, Julius London, Geophysics Research Directorate, December 1952.

No. 19. International Symposium on Atmospheric Turbulence in the Boundary Layer, Massachusetts Institute of Technology, 4-8 June 1951, edited by E. W. Hewson, Geophysics Research Directorate, December 1952.

No. 20. On the Phenomenon of the Colored Sun, Especially the "Blue" Sun of September 1950, Rudolf Penndorf, Geophysics Research Directorate, April 1953.

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No. 24. Contributions to the Study of Planetary Atmospheric Circulations, edited by Robert M. White, Geophysics Research Directorate, November 1953.

No. 25. The Vertical Distribution of Mie Particles in the Troposphere, R. Penndorf, Geophysics Research Directorate, March 1954.

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No. 28. The Rotation-Vibration Spectra of Ammonia in the 6- and 10-Micron Regions, R. G. Breene, Jr., Capt., USAF, Geophysics Research Directorate, June 1954.

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No. 30. Proceedings of the Conference on Auroral Physics, edited by N. C. Gerson, Geophysics Research Directorate, July 1954.

No. 31. Fog Modification by Cold-Water Seeding, Vernon G. Plank, Geophysics Research Directorate, August 1954.

No. 32. Adsorption Studies of Heterogeneous Phase Transitions, S. J. Birstein, Geophysics Research Directorate, December 1954.

No. 33. The Latitudinal and Seasonal Variations of the Absorption of Solar Radiation by Ozone, J. Pressman, Geophysics Research Directorate, December 195(

No. 34. Synoptic Analysis of Convection in a Rotating Cylinder, D. Fultz and J. Corn, Geophysics Research Directorate, January 1955.

No. 35. Balance Requirements of the General Circulation, V. P. Starr and R. M. White, Geophysics Research Directorate, December 1954.

No. 36. The Mean Molecular Weight of the Upper Atmosphere, Warren E. Thompson, Geophysics Research Directorate, May 1955.

No. 37. Proceedings on the Conference on Interfacial Phenomena and Nucleation.
I. Conference on Nucleation.
II. Conference on Nucleation and Surface Tension.
III. Conference on Adsorption.
Edited by H. Reiss, Geophysics Research Directorate, July 1955.

No. 38. The Stability of a Simple Baroclinic Flow With Horizontal Shear, Leon S. Pocinki, Geophysics Research Directorate, July 1955.

No. 39. The Chemistry and Vertical Distribution of the Oxides of Nitrogen in the Atmosphere, L. Miller, Geophysics Research Directorate, April 1955.

No. 40. Near Infrared Transmission Through Synthetic Atmospheres, J. N. Howard, Geophysics Research Directorate, November 1955.

No. 41. The Shift and Shape of Spectral Lines, R. G. Breene, Geophysics Research Directorate, October 1955.

No. 42. Proceedings on the Conference on Atmospheric Electricity, R. Holzer, W. Smith, Geophysics Research Directorate, December 1955.

No. 43. Methods and Results of Upper Atmospheric Research, J. Kaplan, G. Schilling, H. Kallman, Geophysics Research Directorate, November 1955.

No. 44. Luminous and Spectral Reflectance as Well as Colors of Natural Objects, R. Penndorf, Geophysics Research Directorate, February 1956.

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Vol. II. The Downstream Probability Density Function for Various Constant Values of Mean Zonal Wind
Vol. III. The Downstream Probability Density Fucntion for North America and Eurasia
by S. B. Solot and E. M. Darling, Jr., Geophysics Research Directorate, June 1958.

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PROJECT PRAIRIE GRASS, A FIELD PROGRAM IN DIFFUSION (Vol. I), edited by M. L. Barad, July 1958. 270 p. incl. illus. tables (Geophysical Research Papers No. 59; AFCRC-TR-58-235 (I))
Unclassified Report

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No. 59

PROJECT PRAIRIE GRASS, A FIELD PROGRAM IN DIFFUSION.

VOLUME II

EDITED BY
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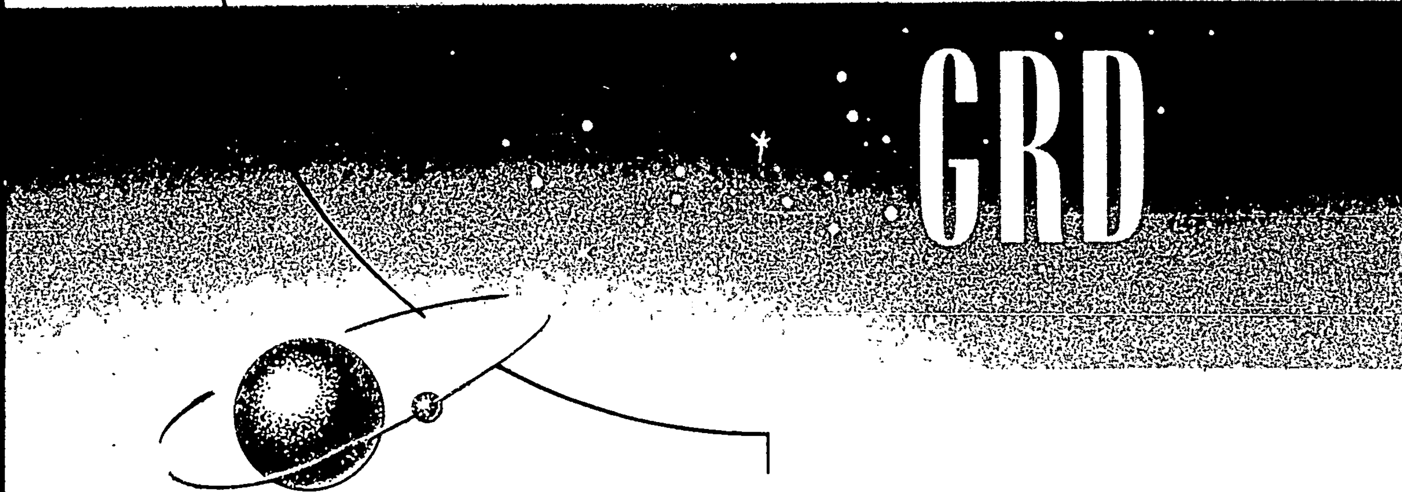
JULY 1958



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UNITED STATES AIR FORCE
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GEOPHYSICAL RESEARCH PAPERS
No. 59

PROJECT PRAIRIE GRASS, A FIELD PROGRAM IN DIFFUSION

Volume II

Edited by
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July 1958

Project 7657

Atmospheric Analysis Laboratory
GEOPHYSICS RESEARCH DIRECTORATE
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UNITED STATES AIR FORCE
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ABSTRACT

Project Prairie Grass was a field program designed to provide experimental data on the diffusion of a tracer gas over a range of 800 meters. In each of 70 experiments the gas was released continuously for 10 minutes at a source located near ground level. The gas releases were made over a flat prairie in Nebraska under a variety of meteorological conditions during July and August of 1956.

This paper, published in two volumes, includes a brief history of the project and detailed descriptions of the tracer technique and the meteorological equipment employed in the field program. Tabulations of the diffusion data and the meteorological data collected during the gas releases are also presented. In addition this paper contains data on the heat budget at the air-earth interface during other selected periods during the Summer of 1956.

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CHAPTER 7
INSTRUMENTATION USED BY THE TEXAS A&M GROUP

R.L. Richman* and W. Covey
Texas A&M Research Foundation

7.1 The Mobile Micrometeorological Station

The mobile micrometeorological station of the Texas A&M group was installed at the extreme west end of the observation line (Figure. 7.1). Figure 7.2 shows the relative locations of the component elements of the station. The station consisted of (a) a slender aluminum pipe mast supporting six anemometers at heights of 8, 4, 2, 1, 0.5, and 0.25 meters, (b) a similar mast supporting seven temperature measuring, radiation shielded, copper-constantan thermocouple junctions at heights of 8, 4, 2, 1, 0.5, 0.25, and 0.125 meters, (c) a similar mast supporting seven polyethylene air sampling tubes at heights of 8, 4, 1, 0.5, 0.25, and 0.125 meters, (d) a triangular section, tubular steel, fold-over type tower supporting at a height of 16 meters an air sampling tube, an anemometer, a shielded thermocouple, a wind vane and a radioactive point collector, (e) a U. S. Signal Corps instrument shelter housing maximum and minimum thermometers and a thermograph, (f) an 8-inch rain gauge and a weighing type recording rain gauge, (g) a wind vane supported at a height of 1 meter by an iron pipe stake, (h) a Gier and Dunkle net exchange radiometer supported at a height of 1 meter, (i) an inverted Eppley thermoelectrical pyrheliometer supported by an iron pipe standard at a height of 2 meters to receive reflected short-wave radiation, (j) an instrument trailer which housed indicating and recording apparatus, (k) an Eppley pyrheliometer mounted on the roof of the trailer, (l) two differentially connected shielded thermocouple measuring junctions supported by a pipe stake at heights of 1/2 and 1 meter, and (m) six copper-constantan temperature measuring junctions at depths of 3.125, 6.25, 12.5, 25, 50, and 100 cm in the

*Present affiliation: U. S. Navy Electronics Laboratory

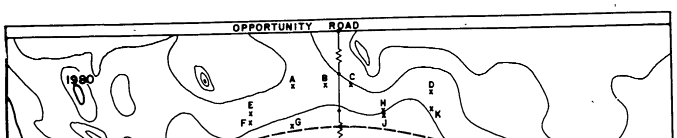

Figure 7.1 Topography of field site and layout of equipment

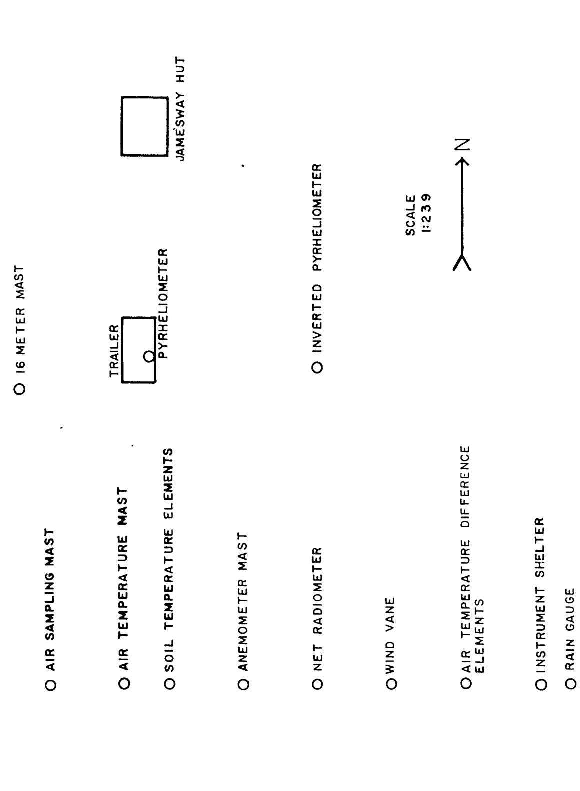

Figure 7.2 The micrometeorological station (Texas A and M)

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soil. Figure 7.3 illustrates the vertical distribution of the sensing elements.

The instrument trailer was a 15-foot house trailer shell, the interior of which was designed to accommodate the recording and indicating equipment associated with the exposed sensing elements.[5] Figures 7.4 and 7.5 illustrate the assignment of space in the trailer. The principal instruments were (a) a Thornthwaite dew-point hygrometer and associated air sampling apparatus, (b) a group of six recording milliammeters with modulated-carrier-type d-c amplifiers for recording insolation, reflected short-wave radiation, net radiation, temperature differences, wind direction, and absolute temperatures, (c) a temperature indicating system with a switch for selecting thermocouple measuring junctions, and (d) a counting system for indicating the number of turns of the anemometers, that is, for recording wind profiles. These instruments will be discussed individually and described in detail. In addition, space was provided for computing and plotting data, storing spare parts, and storing the sensing elements and supporting structures during transit.

7.2 Observation Procedure

Most of the observations were made during periods which centered about five minutes after the hour Central Standard Time. The procedure during such observations is listed below. A similar procedure was followed for periods centered about other times.

1. Ten minutes before the hour: measurement of soil temperature at 6 depths.

2. Five minutes before the hour: start of the anemometer counting period; start of the air sampling period; start of the recording period for insolation, net radiation, reflected short-wave radiation, temperature difference, and wind direction; start of the air temperature measurements. (Eight measurements of air temperature, one at each height, were made each minute for a 20-minute period.)

3. Fifteen minutes after the hour: ending of observation period which was started at five minutes before the hour.

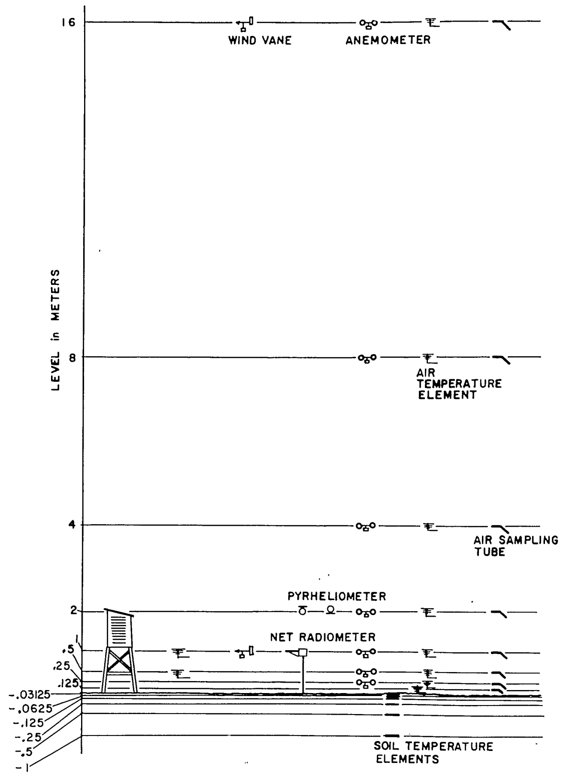
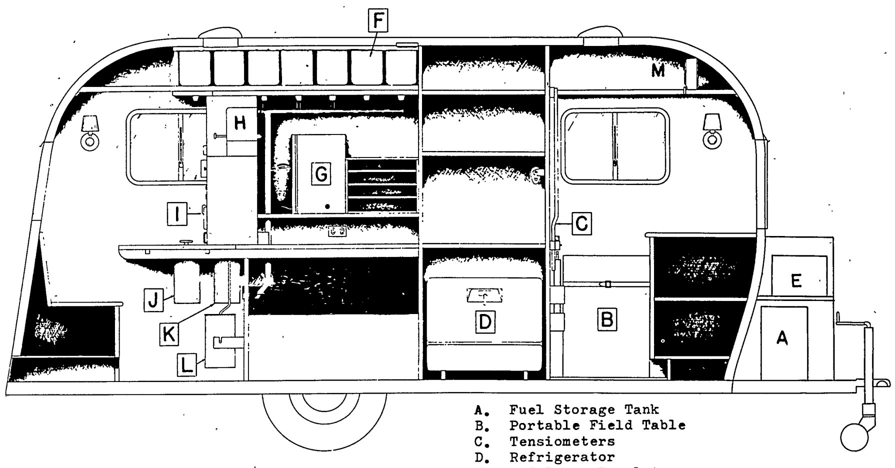
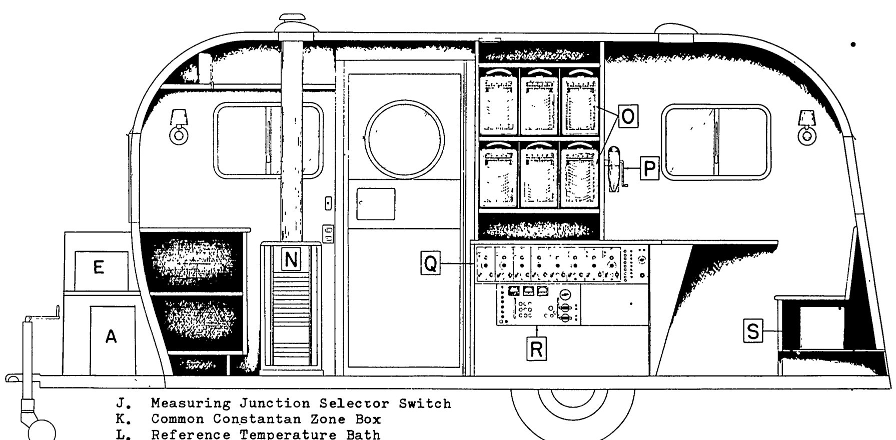


Figure 7.3 Vertical distribution of the sensing elements



A. Fuel Storage Tank
B. Portable Field Table
C. Tensiometers
D. Refrigerator
E. A-C Power Regulator
F. Air Sample Storage Jugs
G. Dew-Point Hygrometer
H. Dew-Point Control Unit
I. Main Instrument Panel

Figure 7.4 Instrument trailer interior



J. Measuring Junction Selector Switch
K. Common Constantan Zone Box
L. Reference Temperature Bath
M. Power Monitoring Meters
N. Kerosene Stove
O. Esterline-Angus Recorders
P. Ice Crusher
Q. Bank of Amplifiers for Recorders
R. 10 Unit Power Supply for Amplifiers
S. Wind Speed Counting Unit

Figure 7.5 Instrument trailer interior

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4. Seventeen minutes after the hour: second measurement of soil temperatures.

5. Twenty minutes after the hour: measurement of the dew-points of the 8 air samples obtained during the air sampling period. (One sample was obtained for each height.)

All data reported are average values for the observation period.

7.3 Individual Elements

7.3.1 Insolation Incoming short-wave radiation was measured by an Eppley pyrheliometer (Weather Bureau 10-junction type). The output of the pyrheliometer was continuously recorded by a modulated-carrier-type d-c amplifier (Figure 7.11) and an Esterline-Angus graphic ammeter. The amplifier was equipped with a gain selector switch so that the recording sensitivity could be changed. Three recording scales were thus provided, 0 to 0.025 cal cm^{-2} sec^{-1}, 0 to 0.01 cal cm^{-2} sec^{-1}, and 0 to 0.0025 cal cm^{-2} sec^{-1}.

The calibration factor for the pyrheliometer was determined by the manufacturer and assumed to be correct. The amplifier and recorder combined were calibrated by supplying an input voltage from a calibrated voltage source. The voltage source had been calibrated by a Leeds and Northrup potentiometer (Type K).

The calibrated voltage source (Figure 7.6) is extremely stable and was used in the field for periodic checks of the calibrations of the various amplifier-recorder systems.

7.3.2 Reflected Short-Wave Radiation Short-wave radiation reflected by the surface was measured and recorded by a system which was identical to that used for insolation measurements. In measuring reflected radiation, the Eppley pyrheliometer was mounted at a height of 2 meters and inverted so that this radiation was incident on the sensitive element.

The calibration of this system was determined in the same manner as that of the insolation system.

7.3.3 Net Radiation A Beckman and Whitley thermal radiometer, Model N188-1 (Gier and Dunkle net exchange radiometer), was used in measuring the net radiation.[3] A continuous record of the net radiometer

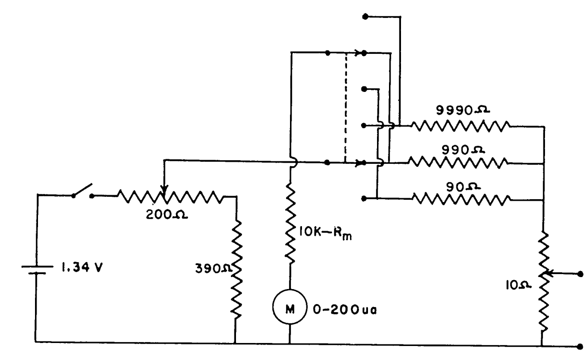

Figure 7.6 Calibrated d-c voltage source

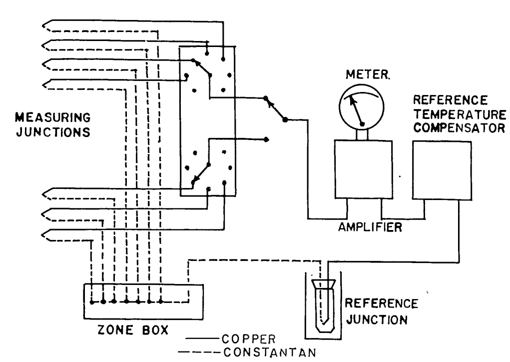

Figure 7.7 Temperature measuring system

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output was obtained by means of an amplifier and recorder similar to that used for insolation measurements. Two recording scales were provided; -0.00125 to +0.005 cal $cm^{-2} sec^{-1}$, and -0.005 to +0.02 cal $cm^{-2} sec^{-1}$.

The calibration of this system was determined in the same manner as that of the insolation system.

7.3.4 Air and Soil Temperature Profiles All temperature measurements were made by means of copper-constantan thermocouples. The temperature measuring system (Figure 7.7) consisted of (a) shielded air temperature measuring junctions, (b) soil temperature measuring junctions, (c) measuring junction selector switches, (d) a modulated-carrier-type d-c amplifier, (e) a milliammeter, (f) a reference temperature compensator (calibrated microvolt source), (g) a constantan junction zone box, and (h) a reference junction.[2]

A radiation-shielded thermocouple assembly is shown in Figure 7.8. The shield consisted of four aluminum plates held together by small screws and plastic spacers. "Alzak" aluminum 0.032 inches thick was used for the shield plates because it is highly reflective in the portion of the spectrum between 0.4 and 7.5 microns. The thermocouple junction formed by No. 36 B&S gauge copper and constantan wire was positioned in the center space of the shield plate stack. The surfaces of the plates faced toward the junction were coated with flat black paint so that heat transfer by radiation would assist in keeping the shield stack at air temperature.

The lead wires were No. 16 B&S gauge rubber-covered copper and constantan in a twisted pair which was encased by a weather-proof neoprene covering.

Hollow brass tubes formed the supporting arms for the shield assembly. The lead wires entered the base fitting and the copper lead was threaded through one arm and the constantan through the other. As shown in Figure 7.8, the ends of the No. 36 B&S gauge copper and constantan wires which formed the junction were secured to the corresponding lead wires by means of firm-fitting plastic sleeves.

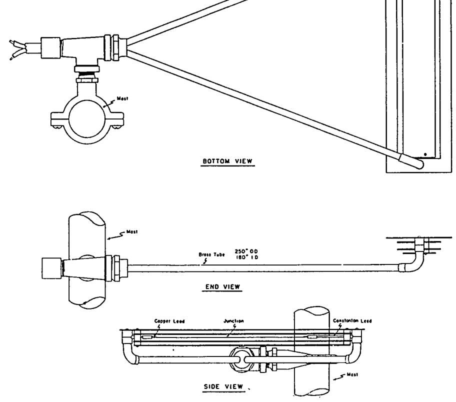

Figure 7.8 Shielded thermocouple assembly

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The thermocouple junctions were made by tinning the ends of No. 36 B&S gauge copper and constantan wires, bringing them into end-to-end contact with the aid of a glass capillary tube, and soldering them.[8] Junctions formed in this manner are uniform and not significantly larger in diameter than the wires themselves. A thermocouple of this type has a low heat capacity and relatively low thermal conductivity.

A set of eight shielded thermocouple assemblies was used as shown in Figure 7.3. The supporting structures could be lowered to facilitate cleaning the shields and replacing the thermocouples.

The thermocouple measuring junctions used to obtain soil temperatures were of two types[4] as shown in Figure 7.9. The junctions which were placed at depths of 12.5, 25, 50, and 100 cm were formed by No. 16 B&S gauge copper and constantan lead wire. This type of junction was encased in a copper tube 6.5 inches long and 5/16-inch outside diameter. The copper tube was sealed at one end by a brass bullet-shaped cap. The junction was electrically insulated from the copper sheath by "Glyptal" lacquer and plastic tape. The junctions which were placed at depths of 3.125 and 6.25 cm were formed by No. 36 B&S gauge copper and constantan wires. The wires were insulated by means of thin glass capillary tubes and inserted in a brass sheath 6.5 inches long and 0.095 inches outside diameter. One end of the sheath was sealed by a pointed brass cap and the other end was connected to a 1.5-inch length of 5/16-inch outside diameter copper tubing which served as a housing for the splices of the No. 36 B&S gauge wires to No. 16 B&S gauge lead wires. The junction was electrically insulated from the sheath by "Glyptal" lacquer.

Care was taken during installation of the soil temperature elements to disturb as little as possible the soil which would surround the junctions. A triangular pit slightly more than one meter deep was excavated. The sod was cut and removed and successive layers of soil were removed and piled separately. In order to maintain accurate spacing between the junctions, a wooden template (5 cm × 2 cm × 105 cm) in which appropriate holes had been drilled was used. The wooden support was accurately positioned vertically at the apex of the pit. Holes which were slightly

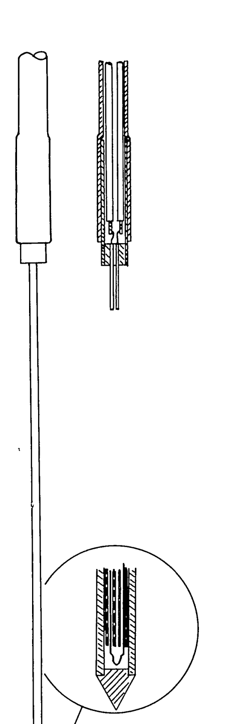

Figure 7.9 Soil temperature thermocouple elements

smaller in diameter than the temperature elements were drilled into the side of the pit at each level. The temperature elements were then inserted horizontally through the wooden support and into the holes in the soil. The layers of soil were replaced at their original depths as the pit was filled. To minimize the effect of thermal conduction along the lead wires, each lead was buried at the same depth as its corresponding element for a horizontal distance of approximately one meter from the element. Figure 7.10 illustrates the arrangement of the soil temperature measuring junctions.

All constantan leads from the measuring junctions were connected to the constantan lead to the reference junction at the constantan junction zone box. (See Figure 7.7.) The lead ends were held in contact with the common lead by means of plastic clamps. Each lead could be easily disconnected from the circuit for checking purposes.

The copper leads from the measuring junctions were connected to the individual positions of a two-gang rotary selector switch. A copper knife switch permitted selection of a gang. Since the rotary selector switch had silver contacts, it was mounted in a thermos flask which insured isothermal conditions and prevented the occurrence of spurious voltages due to the copper-silver junctions.

The reference junction was formed by No. 16 B&S gauge copper and constantan wires and was electrically insulated and water-proofed by a thin coating of polyethelene. The reference junction was immersed in a pint thermos flask filled with a mixture of distilled water and crushed distilled water ice. To prevent conduction of heat to the junction by the lead wires, approximately one foot of the lead wires was looped and immersed with the junction. The thermos flask was mounted in a cork-lined metal container to further reduce the melting rate of the ice. The metal container was mounted near the floor on a pair of horizontal pivots. The operator could impart a rocking motion to the container with his foot. In this way the reference bath was agitated to minimize thermal stratification. The mixture of ice and water was assumed to be at 0°C.

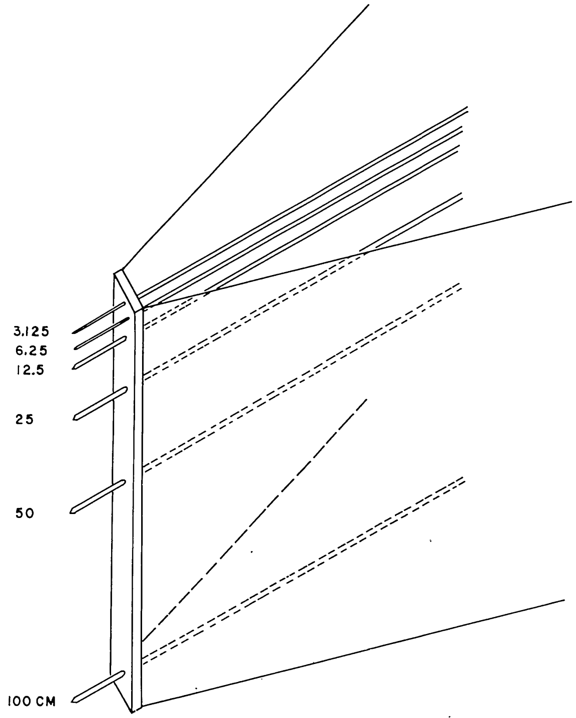

Figure 7.10 Installation of soil temperature elements

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The circuit diagram for the modulated-carrier-type d-c amplifier is shown in Figure 7.11. The prominent characteristics of this amplifier are high sensitivity, virtually no zero drift, high gain stability, relatively high input impedance, and a high degree of linearity. The amplifier used for temperature measurements had a nominal input range of 0 to 400 microvolts which corresponds to the output of copper-constantan thermocouples for a 10°C temperature difference. A control was provided for precise setting of the amplifier gain.

The amplifier output was indicated on a meter (Weston, Model 271) which had a range of 0 to 1 milliampere and an internal resistance of 1400 ohms. The meter scale was 5.8 inches (147 mm) in length, had 100 divisions, and was marked to read a temperature range of 0° to 100°. This meter was equipped with a knife-edge pointer and a mirror scale which eliminated reading errors due to parallax.

The reference temperature compensator circuit is shown in Figure 7.12. This unit is a calibrated variable microvoltage source. By setting the dial of the 5000-ohm precision variable resistor anu regulating the voltage across the precision divider consisting of the 1-ohm, 250-ohm, and nominal 5000-ohm series-connected resistors; a microvoltage equivalent to that produced by copper-constantan thermocouples for any temperature difference in the ranges of 0° to 45°C and 0° to 45°C could be obtained. In this circuit, the output microvoltage is made dependent only on the setting of the 5000-ohm resistor by maintaining a constant voltage across the divider. This is accomplished by comparing the voltage across the divider with the emf of a standard cell and varying the 100K ohm resistor in series with the 1.5-volt dry cell until a condition of balance is obtained as indicated by the microammeter.

Since the input range of the amplifier was limited to a 10°C increment and the reference thermocouple junction was maintained at 0°C, the reference temperature compensator was employed in measuring temperatures which exceeded 10°C. The connection of the compensator in the measuring circuit was such that its output voltage was subtracted from the voltage

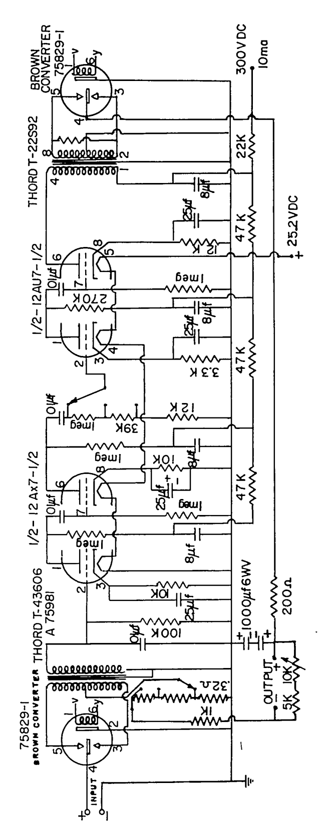

Figure 7.11 Thermocouple amplifier

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produced by the thermocouples. The net voltage was then amplified and indicated on the meter. The following example illustrates the operation of the temperature measuring system:

To measure the temperature (assumed to be between 20° and 30°C) at the 50-cm depth in the soil:

(1) Set the selector switch for the -50 cm soil-measuring junction,
(2) Set the reference temperature compensator dial for 20°C compensation and adjust the balance control,
(3) Set the amplifier gain dial for the 20° to 30°C increment, and
(4) Read the meter (assume a reading of 6.35 is obtained)
(5) Apply a meter correction, in this case +0.02.

The temperature (26.37) is the compensation (20°C) plus the meter reading (6.35°C) plus the meter correction (+0.02).

A platinum resistance thermometer (Leeds and Northrup), which had been calibrated by the National Bureau of Standards, and a Mueller Bridge (Rubicon) were used to calibrate the copper-constantan thermocouple wire. A thermocouple circuit was constructed from a length of No. 16 B&S gauge copper-constantan lead wire. One junction was placed in a 0°C reference bath and the other junction was immersed in a large thermos flask filled with water (approximately five gallons). A Beckman differential thermometer and the resistance thermometer were immersed in this calibrating bath. The thermocouple junction, Beckman thermometer bulb and resistance thermometer bulb, were placed in close proximity near the center of the bath. A motor-driven stirring mechanism was used to agitate the water. The thermocouple wires were connected in a circuit with an amplifier, meter, and reference temperature compensator as shown in Figure 7.13. The amplifier and meter merely served as a sensitive null indicator, hence their calibrations had no influence on the wire calibration.

The temperature of the calibrating bath was varied through the range of -20°C to 50°C and 15 evenly-distributed calibrations points were obtained. Methanol antifreeze was added to the bath water for temperatures less than 0°C. The temperature of the bath was determined by the resistance

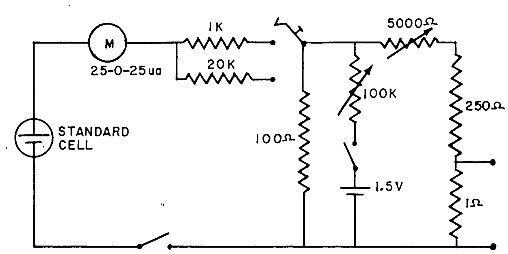

Figure 7.12 Reference temperature compensator

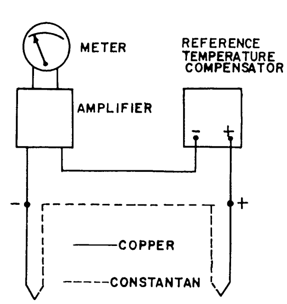

Figure 7.13 Thermocouple wire calibrating circuit

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thermometer, and the rate of change of temperature was monitored by the Beckman differential thermometer. At each calibration point, a reference temperature compensator setting was determined which produced zero current flow in the measuring circuit as indicated by the amplifier meter null detector; that is, a setting was determined which caused the compensator output to be equal in magnitude to the emf produced by the thermocouple junctions. The emf temperature characteristic of the copper-constantan wire was then determined by measuring the output of the compensator for each of the dial settings. A potentiometer (Leeds and Northrup Type K), a precision voltage divider, an amplifier-meter null detector, and an auxiliary emf source were used for this measurement as shown in Figure 7.14. The amplifier and meter were calibrated by means of the circuit shown in Figure 7.15. In this circuit, the compensator serves as a calibrated microvoltage source which simulates the output of a thermocouple circuit. With the auxiliary microvoltage source set at zero output, the compensator was set for 10°C and the setting of the amplifier gain control which produced full-scale meter deflection was determined. The output of the auxiliary microvoltage source was then adjusted until it was equal in magnitude to the compensator output. Since the two microvoltage sources were connected so that their polarities were in opposition, a condition of equality was indicated by a reading of zero on the meter. (The zero reading, of course, is independent of the amplifier-meter calibration.) The setting of the compensator was then changed to 20°C and the amplifier gain setting for full-scale meter deflection was determined. The auxiliary microvoltage source was again adjusted for a condition of equality and the process was repeated. By this method, amplifier gain settings were established for a series of overlapping operating ranges, that is, 0° to 10°C, 5° to 15°C, 10° to 20°C, etc. The transfer characteristic of the amplifier-meter combination was determined and it was found that deviations from linearity were due primarily to meter movement and scale irregularities. Corrections to be applied to meter readings were established which corrected for the irregularities in the amplifier-meter transfer characteristic and the curvature of the emf temperature characteristic of the thermocouple wire.

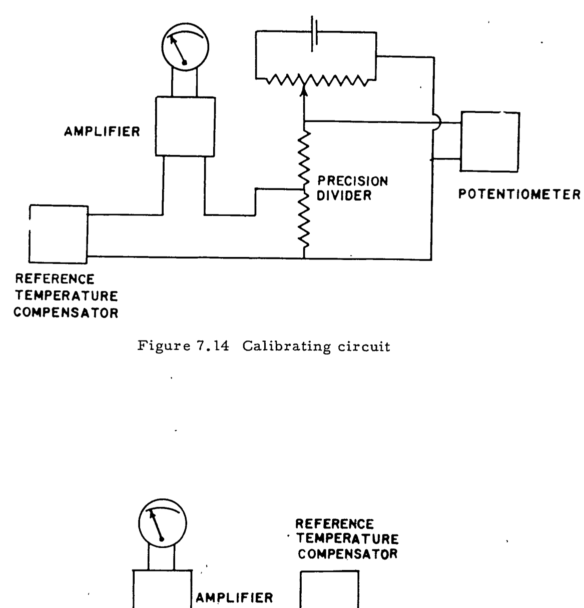

Figure 7.14 Calibrating circuit

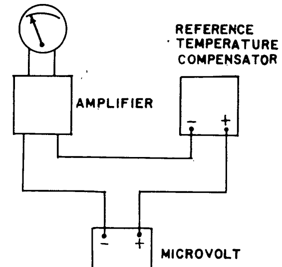

Figure 7.15 Amplifier calibrating circuit

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The emf temperature characteristic of the No. 36 B&S gauge copper-constantan thermocouple wire had been established to be virtually the same as that of the No. 16 B&S gauge thermocouple wire by the Leeds and Northrup Company. This was verified by experimentation. A series circuit was constructed from lengths of No. 16 B&S gauge copper wire, No. 16 B&S gauge constantan wire, No. 36 B&S gauge copper wire, and No. 36 B&S gauge constantan wire.

Four junctions were formed: (1) No. 16 B&S gauge copper to No. 36 B&S gauge copper, (2) No. 36 B&S gauge copper to No. 36 B&S gauge constantan, (3) No. 36 B&S gauge constantan to No. 16 B&S gauge constantan and (4) No. 16 B&S gauge constantan to No. 16 B&S gauge copper. This circuit was connected to an amplifier-meter null detector. The No. 16 B&S gauge copper-constantan junction and the No. 36 B&S gauge copper-constantan junction were maintained at the same temperature by immersing them in a thermos flask filled with water. The No. 16 B&S gauge to No. 36 B&S gauge copper junction and constantan junction were heated separately. No thermoelectrical emf was obtained.

An overall statement of the accuracy of the temperature measurements cannot be made. The accuracy of the air temperature measurements is a function of the prevailing atmospheric conditions at the time the measurements were made. Errors inherent in thermal measurements further complicate an assessment of accuracy. It is possible, however, to designate the sources of error and to estimate, in some cases, the magnitude.

Absolute accuracy can be defined as the deviation of a measurement from true temperature. Relative accuracy can be defined as the deviation of a measured difference from true temperature difference. The significant errors in air temperature measurements are calibration error, radiation error, and sampling error.

The calibration of the thermocouple wire is the basis of the calibration of the temperature measuring system. The accuracy of the wire calibration is difficult to evaluate. However, the calibration was conducted with extreme care and several determinations of each measured value

showed the calibration to be reproducible. A conservative estimate of the error due to calibration inaccuracies is 0.05°C for an absolute measurement and 0.02°C for a relative measurement. Error caused by loss of calibration due to change in characteristics of the system components (in particular, a change in the emf temperature characteristic of the thermocouple wire) can be considered insignificant. A comparison of this wire calibration (conducted in April 1956) with a calibration conducted in May 1953 shows an average difference of 0.05°C. An unknown fraction (believed to be small) of this difference is probably due to a change in the emf temperature characteristic of the wire. Frequent checks of the amplifier calibration were made by the method illustrated in Figure 7.15 to insure no loss in accuracy due to this component.

Probably the most detrimental effect on the accuracy of the air temperature measurements was produced by radiative transfer at the measuring junctions. The magnitude of the radiation error is difficult to determine since it is a function of atmospheric conditions, time, height, and vertical distribution of wind velocity. In the daytime with a clear sky and low wind velocity this error would be greatest. All measured air temperatures would be higher than true air temperature. Air movement decreases the effect of radiation. The measurement nearest the ground would have the greatest error since the wind speed there is less than the wind speed aloft. At night with a clear sky the radiation error would produce measured temperatures lower than real, and variable with height and wind speed. Under cloudy and windy conditions, the radiation error would be less significant. Under isothermal conditions with zero net radiation at the surface, the radiation error would be completely absent. It is conceivable that the radiation error could be as high as 2°C; however, for most of the observations made at O'Neill it probably did not exceed 0.1°C.

A handy means of checking the relative accuracy of air temperature measurements independent of sampling error makes use of Nature's heat bath which exists with adiabatic thermal stratification. At these times, the thermocouples on the mast are exposed to the same constant potential temperature.* That is, since the potential temperature is constant throughout the depth of measurement, and over the time of measurement, no breath of air of different potential temperature can come along to introduce sampling error. Since meteorological sampling error is missing, only radiational error and calibration error remain.

Adiabatic thermal stratification near the ground occurs typically twice a day, shortly after sunrise and a while before sunset. However, these are also times of rapid heating in the morning and cooling in the afternoon, so that the length of time that adiabatic stratification exists may be very short. On some occasions the entire 16-meter depth of measurement will not be at uniform potential temperature at any one time. Adiabatic profiles may be caused at other times by high turbulence if the turbulent heat flux is relatively small.

Analyses were made of six adiabatic or nearly adiabatic air temperature profiles (20-minute periods) obtained during the 3-day observation period 6-9 August 1956. Profiles of mean temperature and mean potential temperature were plotted for each of the six runs (see Figures 7.16, 7.17, 7.18, 7.19, 7.20 and 7.21). It was assumed that the logarithmic profile equation holds:

$$\theta = \theta_o + n\Delta\theta ,$$

where $\Delta\theta$ does not vary with height in the lowest 16 meters. Logarithmic profiles were fitted-by-eye, and the standard error of mean potential temperature for the 20-minute period was estimated as 1.25 times the average deviation of the points from the fitted line. The values are given in Table 7.1. This standard error ranges from 0.0048°C to 0.031°C, with an average value of 0.020°C. Since some meteorological sampling

*More precisely, to the same value of $\theta = T + \frac{g}{C_p} z$ where z is measured from the surface of the ground.

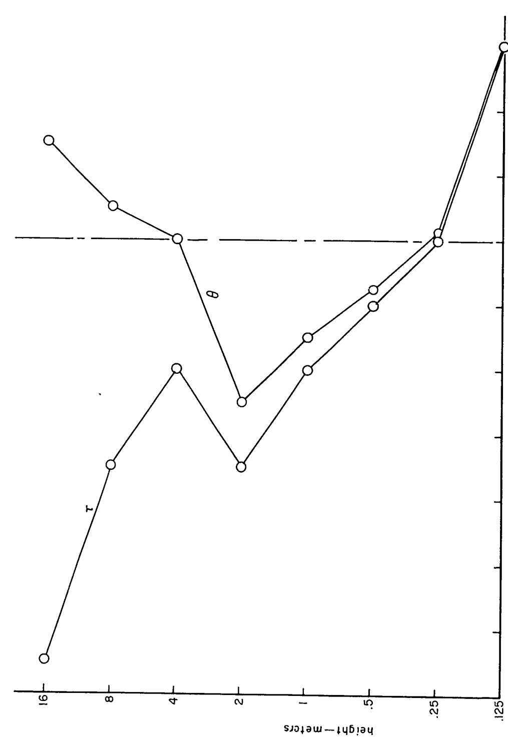

Figure 7.16 Twenty-minute profiles of temperature and potential temperature for conditions of nearly adiabatic stratification, 6 August 1956, 1805 CST

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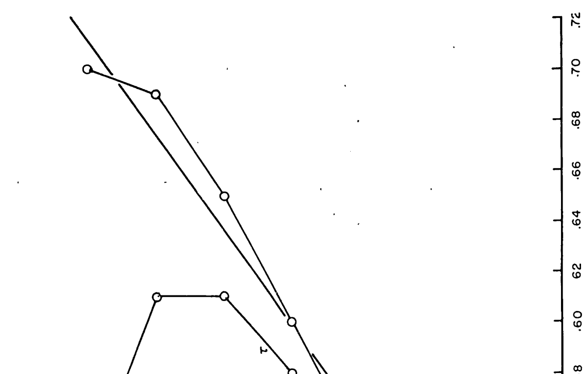

Figure 7.17 Twenty-minute profiles of temperature and potential temperature for conditions of nearly adiabatic stratification, 7 August 1956, 0305 CST

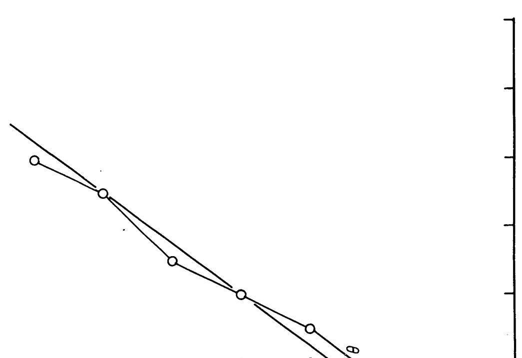

Figure 7.18 Twenty-minute profiles of temperature and potential temperature for conditions of nearly adiabatic stratification, 8 August 1956, 0205 CST

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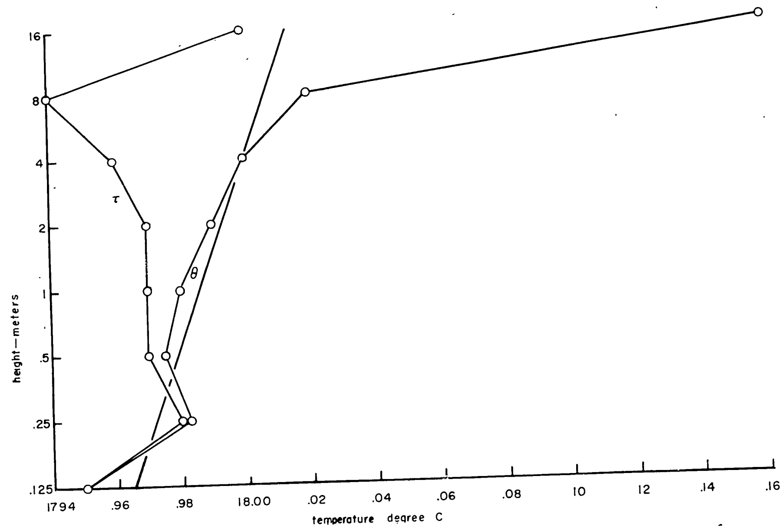

Figure 7.19 Twenty-minute profiles of temperature and potential temperature for conditions of nearly adiabatic stratification, 8 August 1956, 0805 CST

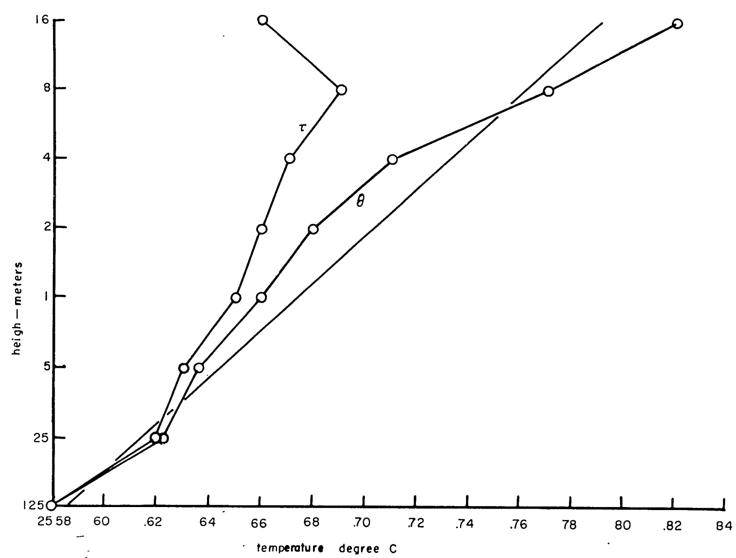

Figure 7.20 Twenty-minute profiles of temperature and potential temperature for conditions of nearly adiabatic stratification, 8 August 1956, 1905 CST

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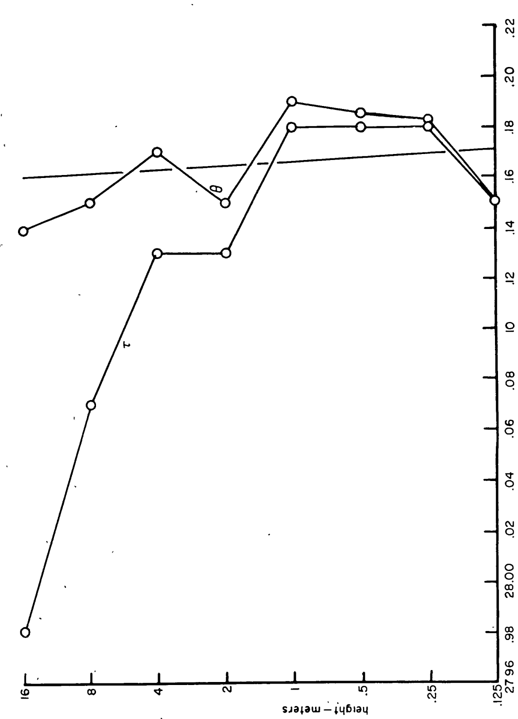

Figure 7.21 Twenty-minute profiles of temperature and potential temperature for conditions of nearly adiabatic stratification, 9 August 1956, 1705 CST

error still exists, and possibly a very small radiational error, these values are considered outside limits for the calibration standard error.

Table 7.1 Values of standard error of mean potential temperature

Date	Time	Type	$\Delta\theta$* (°C)	Wind Velocity Speed (cm/sec)	Dir (deg)	S.E.$_T$ (°C)	Remarks
6 Aug	1755-1805	Cooling	.00	537	160	.031	.1 Cs
7 Aug	0255-0315	Dynamic	.04	574	65	.016	.4 low cloud Was raining previous two hrs
8 Aug	0155-0205	Dynamic	.015	812	20	.0048	Thunderstorms to north last few hrs
8 Aug	0755-0805	Warming	.01	314	330	.030	Overcast Raining one hr. ago
8 Aug	1855-1905	Cooling	.03	527	0	.017	.2 Cu
9 Aug	1655-1705	Cooling	.002	416	30	.019	Huge thunderstorm to west, advancing on us for last 3 hrs

* $\Delta\theta = \frac{\partial\theta}{\partial n}$, where n ("number of doubled levels") is the logarithmic, non-dimensional height scale $n = \frac{\ln z/z_0}{\ln 2}$.

The importance of the meteorological sampling error still remaining can be appreciated by taking a closer look at the data for two of the runs: that of 0205 CST on 8 August, an ideal case, and that of 1805 CST on 6 August, a less than ideal case. The thing sought is the nature of trends during the 20-minute periods. To this end, simplified profiles of potential temperature for the first and last five minutes of each run were obtained. The data of the lowest two heights, middle two heights, and top two heights were combined, giving profiles of only three points. These profiles are plotted in Figures 7.22 and 7.23. The latter 20-minute profile was obtained when shelter-height temperature dropped 1.0°C in 15 minutes, and the potential temperature profile quickly passed from daytime type to nighttime type during the run.

On the other hand, the ideal 20-minute profile was obtained with high turbulent mixing and small, nearly constant, heat flux downward. The drop in shelter-height temperature was only 0.4°C in 15 minutes, and the slope of the potential temperature profiles changed very little during the run. Meteorological sampling error was therefore much less in this period of observation than in that of 1805 CST on 6 August 1956.

Errors in the 20-minute profiles of mean temperature due to sampling may be evaluated by simple statistical techniques. The magnitude of these errors is least (nearly zero) when thermal stratification is adiabatic. It is also usually small with calm conditions at night. These errors are greatest in the heat of the day when no steady breeze is blowing.

A computation was made to evaluate sampling error in the temperature profiles. Data are from the 1455-1515 observation period of 8 August. This was a time of strong solar heating (clear sky above, bank of cumulus clouds in the distant southeast) and "very light" winds from the southwest. In the computations, the standard deviations are in all cases estimated at 5/4 of the average deviation.

The standard deviation of the 20 temperature measurements at each height varied from 1.06 degrees (Z = 0.125 m) to 0.44 degrees (Z = 16 m). Since the serial correlation is negligible, the standard error of the mean temperature is $(1/20)^{1/2}$ times the standard deviation. The mean

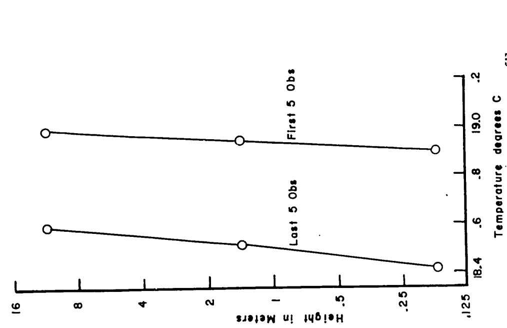

Figure 7.23 Temperature profile, 8 August 1956, 0205 CST

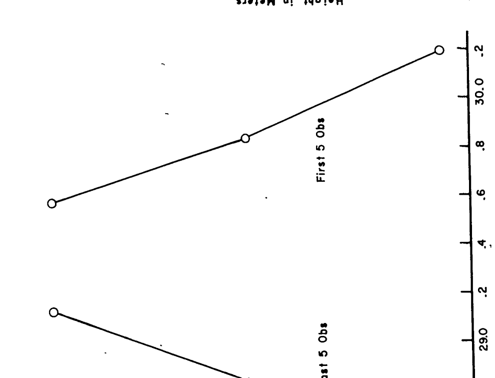

Figure 7.22 Temperature profile, 6 August 1956, 1805 CST

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temperatures at the various heights are found to have standard errors of 0.10 to 0.24 degrees. Figure 7.24 shows the profile of $\overline{T}$ plus or minus S.E.$_{\overline{T}}$ as a function of height.

The accuracy of mean temperature differences within the profile is increased by a small positive correlation between temperature observations at various heights. In this example, the difference in mean temperature at 1 m height and at all other heights is between 0.18 degrees and 0.24 degrees.

The means, standard deviations, and correlation coefficients are given in Table 7.2.

Table 7.2. Statistical measures of temperature

Height (Cm)	$\overline{T}$	σ_T	S.E.$_{\overline{T}}$	$\overline{T}_z-\overline{T}_{1m}$	$\sigma(T_z-T_{1m})$	$SE(\overline{T}_z-\overline{T}_{1m})$	*	$r(T_z, T_{1m})$
1600	28.86	0.44	0.10	-1.83	0.93	0.21	0.20	-.044
800	29.37	.57	.13	-1.32	.92	.21	.22	+.13
400	29.76	.75	.17	-0.93	.91	.20	.25	+.31
200	30.31	.68	.15	-0.38	.91	.20	.23	+.25
100	30.69	.80	.18					
50	31.40	.93	.21	+0.71	0.82	.18	.27	+.56
25	32.54	0.92	.21	+1.85	1.06	.24	.27	+.25
12	33.55	1.06	0.24	+2.86	1.03	0.23	0.30	+.41

* - Value that S.E.(T_z-T_{1m}) would have if correlation were zero.

$$\overline{T} = \frac{1}{N} \sum_{i=1}^{N} T_i$$

$$\sigma_T^{\,2} = \frac{1}{N} \sum_{i=1}^{N} (T_i-\overline{T})^2 \; ; \qquad \sigma_T = \frac{5}{4} \frac{1}{\sqrt{N}} \sum_{i=1}^{N} |T_i-\overline{T}|$$

$$S.E._{\overline{T}} = \frac{1}{\sqrt{N}} \sigma_T$$

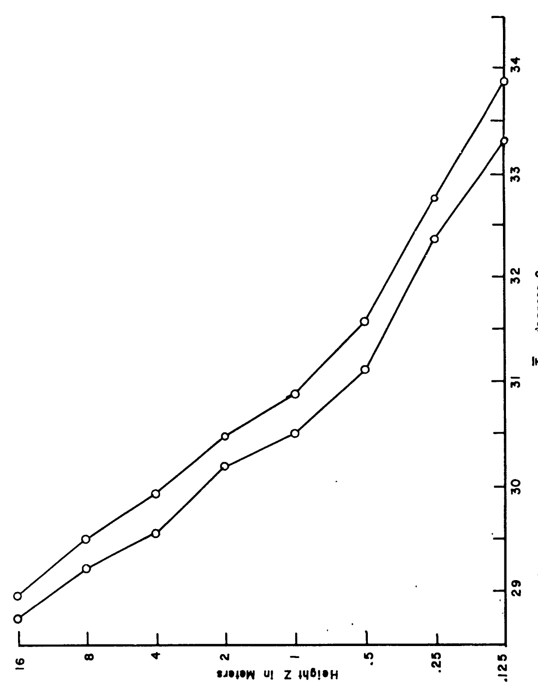

Figure 7.24 Mean temperature plus or minus its standard error, 8 August 1956, 1505 CST

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$$\sigma^2_{(T_z - T_{1m})} = \frac{1}{N}\sum_{i=1}^{N}\left[(T_z - T_{1m}) - (\bar{T}_z - \bar{T}_{1m})\right]^2$$

$$S.E._{(\bar{T}_z - \bar{T}_{1m})} = \frac{1}{\sqrt{N}}\,\sigma_{(T_z - T_{1m})}$$

$$\sigma^2_{(T_z - T_{1m})} = \sigma^2_{T_z} + \sigma^2_{T_{1m}} - 2r_{(T_z, T_{1m})}\sigma_{T_z}\sigma_{T_{1m}}$$

The accuracy of the soil temperature measurements is 0.05°C for absolute measurements and 0.02°C for relative measurements since the only significant error is that due to calibration inaccuracy.

Malfunctioning of the temperature measuring system could be easily recognized by observing the hourly change in temperature at the 1-meter depth in the soil. Large scale change or rapid fluctuations in this reading usually indicated shorts or leakage to ground, electric and magnetic field pickup, or component failures. Difficulties could also be recognized by reading the 1-meter soil temperature using two overlapping reference temperature compensator ranges.

7.3.5 Air Temperature Difference. The air temperature difference between the 1-meter and the 1/2-meter levels was measured by means of two radiation-shielded thermocouple junctions of the same type as that used for air temperature profile measurements. The two junctions were differentially connected and the output was recorded by a modulated-carrier-type d-c amplifier and an Esterline-Angus graphic ammeter.

A recording scale of -5° to +5°C was used; hence, the temperature at one level relative to the other was determined in addition to the temperature difference.

7.3.6 Vapor Pressure Profiles. The measurement of the amount of water vapor in the air was accomplished by means of an air sampling system and a dew-point hygrometer. During the 20-minute observation periods, air samples were obtained at each level as shown in Figure 7.3.

The dew point of each sample was then measured using a Thornthwaite automatic dew-point hygrometer.[6] The data reported are in units of vapor pressure (millibars) which were obtained by conversion of the measured data which were in terms of dew-point temperature (degrees Centigrade).

The air sampling system shown schematically in Figure 7.25 consisted of (a) polyethylene sampling tubes, (b) sample storage jugs, (c) sample selector valves, (d) a variable speed pump, and (e) a pump speed control. Polyethylene tubing having an inside diameter of 0.25-in. was used since this material is virtually non-hygroscopic. One gallon glass jugs were used as reservoirs for the air samples in order to obtain average samples(that is, samples which did not exhibit small scale fluctuations) simultaneously from all levels. The sample selector valves permitted extraction of the samples from the reservoirs for measurement. A modified vacuum cleaner was used as an air pump. The rate of pumping could be changed by varying the input voltage to the pump motor. Two pump speeds were used and were conveniently obtained by switching the motor input to full line voltage or to the voltage at a tap on an auto-transformer.

The dew-point hygrometer is shown in Figure 7.26. This is a condensation type hygrometer which utilizes a mirror surface on which moisture is caused to condense. By measuring the temperature of the mirror at the time of incipient condensation the dew point is obtained.

The instrument which was used consisted of (a) a mirror assembly, (b) a sample chamber, (c) a photoelectric dew-film detection system, (d) a dry-ice heat sink, (e) a control circuit, and (f) a radio frequency induction-heating unit. The mirror assembly was formed by copper foil chrome plated on one surface and soldered to the end of a steel rod 0.25-in. in diameter which, in turn, was connected to a copper slug 1-inch in diameter and 5 inches long. The chrome surface served as the mirror and a copper-constantan thermocouple junction was held in contact with the under or copper surface by a second piece of copper foil. This junction

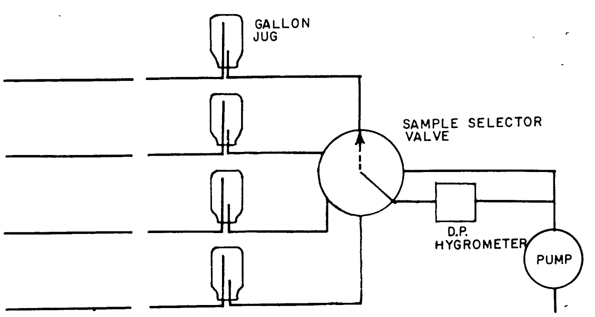

Figure 7.25 Air sampling system

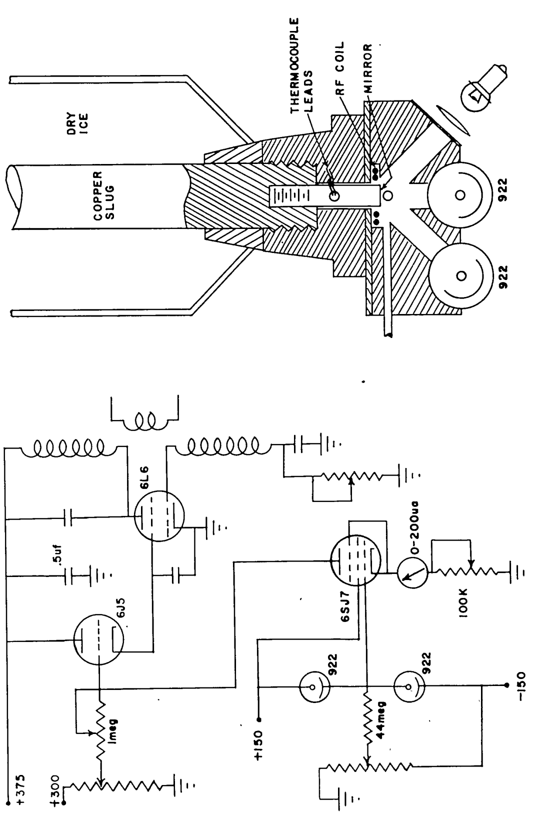

Figure 7.26 Dew point hygrometer

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was connected to the temperature measuring system (see Figure 7.7). The thermocouple wire was the same type, No. 36 B&S gauge, as that used for the air temperature measuring junctions.

The copper slug of the mirror assembly was inserted in a thermos flask filled with crushed dry ice and the steel mirror stem was inserted in a hole in the sample chamber. A radio frequency induction heating coil concentric with the hole in the sample chamber then encircled the steel mirror stem. The sample chamber was a hollow, airtight, plastic block with air sample intake and exhaust ports, windows for two photocells, and a window for the admission of a light beam.

The photoelectric dew-film detection system was connected to an amplifier (control circuit) which, in turn, controlled a radio frequency oscillator (R-F induction heating unit).

In operation the mirror surface was cooled by the dry ice and heated by the R-F induction heater. By controlling the heating, the mirror temperature could be varied. Three heat controls were available: (1) a quick-heat button, (2) a manual control, and (3) an automatic control. By manually depressing the quick-heat button, rapid heating of the mirror was obtained. The manual control enabled the operator to vary the mirror temperature to obtain a dew-film of proper thickness. The automatic control was provided by the photoelectric dew-film detection system. Light which was incident at an angle of 45 degrees on the mirror was reflected to one photocell. A second photocell positioned directly below the mirror surface (that is, on a line normal to the mirror surface) received scattered light when a dew-film was present. An increase in dew-film thickness caused a decrease in reflected light and an increase in scattered light. This change was sensed by the photocells which produced a control voltage causing an increase in R-F induction heating. Conversely a decrease in dew-film thickness was sensed and the heat supply to the mirror decreased. In this way the automatic control aided the operator in maintaining a constant dew-film thickness on the mirror.

In addition to providing automatic control, the photoelectric dew-film detection system produced a meter indication of dew-film thickness. The dew-film thickness meter permitted establishing a standard dew-film thickness for all measurements.

The following procedure was used for measuring dew-point profiles. With the sample selector valves set in the simultaneous sample position and the pump set for high speed, air samples were drawn into the storage jugs. The pump was set for low speed and the valves were set so that air which was a mixture of all the samples was passed through the sample chamber. In this way an initial setting of the manual control was made to produce a dew-film and the proper reference temperature compensator range setting was determined for the temperature measuring system. The quick-heat button was then depressed to clear the dew-film from the mirror and the zero or clear mirror reading of the dew-film thickness meter was checked. Valve settings were made for selection of the first sample. The pump was operated at high speed for 3 to 5 seconds to scavenge the sample chamber and connecting tubes of the initial air. With the pump operating at low speed, the manual control was set to produce a dew-film of the proper thickness as indicated by the dew-film thickness meter. The temperature of the mirror was then read by means of the temperature measuring system. The second sample was selected and the first sample scavenged by operating the pump at high speed. The process was then repeated. Slow speed operation of the pump during the measuring period was necessary to prevent depletion of the air sample and mechanical disturbance of the dew-film by the air passing over its surface.

Because of the number of manual adjustments and switch settings, and complexity of the procedure, considerable skill was required of the operator in measuring dew-point profiles.

Prior to Project Prairie Grass, the dew-point hygrometer was calibrated by an air saturating chamber as shown in Figure 7.27. The chamber was formed by two sheet-copper boxes one within the other

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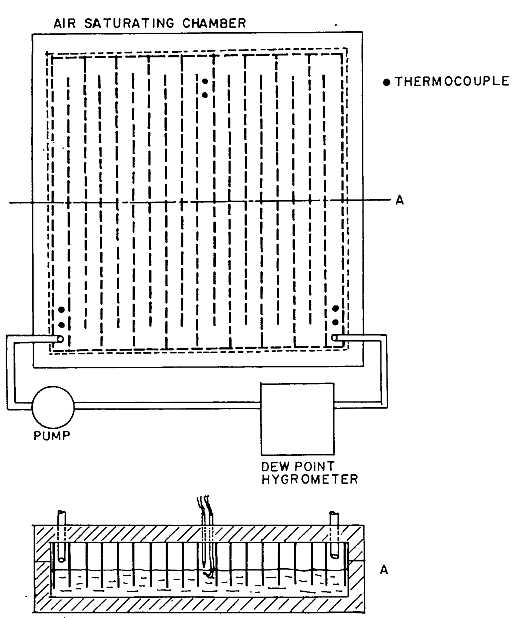

Figure 7.27 Air saturating chamber

and separated by insulating material 1-inch thick. The box was constructed in two sections to permit access to the chamber. The bottom section formed a pan 18 inches by 18 inches by 1.5 inches deep. The top section contained a labyrinth of baffle plates. The pan formed by the top section was 1.5 inches deep and the baffle plates were 2 inches in width. The bottom section was filled with distilled water and the top section was positioned in such a way that the lower edges of the baffle plates were immersed to a depth of 0.5 inches. In this way an enclosed and baffled air space 1.5 inches high was formed over the water surface. Glass tubing inserted through the top section of the chamber provided intake and exhaust ports. Air entering the chamber was confined to a path formed by the baffle plates. Between the intake and exhaust ports, the air path length was 27 feet. The air temperature and water temperature were measured by means of copper-constantan thermocouple junctions at three stations along the air path: at the intake port, at the exhaust port, and at the midpoint of the air path. The dew-point hygrometer, a pump, and the chamber were connected in a closed circuit by means of polyethylene tubing. The pump circulated air through the chamber and dew-point hygrometer at a speed sufficiently high to produce turbulent flow in the saturating chamber. The difference between air and water temperature at each station was observed. A condition of temperature equilibrium between air and water was used as an indication of saturation. The temperature at which saturation occurred was then taken as the actual dew point of the air. The condensation temperature or dew point as indicated by the dew-point hygrometer when operating with various dew-film thicknesses was compared with the saturation temperature. By repeated tests a dew-film thickness was established which produced agreement of saturation temperature and dew point as indicated by the dew-point hygrometer. To prevent condensation from occurring in the connecting polyethylene tubes which were virtually at room temperature, saturation temperatures less than room temperature were used. This was accomplished by using water in the chamber having a temperature a few degrees below that of the room.

The accuracy of the dew-point measurements is at best equal to the accuracy of the calibration of the temperature measuring system. In addition there are sampling errors, and small random errors introduced in setting the dew-film thickness. Sampling errors are difficult to evaluate but are suspected to exist when a smooth profile is not obtained. Excluding sampling errors, absolute measurements are probably accurate to 0.06°C and relative measurements are probably accurate to 0.03°C.

Malfunctioning of the dew-point hygrometer was readily recognized by observing the behavior of the dew-film thickness meter. The presence of water in the sampling tubes could be detected by the behavior of the instrument and by readings of dew point which were greater than ambient temperature. Water in the sampling tubes sometimes occurred as a result of rain, fog or an inversion under humid conditions. The sampling tubes were necessarily cleared of water before resuming measurements. During the observation periods, moisture measurements were made by means of a sling psychrometer. These measurements were used as a check for gross error in the dew-point system.

7.3.7 Wind Profiles. Wind profiles were measured by a set of matched three-cup anemometers. Nineteen Rikoken* anemometers were modified, compared, and grouped in sets of seven matched units.

When received from the manufacturer, the Rikoken anemometers were equipped with gear trains and contact systems for counting the turns of the cups. The modification consisted of replacing the gear train and contact system with a photoelectric counting system. The latter system utilized a cadmium sulfide photoconductive cell and a No. 51 light bulb. The light reflected to the photocell by the mirror was interrupted by a shutter blade connected to the shaft which was turned by the cup assembly. In this way the photocell was illuminated and shaded once for each revolution of the cup assembly. The photoelectric counting system had several advantages not afforded by the gear train and contact system: (a) Friction due to the gear train and contacts was eliminated by use of the photoelectric system. Since this was the major portion of the friction in the instrument, its elimination resulted in lower starting speed. Also, the magnitude of this portion of the friction was not the same in each anemometer so its absence tended to make the anemometer characteristics more nearly alike. (b) The resolution (counts per revolution or counts per meter of air passage) obtained by using a photoelectric system which counted each revolution of the anemometer cups was 6.9 times as large as that provided by the gear train and contact system. Since the anemometer output was in digital or pulse form and was recorded by means of a digital counter (step function integrator), wind measurements having a resolution commensurate with accuracy could be obtained for a shorter time interval using the photoelectric system than by using the gear train and contact system. (c) Gear train and contact systems often produce spurious counts caused by contact bounce and intermittent conduction at the instant of make or break. The photoelectric system produced no spurious counts. (d) Contacts become pitted with use requiring that they be burnished or replaced. The photoelectric system required little and infrequent maintenance.

A unit having 8 counting channels (one for each anemometer and one spare) was used to register the number of revolutions of the anemometers. The circuit of a counting channel is shown in Figure 7.28. The circuit consists of a pulse-shaping stage, three bi-stable multivi-

*Manufactured by the Sanoya Iron Works,
1064 Nakata-machi, Kanuma-shi
Tochigi-ken, Japan

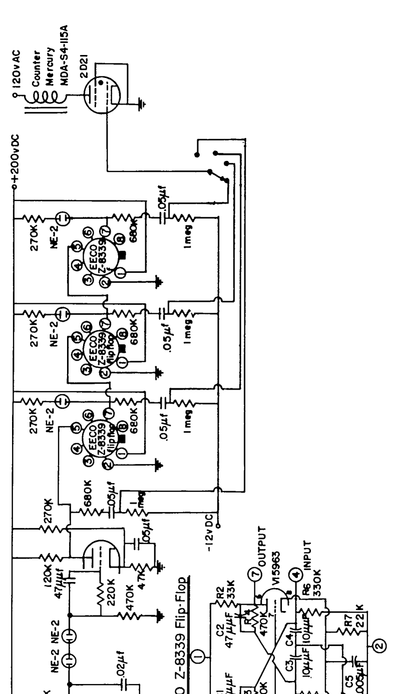

Figure 7.28 Counting circuit

brators, and a thyratron-driven electromechanical counter. Input pulses from the anemometer were converted to short rise time rectangular pulses. The output of the pulse-shaping stage was then fed to the three bistable multivibrators which were connected as a binary frequency divider. By means of a selector switch, the thyratron driven electromechanical counter could be connected to the output of the pulse-shaping stage or the output of any multivibrator. In this way the electromechanical counter was caused to register either each, every other, every fourth, or every eighth revolution of the anemometer. The electromechanical counter (mercury four-digit reset type) was rated at 10 counts per second. Since the anemometer speed could exceed this rate, the binary frequency divider was employed. In addition to enabling the counting circuit to accommodate a maximum input rate of 80 counts per second, the binary frequency divider reduced wear of the electromechanical counter when wind measurements were made which did not require the maximum available resolution.

The counting unit was constructed in three assemblies. The electronic portion of the counting channels was built on a single chassis. The threshold controls and count-down (frequency division) selector switches were located on this chassis. Two banks of electromechanical counters, a counter start-stop switch and a bank selector switch were mounted on a panel. One bank of counters could be read and reset while the other was registering counts. In this way successive profile measurements could be made without loss of data during the reading and reset periods. The power supply for the system was contained on a single chassis.

Prior to Project Prairie Grass, the anemometers were matched by means of a whirling device having four horizontal arms each eight feet long.[7] The anemometers were matched at O'Neill by mounting them at the same level on a horizontal support approximately two meters above the ground in an open field as far as possible from obstructions.[1] The support could accommodate 10 anemometers

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having a horizontal spacing of approximately 1 foot.

An anemometer which was representative of the matched set was selected as a standard and its calibration was determined. This anemometer was calibrated in a wind tunnel* against a pitot tube which had been calibrated by the Bureau of Standards. Several trial calibrations were run to investigate the characteristics of the calibrating procedure and equipment. Four independent calibrations were then made and the average was taken as the true calibration. A check of this calibration was made using a different procedure and different calibrating apparatus.** The calibrating apparatus consisted of an airtight room (located in the laboratory building) having an air intake nozzle (9-inch throat diameter) in one wall and a volumetric flow rate-measuring exhaust nozzle in the opposite wall. By measuring the rate of flow out of the airtight room, the speed of the air entering the room through the intake nozzle could be determined. The anemometer was placed in the throat of the intake nozzle and its calibration determined. In the velocity range of 1 to 4.5 meters per second this calibration was virtually the same as the previous calibration. At higher velocities a difference was obtained. The calibrations differed by 2 percent at 5 meters per second and increased to 8 percent at 15 meters per second. A pitot tube was recognized to be most accurate at high velocities. The second calibrating technique was recognized to have an accuracy deficiency at high velocities. Both calibration techniques were unsatisfactory at velocities less than 1 meter per second since the air flow could not be maintained constant and the zero error and drift of the manometers became large compared to their readings. The calibration using the pitot tube, therefore, was accepted for the velocity

*Massachusetts Institute of Technology portable wind tunnel at O'Neill, Nebraska.

**This calibration was performed at the Fan Test Laboratory, Engineering Experiment Station, Texas A&M campus, October 1956.

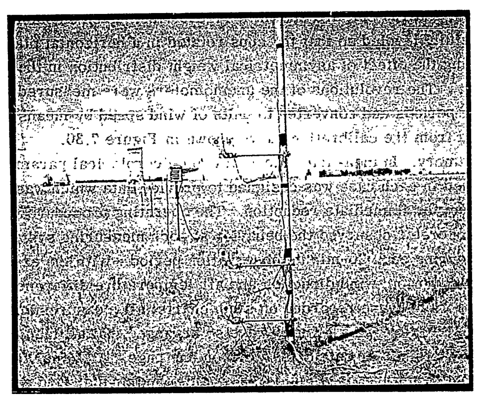

Figure 7.29 View of Rikoken anemometers installed at heights of 25, 50, and 100 cm

range of 1 to 15 meters per second. A third method was employed to obtain a calibration point at a velocity less than 1 meter per second. Under conditions of steady low velocity, virtually laminar flow at a height of 0.5 meters in the atmosphere* the wind velocity was measured by observing the time required for smoke from a cigarette to travel a measured distance, and the corresponding anemometer indication was obtained.

In measuring wind profiles, the anemometers were installed at the heights shown in Figure 7.3. The three lowest anemometers,

*These conditions existed at 2100 CST, 22 July 1956 at O'Neill.

those at 25, 50, and 100 cm, are shown in Figure 7.29. Each anemometer was carefully leveled so that the cups rotated in a horizontal plane thus minimizing the effect of asymmetrical weight distribution in the cup assembly.[1] The revolutions of the anemometers were measured for 20-minute periods and converted to units of wind speed by means of tables derived from the calibration curve shown in Figure 7.30.

7.3.8 Summary. In measuring these micrometeorological parameters, the method used in each case was designed to provide data which was in a convenient form for immediate reduction. The operating procedure was such that the operator observed the behavior of each measuring system at least once during each 20-minute observation period. With the exception of the radiation, wind direction and air temperature difference measurements which were recorded on strip charts, all measurements were recorded on data forms. These were so arranged that all tabulations and computations per data class were on one page. All computations were made from prepared tables, slide rule, and or standard desk calculator. This enabled the operator to reduce the data immediately after the measurements were made; hence, gross errors due to malfunctioning of the measuring equipment were noted and remedial action could be taken before measurements were resumed.

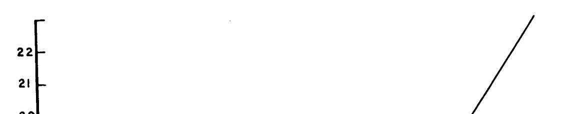

Figure 7.30 Anemometer calibration curve

REFERENCES

1. Halstead, M. H., "The Measurement of Wind Profiles." Publications in Climatology 7, No. 2, The Johns Hopkins University Laboratory of Climatology, Seabrook, New Jersey, 1954.

2. Portman, D. J., "The Measurement of Air Temperature Profiles." Publications in Climatology 7, No. 2, The Johns Hopkins University Laboratory of Climatology, Seabrook, New Jersey, 1954.

3. ___________, "The Measurement of Radiation." ibid.

4. ___________, "The Measurement of Temperature and Heat Transfer in the Soil." ibid.

5. Superior, W. J., "The Mobile Micrometeorological Station." Publications in Climatology 7, No. 2, The Johns Hopkins University Laboratory of Climatology, Seabrook, New Jersey, 1954.

6. Thornthwaite, C. W. and C. Beenhouwer, "The Measurement of Humidity Profiles." Publications in Climatology 7, No. 2, The Johns Hopkins University Laboratory of Climatology, Seabrook, New Jersey, 1954.

7. Thornthwaite, C. W., et al., "Micrometeorology of the Surface Layer of the Atmosphere." The Johns Hopkins University Laboratory of Climatology, Interim Report 10, 6, 1950.

8. Thornthwaite, C. W., et al., "Micrometeorology of the Surface Layer of the Atmosphere." The Johns Hopkins University Laboratory of Climatology, Interim Report 13, 4, 1951.

CHAPTER 8

MICROMETEOROLOGICAL DATA COLLECTED BY TEXAS A&M

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Texas A&M Research Foundation

This section contains three groups of data collected during Project Prairie Grass. In the first group (Table 8.1) are micrometeorological data collected during the 68 regular and the two special gas releases. These observations covered a period of 20 minutes each, starting 5 minutes before and ending 5 minutes after the 10-minute period during which the gas was released.

The second group (Table 8.2) includes similar observations, but at times other than the 70 gas release times. 177 observational periods are included in this group.

The third group (Table 8.3) contains soil moisture and soil density data on four days during July and August.

*Present affiliation: U. S. Navy Electronics Laboratory

Table 8.1

HOURLY OBSERVATIONS						O'NEILL, NEBRASKA
GAS RELEASE NO.	1	2	3	4	5	6
JULY (1956)	3	3	5	6	6	6
CST	1105	1505	2205	0105	1405	1705
RADIATION (cal/cm²sec)						
Insolation	.0080	.0048	--	--	.0205	.0120
Reflected	---	--	--	--	--	--
Net Radiation	.0050	.0029	-.0013	-.0010	.0145	.0060
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	--	--	--	--	--	--
8.00	21.68	23.78	22.41	20.09	29.18	30.19
4.00	21.90	23.79	21.12	18.55	29.72	30.50
2.00	22.12	23.87	19.83	17.50	30.17	30.80
1.00	22.32	23.99	18.45	16.75	30.71	31.09
.50	22.95	24.18	17.24	16.00	31.44	31.32
.25	23.22	24.54	16.89	15.63	32.05	31.63
.12	23.84	24.85	16.55	15.33	--	31.82
-.03	24.06	25.39	--	--	--	--
-.06	23.11	24.63	--	--	--	--
-.12	21.71	23.20	--	--	--	--
-.25	21.61	21.58	--	--	--	--
-.50	20.53	20.38	--	--	--	--
-1.00	18 21	18.18	--	--	--	--
VAPOR PRESSURE (mb)						
16.00	--	--	--	--	--	--
8.00	18.43	18.62	18.34	16.43	17.19	16.53
4.00	18 73	18.73	18.44	16.52	17.39	16.64
2.00	18.86	18.88	18.46	16.53	17.73	16.88
1.00	19.04	19.10	18.58	16.58	18.11	17.07
.50	19.51	19.38	18.58	16.64	18.46	17.24
.25	--	19.77	18.49	16.65	18.73	17.30
.12	19.95	20.21	18.96	17.29	19.27	17.41
WIND SPEED (cm/sec)						
16.00	--	--	--	--	--	--
8.00	321	233	211	304	703	846
4.00	289	216	113	202	651	765
2.00	258	190	44	129	593	680
1.00	239	174	66	91	515	599
.50	206	154	39	52	448	523
.25	173	122	16	17	378	439
WIND DIRECTION (deg)						
1.00	150	100	150	200	160	180
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	--	1450	--	--	--	--
Run Time (min)	--	29	--	--	--	--
-.03	--	-.10	--	--	--	--
-.06	--	00	--	--	--	--
-.12	--	.11	--	--	--	--
-.25	--	.03	--	--	--	--
-.50	--	-.02	--	--	--	--
-1.00	--	-.01	--	--	--	--
Precipitation (cm)	--	--	--	--	--	--

Table 8.1 (Continued)

HOURLY OBSERVATIONS						O'NEILL, NEBRASKA
GAS RELEASE NO.	7	8	9	10	11	12
JULY (1956)	10	10	11	11	14	14
CST	1405	1705	1005	1205	0805	1005
RADIATION (cal/cm²sec)						
Insolation	.0212	.0115	.0180	.0200	.0105	.0185
Reflected	.0039	.0023	.0035	.0040	--	--
Net Radiation	.0128	.0057	.0114	.0128	.0060	.0117
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	28.71	29.90	25.76	28.42	--	--
8.00	29.04	30.15	26.25	28.98	24.16	28.83
4.00	29.46	30.57	26.61	29.58	24.64	29.25
2.00	30.27	31.10	27 39	30.45	25.01	29.67
1.00	31.21	31.47	28.19	31.47	25.42	30.53
.50	31.99	32.01	28.75	32.11	25.92	31.18
.25	33.10	32.58	29.53	33.14	26.34	31.94
.12	34.23	33.06	29.82	33.78	26.68	32.65
-.03	34.90	33.74	26.64	31.79	24.23	28.86
-.06	30.53	31.77	24.48	27.91	23.46	25.98
-.12	24.23	26.77	23.14	23.93	24.25	24.16
-.25	21.11	21.84	22.47	22.27	24.14	23.65
-.50	20.03	19.99	20.42	20.34	21.49	21.34
-1.00	18.22	18.22	18.28	18.20	18.75	18.68
VAPOR PRESSURE (mb)						
16.00	12.06	13.16	20.60	22.84	--	--
8.00	12.97	13.87	20.88	23.10	--	--
4.00	13.02	13.72	20.92	23.14	--	--
2.00	13.05	13.75	21.10	23.27	--	--
1.00	13.18	13.85	21.14	23.40	--	--
.50	13.50	13.98	21.20	23.43	--	--
.25	13.85	14.16	21.39	23.59	--	--
.12	14.15	14.32	21.92	23.62	--	--
WIND SPEED (cm/sec)						
16.00	560	611	884	579	--	--
8.00	508	540	842	536	944	973
4.00	481	498	769	506	850	892
2.00	444	452	700	468	761	799
1.00	402	406	611	415	677	721
.50	352	350	533	376	579	617
.25	295	288	450	312	490	522
WIND DIRECTION (deg)						
1.00	204	171	199	200	185	175
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1351	1651	0950	1150	0750	0950
Run Time (min)	27	26	16	26	28	27
-.03	-1.80	-.76	1.01	.79	.80	.23
-.06	.53	-.29	.59	.70	-.16	.72
-.12	.53	.20	.06	.23	-.08	.10
-.25	.07	.13	-.08	-.03	-.11	-.08
-.50	00	-.03	-.01	-.01	-.03	-.01
-1.00	00	00	-.01	00	-.01	-.01
Precipitation (cm)	--	--	--	--	--	--

Table 8.1 (Continued)

HOURLY OBSERVATIONS						O'NEILL, NEBRASKA
GAS RELEASE NO.	13	14	15	16	17	18
JULY (1956)	22	22	23	23	23	23
CST	2005	2205	0805	1005	2005	2205
RADIATION (cal/cm²sec)						
Insolation	.0001	.0000	.0101	.0183	.0001	.0000
Reflected	--	--	--	--	--	--
Net Radiation	-.0011	-.0010	.0050	.0100	-.0011	-.0014
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	22.34	21.04	20.32	24.61	27.91	25.11
8.00	21.64	19.76	20.51	24.82	27.83	24.30
4.00	21.04	17.87	20.78	25.10	27.62	23.83
2.00	20.39	16.25	21.44	25.61	27.44	23.52
1.00	19.56	15.31	22.05	26.67	27.32	23.23
.50	18.72	14.66	22.58	27.79	27.19	23.03
.25	18.15	14.31	23.32	28.64	27.08	22.83
.12	17.76	13.99	23.95	29.63	27.00	22.66
-.03	26.48	23.10	20.75	26.71	29.49	26.39
-.06	27.02	24.62	20.48	23.55	29.53	27.08
-.12	25.50	24.95	21.44	21.62	27.26	26.51
-.25	22.17	22.60	22.12	21.79	22.96	23.20
-.50	20.36	20.48	20.72	20.68	20.32	20.28
-1.00	18.95	19.02	19.04	18.99	18.54	18.62
VAPOR PRESSURE (mb)						
16.00	16.13	14.91	17.19	17.66	--	--
8.00	16.47	14.20	17.39	18.14	--	--
4.00	16.74	14.21	17.41	18.21	--	--
2.00	16.60	14.20	17.43	18.30	--	--
1.00	16.02	14.25	17.52	18.40	--	--
.50	15.86	14.27	17.63	18.57	--	--
.25	15.71	14.32	17.65	18.81	--	--
.12	15.71	14.99	17.77	19.08	--	--
WIND SPEED (cm/sec)						
16.00	343	445	--	378	555	656
8.00	264	348	378	362	455	488
4.00	198	225	354	346	402	375
2.00	146	139	322	331	341	322
1.00	92	74	290	296	287	268
.50	46	41	261	265	237	229
.25	18	16	215	225	209	186
WIND DIRECTION (deg)						
1.00	--	--	193	202	172	188
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1952	2150	0752	0950	1950	2155
Run Time (min)	25	30	24	27	26	22
-.03	-1.08	-.68	.79	1.54	-.76	-.83
-.06	-.63	-.60	.32	.92	-.59	-.70
-.12	-.07	-.18	-.04	.17	-.10	-.25
-.25	.04	.04	-.04	-.02	.05	-.07
-.50	-.05	.04	00	.01	00	-.04
-1.00	-.04	.02	00	-.02	00	-.01
Precipitation (cm)	--	--	--	--	--	--

Table 8.1 (Continued)

HOURLY OBSERVATIONS						O'NEILL, NEBRASKA
GAS RELEASE NO.	19	20	21	22	23	24
JULY (1956)	25	25	25	26	29	29
CST	1105	1305	2205	0005	2105	2305
RADIATION (cal/cm²sec)						
Insolation	.0140	.0218	--	--	--	--
Reflected	.00290	.00415	--	--	--	--
Net Radiation	.0081	.0137	-.0009	-.0014	-.0014	-.00115
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	27.26	30.14	28.91	26.75	23.62	22.07
8.00	27.77	30.88	28.84	26.70	23 52	21.99
4.00	28.04	31.87	28.74	26.60	23.49	21.96
2.00	28.59	32.49	28.60	26.42	23.40	21.89
1.00	29.28	33.34	28.50	26.32	23.31	21.83
.50	29.75	34.31	28.42	26.22	23.21	21.74
.25	30.56	35.16	28.32	26.05	23.11	21.71
.12	31.06	35.98	28.19	25.93	23.04	21.63
-.03	28.52	33.60	27.70	26.32	27.92	25.85
-.06	24.91	28.89	27.65	26.57	28.14	26.38
-.12	22.80	23.92	26 76	26.11	26 83	26.16
-.25	22.74	22.56	23.90	24.06	23 98	24.10
-.50	21.21	21.12	21.14	21.17	21.63	21.65
-1.00	19.00	18.94	19.04	19.08	19.62	19.62
VAPOR PRESSURE (mb)						
16.00	14.91	14.19	14.56	15.81	--	--
8.00	15.22	14.33	14.65	15.87	--	--
4.00	15.24	14 39	14.66	15.81	--	--
2.00	15.30	14.41	14.60	15.82	--	--
1.00	15.41	14.47	14.62	15.80	20.7*	20.9*
.50	15.60	14.51	14.64	15.81	--	--
.25	15.60	14.57	14.65	15.77	--	--
.12	15.73	14.71	14.59	15.75	--	--
WIND SPEED (cm/sec)						
16.00	752	1211	859	1041	883	865
8.00	721	1130	772	933	784	764
4.00	627	1017	675	814	685	662
2.00	--	938	611	739	605	586
1.00	533	826	531	639	537	521
.50	475	727	462	557	471	461
.25	393	594	376	454	389	382
WIND DIRECTION (deg)						
1.00	162	168	167	170	132	146
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1050	1250	2154	2350	2050	2250
Run Time (min)	26	27	23	26	26	27
-.03	.91	.67	-.16	-.24	-.53	-.78
-.06	.96	.64	-.20	-.11	-.43	-.77
-.12	.13	.37	-.21	-.11	-.12	-.33
-.25	-.04	-.01	.02	.05	.06	-.12
-.50	-.02	-.01	-.01	00	00	00
-1.00	-.01	00	-.01	.01	00	-.03
Precipitation (cm)	--	--	--	--	--	--

* Sling Psychrometer

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Table 8.1 (Continued)

HOURLY OBSERVATIONS						O'NEILL, NEBRASKA
GAS RELEASE NO.	25	26	27	28	29	30
AUGUST (1956)	1	2	2	3	3	3
CST	1305	1205	1405	0005	0205	1305
RADIATION (cal/cm²sec)						
Insolation	.0092	.0180	.0183	--	--	.0202
Reflected	.00185	.00305	--	--	--	.00329
Net Radiation	.0052	.0126	.0123	--	-.0003	.0129
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	22.87	--	--	25.24	26.24	31.88
8.00	22.92	27.93	30.26	24.76	25.81	32.39
4.00	23.26	28.57	30.84	24.38	25.72	32.96
2.00	23.62	29 21	31.43	24.22	25.36	33.53
1.00	24.09	29.91	31.96	24.07	25.14	34.00
.50	24.77	30.42	32.62	23.92	24.78	34.73
.25	25.32	31.15	33.45	23.72	24.58	35.42
.12	25.72	31.74	34.25	23.53	24.33	36.10
-.03	27.41	27.41	29.97	23.68	22.92	33.29
-.06	25.32	25.42	27.84	24.64	23.78	30.50
-.12	22.91	22.96	23.93	25.25	24.60	25.03
-.25	22.50	22.34	22.31	23.74	23.68	22.94
-.50	21.73	21.38	21.31	21.58	21.52	21.58
-1.00	19.82	19.70	19 65	19.82	19.82	19.71
VAPOR PRESSURE (mb)						
16.00	--	--	--	--	--	18.67
8.00	22.57	22.43	21 72	--	--	19.27
4.00	22.40	22.69	21 86	--	--	19.48
2.00	22.63	23.02	22.02	--	--	19.74
1.00	--	23.40	22.29	--	--	20.07
.50	--	23.72	22 44	--	--	20.53
.25	23.28	23.92	22.57	--	--	20.65
.12	23.75	24.31	22.82	--	--	21.04
WIND SPEED (cm/sec)						
16.00	328	851	849	508	606	885
8.00	318	775	755	388	529	852
4.00	297	721	694	321	441	775
2.00	275	648	613	255	394	697
1.00	248	568	540	212	340	628
.50	221	511	483	177	296	540
.25	173	422	402	154	241	455
WIND DIRECTION (deg)						
1.00	183	171	176	167	208	196
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1252	1150	1350	2357	0150	1250
Run Time (min)	26	27	26	20	27	26
-.03	.04	1.35	1.10	-.51	-.21	.72
-.06	.21	1.09	.69	-.61	-.17	.74
-.12	.07	.14	.36	-.45	-.10	.02
-.25	-.04	-.06	.11	-.27	-.01	.05
-.50	-.03	-.07	.05	-.20	.02	00
-1.00	-.03	-.04	.06	-.31	00	.02
Precipitation (cm)	--	--	--	--	--	--

Table 8.1 (Continued)

HOURLY OBSERVATIONS							O'NEILL, NEBRASKA
GAS RELEASE NO.	31	32	33	34	35s	35	36
AUGUST (1956)	3	6	7	7	7	11	11
CST	1505	2005	1305	1505	2305	2135	2335
RADIATION (cal/cm²sec)							
Insolation	.0152	.0000	.0164	.0174	--	--	--
Reflected	.00264	--	--	--	--	--	--
Net Radiation	.0092	-.0013	.0109	.0113	-.0007	-.00091	-.00085
AIR and SOIL TEMPERATURES (°C)							
Height (m)							
16.00	33.23	27.21	21.71	29.09	23.03	23.57	20.74
8.00	33.44	25.33	27.88	29.21	22.68	22.30	19.81
4.00	33.79	23.71	28.16	29.68	22.47	21.04	19.32
2.00	34.25	22 93	28 73	30.19	22.28	19.73	18.94
1.00	34.85	22.45	29.16	30 99	22.17	19.13	18.63
.50	35.37	22.06	29 64	31.45	22 05	18.47	18.10
.25	35.81	21.66	30 07	32.13	21.94	18.34	18.19
.12	36 11	21 38	30.61	32.62	21 79	18.21	17.98
-.03	34.04	25 35	29.57	31 07	23 42	24.85	23.15
-.06	32.10	26.42	27.07	28.96	24.41	26.02	24.41
-.12	26.80	26.18	23.43	24.86	25.22	26.27	25.49
-.25	23.11	24.00	22.58	22.73	23.93	23.78	24.01
-.50	21 50	22.02	21 80	21.82	21 91	21.63	21.74
-1.00	19 69	19 94	19 89	19 93	20 08	19 99	20.08
VAPOR PRESSURE (mb)							
16.00	18.49	13 82	16.64	17.00	19.99	19 08	18 30
8.00	18.65	14.39	16 97	17.21	20 12	18.93	18.43
4.00	18 76	15.08	17.16	17.38	20.17	19.06	18.44
2.00	18 79	15.54	17 41	17.51	20.17	18 91	18 44
1.00	19 07	15.85	17 62	17.76	20.23	18.84	18.52
.50	19.20	16.01	17.77	17.97	20.27	19 32	18.83
.25	19.34	16 09	18.09	18.10	20.27	18.59	18.59
.12	19.33	16.12	18.36	18.28	20 33	18 59	18.83
WIND SPEED (cm/sec)							
16.00	1013	609	1063	1214	639	421	464
8.00	--	412	--	1128	520	318	342
4.00	887	288	848	1052	434	253	243
2.00	787	213	756	920	373	180	186
1.00	691	160	690	846	340	110	137
.50	617	136	580	706	281	88	116
.25	527	95	484	587	231	45	81
WIND DIRECTION (deg)							
1.00	204	168	171	140	164	97	154
SOIL TEMPERATURE CHANGE (°C)							
Initial Time	1450	1950	1250	1450	2255	2120	2320
Run Time (min)	28	27	27	28	21	26	30
-.03	-.06	-.70	.10	.14	-.38	- 47	-.35
-.06	.25	-.55	.64	.31	-.39	-.42	-.38
-.12	.25	-.09	.22	.25	-.19	-.12	-.23
-.25	.10	.05	-.12	.02	-.04	.12	00
-.50	00	.01	-.11	-.04	.05	.04	.01
-1.00	00	.01	-.08	-.03	-.04	.04	00
Precipitation (cm)	--	--	--	--	--	--	--

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Table 8.1 (Continued)

HOURLY OBSERVATIONS						O'NEILL, NEBRASKA
GAS RELEASE NO.	37	38	39	40	41	42
AUGUST (1956)	12	12	13	14	14	14
CST	0305	0505	2235	0035	0305	0505
RADIATION (cal/cm²sec)						
Insolation	--	--	--	--	--	--
Reflected	--	--	--	--	--	--
Net Radiation	-.00067	-.00085	-.00135	-.0014	-.00123	-.00192
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	21.02	20.07	23.68	21.91	21.63	21.92
8.00	20.90	19.93	22.39	21.11	20.82	21.68
4.00	20.79	19.84	21.28	20.69	20.43	21.61
2.00	20.65	19.82	20.47	20 29	20.20	21.49
1.00	20.55	19.65	20.01	19.96	20.03	21.30
.50	20.41	19.34	19.55	19.52	19.90	21.16
.25	20.33	19.48	19.35	19.29	19.62	21.03
.12	20.22	19.37	19.06	19.08	19.43	20.90
-.03	21.68	21.59	25.09	23.54	22 26	21.92
-.06	22.69	22.37	26:52	24.88	23.53	22.82
-.12	24.21	23.62	27 42	26.41	25.28	24.56
-.25	23.83	23.62	24.83	24.89	24.80	24.47
-.50	21.80	21.81	21.87	21.92	22.06	22.06
-1.00	20.08	20.05	20.03	20.02	20.09	22.03
VAPOR PRESSURE (mb)						
16.00	19.61	19.77	12.82	13.11	14.93	14.13
8.00	19.62	19.77	12.91	13.15	15.03	14.14
4.00	19.63	19.82	12.92	13.18	15.08	14.19
2.00	19.62	19.75	12.92	13.19	15.07	14.16
1.00	19.63	19.73	12.94	13.21	15.08	14.20
.50	20.11	20.00	12.95	13.22	15.08	14.23
.25	19.68	19.72	12.93	13.23	15.09	14.22
.12	19.84	19.73	12.99	13.31	15.09	14.23
WIND SPEED (cm/sec)						
16.00	726	679	542	486	671	828
8.00	608	585	419	343	550	751
4.00	528	504	291	250	435	673
2.00	459	428	229	208	369	594
1.00	400	370	169	158	316	527
.50	344	317	152	137	267	452
.25	281	258	112	99	216	380
WIND DIRECTION (deg)						
1.00	176	161	122	166	185	199
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	0250	0450	2220	0020	0250	0450
Run Time (min)	30	26	28	28	28	28
-.03	.06	-.12	-.46	-.27	-.10	-.05
-.06	-.13	-.09	-.45	-.30	-.18	.01
-.12	-.29	-.11	-.25	-.25	-.15	-.14
-.25	-.04	-.06	.02	-.04	-.03	-.06
-.50	00	-.01	00	.01	.01	.01
-1.00	-.01	-.01	-.02	00	.02	00
Precipitation (cm)	--	--	--	--	--	--

Table 8.1 (Continued)

HOURLY OBSERVATIONS								O'NEILL, NEBRASKA
GAS RELEASE NO.	43	44	45	46	47	48s	48s	48
AUGUST (1956)	15	15	15	15	20	20	20	21
CST	1205	1405	1705	1850	1005	1205	1255	0905
RADIATION (cal/cm²sec)								
Insolation	.0178	.0164	.00443	.00035	.0187	.0125	--	.0142
Reflected	.0030	.0028	.00080	--	.00313	.00215	--	.00253
Net Radiation	.0108	.0097	.0014	-.0014	.0108	.0070	--	.0081
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	31.63	33.92	34.59	33.12	16.81	18.55	19.29	17.18
8 00	32.09	34.37	34.75	33.01	17.10	18.77	19.71	17.70
4.00	32.60	34.73	34.91	32.90	17.47	19.04	20.11	18.05
2.00	33.05	35.43	35.04	32.74	17.73	19.45	20.72	18.40
1.00	34.17	36.06	35.28	32.57	18.46	19.91	21.31	18.96
.50	34.92	36.92	35.59	32.44	19.20	20.52	22.10	19.43
.25	35.76	37.69	35.82	32.32	20.13	21.12	23.15	19.97
.12	36.64	38.64	35.95	32.20	21.30	22.02	24.44	20.46
-.03	33.60	37.31	35.56	32.59	18.27	25.66	--	17.12
-.06	28.82	32.25	33.03	31.67	17.79	22.57	--	16.89
-.12	24.63	26.11	27.99	28.32	18.21	19.07	--	18.40
-.25	23.75	23.72	24.11	24.49	20.24	19.87	--	20.52
-.50	22.29	22.25	22.12	22.09	20.96	20.78	--	20.73
-1.00	20.13	20.11	20.08	20.05	20.28	20.13	--	20.04
VAPOR PRESSURE (mb)								
16.00	11.83	10.64	11.90	11.41	--	9.73	--	12.53
8.00	12.28	11.17	12.17	11.51	--	10.09	--	12.78
4.00	12.36	11.16	12.18	11.57	--	10.26	--	12.81
2.00	12.46	11.15	12.21	11.63	--	10.35	--	12.93
1.00	12.50	11.19	12.26	11.64	--	10.49	--	13.03
.50	12.61	11.30	12.31	11.64	--	10.58	--	13.17
.25	12.74	11.33	12.39	11.68	--	10.86	--	13.27
.12	12.95	11.41	12.34	11.70	--	11.33	--	13.38
WIND SPEED (cm/sec)								
16.00	641	760	788	787	394	356	376	1027
8.00	606	719	735	707	374	347	365	961
4.00	565	680	665	625	356	329	342	--
2.00	522	--	602	556	332	307	3.21	784
1.00	468	539	531	486	302	277	2.94	691
.50	411	468	460	428	270	249	2.96	606
.25	343	397	378	364	--	210	2.23	505
WIND DIRECTION (deg)								
1.00	168	156	153	134	--	216	--	189
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1150	1350	1650	1835	0950	1150	--	0850
Run Time (min)	27	28	26	27	26	28	--	27
-.03	.67	.21	-.57	-.77	1.87	.47	--	.96
-.06	.60	.52	-.25	-.40	.70	1.03	--	.52
-.12	.22	.36	.13	-.05	.03	.34	--	00
-.25	-.09	.03	.08	.05	.03	-.06	--	-.06
-.50	-.03	-.02	-.02	-.04	-.04	-.03	--	-.02
-1.00	-.02	-.01	00	-.07	-.04	-.01	--	-.02
Precipitation (cm)	--	--	--	--	--	--	--	--

Table 8.1 (Continued)

HOURLY OBSERVATIONS						O'NEILL, NEBRASKA
GAS RELEASE NO.	55	56	57	58	59	60
AUGUST (1956)	25	25	25	25	25	26
CST	0105	0305	1735	1935	2235	0035
RADIATION (cal/cm²sec)						
Insolation	--	--	.0054	--	--	--
Reflected	--	--	.00087	--	--	--
Net Radiation	-.0015	-.0014	+.0013	-.0013	-.0014	-.0014
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	17.17	15.88	33.54	29.50	26.61	26.49
8.00	17.08	15.70	33.76	28.49	25.34	26.17
4.00	16.90	15.47	33.91	27.16	24.31	25.91
2.00	16.75	15.29	34.11	23.64	23.60	25.75
1.00	16.65	15.15	34.19	25.64	23.13	25.49
.50	16.48	15.03	34 33	25.13	22.82	25.35
.25	16.37	14.91	34 52	24.82	22.58	25.14
.12	16.20	14.77	34.61	24.58	22.29	24.98
-.03	20.56	19.42	31 70	28.09	24.52	23.28
-.06	21.43	20.85	29.54	27.97	25.12	23.87
-.12	23.58	22.75	25.51	25.90	25.10	24.46
-.25	23.04	22.82	22.19	22.49	22.99	23.09
-.50	21.02	21.02	20.89	20.78	20.89	20.94
-1.00	19.71	19.68	19.46	19.51	19.59	19.60
VAPOR PRESSURE (mb)						
16.00	11 72	12.37	12.39	--	12.82	11.89
8.00	11.73	12 21	12 59	--	12.99	11.96
4.00	11.73	12.29	12.55	--	13.05	11.97
2.00	11.73	12.39	12.56	--	13.11	11.97
1.00	11.74	12.39	12.59	--	13.10	12.01
.50	11.73	12.36	12 61	--	13.14	12 04
.25	11.73	12 36	12.63	--	13.15	12.06
.12	11.72	12 30	12 65	--	13 15	12.08
WIND SPEED (cm/sec)						
16.00	830	704	989	572	628	723
8.00	755	619	879	433	462	595
4.00	679	546	824	311	342	533
2.00	594	475	720	224	261	457
1.00	517	415	642	165	202	404
.50	446	361	556	131	168	349
.25	374	299	469	103	134	294
WIND DIRECTION (deg)						
1.00	143	138	185	158	160	182
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	0050	0250	1722	1923	2227	0028
Run Time (min)	26	26	25	25	19	18
-.03	-.24	-.21	-.67	-.86	-.39	-.10
-.06	-.21	-.22	-.22	-.51	-.24	-.17
-.12	-.17	-.22	.16	-.03	-.13	-.13
-.25	-.01	-.04	.08	.11	.03	-.03
-.50	00	00	.01	.03	.01	00
-1.00	00	-.02	-.01	.02	.01	00
Precipitation (cm)	--	--	--	--	--	--

Table 8.1 (Continued)

HOURLY OBSERVATIONS						O'NEILL, NEBRASKA
GAS RELEASE NO.	49	50	51	52	53	54
AUGUST (1956)	21	21	21	24	24	24
CST	1105	1405	1535	1120	2005	2205
RADIATION (cal/cm²sec)						
Insolation	.0209	.0202	.0158	.0204	--	--
Reflected	.00303	.00309	.00259	.00289	--	--
Net Radiation	.0129	.0128	.0088	.0110	-.0015	-.0017
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	21.45	27.14	28.36	23.17	21.32	19.56
8.00	21.94	27.68	29.13	23.59	20.26	19.31
4.00	22.64	27.90	29.40	24.08	18.77	18.94
2.00	23.29	28.64	29.80	24.96	17.39	18.68
1.00	24.05	29.20	30.50	25 98	16.56	18.45
.50	25.00	30.05	31 07	26.74	15.76	18.25
.25	25.72	31.23	31.97	27.95	15.37	18.04
.12	26.38	31.95	32 52	29.19	14.90	17.89
-.03	22.77	29.55	30.45	27.56	25.07	22.48
-.06	20.34	26.18	27.78	23.69	26.32	23.92
-.12	18.86	21.20	22 45	21 12	25.65	24.88
-.25	20.15	19.99	20.12	21.57	22.66	22.96
-.50	20.60	20.45	20.34	20.91	20.82	20.60
-1.00	19.92	19.83	19.73	19.58	19.56	19.64
VAPOR PRESSURE (mb)						
16.00	14.03	14.09	12.94	9.22	10.64	11.40
8.00	13.84	14 35	13 21	10.72	10.79	11 42
4.00	13.77	14.39	13 23	10 69	10.75	11.42
2.00	13.60	14.49	13.34	10.79	10 74	11.40
1.00	13.47	14.58	13.53	11 19	10.78	11.42
.50	13.29	14.68	13.57	11.10	10.86	11 41
.25	13.20	14.75	13.66	11.21	10 84	11.39
.12	12.87	14.93	13.92	11.49	10.84	11.42
WIND SPEED (cm/sec)						
16.00	868	819	869	521	594	641
8.00	802	796	804	508	446	537
4.00	752	764	766	496	320	464
2.00	674	673	682	442	228	394
1.00	603	606	618	404	156	340
.50	522	--	547	--	137	299
.25	444	448	475	308	101	248
WIND DIRECTION (deg)						
1.00	185	197	226	--	119	147
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1050	1350	1520	1150	1950	2150
Run Time (min)	28	28	25	26	26	27
-.03	1.44	.56	-.02	1.21	-.90	-.35
-.06	.97	.60	.20	.89	-.61	-.44
-.12	.22	.40	.34	.20	-.12	-.21
-.25	-.06	.02	04	.08	.07	.04
-.50	-.03	-.02	-.03	-.02	-.01	00
-1.00	-.01	-.03	-.02	-.02	.01	00
Precipitation (cm)	--	--	--	--	--	--

Table 8.1 (Continued)

HOURLY OBSERVATIONS — O'NEILL, NEBRASKA

GAS RELEASE NO.	61	62	63	64	65	66
AUGUST (1956)	27	27	27	27	29	29
CST	1105	1405	2005	2235	1930	2135
RADIATION (cal/cm²sec)						
Insolation	.0190	.0110	--	--	--	--
Reflected	.0030	.00174	--	--	--	--
Net Radiation	.0019	-.0072	-.0011	-.0005	-.0022	-.0018
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	29.80	29.77	29.52	26.77	25.98	22.02
8.00	30.41	30.00	27.27	23.85	25.61	21.22
4.00	31.00	30.49	25.54	22.16	25.22	20.65
2.00	31.63	30.75	24.07	20.90	24.96	20.19
1.00	32.29	31.15	21.41	19.60	24.76	19.88
.50	33.20	31.58	19.24	18.70	24.57	19.57
.25	34.10	32.10	18.17	18.16	24.30	19.27
.12	34.61	32.35	17.57	17.83	24.04	18.99
-.03	30.12	30.02	26.64	23.49	--	--
-.06	25.86	28.56	27.33	24.68	--	--
-.12	23.60	25.44	26.30	25.54	--	--
-.25	23.19	23.01	23.77	23.98	--	--
-.50	21.49	21.39	21.55	21.59	--	--
-1.00	19.66	19.61	19.56	19.78	--	--
VAPOR PRESSURE (mb)						
16.00	11.64	12.41	15.09	15.33	--	--
8.00	12.15	12.56	15.04	15.68	--	--
4.00	12.10	12.67	14.88	15.87	--	--
2.00	12.20	12.83	14.13	15.58	--	--
1.00	12.20	12.91	13.64	15.16	--	--
.50	12.28	13.13	13.20	14.86	--	--
.25	12.36	13.30	12.75	14.69	--	--
.12	12.44	13.47	12.20	14.51	--	--
WIND SPEED (cm/sec)						
16.00	980	632	267	307	768	650
8.00	926	603	195	269	626	506
4.00	--	583	139	169	530	392
2.00	782	518	116	120	455	314
1.00	700	461	26	46	393	256
.50	614	405	--	25	339	217
.25	520	343	--	--	277	177
WIND DIRECTION (deg)						
1.00	190	189	--	--	159	153
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1050	1353	1950	2220	--	--
Run Time (min)	26	23	27	27	--	--
-.03	1.40	.46	-.89	-.24	--	--
-.06	.82	-.27	-.54	-.31	--	--
-.12	.11	.15	-.03	-.19	--	--
-.25	-.08	.03	.08	.01	--	--
-.50	-.05	.01	.04	00	--	--
-1.00	-.03	00	.05	00	--	--
Precipitation (cm)	--	--	--	--	--	--

Table 8.1 (Continued)

HOURLY OBSERVATIONS — O'NEILL, NEBRASKA

GAS RELEASE NO.	67	68
AUGUST (1956)	30	30
CST	0035	0235
RADIATION (cal/cm²sec)		
Insolation	--	--
Reflected	--	--
Net Radiation	-.0011	-.0009
AIR and SOIL TEMPERATURES (°C)		
Height (m)		
16.00	21.12	21.97
8.00	20.88	21.36
4.00	20.66	20.94
2.00	20.55	20.65
1.00	20.38	20.38
.50	20.21	20.24
.25	20.19	20.08
.12	20.02	19 88
-.03	--	--
-.06	--	--
-.12	--	--
-.25	--	--
-.50	--	--
-1.00	--	--
VAPOR PRESSURE (mb)		
16.00	--	--
8.00	--	--
4.00	--	--
2.00	--	--
1.00	--	--
.50	--	--
.25	--	--
.12	--	--
WIND SPEED (cm/sec)		
16.00	748	558
8.00	615	427
4.00	521	331
2.00	444	269
1.00	385	219
.50	336	188
.25	274	149
WIND DIRECTION (deg)		
1.00	168	159
SOIL TEMPERATURE CHANGE (°C)		
Initial Time	--	--
Run Time (min)	--	--
-.03	--	--
-.06	--	--
-.12	--	--
-.25	--	--
-.50	--	--
-1.00	--	--
Precipitation (cm)	--	--

Table 8.2

HOURLY OBSERVATIONS			July 10, 1956			O'NEILL, NEBRASKA
CST	1305	1405	1505	1605	1705	1805
RADIATION (cal/cm²sec)						
Insolation	.0225	.0212	.0187	.0150	.0115	.0066
Reflected	.0040	.0039	.0036	.0027	.0023	.0015
Net Radiation	.0138	.0128	.0108	.0085	.0057	.0025
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	28.55	28.71	29.22	29.85	29.90	29.89
8.00	29.09	29.04	29.57	30.18	30.15	30.12
4.00	29.21	29.46	29.75	30.61	30.57	30.34
2.00	29.84	30.27	30.34	30.73	31.10	30.52
1.00	30.50	31.21	31.10	31.61	31.47	30.79
.50	32.01	31.99	32.01	32.30	32.01	31.00
.25	32.93	33.10	33.39	33.22	32.58	31.16
.12	33.92	34.33	34.27	34.16	33.06	31.38
-.03	33.68	34.89	35.41	35.22	33.74	31.75
-.06	29.89	30.53	31.58	32.08	31.77	30.82
-.12	23.25	24.23	25.34	26.16	26.77	27.19
-.25	21.01	21.11	21.27	21.55	21.84	22.17
-.50	20.07	20.03	19.97	20.00	19.99	19.97
-1.00	18.23	18.22	18.19	18.22	18.22	18.20
VAPOR PRESSURE (mb)						
16.00	11.90	12.06	12.12	13.28	13.16	13.41
8.00	13.06	12.97	13.07	13.81	13.87	13.59
4.00	13.03	13 02	13.10	13.87	13.72	13.63
2.00	13.12	13.05	13.16	13.92	13.75	13.69
1.00	13.32	13.18	13.42	14.15	13.85	13.78
.50	13.71	13.50	13.63	14.52	13.98	13.88
.25	14.26	13.85	13.94	14.65	14.16	13.93
.12	14.81	14.15	14.31	15.12	14.32	14.02
WIND SPEED (cm/sec)						
16.00	362	560	479	506	611	827
8.00	314	508	433	461	540	710
4.00	324	481	408	427	498	647
2.00	298	444	379	390	452	572
1.00	277	402	350	353	406	503
.50	246	352	309	308	350	432
.25	203	295	257	253	288	362
WIND DIRECTION (deg)						
1.00	--	205	--	--	171	--
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1253	--	1452	1550	1757	--
Run Time (min)	26	--	29	29	21	--
-.03	.85	--	.02	-.37	--	--
-.06	.85	--	.40	.06	--	--
-.12	.55	--	.39	.35	--	--
-.25	.02	--	.08	.12	--	--
-.50	-.05	--	-.04	-.01	--	--
-1.00	0	--	-.01	0	--	--
Precipitation (cm)	--	--	--	--	--	--

Table 8.2 (Continued)

HOURLY OBSERVATIONS			July 10, 1956			O'NEILL, NEBRASKA
CST	1905	2005	2105	0005*	0105*	0205*
RADIATION (cal/cm²sec)						
Insolation	.0002	--	--	--	--	--
Reflected	.0004	--	--	--	--	--
Net Radiation	-.0004	-.0017	-.0016	-.0014	-.0013	-.0013
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	29.15	26.90	25.72	--	--	--
8.00	29.12	26.36	25.06	23.29	21.99	21.92
4.00	29.07	25.90	24.47	23.03	21.61	21.50
2.00	29.03	25.50	24.13	22.86	21.38	21.24
1.00	28.99	25.26	23.81	22.63	21.12	21.04
.50	28.96	25.02	23.45	22.47	20.96	20.86
.25	28.91	24.78	23.20	22.29	20.74	20.64
.12	28.89	24.58	23.03	22.13	20.58	20.38
-.03	30.34	28.48	26.89	24.10	23.47	22.91
-.06	29.98	28.78	27.60	24.99	24.40	23.91
-.12	27.20	27.06	26.84	25.54	25.16	24.86
-.25	22.42	22.72	23.00	23.30	23.33	23.34
-.50	19.99	20.01	20.10	20.20	20.26	20.34
-1.00	18.20	18.25	18.32	18.39	18.34	18.35
VAPOR PRESSURE (mb)						
16.00	14.08	14.63	14.06	--	15.76	16.07
8.00	14.24	14.80	14.20	15.70	16.06	16.04
4.00	14.35	14.84	14.24	15.73	16.00	16.07
2.00	14.43	14.93	14.28	15.76	16.02	16.09
1.00	14.54	14.98	14.34	15.78	16.01	16.09
.50	14.58	15.02	14.36	15.78	16.03	16.11
.25	14.63	15.02	14.43	15.80	15.98	16.11
.12	14.70	15.02	14.54	15.80	16.00	16.13
WIND SPEED (cm/sec)						
16.00	729	627	660	801	1368	632
8.00	639	478	501	640	1061	491
4.00	569	380	397	554	900	416
2.00	497	307	322	484	775	352
1.00	432	260	279	415	661	305
.50	373	222	230	362	576	262
.25	299	161	173	294	457	201
WIND DIRECTION (deg)						
1.00	--	--	--	--	--	--
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1850	1950	2050	2353.	0058	0155
Run Time (min)	28	28	28	28	26	22
-.03	-.84	-.87	-.68	-.27	-.20	.20
-.06	-.51	-.52	-.53	-.30	-.17	.20
-.12	-.02	-.09	-.17	-.19	-.08	.11
-.25	.15	.14	+.06	0	+.06	.01
-.50	.02	.01	0	-.02	+.09	0
-1.00	.01	.05	0	-.04	0	.02
Precipitation (cm)	--	--	--	--	--	--

* July 11, 1956

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Table 8.2 (Continued)

HOURLY OBSERVATIONS			July 11, 1956			O'NEILL, NEBRASKA		
CST	0305	0405	0505	0605	0705	0805		
RADIATION (cal/cm^{2}sec)								
Insolation	--	--	.0001	.0020	.0058	.0078		
Reflected	--	--	--	.0003	.0014	.0013		
Net Radiation	-.0010	-.0009	-.0012	.0000	.0028	.0042		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	--	--	--	--	--	--		
8.00	21.86	21.88	22.33	22.87	23.49	24.02		
4.00	21.61	21.69	22.29	22.83	23.69	24.23		
2.00	21.30	21.58	22.12	22.80	23.87	24.35		
1.00	21.16	21.42	22.04	22.77	24.03	24.51		
.50	20.97	21.30	21.87	22.74	24.23	24.66		
.25	20.78	21.18	21.66	22.67	24.38	24.81		
.12	20.61	21.03	21.54	22.64	24.50	24.88		
-.03	22.44	22.18	22.07	21.96	22.35	23.19		
-.06	23.34	23.02	22.74	22.55	22.52	22.84		
-.12	24.48	24.13	23.80	23.56	23.30	23.07		
-.25	23.28	23.19	23.08	22.99	22.87	22.70		
-.50	20.40	20.38	20.40	20.44	20.44	20.40		
-1.00	18.36	18.34	18.32	18.33	18.31	18.28		
VAPOR PRESSURE (mb)								
16.00	16.34	16.73	17.16	17.10	18.00	18.32		
8.00	16.30	16.68	17.10	17.21	17.92	18.38		
4.00	16.35	16.71	17.15	17.39	18.09	18.56		
2.00	16.36	16.76	17.19	17.39	18.19	18.82		
1.00	16.39	16.75	17 21	17.39	18.19	18.94		
.50	16.43	16.80	17.24	17.47	18.15	18.68		
.25	16.46	16.82	17.24	17.54	18.22	19.32		
.12	16.46	16.82	17.24	17.54	18.15	19.42		
WIND SPEED (cm/sec)								
16.00	651	685	843	780	914	1090		
8.00	506	559	707	689	793	936		
4.00	429	491	628	607	704	833		
2.00	365	437	558	543	636	744		
1.00	314	383	488	474	558	649		
.50	272	327	424	411	484	570		
.25	204	267	348	340	402	468		
WIND DIRECTION (deg)								
1.00	--	--	--	--	--	--		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0255	0351	0452	0550	0650	0750		
Run Time (min)	23	25	24	26	26	26		
-.03	.15	-.03	.08	-.11	-.29	-.26		
-.06	.07	.14	.06	+.03	-.04	-.15		
-.12	.12	.16	.10	.09	.11	+.11		
-.25	.02	.06	.04	.04	.08	.09		
-.50	.02	-.01	-.01	-.02	.02	.03		
-1.00	-.02	-.01	0	-.02	.01	0		
Precipitation (cm)	--	--	--	--	--	--		

Table 8.2 (Continued)

HOURLY OBSERVATIONS			July 11, 1956			O'NEILL, NEBRASKA		
CST	0905	1105	1305	1405	1505	1605		
RADIATION (cal/cm^{2}sec)								
Insolation	.0135	.0200	.0190	.0202	.0135	.0135		
Reflected	.0028	.0038	.0037	.0039	.0028	.0032		
Net Radiation	.0082	.0128	.0125	.0123	.0080	.0075		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	--	27.13	29.54	31.20	32.47	32.83		
8.00	25.06	27.27	30.00	31.67	32.83	33.38		
4.00	25.38	27.93	30.46	32.13	33.32	33.81		
2.00	25.87	29.11	31.39	32.85	34.11	34.33		
1.00	26.09	29.84	32.22	33.26	34.80	35.23		
.50	26.77	30.46	32.98	33.97	35.75	36.19		
.25	27.36	31.64	33.82	35.26	36.98	37.17		
.12	27.89	32.07	34.71	36.49	38.02	37.76		
-.03	24.42	29.29	34.30	35.52	36.46	36.00		
-.06	23.37	26.06	29 64	31.12	32.34	32.72		
-.12	23.04	23.40	24.68	25.53	26.28	27.10		
-.25	22.58	22.34	22.34	22.36	22.50	22.58		
-.50	20.41	20.37	20.40	20.34	20.38	20.26		
-1.00	18.27	18.21	18.25	18.21	18.20	18.18		
VAPOR PRESSURE (mb)								
16.00	19.11	23.21	23.14	22.62	24.01	23.55		
8.00	19.17	23.48	23.62	22.94	24.31	23.69		
4.00	19.20	23.57	23.40	23.10	24.45	23.74		
2.00	19.26	23.78	23 40	23.22	24.75	23.89		
1.00	19.34	23.98	23.54	23.34	24.94	24.10		
.50	19.51	24.31	23.73	23.57	24.90	24.15		
.25	20.05	24 64	24.06	23.85	24.91	24.55		
.12	20.21	25.07	24.58	24.26	24.88	24.75		
WIND SPEED (cm/sec)								
16.00	1068	735	670	604	486	630		
8.00	923	684	626	--	463	628		
4.00	837	634	575	533	435	596		
2 00	761	582	530	490	403	515		
1.00	663	519	471	439	360	484		
.50	585	460	416	390	320	429		
.25	527	380	350	321	261	361		
WIND DIRECTION (deg)								
1.00	--	--	--	--	--	--		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0850	1050	1250	1350	1453	1550		
Run Time (min)	26	26	26	27	25	27		
-.03	+.87	+1.12	+.67	+.52	+.29	-.23		
-.06	+.37	+.76	+.68	+.57	+.36	+.11		
-.12	0	+.17	+.31	+.34	+.28	+.25		
-.25	-.05	-.03	0	+.01	+.03	+.07		
-.50	0	0	-.01	-.02	-.01	-.03		
-1 00	0	-.02	-.04	-.02	-.01	-.01		
Precipitation (cm)	--	--	--	--	--	--		

Table 8.2 (Continued)

HOURLY OBSERVATIONS July 23, 1956 O'NEILL, NEBRASKA

CST	0905	1105	1205	1305	1405	1605
RADIATION (cal/cm^{2}sec)						
Insolation	.0148	.0205	.0219	.0217	.0201	.0148
Reflected	--	--	--	--	--	--
Net Radiation	.0080	.0118	.0130	.0130	.0117	.0076
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	22.67	26.10	27.43	28.56	30.54	30.92
8.00	23.18	26.83	27.89	28.83	30.91	31.22
4.00	23.65	26.89	28.30	29.52	31.76	31.61
2.00	24.19	27.81	29.11	30.45	32.47	32.03
1.00	25.04	28.73	29.88	30.96	32.85	32.80
.50	25.81	29.59	31.02	31.85	33.62	33.68
.25	26.80	30.92	32.17	33.05	34.90	34.62
.12	27.44	31.97	33.06	34.21	35.80	35.22
-.03	23.44	30.35	33.22	35.40	37.20	36.63
-.06	21.69	25.88	28.20	30.24	32.72	33.05
-.12	21.37	22.10	22.81	23.74	25.72	26.48
-.25	21.93	21.64	21.57	21.60	21.68	21.98
-.50	20.65	20.60	20.54	20.54	20.36	20.37
-1.00	19.01	18.92	18.92	18.85	18.74	18.56
VAPOR PRESSURE (mb)						
16.00	18.21	--	13.77	--	13.00	--
8.00	18.47	--	--	--	13.91	--
4.00	18.50	17.57	--	--	13.83	--
2.00	18.54	17.57	--	--	13.84	--
1.00	18.61	17.77	14.89	--	13.82	--
.50	18.80	18.04	14.68	--	13.99	--
.25	18.86	18.34	--	--	14.07	--
.12	19.09	18.83	15.30	--	14.11	--
WIND SPEED (cm/sec)						
16.00	516	410	442	512	546	521
8.00	489	378	424	483	511	485
4.00	464	359	397	452	472	455
2.00	425	342	373	428	457	423
1.00	379	305	334	387	410	382
.50	338	275	303	343	369	336
.25	281	234	255	289	303	287
WIND DIRECTION (deg)						
1.00	186	180	170	170	200	210
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	0850	1057	1154	1254	1354	1555
Run Time (min)	27	25	27	20	25	30
-.03	1.40	1.38	89	.63	-.10	-.36
-.06	.74	1.03	.74	72	36	.16
-.12	.07	.22	.30	.49	.21	.16
-.25	-.05	-.09	-.04	.13	.17	.25
-.50	0	-.08	-.04	.08	-.02	.12
-1.00	.01	-.01	-.03	0	-.02	-.01
Precipitation (cm)	--	--	--	--	--	--

Table 8.2 (Continued)

HOURLY OBSERVATIONS July 23, 1956 O'NEILL, NEBRASKA

CST	1705	1805	1905	2105	2305	0005*
RADIATION (cal/cm^{2}sec)						
Insolation	.0099	.0060	.0018	--	--	--
Reflected	--	--	--	--	--	--
Net Radiation	.0042	.0017	-.0007	-.0011	-.0014	-.0014
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	31.21	31.05	29.96	26.83	23.68	24.82
8.00	31.48	31.27	30.04	26.49	23.13	24.26
4.00	31.93	31.52	30.04	26.18	22.69	23.93
2.00	32.37	31.77	30.01	26.01	22.34	23.55
1.00	32.65	31.99	30.02	25.70	22.07	23.15
.50	33.16	32.26	30.01	25.58	21.74	22.59
.25	33.61	32.50	30.01	25.40	21.51	22.27
.12	34.06	32.69	30.03	25.22	21.33	21.99
-.03	34.40	33.20	31.31	27.98	25.27	24.66
-.06	32.77	31.84	30.68	28.31	26.20	25.69
-.12	26.98	27.30	27.28	26.95	26.16	26.07
-.25	22.19	22.52	22.74	23.17	23.44	23.75
-.50	20.31	20.38	20.32	20.32	20.38	20.65
-1.00	18.58	18.54	18.54	18.54	18.65	18.93
VAPOR PRESSURE (mb)						
16.00	--	--	--	15.33	15.17	16.64
8.00	--	--	--	15.38	15.17	16.46
4.00	--	--	--	16.26	15.17	16.50
2.00	--	--	--	15.74	15.12	16.43
1.00	--	--	--	15.81	15.09	16.34
.50	--	--	--	15.53	15.13	16.30
.25	--	--	--	15.71	15.16	16.11
.12	--	--	--	15.58	15.15	16.11
WIND SPEED (cm/sec)						
16.00	637	778	731	532	575	437
8.00	600	706	635	410	474	398
4.00	537	667	568	341	385	341
2.00	487	--	--	278	330	288
1.00	449	505	437	233	279	241
.50	390	442	377	176	241	207
.25	326	368	310	160	174	168
WIND DIRECTION (deg)						
1.00	190	180	170	180	200	250
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1657	1753	1850	2050	2252	2352
Run Time (min)	20	13	27	27	33	25
-.03	-.85	-.62	-.76	-.68	-.49	-.33
-.06	-.35	-.38	-.48	-.58	-.43	-.31
-.12	.37	.22	0	-.26	-.24	-.17
-.25	-.04	.10	.12	.06	.07	0
-.50	-.15	-.01	0	0	.07	.01
-1.00	-.12	0	0	0	.01	-.01
Precipitation (cm)	--	--	--	--	--	--

* July 24, 1956

Table 8.2 (Continued)

HOURLY OBSERVATIONS — July 24, 1956 — O'NEILL, NEBRASKA

CST	0105	0205	0305	0405	0505	0605		
RADIATION (cal/cm²sec)								
Insolation	--	--	--	--	.0001	.0013		
Reflected	--	--	--	--	.0000	.0003		
Net Radiation	-.0014	-.0017	-.0016	-.0017	-.0018	-.0008		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	24.34	22.55	20.96	19.83	19.64	18.74		
8.00	24.17	22.18	20.62	19.47	19.52	18.70		
4.00	23.98	21.93	20.35	19.27	19.41	18.68		
2.00	23.83	21.73	20.18	19.08	19.25	18.60		
1.00	23.65	21.47	19.96	18.95	19.13	18.50		
.50	23.30	21.23	19.62	18.68	18.95	18.43		
.25	23.05	20.91	19.32	18.48	18.89	18.34		
.12	22.80	20.64	19.02	18.33	18.62	18.26		
-.03	24.23	23.71	22.92	22.37	21.91	21.60		
-.06	25.04	24.58	24.02	23.50	23.00	22.64		
-.12	25.65	25.28	24.96	24.66	24.32	23.99		
-.25	23.76	23.75	23.70	23.70	23.62	23.52		
-.50	20.70	20.74	20.80	20.84	20.88	20.91		
-1.00	18.93	18.92	18.93	18.94	18.94	18.95		
VAPOR PRESSURE (mb)								
16.00	18.43	17.77	17.97	18.23	18.32	17.99		
8.00	18.47	17.74	17.98	18.05	18.35	18.05		
4.00	18.44	17.70	17.97	18.09	18.42	18.03		
2.00	18.41	17.61	17.98	18.17	18.45	18.05		
1.00	18.36	17.57	18.01	18.19	18.51	18.07		
.50	18.36	17.57	18.07	18.21	18.56	18 12		
.25	18.31	17.48	18.09	18 23	18.61	18.13		
.12	18.31	17.43	18.14	18.25	18.71	18.11		
WIND SPEED (cm/sec)								
16.00	669	605	530	637	642	584		
8.00	559	472	418	495	542	532		
4.00	467	415	371	435	483	505		
2.00	375	358	319	378	411	420		
1.00	321	307	270	328	378	380		
.50	294	267	229	287	330	336		
.25	246	222	197	244	281	289		
WIND DIRECTION (deg)								
1.00	320	320	320	320	320	320		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0051	0157	0238	0350	0450	0051		
Run Time (min)	25	19	20	27	27	25		
-.03	-.12	-.26	-.31	-.20	-.12	-.11		
-.06	-.17	-.21	-.18	-.19	-.12	-.15		
-.12	-.15	-.13	-.11	-.11	-.10	-.14		
-.25	-.01	0	-.01	-.03	0	-.06		
-.50	.02	.03	.01	.03	.06	-.02		
-1.00	0	.01	0	0	.03	-.02		
Precipitation (cm)	--	--	--	--	--	--		

Table 8.2 (Continued)

HOURLY OBSERVATIONS — July 24, 1956 — O'NEILL, NEBRASKA

CST	0705	0805	0905	1005	1105	1205		
RADIATION (cal/cm²sec)								
Insolation	.0048	.0095	.0143	.0182	.0212	.0225		
Reflected	.0012	.0022	.0030	.0035	.0039	.0041		
Net Radiation	.0015	.0051	.0084	.0115	.0133	.0144		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	19.75	21.48	22.78	24.58	25.64	26.77		
8.00	20.95	21.87	23.09	24.90	26.05	27.03		
4.00	20.05	22.13	23.56	25.26	26.60	27.87		
2.00	20.20	22.48	24.02	26.04	27.23	28.66		
1.00	20.35	22.73	24.66	26.91	28.16	29.74		
.50	20.42	23.20	25.08	27.68	29.11	30.38		
.25	20.59	23.66	25.77	28.44	29.80	31.31		
.12	20.67	23.98	26.30	28.83	30.52	32.02		
-.03	21.70	22.75	24.72	27.44	30.20	32.65		
-.06	22.38	22.66	23.47	24.84	26.57	28.38		
-.12	23.66	23.43	23.30	23.38	23.74	24.30		
-.25	23.37	23.29	23.16	23.04	22.90	22.85		
-.50	29.90	20.97	20.98	21.00	21.00	20.98		
-1.00	18.94	18.96	18.95	18.84	18.87	18.85		
VAPOR PRESSURE (mb)								
16.00	17.96	18.21	17.91	16.93	15.96	12.24		
8.00	18.05	18.36	18.00	17.10	15.96	12.74		
4.00	18.00	18.34	18.04	17.15	16.12	12.74		
2.00	18.03	18.37	18.01	17.14	16.08	12.68		
1.00	18.09	18.43	18.07	17.25	16.19	12.70		
.50	18.13	18.48	18.19	17.39	16.23	12.71		
.25	18.12	18.48	18.21	17.48	16.20	12.83		
.12	18.21	18.57	18.30	17.68	16.17	12.88		
WIND SPEED (cm/sec)								
16.00	843	905	929	999	974	918		
8.00	763	828	856	904	889	863		
4.00	708	719	723	756	745	765		
2.00	609	608	614	662	658	679		
1.00	552	532	540	585	585	613		
.50	501	475	492	537	538	569		
.25	426	412	416	455	455	502		
WIND DIRECTION (deg)								
1.00	340	340	340	340	340	340		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0651	•0750	0851	0951	1050	1150		
Run Time (min)	25	27	26	25	29	30		
-.03	.20	.70	.97	1.05	1.27	.88		
-.06	-.03	.29	.46	.61	.75	.74		
-.12	-.14	-.06	.03	.09	.21	.29		
-.25	-.06	-.02	-.04	-.05	-.05	-.04		
-.50	-.01	+.06	.02	0	0	-.01		
-1.00	-.01	.01	0	-.02	-.02	-.02		
Precipitation (cm)	--	--	--	--	--	--		

Table 8.2 (Continued)

HOURLY OBSERVATIONS			July 24, 1956			O'NEILL, NEBRASKA		
CST	1305	1405	1505	1605	1805	1905		
RADIATION (cal/cm^{2}sec)								
Insolation	.0222	.0208	.0183	.0150	.0063	.0019		
Reflected	.0041	.0039	.0034	.0030	.0017	--		
Net Radiation	.0142	.0127	.0109	.0080	.0014	-.0011		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	27.71	28.60	28.92	29.04	29.09	28.45		
8.00	28.11	28.83	29.39	29.63	29.19	28.51		
4.00	28.75	29.50	30.07	30.12	29.54	28.54		
2.00	29.93	30.08	30.74	30.83	29.82	28.56		
1.00	30.35	31.11	31.44	31.24	30.08	28.59		
.50	31.32	32.05	32.17	31.84	30.36	28.60		
.25	32.54	32.94	33.08	32.42	30.72	28.65		
.12	33.36	33.77	33.98	33.26	31.17	28.63		
-.03	34.60	36.12	36.74	36.43	33.54	31.58		
-.06	30.03	31.45	32.52	32.95	32.03	30.99		
-.12	24.98	25.77	26.47	27.17	28.04	28.08		
-.25	22.84	22.94	23.03	23.20	23.45	23.69		
-.50	20.98	21.03	21.01	20.99	20.87	20.85		
-1.00	18.82	18.84	18.80	18.75	18.87	18.87		
VAPOR PRESSURE (mb)								
16.00	11.17	10.96	11.29	16.51	16.46	12.26		
8.00	11.82	11.65	11.89	16.88	16.61	12.38		
4.00	11.84	11.68	12.00	16.88	16.51	12.38		
2.00	11.66	11.65	11.76	16.84	16.45	12.36		
1.00	11.78	11.68	11.79	16.76	16.44	12.35		
.50	11.90	12.19	11.93	16.81	16.46	12.36		
.25	12.24	12.76	11.93	16.92	16.57	12.36		
.12	12.33	12.84	12.21	17.14	16.57	12.36		
WIND SPEED (cm/sec)								
16.00	856	790	825	657	487	503		
8.00	793	707	745	588	433	427		
4.00	736	688	704	566	426	398		
2.00	657	611	618	501	376	339		
1.00	595	540	554	444	337	291		
.50	540	485	507	401	296	259		
.25	477	420	434	353	264	224		
WIND DIRECTION (deg)								
1.00	340	340	--	--	--	--		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1250	1350	1450	1554	1752	1850		
Run Time (min)	27	27	26	27	25	26		
-.03	.64	.45	.01	-.43	-.63	-.93		
-.06	.74	.46	.30	.06	-.33	-.52		
-.12	.32	.30	.30	.28	.05	-.02		
-.50	.01	.02	.03	.09	.10	+.06		
-1.00	-.01	0	-.02	0	.01	0		
Precipitation (cm)	--	--	--	--	--	--		

Table 8.2 (Continued)

HOURLY OBSERVATIONS			July 24, 1956			O'NEILL, NEBRASKA		
CST	2005	2105	2205	2305	0005*	0105*		
RADIATION (cal/cm^{2}sec)								
Insolation	.0002	--	--	--	--	--		
Reflected	--	--	--	--	--	--		
Net Radiation	-.0015	-.0012	-.0011	-.0010	-.0011	-.0009		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	27.19	26.40	25.42	23.66	22.44	21.26		
8.00	26.47	24.39	23.13	22.37	21.29	19.58		
4.00	25.28	22.98	21.83	20.73	19.43	17.15		
2.00	23.83	21.71	19.63	19.17	17.62	15.94		
1.00	22.94	20.23	17.27	16.31	16.54	14.54		
.50	21.68	18.52	16.01	14.68	15.76	13.05		
.25	21.02	17.49	15.42	13.73	15.26	12.13		
.12	20.26	16.30	14.81	13.02	14.77	11.56		
-.03	29.13	26.72	25.05	23.70	22.64	21.70		
-.06	29.62	28.04	26.68	25.49	24.48	23.62		
-.12	27.94	27.63	27.21	26.69	26.14	--		
-.25	23.95	24.19	24.33	24.42	24.44	24.46		
-.50	20.95	21.05	21.08	21.10	21.16	21.24		
-1.00	18.91	18.95	19.00	19.04	19.08	19.16		
VAPOR PRESSURE (mb)								
16.00	12.36	12.93	12.40	13.18	13.74	13.16		
8.00	12.28	12.64	12.46	13.18	13.58	12.89		
4.00	12.26	12.42	12.46	13.29	13.55	12.76		
2.00	12.22	12.28	12.38	13.25	13.56	12.71		
1.00	12.20	12.19	12.22	13.10	13.52	12.67		
.50	12.33	12.08	11.99	13.08	13.34	12.66		
.25	12.22	11.98	11.96	13.08	13.15	12.64		
.12	12.18	11.97	11.94	13.13	12.98	12.96		
WIND SPEED (cm/sec)								
16.00	417	442	448	478	512	521		
8.00	317	270	387	395	414	378		
4.00	250	172	301	291	302	230		
2.00	146	115	216	217	202	178		
1.00	85	69	130	126	137	116		
.50	36	21	79	69	92	48		
.25	26	18	27	16	45	16		
WIND DIRECTION (deg)								
1.00	--	--	--	--	--	180		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1951	2052	2150	2250	2353	0053		
Run Time (min)	26	25	27	27	25	31		
-.03	-1.19	-.83	-.66	-.57	-.34	-.49		
-.06	-.73	-.64	-.57	-.50	-.39	-.47		
-.12	-.19	-.16	-.20	-.28	-.22	--		
-.25	.17	.04	.05	-.01	-.01	-.11		
-.50	.11	-.01	.03	0	0	-.03		
-1.00	0	.01	.02	-.01	.02	.02		
Precipitation (cm)	--	--	--	--	--	--		

* July 25, 1956

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Table 8.2 (Continued)

HOURLY OBSERVATIONS — July 25, 1956 — O'NEILL, NEBRASKA

CST	0205	0305	0405	0505	0605	0705
RADIATION (cal/cm²sec)						
Insolation	--	--	--	.0000	.0017	.0057
Reflected	--	--	--	.0000	.0006	.0016
Net Radiation	-.0009	-.0008	-.0012	-.0011	-.0004	.0022
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	20.05	18.35	18.15	17.65	17.14	19.22
8.00	18.51	15.34	16.34	15.56	16.67	19.40
4.00	15.78	14.13	15.07	14.04	16.52	19.56
2.00	14.60	13.73	14.47	13.25	16.41	19.75
1.00	13.61	13.38	14.00	12.86	16.36	20.09
.50	12.56	11.91	13.66	12.45	16.27	20.33
.25	11.77	10.73	13.34	12.13	16.24	20.69
.12	11.04	9.86	13.01	11.89	16.19	20.87
-.03	21.24	19.94	19.47	19.21	18.99	19.82
-.06	22.78	22.04	21.40	20.90	20.31	20.64
-.12	25.06	24.56	24.07	23.60	23.14	22.82
-.25	24.30	24.18	24.06	23.90	23.69	23.57
-.50	21.24	21.26	21.30	21.29	21.32	21.34
-1.00	19.15	19.16	19.18	19.16	19.08	19.09
VAPOR PRESSURE (mb)						
16.00	13.27	13.13	--	--	--	14.65
8.00	12.33	12.01	--	--	--	14.87
4.00	12.23	11.95	--	--	--	14.79
2.00	12.20	11.82	--	--	--	14.86
1.00	12.28	11.79	--	--	--	14.87
.50	12.30	11.83	--	--	--	14.92
.25	12.36	11.89	--	--	--	14.98
.12	12.63	12.27	--	--	--	15.05
WIND SPEED (cm/sec)						
16.00	521	458	599	538	646	521
8.00	398	217	442	414	514	512
4.00	229	118	301	267	426	466
2.00	153	79	230	191	365	429
1.00	95	55	174	137	322	390
.50	32	45	140	97	278	335
.25	16	16	94	55	220	271
WIND DIRECTION (deg)						
1.00	180	180	190	190	180	190
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	0152	0252	0352	0453	0550	0650
Run Time (min)	32	24	24	24	28	26
-.03	-.51	-.25	-.06	-.14	.11	+.56
-.06	-.43	-.32	-.12	-.17	-.58	.12
-.12	-.30	-.21	-.22	-.14	-.16	-.18
-.25	-.05	-.07	-.05	-.01	-.06	-.10
-.50	.01	-.01	.03	0	.03	-.01
-1.00	0	0	.03	.01	0	-.01
Precipitation (cm)	--	--	--	--	--	--

Table 8.2 (Continued)

HOURLY OBSERVATIONS — July 25, 1956 — O'NEILL, NEBRASKA

CST	0805	0905	1005	1205	1405	1505
RADIATION (cal/cm²sec)						
Insolation	.0085	.0055	(.0126)	.0230	.0203	.0180
Reflected	.0020	.0012	.0025	.0044	.0038	.0033
Net Radiation	.0042	.0023	.0069	.0142	.0128	.0108
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	21.95	23.96	25.37	28.91	31.40	32.63
8.00	22.27	24.25	25.82	29.72	32.15	33.35
4.00	22.68	24.39	26.27	30.44	32.87	34.01
2.00	22.96	24.64	26.90	31.13	33.63	34.70
1.00	23.17	24.83	27.43	31.75	34.40	35.31
.50	23.64	24.95	27.98	32.80	35.18	35.80
.25	24.06	25.17	28.55	34.06	36.07	36.55
.12	24.27	25.35	28.81	34.96	36.82	37.35
-.03	21.41	23.58	25.58	31.46	35.05	35.69
-.06	21.19	22.30	23.38	26.50	30.32	31.22
-.12	22.52	22.44	22.57	23.24	24.66	25.58
-.25	23.31	23.09	22.91	22.62	22.56	22.60
-.50	21.31	21.27	21.85	21.15	21.11	21.02
-1.00	19.05	19.01	19.02	18.97	18.92	18.89
VAPOR PRESSURE (mb)						
16.00	14.69	15.09	15.20	13.22	13.75	13.28
8.00	14.79	15.23	15.37	13.68	13.95	13.44
4.00	14.83	15.24	15.38	13.76	13.99	13.48
2.00	14.89	15.32	15.42	13.97	14.05	13.54
1.00	14.89	15.38	15.48	14.04	14.11	13.58
.50	14.96	15.46	15.51	14.30	14.17	13.64
.25	15.00	15.47	15.60	14.38	14.21	13.67
.12	15.09	15.50	15.73	14.57	14.30	13.90
WIND SPEED (cm/sec)						
16.00	786	819	776	1053	1289	1145
8.00	717	753	--	1009	1217	1103
4.00	652	684	662	878	1073	994
2.00	547	624	616	841	975	901
1.00	522	550	545	732	864	785
.50	460	474	--	648	749	688
.25	375	388	393	534	614	563
WIND DIRECTION (deg)						
1.00	180	180	170	160	165	180
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	0750	0854	0951	1151	1350	1450
Run Time (min)	26	24	28	27	28	26
-.03	.73	.45	.90	1.03	.48	.02
-.06	.30	.52	.63	.75	.58	.27
-.12	-.13	.02	.07	.21	.33	.31
-.25	-.11	-.08	-.09	-.05	.01	.05
-.50	-.02	0	-.01	-.02	-.02	0
-1.00	-.04	.02	-.01	-.02	0	0
Precipitation (cm)	--	--	--	--	--	--

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Table 8.2 (Continued)

HOURLY OBSERVATIONS	July 25, 1956				O'NEILL, NEBRASKA			
CST	1605	1705	1805	1905	2005	2105		
RADIATION (cal/cm²sec)								
Insolation	.0145	.0090	.0045	.0011	.0001	--		
Reflected	.0028	.0020	.0010	--	--	--		
Net Radiation	.0080	.0040	.0006	-.0015	-.0017	-.0011		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	32.66	33.42	33.14	31.97	29.63	28.91		
8.00	33.32	33.68	33.26	31.87	29.52	28.86		
4.00	33.79	34.01	33.36	31.79	29.42	28.76		
2.00	34.45	34.38	33.40	31.68	29.21	28.68		
1.00	34.96	34.72	33.49	31.61	29.03	28.62		
.50	35.40	35.02	33.56	31.50	28.85	28.52		
.25	36.17	35.34	33.62	31.38	28.66	28.34		
.12	36.78	35.62	33.68	31.28	28.50	28.25		
-.03	35.28	34.46	32.69	31.28	29.64	28.34		
-.06	31.64	31.71	31.10	30.26	29.30	28.28		
-.12	26.22	26.84	27.14	27.22	27.18	29.96		
-.25	22.70	22.99	23.17	23.37	23.60	23.78		
-.50	20.98	21.06	21.04	21.04	21.06	21.10		
-1.00	18.88	18.99	18.98	18.98	19.01	19.04		
VAPOR PRESSURE (mb)								
16.00	14.01	13.05	13.13	13.80	14.37	14.51		
8.00	14.20	13.12	13.27	13.94	14.43	14.61		
4.00	14.24	13.21	13.26	13.85	14.49	14.60		
2.00	14.31	13.26	13.28	13.94	14.38	14.53		
1.00	14.35	13.29	13.35	13.86	14.48	14.62		
.50	14.39	13.33	13.32	13.97	14.45	14.59		
.25	14.42	13.40	13.32	13.94	14.49	14.59		
.12	14.49	13.46	13.33	13.84	14.39	14.59		
WIND SPEED (cm/sec)								
16.00	1260	1236	1174	948	920	972		
8.00	1179	1193	1073	821	803	863		
4.00	1046	1044	944	727	714	770		
2.00	955	959	853	650	614	683		
1.00	830	826	744	565	541	587		
.50	722	789	652	490	475	520		
.25	591	588	534	405	386	419		
WIND DIRECTION (deg)								
1.00	170	180	170	160	160	160		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1550	1650	1752	1851	1951	2053		
Run Time (min)	26	26	24	25	26	27		
-.03	-.12	-.63	-.74	-.74	-.50	-.30		
-.06	.03	-.12	-.33	-.32	-.39	-.31		
-.12	.26	.13	.09	+.02	-.05	-.07		
-.25	+.07	+.10	.10	.08	.10	.07		
-.50	-.02	-.02	.01	0	.04	.01		
-1.00	-.01	0	.03	.02	.04	0		
Precipitation (cm)	--	--	--	--	--	--		

Table 8.2 (Continued)

HOURLY OBSERVATIONS	July 25, 1956				O'NEILL, NEBRASKA			
CST	2305	0005*	0205*	0305*	0405*	0505*		
RADIATION (cal/cm²sec)								
Insolation	--	--	--	--	--	.0000		
Reflected	--	--	--	--	--	.0000		
Net Radiation	-.0014	-.0014	-.0009	-.0012	-.0011	-.0007		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	27.72	26.75	26.37	25.65	25.07	24.02		
8.00	27.63	26.70	26.38	25.56	24.83	23.48		
4.00	27.51	26.60	26.34	25.30	24.63	22.79		
2.00	27.43	26.42	26.23	25.16	24.45	22.03		
1.00	27.35	26.32	26.16	24.89	24.20	21.31		
.50	27.23	26.22	26.09	24.69	24.07	20.65		
.25	27.11	26.05	26.00	24.42	23.94	20.27		
.12	27.03	25.93	25.91	24.25	23.78	20.02		
-.03	27.16	26.32	25.44	25.26	24.75	24.02		
-.06	27.14	26.57	25.69	25.44	25.09	24.67		
-.12	26.46	26.11	25.78	25.48	25.26	25.07		
-.25	23.98	24.06	24.17	24.15	24.10	24.05		
-.50	21.14	21.17	21.33	21.34	21.37	21.42		
-1.00	19.05	19.08	19.19	19.19	19.20	19.21		
VAPOR PRESSURE (mb)								
16.00	15.29	15.81	17.73	15.75	15.38	14.55		
8.00	15.23	15.87	17.75	15.84	15.48	14.99		
4.00	15.24	15.81	17 75	15.88	15.46	15.05		
2.00	15.28	15.82	17 73	15.87	15.50	15.16		
1.00	15.31	15.80	17.73	15.88	15 48	15.16		
.50	15.22	15.81	17.75	15 98	15.54	15.18		
.25	15.26	15.77	17.77	15 92	15.48	15.13		
.12	15.28	15.75	17.84	15.97	15.60	15.18		
WIND SPEED (cm/sec)								
16.00	1084	1041	968	581	607	341		
8.00	931	933	954	527	550	287		
4.00	864	814	853	432	457	238		
2.00	724	739	757	400	411	191		
1.00	636	639	655	342	351	150		
.50	561	557	576	295	299	120		
.25	463	454	469	236	242	72		
WIND DIRECTION (deg)								
1.00	150	170	190	215	210	250		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	2253	2350	0150	0250	0350	0450		
Run Time (min)	23	26	26	26	25	26		
-.03	-.23	-.24	.01	-.27	-.17	-.38		
-.06	-.18	-.11	-.13	-.14	-.13	-.20		
-.12	-.11	-.11	.01	-.12	-.06	-.08		
-.25	.02	.05	.03	-.04	-.01	-.02		
-.50	0	0	.01	0	0	0		
-1.00	.02	.01	0	0	-.01	0		
Precipitation (cm)	--	--	--	--	--	--		

* July 26, 1956

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Table 8.2 (Continued)

HOURLY OBSERVATIONS			July 26, 1956			O'NEILL, NEBRASKA		
CST	0605	0705	0805	0905	1005	1805*		
RADIATION (cal/cm²sec)								
Insolation	.0016	.0050	.0060	.0150	.0155	.0035		
Reflected	.0006	.0013	.0013	.0030	.0030	--		
Net Radiation	-.0002	.0019	.0027	.0080	.0090	.0009		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	23.44	24.78	26.74	29.84	32.45	29.29		
8.00	22.52	24.90	26.85	30.07	32.68	29.35		
4.00	21.78	25.10	26.98	30.26	33.21	29.38		
2.00	21.23	25.28	27.19	30.83	33.63	29.35		
1.00	20.93	25.45	27.57	31.42	34.18	29.38		
.50	20.74	25.74	27.93	32.10	34.98	29.40		
.25	20.78	25.99	28.25	33.08	36.00	29.42		
.12	20.78	26.22	28.57	33.81	36.82	29.48		
-.03	23.41	23.71	24.76	26.58	30.15	28.71		
-.06	24.21	23.96	24.24	24.89	26.68	28.68		
-.12	24.88	24.62	24.38	24.26	24.29	26.38		
-.25	24.03	23.94	23.83	23.70	23.54	23.76		
-.50	21.45	21.45	21.44	21.42	21.36	22.06		
-1.00	19.21	19.21	19.20	19.19	19.15	19.91		
VAPOR PRESSURE (mb)								
16.00	15.05	14.49	14.39	13.88	13.38	14.34		
8.00	15.27	14.55	14.45	14.02	13.57	14.89		
4.00	15.38	14.59	14.50	14.04	13.56	15.07		
2.00	15.50	14.63	14.66	14.11	13.63	15.21		
1.00	15.54	14.67	14.77	14.21	13.77	15.44		
.50	15.58	14.72	14.89	14.37	14.09	15.58		
.25	15.62	14.79	15.01	14.68	14.22	15.71		
.12	15.73	14.96	15.26	15.16	14.33	15.76		
WIND SPEED (cm/sec)								
16.00	306	364	311	430	319	726		
8.00	264	372	326	415	328	680		
4.00	212	346	301	374	308	612		
2.00	179	324	281	371	277	537		
1.00	146	287	248	331	253	471		
.50	121	272	180	296	234	411		
.25	86	206	174	246	198	332		
WIND DIRECTION (deg)								
1.00	180	210	200	235	320	160		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0550	0650	0750	0852	0952	1750		
Run Time (min)	26	28	28	24	26	27		
-.03	-.24	.46	.49	1.20	1.46	-.74		
-.06	-.20	.05	.17	.40	.85	-.43		
-.12	-.10	-.15	-.08	-.02	.06	.05		
-.25	-.01	-.04	-.04	-.05	-.05	.05		
-.50	0	0	0	-.01	-.03	-.01		
-1.00	0	0	0	0	0	00		
Precipitation (cm)	--	--	--	--	--	--		

* August 6, 1956

Table 8.2 (Continued)

HOURLY OBSERVATIONS			August 6, 1956			O'NEILL, NEBRASKA		
CST	1905	2105	2205	2305	0005*	0305*		
RADIATION (cal/cm²sec)								
Insolation	.0015	--	--	--	--	--		
Reflected	--	--	--	--	--	--		
Net Radiation	.0007	-.0012	-.0011	rain	-.0007	-.0013		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	28.18	24.70	22.25	21.67	21.06	17.54		
8.00	28.00	23.67	22.10	21.63	21.05	17.61		
4.00	27.94	22.85	21.99	21.58	21.09	17.61		
2.00	27.78	22.44	21.87	21.53	21.03	17.58		
1.00	27.56	21.97	21.77	21.44	21.02	17.54		
.50	27.42	21.54	21.59	21.34	20.96	17.50		
.25	27.25	21.25	21.45	21.26	20.90	17.47		
.12	27.14	21.01	21.28	21.20	20.88	17.46		
-.03	27.12	23.88	22.96	22.84	22.71	20.57		
-.06	27.64	25.22	24.30	23.80	23.52	21.86		
-.12	26.38	25.86	25.49	25.13	24.70	23.73		
-.25	23.89	24.07	24.15	24.22	24.18	23.83		
-.50	22.06	22.01	22.06	22.11	22.16	22.06		
-1.00	19.93	19.96	20.00	20.11	20.02	20.01		
VAPOR PRESSURE (mb)								
16.00	13.47	15.06	22.93	rain	rain	20.27		
8.00	13.85	15.54	22.55	rain	rain	19.59		
4.00	14.02	15.90	22.58	rain	rain	19.59		
2.00	14.14	16.11	22.51	rain	rain	19.51		
1.00	14.24	16.31	22.45	rain	rain	19.50		
.50	14.32	16.42	22.45	rain	rain	19.59		
.25	14.38	16.52	22.33	rain	rain	19.27		
.12	14.45	16.58	22.39	rain	rain	19.63		
WIND SPEED (cm/sec)								
16.00	630	492	651	549	779	780		
8.00	528	367	544	457	697	700		
4.00	464	308	498	425	660	638		
2.00	404	244	437	374	565	574		
1.00	354	196	386	327	491	--		
.50	305	166	337	286	428	437		
.25	247	131	281	235	360	371		
WIND DIRECTION (deg)								
1.00	165	80	60	55	75	50		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1850	2050	2150	2250	2350	0250		
Run Time (min)	27	28	27	27	26	26		
-.03	-.65	-.50	-.31	-.04	.11	-.29		
-.06	-.45	-.46	-.41	-.14	00	-.29		
-.12	-.05	-.14	-.22	-.18	-.14	-.19		
-.25	.04	.06	00	-.01	.06	-.14		
-.50	-.01	.02	00	00	.09	-.06		
-1.00	00	.03	+.03	.02	00	-.02		
Precipitation (cm)	--	--	--	--	--	--		

*August 7, 1956

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Table 8.2 (Continued)

HOURLY OBSERVATIONS August 7, 1956 O'NEILL, NEBRASKA

CST	0405	0505	0605	0705	0805	0905		
RADIATION (cal/cm²sec)								
Insolation	--	.0000	.0005	.0048	.0092	.0125		
Reflected	--	--	--	--	--	--		
Net Radiation	-.0014	-.0012	-.0009	.0019	.0055	.0068		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	17.76	17.19	16.82	18.28	20.67	22.60		
8.00	17.83	17.11	16.70	18.41	20.96	22.93		
4.00	17.75	17.00	16.57	18.55	21.22	23.15		
2.00	17.69	16.90	16.45	18.66	21.49	23.41		
1.00	17.62	16.80	16.37	18.75	21.73	23.74		
.50	17.51	16.69	16.24	18.84	22.03	23.96		
.25	17.40	16.57	16.18	18.98	22.34	24.25		
.12	17.57	16.53	16.13	19.08	22.70	24.57		
-.03	20.17	19.51	18.92	19.04	20.14	21.64		
-.06	21.41	20.91	20.38	20.09	20.41	21.31		
-.12	23.40	23.09	22.75	22.41	22.16	22.06		
-.25	23.75	23.67	23.56	23.42	23.28	23.13		
-.50	22.06	22.10	22.08	22.06	22.04	22.04		
-1.00	20.03	20.03	20.04	20.02	20.01	20.00		
VAPOR PRESSURE (mb)								
16.00	18.64	17.60	17.43	17.86	17.75	18.07		
8.00	18.62	17.53	18.02	18.14	18.11	18.19		
4.00	18.56	17.53	18.13	18.23	18.23	18.32		
2.00	18.64	17.56	18.08	18.37	18.42	18.49		
1.00	18.67	17.61	18.07	18.56	18.61	18.66		
.50	18.75	17.72	18.06	18.77	18.94	18.91		
.25	18.76	17.75	17.98	19.12	19.22	19.25		
.12	19.02	17.94	17.82	19.21	19.52	19.47		
WIND SPEED (cm/sec)								
16.00	698	623	589	583	694	1218		
8.00	617	553	509	535	660	1134		
4.00	577	511	455	512	606	1040		
2.00	498	436	385	456	542	915		
1.00	439	--	--	431	500	835		
.50	410	331	289	370	420	693		
.25	319	279	242	299	349	603		
WIND DIRECTION (deg)								
1.00	75	85	85	50	110	140		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0355	0450	0551	0652	0751	0851		
Run Time (min)	21	26	25	24	25	25		
-.03	-.30	-.14	-.06	.18	.72	.51		
-.06	-.19	.78	-.08	-.05	.27	.41		
-.12	-.11	-.13	-.07	-.11	-.05	00		
-.25	00	-.06	-.01	-.05	-.04	-.06		
-.50	.01	.01	.04	-.02	.02	-.03		
-1.00	.01	00	.10	-.04	.03	-.02		
Precipitation (cm)	--	--	--	--	--	--		

Table 8.2 (Continued)

HOURLY OBSERVATIONS August 7, 1956 O'NEILL, NEBRASKA

CST	1005	1105	1205	1405	1605	1705		
RADIATION (cal/cm²sec)								
Insolation	.0145	.0192	.0150	.0199	.0150	.0097		
Reflected	--	--	--	--	--	--		
Net Radiation	.0102	.0130	.0110	.0135	.0103	.0054		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	23.95	25.97	27.47	27.74	29.83	28.58		
8.00	24.24	26.34	27.89	28.38	30.26	28.86		
4.00	24.58	26.82	28.34	28.92	30.52	29.23		
2.00	24.94	27.49	28.66	29.37	31.00	29.62		
1.00	25.32	28.24	29.27	29.93	31.36	29.95		
.50	25.83	28.77	29.84	30.78	31.85	30.46		
.25	26.39	29.25	30.39	31.62	32.47	30.73		
.12	26.67	30.30	30.89	32.02	32.90	31.15		
-.03	23.09	25.80	27.62	30.24	31.12	30.65		
-.06	21.71	23.80	25.54	28.18	29.48	29.53		
-.12	22.13	22.32	22.81	24.24	25.52	25.97		
-.25	22.94	22.76	22.70	22.68	22.96	23.12		
-.50	21.99	21.92	21.92	21.86	21.88	21.87		
-1.00	19.98	19.92	19.96	19.94	19.98	19.98		
VAPOR PRESSURE (mb)								
16.00	18.48	17.77	18.80	17.42	17.12	19.50		
8.00	18.97	18.17	19.14	17 80	17.38	19.82		
4.00	19.10	18.19	19.13	17.97	17.54	20.02		
2.00	19.42	18.34	19.25	18 12	17.69	20.16		
1.00	19.62	18.63	19.64	18.29	17.85	20.27		
.50	19.96	18.91	19.79	18.59	18.02	20.44		
.25	20.33	19.36	20.14	18 79	18.24	20.60		
.12	20.59	19.65	20.64	18.97	18.46	20.87		
WIND SPEED (cm/sec)								
16.00	991	838	865	1348	1379	992		
8.00	874	754	773	1251	1290	923		
4.00	878	707	718	1135	1165	841		
2.00	764	609	651	1004	1025	739		
1.00	710	554	595	908	923	669		
.50	404	470	509	768	773	560		
.25	340	385	405	640	630	464		
WIND DIRECTION (deg)								
1.00	145	155	175	155	150	155		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0952	1052	1150	1350	1550	1650		
Run Time (min)	24	25	27	27	26	28		
-.03	-.61	1.00	.61	.43	-.19	-.38		
-.06	1.41	.79	.54	.27	.07	-.04		
-.12	.07	13	.24	.36	.21	.18		
-.25	-.05	-.08	-.07	.02	.07	.11		
-.50	-.02	-.03	-.04	00	-.01	.04		
-1.00	.01	-.03	-.04	.01	.01	.04		
Precipitation (cm)	--	--	--	--	--	--		

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Table 8.2 (Continued)

HOURLY OBSERVATIONS — August 7, 1956 — O'NEILL, NEBRASKA

CST	1805	1905	2005	2105	2205	0005*		
RADIATION (cal/cm²sec)								
Insolation	.0050	.0009	.0000	--	--	--		
Reflected	--	--	--	--	--	--		
Net Radiation	.0023	-.0009	-.0012	-.0010	-.0008	-.0014		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	28.29	27.08	25.79	24.96	23.91	22.78		
8.00	28.50	27.03	25.46	24.29	23.56	22.62		
4.00	28.62	26.95	25.13	23.70	23.12	22.48		
2.00	28.77	26.84	24.96	23.25	22.82	22.27		
1.00	28.93	26.77	24.77	22.97	22.52	22.19		
.50	29.12	26.65	24.57	22.59	22.17	22.03		
.25	29.31	26.54	24.38	22.43	22.02	21.87		
.12	29.50	26.48	24.22	22.33	21.88	21.75		
-.03	29.33	27.82	26.28	25.11	24.15	22.98		
-.06	28.96	28.09	27.02	26.02	25.16	23.94		
-.12	26.23	26.29	26.19	25.93	25.59	24.89		
-.25	23.30	23.50	23.64	23.80	23.90	23.96		
-.50	21.85	21.89	21.86	21.90	21.91	21.93		
-1.00	20.00	20.04	20.05	20.06	20.08	20.10		
VAPOR PRESSURE (mb)								
16.00	19.62	19.84	19.31	19.89	19.75	18.42		
8.00	19.77	20.00	19.50	20.01	20.06	18.59		
4.00	19.84	20.01	19.60	20.12	20.25	18.60		
2.00	19.89	20.10	19.62	20.11	20.26	18.62		
1.00	20.02	20.13	19.64	20.13	20 27	18.66		
.50	20.11	20.22	19.75	20.21	20.39	18.74		
.25	20.22	20.22	19.76	20.14	20.36	18.74		
.12	20.27	20.31	19.87	20.22	20.39	18.78		
WIND SPEED (cm/sec)								
16.00	714	697	632	440	378	932		
8.00	668	634	521	349	298	833		
4.00	615	554	439	267	238	745		
2.00	544	491	376	214	191	652		
1.00	500	447	342	177	163	589		
.50	423	378	280	139	128	491		
.25	350	314	232	102	92	399		
WIND DIRECTION (deg)								
1.00	145	135	145	105	75	150		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1750	1850	1950	2050	2155	2353		
Run Time (min)	26	26	26	26	21	23		
-.03	-.47	-.66	-.53	-.44	-.28	-.22		
-.06	-.31	-.42	-.42	-.40	-.31	-.18		
-.12	.07	-.02	-.09	-.17	-.15	-.11		
-.25	.08	.09	-.03	.06	.04	-.01		
-.50	.02	00	-.09	00	00	-.02		
-1.00	00	00	-.01	00	-.01	-.01		
Precipitation (cm)	--	--	--	--	--	--		

*August 8, 1956

Table 8.2 (Continued)

HOURLY OBSERVATIONS — August 8, 1957 — O'NEILL, NEBRASKA

CST	0105	0205	0305	0405	0505	0605		
RADIATION (cal/cm²sec)								
Insolation	--	--	--	--	.0000	.0005		
Reflected	--	--	--	--	--	--		
Net Radiation	-.0015	-.0007	-.0014	-.0015	-.0011	-.0004		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	23.12	18.76	17.77	17.15	16.51	17.17		
8.00	22.89	18.83	17.58	16.70	16.11	17.11		
4.00	22.58	18.85	17.41	16.45	15.81	17.05		
2.00	22.33	18.86	17.30	16.21	15.57	16.95		
1.00	22.07	18.86	17.17	16.00	15.44	16.89		
.50	21.73	18.85	17.00	15.77	15.22	16.81		
.25	21.41	18.83	16.86	15.60	15.12	16.73		
.12	21.20	18.82	16.77	15.43	15.02	16.65		
-.03	22.37	21.89	21.08	20.12	19.16	19.10		
-.06	23.52	22.96	22.43	21.75	21.00	20.48		
-.12	24.74	24.34	24.02	23.70	23.29	22.84		
-.25	23.94	23.87	23.81	23.73	23.62	23.44		
-.50	21.95	21.95	21.95	21.96	21.95	21.90		
-1.00	20.10	20.09	20.08	20.08	20.06	20.04		
VAPOR PRESSURE (mb)								
16.00	17.30	15.20	15.21	15.21	15.71	16.40		
8.00	17.43	15.29	15.25	14.89	15.52	16.42		
4.00	17.51	15.30	15.30	14.95	15.54	16.49		
2.00	17.59	15.31	15.31	14.99	15.52	16.62		
1.00	17 59	15.32	15.31	15 01	15.55	16.71		
.50	17.68	15.34	15.34	15.06	15.57	16.72		
.25	17.74	15.35	15.36	15.06	15.58	16.76		
.12	17.75	15.36	15.36	15.15	15.75	16.77		
WIND SPEED (cm/sec)								
16.00	479	1190	547	532	470	558		
8.00	438	997	451	445	377	494		
4.00	395	915	397	375	310	440		
2.00	340	812	344	311	255	379		
1.00	313	729	311	283	229	349		
.50	255	633	256	233	186	294		
.25	214	533	201	191	142	238		
WIND DIRECTION (deg)								
1.00	265	360	50	85	95	110		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0053	0154	0253	0351	0454	0550		
Run Time (min)	23	22	23	25	21	27		
-.03	-.30	-.28	-.37	-.37	.24	-.01		
-.06	-.20	-.17	-.24	-.31	-.21	-.16		
-.12	-.21	-.14	-.12	-.15	- 13	-.16		
-.25	-.02	-.04	-.03	-.05	-.04	-.05		
-.50	00	.01	00	-.01	00	-.01		
-1.00	00	00	-.01	-.01	00	-.01		
Precipitation (cm)	--	--	--	--	--	--		

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Table 8.2 (Continued)

HOURLY OBSERVATIONS — August 8, 1956 — O'NEILL, NEBRASKA

CST	0805	0905	1005	1105	1205	1305
RADIATION (cal/cm²sec)						
Insolation	.0030	.0139	.0179	.0190	.0220	.0218
Reflected	--	--	--	--	--	--
Net Radiation	wet	.0088	.0113	.0110	.0150	.0150
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	18.00	20.84	23.76	25.28	26.74	27.54
8.00	17.94	21.20	23.79	25.52	27.23	27.76
4.00	17.96	21.45	24.17	25.80	27.74	28.13
2.00	17.97	21.93	24.46	26.12	28.01	28.70
1.00	17.97	22.19	25.09	26.63	28.61	29.70
.50	17.97	22.62	25.88	27.52	29.64	30.74
.25	17.98	23.07	26.85	28.33	30.83	31.41
.12	17.95	23.55	27.68	28.97	31.67	32.71
-.03	19.30	20.78	24.27	27.44	29.85	31.89
-.06	20.19	20.56	21.76	24.62	26.71	28.46
-.12	22.22	22.00	21.94	22.38	23.06	23.93
-.25	23.18	22.98	22.82	22.75	22.41	22.61
-.50	21.90	21.88	21.82	21.87	21.87	21.83
-1.00	20.04	20.02	19.99	20.04	20.06	20.05
VAPOR PRESSURE (mb)						
16.00	--	14.04	14.74	13.28	12.96	13.16
8.00	--	14.41	15.05	13.55	13.42	13.83
4.00	--	14.55	15.26	13.74	13.62	14.03
2.00	--	14.63	15.35	13.85	13.85	14.18
1.00	--	14.95	15.58	14.18	14.04	14.40
.50	--	15.91	15.96	14.66	14.67	14.69
.25	--	16.13	16.46	15.16	15.17	15.08
.12	--	16.83	17.16	15.64	15.72	15.61
WIND SPEED (cm/sec)						
16.00	511	489	368	530	493	531
8.00	440	466	349	505	487	541
4.00	385	444	321	473	446	487
2.00	314	409	298	436	413	452
1.00	287	385	290	408	391	420
.50	250	320	245	344	178	--
.25	212	270	210	317	60	--
WIND DIRECTION (deg)						
1.00	330	45	5	40	110	150
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	0750	0850	0950	1050	1155	1250
Run Time (min)	28	27	28	28	21	26
-.03	.16	1.32	1.68	1.00	.83	.71
-.06	-.02	.29	.06	1.01	.70	.70
-.12	-.13	-.09	.06	.26	.34	.34
-.25	-.07	-.16	-.09	.04	-.55	00
-.50	-.01	-.03	-.01	.02	-.02	-.03
-1.00	-.01	-.01	-.02	.03	-.02	-.04
Precipitation (cm)	--	--	--	--	--	--

Table 8.2 (Continued)

HOURLY OBSERVATIONS — August 9, 1956 — O'NEILL, NEBRASKA

CST	1405	1505	1605	1705	1805	1905
RADIATION (cal/cm²sec)						
Insolation	.0200	.0178	.0138	.0082	.0052	.0012
Reflected	--	.0033	.0029	.0018	.0013	--
Net Radiation	.0133	.0110	.0077	.0041	.0018	-.0011
AIR and SOIL TEMPERATURES (°C)						
Height (m)						
16.00	28.02	28.86	28.48	27.91	27.14	25.66
8.00	28.44	29.37	29.00	28.28	27.35	25.69
4.00	28.79	29.76	29.60	28.58	27.58	25.67
2.00	29.28	30.31	30.04	28.90	27.80	25.66
1.00	29.92	30.69	30.43	29.26	28.03	25.65
.50	31.31	31.40	30.99	29.65	28.19	25.63
.25	32.09	32.54	31.77	30.03	28.39	25.62
.12	33.48	33.55	32.25	30.43	28.68	25.58
-.03	33.29	34.46	34.48	32.91	30.98	29.02
-.06	29.97	31.25	31.98	31.63	30.78	29.49
-.12	24.80	25.65	26.43	27.16	27.55	27.54
-.25	22.58	22.74	22.91	23.11	23.44	23.71
-.50	21.79	21.76	21.72	21.69	21.75	21.76
-1.00	20.01	19.96	19.94	19.93	20.00	20.03
VAPOR PRESSURE (mb)						
16.00	12.79	13.58	15.40	17.08	17.40	17.51
8.00	13.46	13.48	15.89	17.31	17.65	17.52
4.00	13.66	13.57	15.95	17.39	17.73	17.52
2.00	13.76	13.65	15.95	17.39	17.77	17.51
1.00	14.04	13.85	16.08	17.43	17.84	17.53
.50	14.50	14.20	16.40	17.58	17.92	17.57
.25	14.89	14.47	16.66	17.73	17.86	17.57
.12	15.58	14.96	16.98	17.80	17.99	17.62
WIND SPEED (cm/sec)						
16.00	411	295	595	685	744	794
8.00	396	291	547	624	674	671
4.00	366	269	508	572	587	601
2.00	336	256	467	517	515	527
1.00	317	249	438	483	480	494
.50	272	218	378	408	418	419
.25	228	173	318	346	360	351
WIND DIRECTION (deg)						
1.00	145	140	5	360	350	360
SOIL TEMPERATURE CHANGE (°C)						
Initial Time	1350	1450	1550	1650	1752	1853
Run Time (min)	26	26	26	26	24	23
-.03	.52	.12	-.43	-.62	-.72	-.77
-.06	.60	.37	.06	-.26	-.50	-.51
-.12	.36	.30	.28	.15	.08	-.03
-.25	.14	.05	.05	.10	.09	.09
-.50	-.01	-.03	-.05	-.04	-.01	00
-1.00	-.01	-.09	-.03	-.02	-.02	.02
Precipitation (cm)	--	--	--	--	--	--

Table 8.2 (Continued)

HOURLY OBSERVATIONS			August 8, 1956			O'NEILL, NEBRASKA		
CST	2005	2105	2205	2305	0005*	0105*		
RADIATION (cal/cm²sec)								
Insolation	.0000	--	--	--	--	--		
Reflected	--	--	--	--	--	--		
Net Radiation	-.0015	-.0010	-.0010	-.00085	-.00031	-.00110		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	24.26	23.43	22.45	22.44	21.83	19.68		
8.00	23.38	22.43	21.25	20.15	20.35	18.85		
4.00	22.65	21.15	19.74	18.90	18.86	18.34		
2.00	22.22	19.88	18.81	17.83	17.49	17.86		
1.00	21.82	19.08	17.19	16.46	16.38	17.64		
.50	21.54	18.01	15.91	15.29	15.84	17.41		
.25	21.24	17.23	15.48	14.77	15.62	17.19		
.12	21.02	16.20	15.19	14.34	15.45	17.07		
-.03	27.13	25.30	23.89	22.71	21.96	21.70		
-.06	28.16	26.75	25.56	24.49	23.58	23.09		
-.12	27.34	26.95	26.52	26.00	25.45	25.00		
-.25	23.92	24.07	24.21	24.27	24.25	24.24		
-.50	21.80	21.79	21.80	21.80	21.82	21.88		
-1.00	20.07	20.02	20.03	20.02	20.02	20.04		
VAPOR PRESSURE (mb)								
16.00	18.14	17.63	16.77	15.45	18.65	18.84		
8.00	18.42	17.43	15.89	14.64	17.78	18.36		
4.00	18.41	17.49	15.94	14.65	17.78	18.34		
2.00	18.35	17.51	15.98	14.62	17.76	18.28		
1.00	18.35	17.54	16.01	14.68	17.77	18.28		
.50	18.35	17.58	16.01	14.67	17.77	18.34		
.25	18.28	17.58	16.09	15.63	17.71	18.23		
.12	18.29	17.89	16.53	15.00	17.82	18.44		
WIND SPEED (cm/sec)								
16.00	482	296	--	189	118	552		
8.00	343	225	156	179	82	423		
4.00	256	130	114	139	76	338		
2.00	197	85	174	109	85	269		
1.00	157	36	101	66	57	222		
.50	132	19	51	44	50	193		
.25	101	--	--	--	18	151		
WIND DIRECTION (deg)								
1.00	40	--	--	--	--	175		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1953	2054	2152	2253	2350	0050		
Run Time (min)	23	25	24	23	28	27		
-.03	-.63	-.79	-.50	-.40	-.21	-.23		
-.06	-.52	-.56	-.46	-.40	-.37	-.20		
-.12	-.11	-.17	-.21	-.21	-.26	-.21		
-.25	-.01	.06	.03	00	-.04	-.04		
-.50	.02	.01	00	.03	00	00		
-1.00	.04	.01	-.01	00	-.01	-.01		
Precipitation (cm)	--	--	--	--	--	--	* August 9, 1956	

Table 8.2 (Continued)

HOURLY OBSERVATIONS			August 9, 1956			O'NEILL, NEBRASKA		
CST	0205	0305	0405	0505	0605	0705		
RADIATION (cal/cm²sec)								
Insolation	--	--	--	.0000	.0011	.0052		
Reflected	--	--	--	.0000	.00035	.0015		
Net Radiation	-.00100	.00099	-.00101	-.00114	-.00038	.0026		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	19.75	19.04	18.36	17.33	16.97	19.12		
8.00	18.69	17.61	16.97	16.91	16.92	19.20		
4.00	17.92	16.97	16.14	16.56	16.70	19.27		
2.00	16.96	16.38	15.46	16.25	16.17	19.34		
1.00	16.08	15.72	14.93	16.02	15.39	19.42		
.50	15.26	15.08	14.47	15.66	14.85	19.53		
.25	14.75	14.81	14.30	15.44	14.98	19.77		
.12	14.39	14.60	14.13	15.22	15.10	19.84		
-.03	21.18	20.22	19.68	19.40	19.00	19.51		
-.06	22.61	21.99	21.38	20.85	20.54	20.37		
-.12	24.56	24.16	23.68	23.28	22.93	22.63		
-.25	24.18	24.10	23.88	23.75	23.70	23.53		
-.50	21.90	21.92	21.91	21.92	22.00	21.98		
-1.00	20.03	20.04	20.04	20.04	20.11	20.10		
VAPOR PRESSURE (mb)								
16.00	15.96	15.16	16.45	15.95	17.19	16.07		
8.00	15.25	14.67	15.41	15.70	16.45	17.30		
4.00	15.25	14.67	15.44	15.70	16.48	17.46		
2.00	15.22	14.68	15.39	15.70	16.51	17.49		
1.00	15.23	14.66	15.39	15.70	16.41	17.17		
.50	15.25	14.69	15.41	15.70	16.41	17.20		
.25	15.20	14.68	15.36	15.69	16.21	17.40		
.12	15.91	15.22	15.38	15.97	16.12	17.63		
WIND SPEED (cm/sec)								
16.00	293	404	470	425	147	308		
8.00	278	293	365	336	105	286		
4.00	204	227	288	259	76	263		
2.00	143	160	212	205	106	245		
1.00	96	107	157	160	82	214		
.50	71	88	135	145	62	194		
.25	19	41	98	116	29	161		
WIND DIRECTION (deg)								
1.00	--	--	--	300	160*	230		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0150	0250	0350	0450	0550	0650		
Run Time (min)	27	27	28	28	26	26		
-.03	-.53	-.19	-.25	-.05	-.18	.64		
-.06	-.24	-.29	-.39	-.16	-.18	.08		
-.12	-.17	-.15	-.20	-.18	-.23	-.16		
-.25	-.03	-.03	-.06	-.06	-.07	-.06		
-.50	.01	+.01	00	.01	-.04	-.05		
-1.00	00	+.01	-.01	.02	00	-.02		
Precipitation (cm)	--	--	--	--	--	--	*Wind to light to turn vane	

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Table 8.2 (Continued)

HOURLY OBSERVATIONS	August 9, 1956				O'NEILL, NEBRASKA			
CST	0805	0905	1005	1105	1205	1305		
RADIATION (cal/cm²sec)								
Insolation	.0071	.0138	.0177	.0204	.0214	.0132		
Reflected	.0015	.00265	.00315	.0035	.0037	.0023		
Net Radiation	.0037	.0077	.0104	.0119	.0127	.0069		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	21.33	23.22	24.75	26.46	27.36	28.05		
8.00	21.66	23.66	25.13	26.75	27.71	28.29		
4.00	21.82	23.92	25.58	27.08	28.14	28.74		
2.00	21.82	24.20	25.90	27.21	28.26	29.24		
1:00	22.04	24.67	26.35	28.03	29.41	29.66		
.50	22.50	25.28	27.44	29.35	30.27	30.38		
.25	22.91	26.47	28.33	30.67	31.52	30.94		
.12	23.54	27.16	29.21	31.68	32.79	32.08		
-.03	20.89	23.10	26.26	29.41	31.98	34.12		
-.06	20.87	21.98	23.82	26.07	28.09	30.21		
-.12	22.33	22.25	22.45	22.96	23.63	24.70		
-.25	23.31	23.11	22.91	22.78	22.68	22 72		
-.50	21.92	21.87	21.83	21.78	21.78	21.74		
-1.00	20.03	19.96	19.99	19.93	19.91	19.95		
VAPOR PRESSURE (mb)								
16.00	22.62	16.91	16.10	14.75	14.37	--		
8.00	27.58	17.36	16.53	15.40	14.79	--		
4.00	27.88	17.50	16 65	15.46	14.86	--		
2.00	27.72	18.82	17.63	15.40	14.78	--		
1.00	26.91	17.63	16.77	15.46	14.85	--		
.50	19.11	17.76	17.08	15.78	15.05	--		
.25	17.29	18.01	17.30	16 09	15.42	--		
.12	17.29	18.34	18.17	16.64	15.98	--		
WIND SPEED (cm/sec)								
16.00	174	338	322	400	393	313		
8.00	176	339	290	373	391	306		
4.00	148	323	273	360	361	286		
2.00	153	300	256	330	332	258		
1.00	136	(273)	239	306	309	235		
.50	128	246	216	276	282	212		
.25	102	204	182	235	239	182		
WIND DIRECTION (deg)								
1.00	265	200	235	230	260	315		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0750	0850	0950	1050	1148	1251		
Run Time (min)	26	26	26	20	28	29		
-.03	.65	1.10	1.28	1.06	1.17	.22		
-.06	.33	.64	.81	.87	.96	.77		
-.12	-.04	00	.17	.31	.42	.56		
-.25	-.08	-.11	.09	-.07	.04	-.01		
-.50	-.01	-.03	-.03	-.06	.07	-.04		
-1.00	00	-.12	-.03	-.02	-.02	-.03		
Precipitation (cm)	--	--	--	--	--	--		

Table 8.2 (Continued)

HOURLY OBSERVATIONS	August 9, 1956				O'NEILL, NEBRASKA			
CST	1405	1505	1605	1705	1505*	1605*		
RADIATION (cal/cm²sec)								
Insolation	.0210	.0185	.0080	.0012	.0072	.0125		
Reflected	.0038	.0033	.0016	--	.0013	.0021		
Net Radiation	.0125	.0105	.0030	-.0006	.0038	.0060		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	28.81	29.80	29.27	27.98	32.09	33.00		
8.00	29.29	30.33	29.64	28.07	32.30	33.26		
4.00	29.59	30.88	29.89	28.13	32.59	33.81		
2.00	30.01	30.80	30.11	28.13	32.94	34.32		
1.00	30.27	31.66	30.24	28.18	33.30	34.84		
.50	31.03	32.88	30.75	28.18	33.62	35.61		
.25	33.04	33.92	31.27	28.18	34.00	36.10		
.12	34.02	34.94	32.12	28.15	34.35	36.50		
-.03	35.64	36.77	36.01	33.28	30.82	32.05		
-.06	31.53	32.79	33.30	32.44	28.54	28.86		
-.12	25.77	26.64	27.48	27.98	25.65	25.70		
-.25	22.76	22.88	23.06	23.31	23.10	23.30		
-.50	21.69	21.65	21.60	21.56	21.39	21.51		
-1.00	19.91	19.87	19.82	19.84	19.62	19.47		
VAPOR PRESSURE (mb)								
16.00	13.06	13.60	13.53	14.38	12.71	13.24		
8.00	13.85	14.06	13.85	14.55	12.90	13.48		
4.00	13.95	14.17	13.89	14.60	12.94	13.53		
2.00	13.92	14.16	13.94	14.65	13.00	13.64		
1.00	14.04	14.26	14.09	14.66	13.09	13.68		
.50	14.32	14.59	14.27	14.74	13.13	13.71		
.25	14.64	14.66	14.51	14.76	13.18	13.77		
.12	15.05	14.87	14.88	14.85	13.23	13.82		
WIND SPEED (cm/sec)								
16.00	246	277	154	573	753	889		
8.00	261	279	153	501	727	843		
4.00	244	261	141	463	664	764		
2.00	230	244	144	416	590	678		
1.00	217	228	133	370	522	603		
.50	200	205	125	325	456	527		
.25	166	175	101	276	383	440		
WIND DIRECTION (deg)								
1.00	215	250	85	30	158	162		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1353	1454	1553	1653	1453	1553		
Run Time (min)	25	24	25	23	24	23		
-.03	.60	.32	-.56	-1.23	-.03	-.46		
-.06	.56	.46	.17	-.50	.16	-.34		
-.12	.39	.38	.33	.18	.08	.10		
-.25	.03	.05	.11	.10	.03	.05		
-.50	-.03	00	00	-.01	00	00		
-1.00	-.01	-.04	.01	.01	.02	-.02		
Precipitation (cm)	--	--	--	--	--	--		

* August 27, 1956

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Table 8.2 (Continued)

HOURLY OBSERVATIONS — August 27, 1956 — O'NEILL, NEBRASKA

CST	1705	1905	2105	2205	0005*	0105*		
RADIATION (cal/cm²sec)								
Insolation	.0070	.0003	.0000	.0000	.0000	.0000		
Reflected	.0014	--	.0000	.0000	.0000	.0000		
Net Radiation	.0027	-.0011	-.0010	-.0008	-.0006	-.0009		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	33.22	31.13	29.11	26.72	24.46	21.75		
8.00	33.32	30.55	26.72	24.90	21.38	20.03		
4.00	33.60	29.67	24.95	22.57	20.11	19.02		
2.00	33.95	28.94	22.59	20.69	18.83	18.37		
1.00	34.34	27.41	18.84	19.72	18.29	17.65		
.50	34.64	25.57	17.45	19.02	17.68	16.78		
.25	35.04	24.45	16.86	18.56	17.26	16.47		
.12	35.38	23.85	16.28	18.09	16.94	16.06		
-.03	32.19	29.07	25.04	23.77	22.52	21.79		
-.06	29.40	28.58	26.26	25.04	23.67	23.14		
-.12	25.91	26.36	26.26	25.76	24.96	24.57		
-.25	23.38	23.65	23.98	23.96	23.99	23.92		
-.50	21.49	21.54	21.60	21.58	21.61	21.62		
-1.00	19.44	19.56	19.77	19.78	19.78	19.78		
VAPOR PRESSURE (mb)								
16.00	13.55	14.87	14.32	--	14.48	14.49		
8.00	13.70	15.00	16.10	--	15.20	14.84		
4.00	13.73	14.80	15.76	--	15.06	14.85		
2.00	13.76	14.88	15.55	--	14.82	14.77		
1.00	13.81	14.75	14.35	--	14.70	14.51		
.50	13.87	14.45	14.08	--	14.38	14.51		
.25	13.93	14.22	13.89	--	14.37	14.53		
.12	13.98	14.05	13.73	--	14.32	14.48		
WIND SPEED (cm/sec)								
16.00	825	230	213	320	167	337		
8.00	784	201	157	325	138	265		
4.00	706	163	136	262	103	206		
2.00	625	147	149	165	100	169		
1.00	555	83	70	76	66	113		
.50	490	49	33	59	70	99		
.25	403	--	--	30	52	74		
WIND DIRECTION (deg)								
1.00	165	--	--	--	--	--		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1652	1850	2050	2150	000C	0050		
Run Time (min)	24	27	27	27	26	25		
-.03	-.25	-.96	-.69	-.30	-.27	-.37		
-.06	.09	-.40	-.55	-.38	-.27	-.28		
-.12	.12	.02	-.14	-.15	-.18	-.14		
-.25	.03	.06	-.03	.04	.00	-.02		
-.50	-.02	.02	.01	.02	.02	.00		
-1.00	-.01	.01	.00	.02	.00	00		
Precipitation (cm)	--	--	--	--	--	--		

* August 28, 1956

Table 8.2 (Continued)

HOURLY OBSERVATIONS — August 28, 1956 — O'NEILL, NEBRASKA

CST	0205	0305	0405	0505	0605	0705		
RADIATION (cal/cm²sec)								
Insolation	.0000	.0000	.0000	.0000	.0004	.0045		
Reflected	.0000	.0000	.0000	.0000	.0001	.0011		
Net Radiation	.0009	-.0004	-.0006	-.0008	-.0007	.0021		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	23.14	21.93	22.32	21.28	19.15	19.74		
8.00	21.83	21.04	21.37	20.04	17.71	19.95		
4.00	20.87	19.90	20.27	18.55	16.50	20.15		
2.00	19.97	18.95	19.01	17.39	15.65	20.28		
1.00	19.30	18.45	16.91	15.97	14.93	20.51		
.50	18.59	17.98	14.59	15.13	13.72	20.84		
.25	18.10	17.65	13.92	14.75	13.30	21.14		
.12	17.76	17.47	13.38	14.43	13.02	21.41		
-.03	21.23	20.87	20.63	19.91	19.42	19.60		
-.06	22.63	22.15	21.88	21.41	20.94	20.63		
-.12	24.27	23.93	23.60	23.30	22.99	22.70		
-.25	23.91	23.83	23.73	23.61	23.50	23.38		
-.50	21.68	21.71	21.73	21.73	21.74	21 74		
-1.00	19.82	19.83	19 83	19.83	19.83	19.85		
VAPOR PRESSURE (mb)								
16.00	14.82	14.57	14.99	14.70	14.87	14.80		
8.00	15.04	14.70	14.78	14.90	13.83	14.87		
4.00	14.87	15.05	14.78	14.70	13.80	14.87		
2.00	14.69	15.05	14.69	14.68	13.58	14.85		
1.00	14.52	14.95	14.51	14.59	13.02	14.86		
.50	14.50	14.93	14.13	14 43	12.92	14.90		
.25	14.39	14.85	13.82	14.39	12.85	14.87		
.12	14.31	14.83	13 68	14.37	12.80	14.97		
WIND SPEED (cm/sec)								
16.00	289	99	314	422	223	400		
8.00	248	149	183	365	184	393		
4.00	192	144	112	301	99	366		
2.00	158	114	111	238	57	326		
1.00	106	61	81	164	41	290		
.50	90	51	32	124	46	256		
.25	64	36	--	97	31	205		
WIND DIRECTION (deg)								
1.00	--	--	--	--	340	151		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0150	0250	0350	0450	0550	0650		
Run Time (min)	26	26	26	26	27	26		
-.03	-.16	.07	-.35	-.27	-.22	.63		
-.06	-.21	-.16	-.13	-.16	-.18	00		
-.12	-.12	-.15	-.12	-.11	-.10	-.12		
-.25	-.02	-.02	-.03	-.07	-.08	-.08		
-.50	03	00	.01	00	00	-.01		
-1.00	.01	01	00	00	00	00		
Precipitation (cm)	--	--	--	--	--	--		

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Table 8.2 (Continued)

HOURLY OBSERVATIONS	August 28, 1956				O'NEILL, NEBRASKA			
CST	0805	0905.	1005	1105	1205	1305		
RADIATION (cal/cm²sec)								
Insolation	.0070	.0125	.0155	.0195	.0165	.0185		
Reflected	.0015	.0022	.0024	.0031	.0028	.0016		
Net Radiation	.0035	.0061	.0085	.0115	.0100	.0030		
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	20.96	24.98	26.94	30.36	31.11	31.34		
8.00	21.09	25.34	27.25	30.86	31.51	31.71		
4.00	21.20	25.62	27 69	31.39	31.86	31.91		
2.00	21.29	26.02	28.07	32.26	32.43	32.27		
1.00	21.59	26.26	28.87	32.90	33.36	32.56		
.50	22.04	26.78	29.63	33.63	33.97	33.41		
.25	22.65	27.74	30.77	34.42	34.99	34.28		
.12	23.20	28.51	31.45	34.98	35.90	34.98		
-.03	21.41	24.46	27.96	31.28	33.95	35.24		
-.06	21.14	22.41	24.44	26.63	28.62	30.25		
-.12	22.40	22.34	22.52	22.95	23.76	24.61		
-.25	23.20	23.02	22.85	22.68	22.70	22.70		
-.50	21 73	21.70	21.68	21.58	21.64	21.61		
-1.00	19.82	19.83	19.80	19.74	19.84	19.82		
VAPOR PRESSURE (mb)								
16.00	15.80	17 96	17.19	13.44	14.76	12.31		
8.00	15.92	18 07	17.58	14 32	15.05	12.57		
4.00	16.00	18.07	17.60	14.37	15.05	12.57		
2.00	16.04	18.06	17 63	14.30	15.03	12.58		
1.00	16.10	18.09	17.65	14.21	15.08	12.59		
.50	16 20	18 18	17 72	14.48	15 11	12.66		
.25	16.43	18.36	17.80	14.63	15 16	12.71		
.12	16.51	18.54	17.88	14.78	15.19	12.86		
WIND SPEED (cm/sec)								
16.00	159	185	331	546	637	464		
8.00	162	194	322	488	598	456		
4.00	148	183	307	475	553	433		
2.00	144	171	281	428	476	384		
1.00	114	137	253	385	438	339		
.50	117	135	235	348	403	307		
.25	94	117	207	303	367	269		
WIND DIRECTION (deg)								
1.00	315	45	315	360	360	315		
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	0750	0850	0950	1050	1150	1250		
Run Time (min)	26	26	26	26	27	27		
-.03	67	1.50	1.43	1.17	.74	.19		
-.06	32	.76	.87	88	.83	.66		
-.12	- 08	.04	.16	.22	.38	.42		
-.25	-.08	-.05	-.08	- 08	-.01	01		
-.50	-.01	-.01	00	- 04	00	- 02		
-1.00	00	.01	00	00	- 01	-.04		
Precipitation (cm)	--	--	--	--	--	--		

Table 8.2 (Continued)

HOURLY OBSERVATIONS	August 28, 1956				O'NEILL, NEBRASKA			
CST	1405	1505	1805					
RADIATION (cal/cm²sec)								
Insolation	.0175	.0157	--					
Reflected	.0029	.0027	--					
Net Radiation	.0097	.0083	--					
AIR and SOIL TEMPERATURES (°C)								
Height (m)								
16.00	31.87	29.63	32.96					
8.00	32.29	30.26	33.08					
4.00	33.01	30.67	33.16					
2.00	33.54	31.38	33.18					
1.00	34.01	32.23	33.22					
.50	34.80	32.94	33.26					
.25	36.16	33.84	33.28					
.12	37.14	34.52	33.32					
-.03	35.59	36.25	31.00					
-.06	31.11	31.98	29.25					
-.12	25.44	26.14	26.24					
-.25	22.78	22.93	23.53					
-.50	21.60	21.59	21.52					
-1.00	19.83	19.84	19.52					
VAPOR PRESSURE (mb)								
16.00	13.80	17.16	13.92					
8.00	14.05	17.28	14.09					
4.00	14.07	17.28	14.11					
2.00	14.07	17.27	14.12					
1.00	14.08	17.29	14.20					
.50	14.17	17.31	14.23					
.25	14.24	17.30	14.30					
.12	14.39	17.31	14.32					
WIND SPEED (cm/sec)								
16.00	746	954	567					
8.00	790	946	511					
4.00	744	893	466					
2.00	669	798	407					
1.00	593	711	356					
.50	532	626	315					
.25	451	542	261					
WIND DIRECTION (deg)								
1.00	288	295	--					
SOIL TEMPERATURE CHANGE (°C)								
Initial Time	1350	1450	1750					
Run Time (min)	27	28	27					
-.03	.72	-.06	-.57					
-.06	.36	.23	-.08					
-.12	.33	.31	10					
-.25	.06	.06	.04					
-.50	.01	.02	00					
-1.00	00	-.03	.01					
Precipitation (cm)	--	--	--					

Table 8.3 Soil moisture and soil density, O'Neill, Nebraska, 1956

Date:	July 10		July 16	
Depth (cm)	Soil Moisture (% Dry Wt.)	Soil Density (Gr/cm³)	Soil Moisture (% Dry Wt.)	Soil Density (Gr/cm³)
0-10	7.2	1.06	6.8	.99
10-20	7.0	1.13	6.3	1.07
20-30	3.8	1.28	6.3	1.11
30-40	4.2	1.35	4.9	1.17
40-50	5.1	1.31	3.9	1.19
50-60	3.1	1.43	3.7	1.20
60-70	1.9	1.53*	3.4	1.27
70-80	1.8	1.53*	3.2	1.29
80-90	2.9	1.53*	4.8	1.40
90-100	5.7	1.53*	4.8	1.45
Date:	**August 6**		**August 29**	
Depth (cm)	**Soil Moisture (% Dry Wt.)**	**Soil Density (Gr/cm³)**	**Soil Moisture (% Dry Wt.)**	**Soil Density (Gr/cm³)**
0-10	9.2	1.03	6.6	1.05
10-20	6.6	1.11	6.5	1.19
20-30	3.0	1.23	6.0	1.22
30-40	2.8	1.27	4.4	1.35
40-50	2.9	1.29	5.6	1.29
50-60	3.5	1.32	6.7	1.39
60-70	6.2	1.20	3.8	1.51
70-80	3.8	1.35	2.9	1.56
80-90	2.6	1.45	2.4	1.58
90-100	1.8	1.60	2.4	1.68

*Mean value, 60-100cm.

CHAPTER 9
EVALUATION OF THE FLUXES OF SENSIBLE AND LATENT HEAT FROM MEASUREMENTS OF WIND, TEMPERATURE, AND DEW POINT PROFILES

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Texas A&M Research Foundation

9.1 Introduction

Inasmuch as the macroparameters of meteorology are, in many cases, determinable by the microparameters in the near surface layers of the atmosphere, a great deal of study has been conducted by many investigators towards better evaluation of these microparameters. A basic attack on the problem lies in the determination of the surface energy budget; and it is the purpose of this paper to present a method of evaluating the various terms of the energy balance relationship from measurements of moisture, net radiation, and the vertical gradients of wind, temperature, and moisture at a particular site for a given time interval.

From conservation of energy requirements, the sum of energy fluxes entering or leaving the earth's surface must be zero. Or

$$R_n + q_c + q_e + q_s = 0 \tag{1}$$

where R_n = net radiative flux of heat,

q_c = flux of sensible heat to the air,

q_e = flux of latent heat from evaporation or condensation of water, and

q_s = conductive heat flux into or out of the ground.

The net radiation is easily measurable directly and need not concern us here other than as a measure of the reliability of the other terms in Eq. (1).

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Measurements of soil heat flux, though not performed directly, are based on the Fourier conduction equation and the treatment shown in this paper is no different from that of previous authors (for example, Sutton[5]).

The essential difference between this and previous papers is based on a definition of turbulent flow first advanced by Halstead.[2] This, in turn, leads to evaluations of q_c and q_e in a turbulent regime different from those obtained through the classical concept of equivalence of exchange coefficients for heat and momentum.

The applicability of these evaluations is shown by heat budget computations based on data collected during Project Prairie Grass by personnel of Texas A&M Research Foundation.

9.2 The Flux of Momentum

The transfer rate of molecular momentum within a gas per unit time and area, in a direction perpendicular to the mean velocity of the gas (or tangential shear), is proportional to the vertical gradient of the velocity. That is,

$$\tau_z = \mu du/dz \tag{2}$$

where μ is defined as the absolute viscosity of the gas. Equation (2), though first presented as an empirical concept, can easily be derived from kinetic theory.

This derivation shows that

$$\mu = \rho \bar{c} L/3 \tag{3}$$

where $\bar{c}$ is the root-mean-square velocity of the molecules comprising the gas, ρ is the density, and L is the mean free path. If the scale of motion within the gas, as characterized by the product uz, where z is the distance from the bounding surface, exceeds the molecular scale of motion as shown by $\bar{c}L$, by a sufficient amount, the flow ceases to be laminar and becomes irregular or chaotic or, as usually described, turbulent.

The critical values of this ratio for tubes of various sizes were first investigated by Reynolds, who found that turbulent motion occurred

in a tube of diameter d when

$$R_e = 3ud/\bar{c}L = \rho ud/\mu > 2000. \tag{4}$$

Even though turbulent motion is present, a laminar sublayer adjacent to the boundary can still exist. The thickness of this layer is determinable from R_e for flow over smooth surfaces. Assuming a linear profile within the laminar layer, the surface friction 1 is

$$\tau_o = .332 \rho u_\delta^2 / \sqrt{R_e} .$$

From integration of Eq. (2), assuming $\tau \neq \tau(z)$,

$$\tau_o = \rho \bar{c} L u_\delta / 3\delta .$$

Thus, the localized Reynolds' number is

$$R_c = 3 u_\delta \delta / \bar{c} L = 135 . \tag{5}$$

It should be noted that the flow pattern at $z = \delta$ will not be strictly laminar or turbulent. That is, $z = \delta$ cannot be interpreted as a point but rather as a region. However, for purposes of discussion here, δ will be regarded as the thickness of the laminar layer.

To apply Eq. (2) to a turbulent regime, the molecular viscosity must be replaced by a term, usually referred to as the eddy viscosity, which will be a function of the distance from the bounding surface.

Inasmuch as division between laminar and turbulent flow does not occur at a precise point, it appears reasonable that the eddy viscosity should be so defined that it reduces to the molecular viscosity. That is, Eq. (2) could be written as

$$\tau_z = K du/dz , \tag{6}$$

where K will be equal to μ at $z = \delta$.

Consider a flow of gas over a smooth surface and assume n hypothetical surfaces inserted in the gas above the boundary, each a mean distance δ units above the layer preceding it. That is, the first

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surface is coincident with the top of the laminar sublayer. The effect of turbulence may be thought of as a factor of area distortion of a given surface. Hence, the area of the surface at elevation j will be greater than the area of the surface at j - δ and less than the surface at elevation j + δ. This is shown in Figure 9.1.

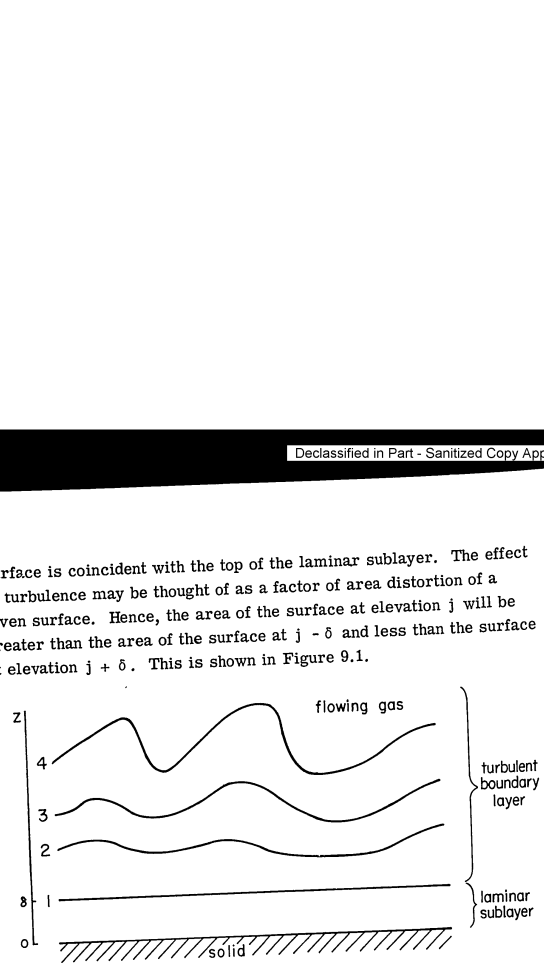

Figure 9.1 Distorted Area Pattern

The first surface has the same area as the smooth boundary itself inasmuch as below $z = \delta$ the flow is laminar. Above $z = \delta$, a given surface becomes distorted due to the distortion of the preceding surface, plus any inherent distortion of the surface itself.

Let r be the ratio of areas of any two adjacent surfaces. Then

$$r = A_n/A_{n-1}.$$

Hence, Eq. (6) may be written $\tau_z = \mu A_n/A_o \; du/dz.$ (7)

Thus, the area of the nth layer at elevation z will be

$$A_n = A_1 rn.$$

Since $A_1 = A_o$,

$$A_n/A_o = r z/\delta. \quad (8)$$

Substituting Eq. (8) in Eq. (7), we obtain,

$$\tau_z = rz\,\mu/\delta \;\; du/dz, \quad (9)$$

as applicable to turbulent flow.

The shearing stress τ_z will vary with elevation, being a maximum at $z = 0$, and decreasing with elevation. For the atmosphere, τ_z will vanish at $z = H$, where H is the geostrophic wind level.

Assuming a linear variation of shearing stress with height*, we may write,

$$\tau_z = \tau(1-z/H), \quad (10)$$

where τ is the stress at the top of the laminar layer, which for all practical considerations for the atmosphere will equal the shear stress at the surface. Hence,

$$\tau_o(1-z/H) = \rho\,\bar{c}\,(Lrz/3\delta)\;du/dz \quad (11)$$

Actually, ρ and $\bar{c}$ and L will vary with height also, but for the lower layers of the atmosphere this variation will be small.

Separating variables and integrating from δ to z, we obtain,

$$u_z = u_\delta + 3\delta\tau_o(\ln z/\delta - z/H)/\rho\,\bar{c}Lr \quad (12)$$

From integration of Eq. (7) from $z = 0$ to $z = \delta$ ($\tau_o = \tau_z$, $K = \mu$),

$$u_\delta = 3\tau_o\delta/\rho\,\bar{c}L. \quad (13)$$

*This is equivalent to assuming a unidirectional mean velocity, negligible Coriolis acceleration, and a uniform horizontal pressure gradient.

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Thus,

$$u_z = u_\delta [1 + (\ln z/\delta - z/H)/r] . \quad (14)$$

Inasmuch as the discussion is restricted to the region where z is of the order of a few meters, while H will be of the order of 500 meters, z/H of Eq. (14) will be insignificant with respect to ln z/δ and the former term may be neglected. Thus,

$$u_z = u_\delta [1 + (\ln z/\delta) r] . \quad (15)$$

Equation (15) is analogous to the wind profile equation derived from mixing length concepts, that is,

$$u_z = u_* [A + (\ln u_* z/\nu)/k] \quad (16)$$

where $u_* = \sqrt{\tau/\rho}$, k is von Karman's constant (k = 0.40), and A is a constant. It is interesting to convert Eqs. (15) and (16) to identical form, inasmuch as A and k have been evaluated from empirical studies.

From Eqs. (5) and (13),

$$u_\delta = R_c \nu/\delta = u_*^2 \delta/\nu . \quad (17)$$

Substituting in Eq. (15)

$$u_z = u_* [A + (\ln z u_*/\delta) k] \quad (18)$$

which is identical to Eq. (16) when

$$A = u_* \delta/\nu [1 - (\ln u_* \delta/\nu)/r] \quad (19)$$

and

$$k = \nu r/u_* \delta . \quad (20)$$

Using Nikuradse's (Sutton[5]) data for flow near a smooth surface, A = 5.5 for k = .40; hence, r = 4.65.

More recent work by Laufer at the Bureau of Standards affirms the Nikuradse data and leads to the same r value.

Substituting this value in Eq. (15),

$$u_z = u_\delta [1 + (\ln z/\delta)/4.65] , \; z > \delta \quad (21)$$

for flow near a smooth bounding surface.

Within the laminar sublayer ($z \leq \delta$), u is given from Eq. (17) and using $\mu = 1.8 \times 10^{-4}$ gm/cm sec, $\rho = 1.2 \times 10^{-3}$ gm/cm^3,

$$u_\delta = 20.3/\delta . \quad (22)$$

Figure 9.2 shows Eqs. (21) and (13) for several τ values, plotted as velocity versus the logarithm of elevation. The turbulent and laminar regimes are separated by the line along which $u_\delta \delta = 20.3$.

The applicability of Eq. (21) is limited to small elevations and smooth surfaces. We can rigorously define elevation but not a smooth surface. Aerodynamically speaking, a smooth surface means a surface that does not physically protrude through the laminar sublayer. However, since the thickness of this layer depends upon the velocity, a surface consisting of No. 4 sandpaper could be a smooth surface; and, under other flow conditions, a pane of glass could be a rough surface.

While a satisfactory theoretical treatment of the effect of surface roughness has yet to be developed, it is reasonable to think of the roughness elements as sinks of momentum which in total are equivalent to a "drag velocity." Hence, for the postulated type of flow over a rough surface, Eq. (21) can be modified to

$$u_z = u_\delta [1 + (\ln z/\delta)/4.65] - u_s , \quad (23)$$

where u_s is the drag velocity corresponding to momentum transferred to surface roughness elements, assuming no modification of the roughness elements by the flow. Further, the length δ must then represent, not the thickness of an actual sublayer, but more generally, the thickness of any layer which would give a distortion r. Since it is impossible to determine the sink strength of a surface theoretically or to

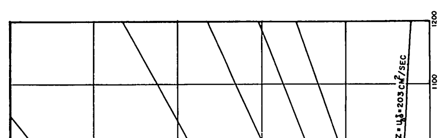

Figure 9.2 Wind profile grid for steady flow of air at constant temperature over aerodynamically smooth surfaces

measure u_s directly, it is necessary to eliminate the "drag velocity" by solving Eq. (23) simultaneously for more than one level.

In the presence of a vertical gradient of potential temperature, the modification of the flow pattern can be significant, as the density, mean free path, and root mean square velocity of the gas will change with elevation. That is, a buoyancy term will be present. This will be true in the laminar as well as in the turbulent region. For the lower layers of the atmosphere to which this discussion is restricted, the effects of buoyancy can be large, varying velocities and transfer rates through one or two orders of magnitudes. Fortunately, however, these effects do not appreciably influence the logarithmic nature of the profiles in the layers below one or two meters, hence need not be considered. Actually, this requires that z be no greater than the elevation for which u vs ln z is linear.

In general, the argument presented implies that turbulent transfer is not a function of an exchange coefficient varying with lateral or vertical displacement but a rate of distortion of laminar flow area which will vary from case to case, but will remain constant for a given flow pattern.

In order to apply the development to measurements of momentum transfer to the surface, we require the difference in velocity between a height z and 2z. From Eq. (23)

$$u_{2z} - u_z = (u_\delta \ln 2)/r. \qquad (24)$$

Substituting Eq. (23) in (13) and recalling that r = 4.65, then the total momentum flux at the surface (or any elevation, z, since Eq. (23) is essentially based on constancy of shearing stress with height) is given by

$$\tau_z = 1/3\rho\,(u_{2z} - u_z)^2. \qquad (25)$$

Inasmuch as this equation will be used again in the evaluation of the convective and evaporative fluxes of heat, it will be worthwhile to repeat the meaning of the various terms entering this equation.

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These are listed below:

u_z = mean wind speed at elevation z,

u_δ = mean speed at the top of the laminar sublayer (fictional for flow over a rough surface),

r = 4.65, increase in surface area due to turbulent distortion of a single layer of mean thickness δ,

δ = thickness of layer producing a constant distortion r (for flow over smooth surfaces, the thickness of the laminar sublayer).

9.3 The Flux of Sensible Heat

The rate of vertical transfer of heat (q_c) per unit time and unit area within a gas is proportional to the density of the medium, the specific heat, and the gradient of potential temperature, or for non-turbulent flow,

$$q_c = \nu_c \rho c_p \, dT/dz, \qquad (26)$$

where ρ is density, c_p is the specific heat at constant pressure, T is potential temperature, and ν_c is a constant of proportionality related to the product of molecular mean free path and root-mean-square velocity, and generally referred to as the thermal diffusivity. It has the same units as kinematic viscosity, cm^2/sec in the cgs system.

If air is in turbulent motion, transfer of heat is still expressible by Eq. (26) but with a dependency on the scale of motion within the fluid. That is, heat is transferred by parcels of air as well as by individual molecules.

As in the case of flux of momentum, consider a flow of air over a smooth boundary with hypothetical, equally spaced surfaces separating layers of the moving air. For laminar flow, each surface will be parallel to every other surface, or each surface will have the same area. For turbulent flow, however, each surface will have a different area depending on the degree of turbulence. The first of this hypothetical group of surfaces will be parallel to the solid surface itself, if it is located at the top of the laminar layer, which is at a distance δ

above the solid boundary. Surface number two, at a mean distance δ above number one, will be distorted to a degree depending on the scale of motion between the two surfaces. Surface number three (at a mean distance δ above surface two) will be distorted according to the scale of motion between it and surface one, or between it and number two, plus the distortion between surfaces one and two.

The area of a surface at a given height, z, is a measure of the opportunity for energy transfer. This area A_n, divided by the area of surface number one (or the area of the boundary itself, A_o), will be equal to rn where r is the fractional increase in area due to turbulent distortion and n is the number of surfaces, each a mean distance δ apart, between the boundary and elevation z.
Thus,

$$A_n = A_o rz/\delta. \qquad (27)$$

Hence, Eq. (26) may be written as

$$q_c = K_c \rho c_p \, dT/dz, \qquad (28)$$

where $K_c = \nu_c$ for $z \leq \delta$ (laminar flow),

and for turbulent flow (over smooth surfaces) as,

$$q = \nu_c rz \rho c_p/\delta \, dT/dz. \qquad (29)$$

Restricting the application of Eq. (29) to small values of z, constancy of ν_c, ρ, and c_p may be assumed. This, in effect, means negligibility of any buoyancy terms.

For the same conditions given in the preceding section for stress varying linearly with elevation, we assume a linear variation of q with elevation, or

$$q_c = q_o (1 - z/H), \qquad (30)$$

where H is the thickness of the turbulent layer, or geostrophic wind level.

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Substituting Eq. (30) in (29), separating variables, and integrating from the top of the laminar layer to an elevation z,

$$T_z = T_\delta[1 + (\ln z/\delta - z/H)/r], \tag{31}$$

where

$$T_\delta = q_c\delta/\rho\, c_p\, \nu_c. \tag{32}$$

For small values of z, the term z/H will be negligible in comparison with $\ln z/\delta$ and may be omitted. Thus,

$$T_z = T_\delta\,[1 + (\ln z/\delta)/r], \tag{33}$$

for flow over smooth surfaces.

For flow over aerodynamically rough surfaces, we parallel the previous view concerning momentum. That is, we will regard roughness elements to act as sources or sinks of heat, according to the temperature differences between the elements and the ambient, and postulate a potential temperature equivalent to the magnitude of the sources or sinks. In this view, Eq. (32) may be modified to

$$T_z = T_\delta[1 + (\ln z/\delta)/r] + T_s. \tag{34}$$

Generally, T_s will be unknown, but it is not involved when Eq. (34) is applied to potential difference between two levels. For the particular levels z and 2z,

$$T_{2z} - T_z = T_\delta\,(\ln 2)/r. \tag{35}$$

Combining Eqs. (17), (24), (32), and (35), we obtain

$$q_c = c_p r^2 \rho\, \nu_c\,(T_{2z} - T_z)\,(u_{2z} - u_z)/R_c\, \nu\, (\ln 2)^2, \tag{36}$$

for evaluation of the flux of sensible heat.

Using the values

$\rho = 1.2 \times 10^{-3}$ gm/cm^3,

$c_p = 0.24$ cal/gm deg C,

$\nu_c = 0.21$ cm^2/sec,

$\nu = 0.15$ cm^2/sec,

$r = 4.65$, and

$R_c = 135$,

in Eq. (36)

$$q_c = .124 \times 10^{-3}\,(u_{2z} - u_z)\,(T_{2z} - T_z) \tag{37}$$

with q_c in cal/cm^2 sec, velocity in cm/sec, and temperature in degrees Centigrade.

9.4 The Flux of Water Vapor

Evaporation of a fluid is a measure of the difference of exchange rates of molecules of the fluid between the surface and the surrounding medium. For the case in which molecules escaping from the surface of the fluid are influenced only by their concentration and the molecular properties of the surrounding medium (for example, still air over water), the evaporation is given by,

$$E = \sigma\, d\, \rho'/dz, \tag{38}$$

where σ is the diffusion coefficient, and ρ' is the density of the fluid vapor. While σ will vary slightly with temperature, it may be considered constant for purposes of this discussion. Its value for 15°C is .250 cm^2/sec.

If the air is in turbulent motion, Eq. (38) requires modification to allow for non-molecular transfer. As in the previous cases of transfer of momentum and heat, we will generalize the laminar flow case to include turbulent flow by introducing a factor to allow for the increased area of contact between the turbulently distorted layers, or

$$E = \sigma r\, z/\delta\, d\rho'/dz. \quad (39)$$

Using the same reasoning that has been applied for the wind and temperature profiles with respect to variations in E with height, surface roughness, and thermal buoyancy, the evaporation is given as

$$E = \sigma (u_{2z} - u_z)(\rho'_{2z} - \rho'_z)/3, \quad (40)$$

where E will be given in gm/cm^2 sec for ρ' in gm/cm^3, and u in cm/sec.

In order to compute the flux of latent heat by evaporation, Eq. (40) must be multiplied by the latent heat of vaporization of water for the particular temperature concerned. Using 20°C as an average temperature and converting absolute humidity to an equivalent vapor pressure by use of

$$\rho' = eM/RT \quad (41)$$

where

- M = 18, molecular weight of water,
- R = 8.31×10^{-7} erg deg, universal gas constant,
- T = 293°K,
- e = vapor pressure (millibars), and
- q_e = evaporative flux of heat,

we can write approximately,

$$q_e = .240 \times 10^{-3} (u_{2z} - u_z)(e_{2z} - e_z), \quad (42)$$

when q_e is given in cal/cm^2 sec.

9.5 Soil Heat Flux

Inasmuch as transfer of heat energy within the soil is by conduction, the equation for heat flux in the soil is given by the Fourier relation,

$$\partial T/\partial t = \nu_c \nabla^2 T \quad (43)$$

where T = temperature, and ν_c = thermal diffusion coefficient. If $\partial^2 T/\partial x^2 = \partial^2 T/\partial y^2 = 0$, using Eq. (26) to define the heat flux, and considering z to increase positively with height,

$$q_o = q_z + \int_z^o \rho c_p (\partial T/\partial t)\, dz. \quad (44)$$

Since it is desirable to determine the surface heat flux from soil temperature difference with time, q_z must equal zero. That is, measurements must cover the range from the surface to a point where $\partial T/\partial z = 0$. Hence,

$$q_o = \int_z^o \rho\, c_p (\partial T/\partial t)\, dz. \quad (45)$$

9.6 Computation of Surface Heat Budgets

During the 70 gas releases of Project Prairie Grass, personnel of the Texas A&M Research Foundation made measurements of net radiation as well as of wind velocity, vapor pressure, air temperature, and soil temperature at several levels. These data have been used in the energy balance equation as a measure of the applicability of the expressions developed for evaluating the fluxes of sensible and evaporative heat.

The systems of measurement employed in the study are described in Chapter 7 of this report and need not be repeated here. The method of analysis of the data as pertinent to the various flux computations, however, is given below.

Referring to Eq. (37), evaluation of $\Delta u = (u_{2z} - u_z)$ and $\Delta T = (T_{2z} - T_z)$

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is all that is required to evaluate the flux of sensible heat. These values, of course, are obtainable from profile measurements of wind speed and air temperature. Specifically, the mean values of u and T at 12.5, 25, 50, 100, 200, 400, 800, and 1600 centimeters were measured for a 20- to 30-minute interval surrounding the gas release intervals and plotted versus the logarithm of elevation. Inasmuch as the developed relationships apply in the region where u is linear with ln z, the portions of the profiles significant to the study are straight lines, and the double-level variation is merely the abscissa increment between any two successive levels along the profile.

To minimize plotting and reading errors, the increments were read between four levels and divided accordingly. Of course, not all profiles were strictly linear. In such cases the "best sight" fit to a linear profile was used with greatest weight given to the lowest levels where deviation from linearity was a minimum.

In the u evaluation, extrapolation of the profile to u = 0 gives the roughness parameter z_o, as can be seen from

$$u = (u_* \ln z/z_o)/k, \qquad (46)$$

which is another form of Eq. (16). A value of 0.6 cm was found to be the z_o value for the measuring station location. This value represents the average value of the ln z versus u intercepts of 16 profiles that were essentially linear at all levels. Hence, all wind profiles were drawn as straight lines from the point z = 0.6 cm, u = 0, through the lower four points of u versus the logarithm of z.

The increment of vapor pressure $\Delta e = (e_{2z} - e_z)$ was obtained similarly from measurements of vapor pressure at the same elevations used for wind speed and air temperature.

The soil heat flux at the surface is given by Eq. (45). Both ρ and c_p vary with depth but so slightly, for the interval considered, that they may be treated as constant. For the type of soil in question (O'Neill loam, upland phase), $\rho c_p = 0.28$, as determined from six

different soil tests performed during the period covered by the data.

Thus, the value of soil heat flux is proportional to the area between profiles of temperature versus depth at the beginning and the end of the sampling period. The above, of course, is based on the assumption that $\partial T/\partial z = 0$ at some level z.

Soil temperatures were measured at 3.12, 6.25, 12.5, 25, 50, and 100 centimeters. If a maximum or minimum occurred at a depth of less than 100 centimeters, then the integral is represented by the area between the two profiles from the surface to the critical depth. If no maximum or minimum temperature occurred, then the integral was evaluated to 100 centimeters, provided the temperature at that depth did not vary significantly with time during the gas release period. Inasmuch as surface temperature was not measured, this point on the profile was obtained from a graph of surface temperature versus time of day for that location as given by an analog computer[4] from local input data.

Table 9.1 gives a summary of the analysis for 48 release periods for which complete data were available. The fluxes in this table are given in kilocalories per square centimeter per second. To facilitate comparison of these fluxes with values determined by the University of Wisconsin group, the fluxes are presented in calories per square centimeter per minute in Table 9.2.

The line of best fit* of the data of Table 9.1 is y = .99 x, where y represents the net radiation values and x is the negative of the sum of the fluxes of latent heat, sensible heat, and soil heat. The average error (that is, between the net radiation values and the sum of the fluxes) is 0.43×10^{-3} cal/cm^2 sec. If release No. 10, which is obviously suspect, is omitted, the line of best fit is y = 0.97 x and average error is 0.36×10^{-3} cal/cm^2 sec.

*Determined by the method of least squares. The second significant figure in the equation of best fit should not be taken to imply an accuracy of 1 percent, but is given only as a means of comparison with other equations based on different methods of evaluating heat fluxes.

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Table 9.1. Heat budget data collected by the Texas A&M Research Foundation

Gas Rel. No.	Δu cm/sec	$\Delta\theta$ °C	Δe mb	q_c Kcal/cm^{2}sec	q_e Kcal/cm^{2}sec	q_s Kcal/cm^{2}sec	$\sum q_i$ Kcal/cm^{2}sec	R_n Kcal/cm^{2}sec	$R_n+\sum q_i$ Kcal/cm^{2}sec
2	23	- .28	-.42	- .80	-2.32	:07	- 3.05	2.90	.15
7	54	-1.07	-.33	- 7.16	-4.28	-1.58	-13.02	12.80	.22
8	54	- .51	-.20	- 3.41	-2.59	.23	- 5.77	5.70	.07
9	84	- .53	-.23	- 5.52	-4.64	-1.18	-11.34	11.40	- .06
10	57	- .90	-.13	- 6.36	-1.78	-1.39	- 9.53	12.80	-3.27
15	40	- .70	-.09	- 3.47	- .86	-1.11	- 5.44	5.00	.44
16	42	-1.03	-.23	- 5.36	-2.32	-2.38	-10.06	10.00	.06
19	73	- .60	-.10	- 5.43	-1.75	-1.08	- 8.26	8.10	.16
20	112	- .83	-.05	-11.53	-1.34	-1.43	-14.30	13.70	.60
21	72	.10	-.01	.89	- .17	.22	.94	- .90	- .04
22	83	.15	-.02	1.54	- .40	.28	1.42	- 1.40	- .02
25	34	- .52	-.48	- 2.19	-3.92	.03	- 6.08	6.20	- .12
26	79	- .63	-.30	- 6.17	-5.69	-1.06	-12.92	12.60	.32
27	73	- .82	-.18	- 7.42	-3.15	-2.68	-13.25	12.30	.95
30	83	- .70	-.25	- 7.20	-4.98	-1.52	-13.70	12.90	.80
31	99	- .38	-.14	- 4.66	-3.33	- .95	- 8.94	9.20	- .26
32	20	.33	-.06	.82	- .29	.99	1.52	- 1.30	- .22
33	90	- .48	-.30	- 5.36	-6.48	.78	-11.06	10.90	.16
34	110	- .55	-.15	- 7.50	-3.96	- .35	-11.81	11.30	.51
35s	44	.12	-.04	.65	- .42	.76	.99	- .70	- .29
35	10	.12	.00	.15	.00	.82	.97	- .91	- .06
36	16	.23	-.06	.46	- .23	.61	.84	- .85	.01
38	48	.10	.00	.60	.00	.35	.95	- .85	- .10
39	22	.26	-.02	.71	- .11	.78	1.38	- 1.35	- .03
40	20	.23	-.04	.57	- .19	.70	1.08	- 1.14	.06
41	42	.16	-.01	.83	- .10	.51	1.24	- 1.23	- .01
42	70	.15	-.01	1.30	- .17	.26	1.39	- 1.92	.53
43	65	- .83	-.17	- 6.69	-2.65	- .63	- 9.97	10.80	- .83
44	71	- .85	-.07	- 7.48	-1.19	-1.35	-10.02	9.70	.32
45	70	- .20	-.03	- 1.74	- .50	.66	- 1.58	1.40	.18
46	66	.13	-.04	1.06	- .63	1.34	1.77	- 1.40	- .37
48s	38	- .77	-.34	- 3.63	-3.10	-1.54	- 8.27	7.00	1.27
48	91	- .51	-.11	- 5.75	-2.40	-1.01	- 9.16	8.10	1.06
49	82	- .76	-.15	- 7.73	-2.95	-1.67	-12.35	12.90	- .55
50	81	- .90	-.13	- 9.04	-2.53	-1.33	-12.90	12.80	.10
51	82	- .67	-.13	- 6.81	-2.56	- .52	- 9.89	8.80	1.09
52	55	-1.25	-.19	- 8.52	-2.51	- .68	-11.71	11.00	.71
53	21	.43	-.03	1.12	- .15	.98	1.95	- 1.50	- .45
54	46	.17	.00	.97	.00	.67	1.64	- 1.70	.06
55	69	.15	.00	1.28	.00	.55	1.83	- 1.50	- .33
56	56	.10	.04	.69	.54	.64	1.87	- 1.40	- .47
57	85	- .13	-.02	- 1.37	- .41	.34	- 1.44	1.30	.14
59	26	.26	-.01	.84	- .06	.58	1.36	- 1.40	.04
60	54	.17	-.01	1.14	- .13	.52	1.53	- 1.40	- .13
61	96	- .70	-.08	- 8.33	-1.84	-1.21	-11.38	11.90	- .52
62	63	- .37	-.17	- 2.89	-2.57	- .60	- 6.06	7.20	-1.14
63	3	.83	.47	.31	.34	.95	1.60	- 1.10	- .50
64	3	.43	.18	.16	.13	.96	1.25	- .50	- .75

Table 9.2. Heat budget data collected by the Texas A&M Research Foundation

Gas Release No.	q_c cal/cm^{2}min	q_e cal/cm^{2}min	q_s cal/cm^{2}min	R_n cal/cm^{2}min
2	-.048	-.139	.004	.174
7	-.430	-.257	-.095	.768
8	-.205	-.155	.014	.342
9	-.331	-.278	-.071	.684
10	-.382	-.107	-.083	.768
15	-.208	-.052	-.067	.300
16	-.322	-.139	-.143	.600
19	-.326	-.105	-.065	.486
20	-.692	-.080	-.086	.822
21	.053	-.010	.013	-.054
22	.092	-.024	.017	-.084
25	-.131	-.235	.002	.372
26	-.370	-.341	-.064	.756
27	-.445	-.189	-.161	.738
30	-.432	-.299	-.091	.774
31	-.280	-.200	-.057	.552
32	.049	-.017	.059	-.078
33	-.322	-.389	.047	.654
34	-.450	-.238	-.021	.678
35s	.039	-.025	.046	-.042
35	.009	.000	.049	-.055
36	.028	-.014	.037	-.051
38	.036	.000	.021	-.051
39	.043	-.007	.047	-.081
40	.034	-.011	.042	-.068
41	.050	-.006	.031	-.074
42	.078	-.010	.016	-.115
43	-.401	-.159	-.038	.648
44	-.449	-.071	-.081	.582
45	-.104	-.030	.040	.084
46	.064	-.038	.080	-.084
48s	-.218	-.186	-.092	.420
48	-.345	-.144	-.061	.486
49	-.464	-.177	-.100	.774
50	-.542	-.152	-.080	.768
51	-.409	-.154	-.031	.528
52	-.511	-.151	-.041	.660
53	.067	-.009	.059	-.090
54	.058	.000	.040	-.102
55	.077	.000	.033	-.090
56	.041	.032	.038	-.084
57	-.082	-.025	.020	.078
59	.050	-.004	.035	-.084
60	.068	-.008	.031	-.084
61	-.500	-.110	-.073	.714
62	-.173	-.154	-.036	.432
63	.019	.020	.057	-.066
64	.010	.008	.058	-.030

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Figure 9.3 is a scatter diagram of the data of Table 9.1.

A comparison of Eq. (40) with the Thornthwaite-Holzman evaporation formula shows that the latter relation differs from the former by a constant factor. The equations are, respectively,

$$q_{1e} = \sigma/3\nu \Delta u \rho' \qquad (46)$$

$$q_{2e} = (pk^2 \Delta u \Delta h)/(\ln 2)^2 \qquad (47)$$

where Δh is the difference in specific humidity between elevations z and 2z, and all other symbols have the meanings previously used. Replacing h in Eq. (47) by the ratio of absolute humidity to air density

$$q_{1e}/q_{2e} = \sigma/\nu \, (\ln 2)^2/3k^2 \, . \qquad (48)$$

That is,

$$q_{1e} \doteq \sigma/\nu \; q_{2e} \qquad (49)$$

At 20°C, the ratio of σ/ν is equal to 1.6 or

$$q_{1e} \doteq 1.6 \, q_{2e} \qquad (50)$$

Hence, the evaporation amount and the flux of latent heat, as computed by the developments in this paper, are approximately 50 percent greater than the corresponding values obtained by the Thornthwaite-Holzman equation.

The sensible heat flux, according to the developments of this paper, also differs from the usual computations based on equivalence of the eddy conduction of heat and momentum by approximately 50 percent. That is,

$$q_{1h} = K_H \, c_p \, \rho \; d\theta/dz \qquad (51)$$

where K_H is the eddy coefficient for heat. Assuming that $K_m = K_H = ku_* z$, where the subscript m refers to momentum, then

$$q_{1h} = ku_* \, z \, c_p \rho \;\; d\theta/dz \qquad (52)$$

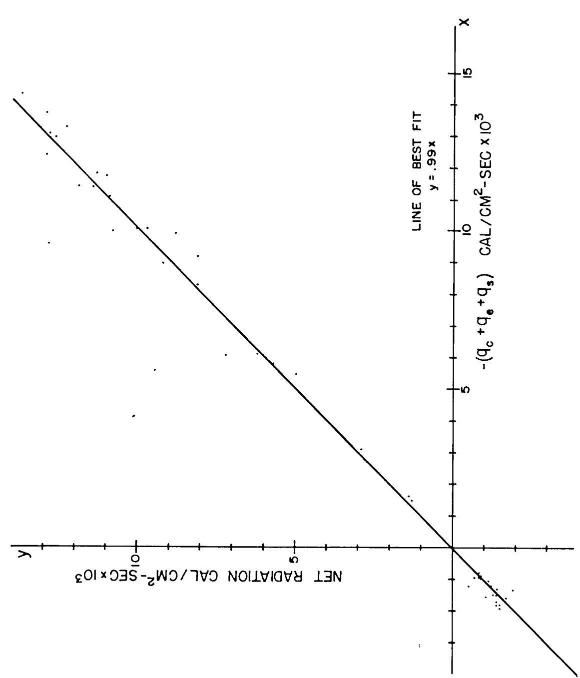

Figure 9.3 Net radiation vs. summation of heat fluxes, O'Neill, Nebraska, Summer of 1956, $K_M \neq K_H \neq K_W$

Comparing this with Eq. (29)

$$q_{2h} = \nu_c \, r(z/\delta) \, \rho \, c_p \, d\theta/dz$$

and using Eq. (20) to evaluate ku_*,

$$q_{1h}/q_{2h} = \nu/\nu_c = K_m/K_H, \qquad (53)$$

which is the Prandtl number for air (.711). Hence,

$$q_{2h} = 1.4\, q_{1h}, \qquad (54)$$

or, as noted above, the sensible heat flux based on the reasoning of this paper is approximately one and one-half times the flux computations based on equivalence of the Austauch values for heat and momentum. Figure 9.4 is a scatter diagram of the O'Neill data based on the latter concept.

The supposition that the exchange coefficients for heat and momentum are equal or nearly so probably dates from the Reynolds' analogy, that is,

$$\tau/\rho = (\nu + K)\, du/dz = K_m \, du/dz \qquad (55)$$

and

$$-q/c_p\rho = (\nu_c + K)\, d\theta/dz = K_H \, d\theta/dz. \qquad (56)$$

Assuming that ν and ν_c represent insignificant contributions to the coefficients, K_H and K_m should be nearly equal.

The development used in this paper is equivalent to the postulate that

$$\tau/\rho = K\, du/dz = K_m \, du/dz, \qquad (57)$$

and

$$-q/\rho \, c_p = \nu_c \, K \, d\theta/dz = K_H \, d\theta/dz, \qquad (58)$$

hence, using Eqs. (9) and (29),

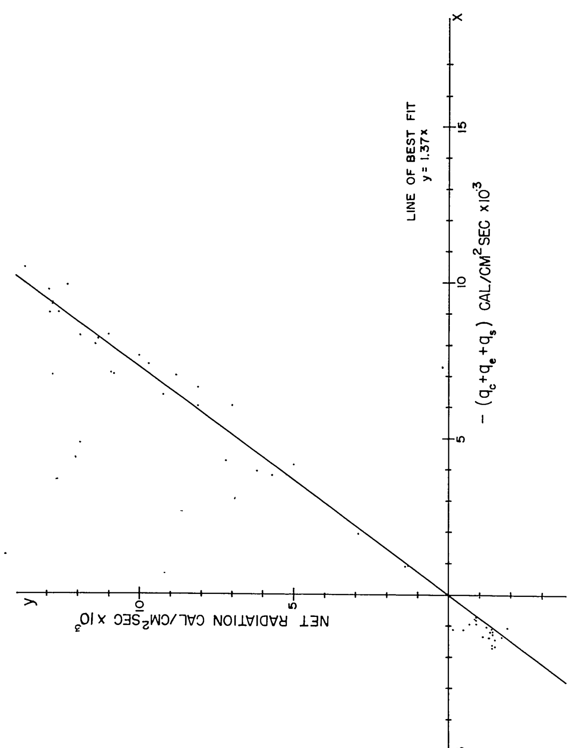

Figure 9.4 Net radiation vs summation of heat fluxes, O'Neill, Nebraska, Summer of 1956, $K_M = K_H = K_W$

$$K_m/K_H = \nu/\nu_c . \qquad (59)$$

It is not intended to imply that the equivalence of the eddy coefficients for momentum and heat has been universally accepted in the past. Swinbank[6] from experiments conducted in Australia says "... there is a certain notable consistency about the manner in which K_H exceeds K_m ... Not only is this order of the coefficients maintained from one occasion to another, but also, broadly, the proportionality among them." From five measurements of K_m and K_H, his average ratio is

$$K_H/K_m = 1.8 , \qquad (60)$$

which is certainly of the magnitude of the ratio of ν_c to ν.

Data obtained by Rider[4] at Cardington, England, also supports this value of the ratio of K_m and K_H, although Rider did not interpret the results as support for the non-equivalence of the two coefficients. From averaging of nine evaluations of K_H and K_m (at 75 centimeters) from observed energy balance computations, Rider finds as an average ratio

$$K_m/K_H = .70 .$$

While this value is indeed near unity, it is remarkably near the Prandtl number (.711) for air.

While detailed profiles of wind, temperature, and humidity have been utilized in verifying the turbulent transfer equations, the equations themselves require measurements at only two levels. Since measurement of a detailed profile requires a large number of highly accurate instruments and a comparable amount of technical time and attention, it would seem important to determine the degree of accuracy with which the various terms in the energy budget would have balanced had only two levels been available. Further, the data available should be sufficient to determine the optimum levels at which measurements could have been made.

The matter of optimum levels must require a compromise which will minimize three possible sources of error. First, the lowest level needs to be far enough above the surface that irregularities in that surface do not cause an appreciable uncertainty in determining the height of that level. Second, the difference in height between the two levels needs to be sufficiently great (in terms of doubled levels) so that errors caused by instrument inaccuracies and sampling errors are not too great. Third, the top level needs to be as low as possible so as to avoid the effect of buoyancy.

To study the combined effect of these three error sources, the data of the previous section have been treated in the following way. Values of Δu, $\Delta\theta$, and Δe have been obtained from the 21 pairs of levels; 25 to 50 cm, 25 to 100 cm, 25 to 200 cm, 25 to 400 cm, 25 to 800 cm, 25 to 1600 cm, 50 to 100 cm, 50 to 200 cm, 50 to 400 cm, 50 to 800 cm, 50 to 1600 cm, 100 to 200 cm, 100 to 400 cm, 100 to 800 cm, 100 to 1600 cm, 200 to 400 cm, 200 to 800 cm, 200 to 1600 cm, 400 to 800 cm, 400 to 1600 cm, and 800 to 1600 cm. The number of Δu's, $\Delta\theta$'s and Δe's, obtained in this manner (per pair of levels) that fall within 10 percent of the corresponding profile determinations are shown in Table 9.3.

As can be seen from this table, the levels at 25 and 100 cm appear to give the most satisfactory representation of the entire profiles. This is further substantiated by Table 9.4 which lists the best fit equations and average error for the four best level pairs, as well as that obtained from use of the profiles to determine Δu, $\Delta\theta$, and Δe.

9.7 Conclusion

The method developed in this paper appears to be satisfactory for calculating the turbulent transport of sensible and latent heat over the range of conditions represented by the data available.

However, since it differs from earlier methods by approximately 50 percent and since the test data are restricted to a summer season with exclusively southerly winds, it would appear desirable that it be tested further, preferably by other workers in the field.

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Table 9.3. Percentage of double-level values within 10 percent of profile values

Level Pair (cm)	Δu cm/sec	Δθ °C	Δe mb	%	Level Pair (cm)	Δu cm/sec	Δθ °C	Δe mb	%
25-50	17	19	19	38	100-200	15	12	10	26
25-100	25	25	18	47	100-400	15	14	8	26
25-200	28	20	17	45	100-800	8	8	15	22
25-400	24	18	11	37	100-1600	7	8	12	19
25-800	12	17	11	28	200-400	12	9	9	21
25-1600	12	15	15	29	200-800	6	10	12	19
50-100	18	13	8	27	200-1600	3	6	14	16
50-200	17	13	13	30	400-800	4	5	6	10
50-400	19	17	11	33	400-1600	4	4	6	10
50-800	10	11	12	23	800-1600	4	3	6	9
50-1600	9	8	8	17					

Table 9.4. Statistical analysis of heat budget balance

Method	Line of Best Fit*	Average Error (cal/cm^2 sec)	Levels Employed
CLASSICAL	y = 1.37X	1.60×10^{-3}	Profiles
DISTORTED AREA	y = .92X	1.14×10^{-3}	25-50 cm
DISTORTED AREA	y = 1.0 X	1.06×10^{-3}	25-100 cm
DISTORTED AREA	y = 1.0 X	1.25×10^{-3}	25-200 cm
DISTORTED AREA	y = 1.0 X	1.40×10^{-3}	25-400 cm
DISTORTED AREA	y = .99X	$.43 \times 10^{-3}$	Profiles

*Line of regression

REFERENCES

1. Blasius, H., Z. Math. u. Physik 56, 1908.
2. Halstead, M. H., "The Fluxes of Momentum, Heat, and Water Vapor in Micrometeorology." Publications in Climatology 7, No. 2, The Johns Hopkins University Laboratory of Climatology, Seabrook, New Jersey, 1954.
3. Halstead, M. H., et al., "A Preliminary Report on the Design of a Computer for Micrometeorology." Scientific Report No. 1, Project 93, Texas A&M Research Foundation, College Station, Texas, 1956.
4. Rider, N. E., "Eddy Diffusion of Momentum, Water Vapor, and Heat Near the Ground." Proc. Roy. Soc. A246, 481-501, 1954.
5. Sutton, O. G., Micrometeorology, McGraw-Hill, New York, 198 and 80, 1953.
6. Swinbank, W. C., "The Measurement of the Vertical Transfer of Heat, Water Vapor, and Momentum by Eddies in the Lower Atmosphere, with Some Results." Geophysical Research Papers No. 19, Geophysics Research Directorate, AF Cambridge Research Center, 363, 1952.

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CHAPTER 10

HEAT BUDGET DETERMINATIONS MADE BY THE UNIVERSITY OF WISCONSIN GROUP

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10.1 Instrumentation

The instrumentation used in heat budget determinations during Project Prairie Grass was, with two exceptions, the same as that used by the University of Wisconsin during the Great Plains Turbulence Field Program in 1953.[1] The exceptions are as follows:

a. In 1953 the thermocouples in the psychrometers were wired to give the dry bulb temperature difference and the difference in the wet bulb depressions. During these experiments the thermocouples were wired to give the dry bulb temperature difference and the wet bulb temperature difference so that the vapor pressure difference is given by the relation

$$\Delta e = (K + k)\,\Delta T_w - k\,\Delta T_d \qquad (1)$$

where k is the psychrometric constant and K is the slope of the vapor pressure vs. temperature curve at the mean wet bulb temperature.

Every 10 minutes the positions of the two psychrometers were reversed but the connection to the recorder was not. This has the effect of doubling the sensitivity and yet eliminating dead zone and zero errors. Therefore, the vapor pressure and temperature gradients obtained during the Prairie Grass experiments are more accurate than those obtained in 1953. This is especially true during those times that the gradient is small.

b. Soil heat flow was obtained by measuring the change in the heat content of the layer 0-5 cm and the heat flux through the -5 cm level. The change in mean temperature of the 0-5 cm layer was measured using 12 space-integrating thermometers similar to those used in 1953. Instead of a manual balancing of a Wheatstone bridge, the out-of-balance current was recorded on the 12-point Brown recorder. The out-of-balance current depends on battery voltage as well as resistance; however, the former was held constant by employing mercury alkaline batteries. The heat flow through the -5 cm layer was measured using 5 heat flux plates connected in series. The soil term G listed in the tables in Section 10.2 is the sum of the change in the heat content of the layer 0 to -5 cm and the heat flux through the -5 cm level.

10.2 Heat Budget Data

The heat budget values listed in Table 10.1 are 20-minute averages centered, in each case, on the period of gas release. Estimated values are shown in parentheses. Missing values, due to instrument failure, are denoted by dashes. Positive signs indicate fluxes toward the air-earth interface; negative signs indicate fluxes away from the interface.

Table 10.1 Heat budget data* collected by the University of Wisconsin

Gas Release Number	Date	Time (CST)	I	R_N	L	E	G
3	7/5	2200		-.10			
4	7/6	0100		-.10			
5	7/6	1400	1.30	1.08			
6	7/6	1700	.73	.50			
7	7/10	1400	1.35	.82	-.39	-.26	-.12
8	7/10	1700	.75	.36	-.23	-.12	.01
9	7/11	1000	1.06	.61	-.30	-.18	-.13
10	7/11	1200	1.23	.76	-.38	-.24	-.14
11	7/14	0800	.72	.39	-.21	-.12	-.05
12	7/14	1000	1.15	.73	-.38	-.21	-.14
13	7/22	2000	.03	-.08	.01	0	.06
14	7/22	2200	0	-.07	.01	.01	.05
15	7/23	0800	.70	.38	-.19	-.08	-.10
16	7/23	1000	1.15	.70	-.36	-.18	-.16
17	7/23	2000	.05	-.06	0	.01	.05
18	7/23	2200	0	-.09	--	--	.04
19	7/25	1100	1.10	.69	-.40	-.16	-.14
20	7/25	1300	1.30	.85	-.52	-.26	-.06
21	7/25	2200	0	-.05	.02	.01	.02
22	7/26	0000	0	-.07	.02	.01	.05
23	7/29	2100	0	-.09	.04	.02	.02
24	7/29	2300	0	-.08	.03	.02	.02
25	8/1	1300	.72	.46	-.19	-.23	-.04
26	8/2	1200	.86	.61	-.20	-.33	-.08
27	8/2	1400	.97	.64	-.19	-.37	-.08
28	8/3	0000	0	-.09	--	--	--
29	8/3	0200	0	-.06	--	--	.01
30	8/3	1300	1.22	.84	-.34	-.39	-.10
31	8/3	1500	.89	.58	-.25	-.31	-.03
32	8/6	2000	.02	(-.09)	--	--	.04
33	8/7	1300	1.09	.83	-.39	-.35	-.08
34	8/7	1500	1.10	.84	-.44	-.36	-.05
35	8/11	2130	0	-.06	.02	.01	.03
36	8/11	2330	0	-.07	.01	0	.05
37	8/12	0300	0	-.05	--	--	.02
38	8/12	0500	.01	-.07	--	--	.02
39	8/13	2230	0	0	-.01	-.02	.03
40	8/14	0030	0	-.01	-.01	-.02	.04
41	8/14	0300	0	-.01	-.01	-.01	.02
42	8/14	0500	0	0	-.01	-.01	.02

Table 10.1 Heat budget data* collected by the University of Wisconsin (cont)

Gas Release Number	Date	Time (CST)	I	R_N	L	E	G
43	8/15	1200	1.11	.93	--	--	--
44	8/15	1400	1.13	.93	--	--	--
45	8/15	1200	.41	.25	--	--	--
46	8/15	1845	.05	-.03	--	--	.04
47	8/20	1000	.85	.45	-.21	-.14	-.11
48	8/21	0900	.39	.21	-.11	-.05	-.04

* All heat budget entries are in langleys per minute.
I represents insolation
R_N represents net radiation
L represents convective heat transfer
E represents evaporation
G represents soil heat transfer
( ) denotes estimated value
-- denotes missing data due to instrument failure

REFERENCE

1. Lettau, H. H. and Davidson, B. Exploring the Atmosphere's First Mile. Pergamon Press, New York, 1957, Volume 1, Chapters 2, 3, and 4.

CHAPTER 11
OPTICAL MEASUREMENTS OF LAPSE RATE

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11.1 Introduction

Detailed and very accurate observations of temperature structure in the lowest 50 cm of the atmosphere have been made above a cold water surface by an optical method.[1] These observations reveal a minor anomaly in the temperature profile at a height of about 10 cm of air (equivalent to an optical path length of 10^{-4} gm cm^{-2} of water vapor) which is consistent with simple numerical calculations based on extrapolated radiative absorption coefficients for water vapor. At this height above a cold surface, the air cools by radiation at several degrees Centigrade per hour; and, this cooling is reflected in the observed anomaly in the temperature profile.

Optical observations were incorporated in Project Prairie Grass to determine the detailed temperature structure above a warm land surface. The method used was essentially that described in reference 1, but certain modifications in detailed technique were necessary. The instrument used was a field artillery range finder operated in the vertical position. In lapse conditions the two light paths from instrument to target diverge from their respective straight-line directions as shown in Figure 11.1, whereas in inversions the light paths converge from their respective straight-line directions. The instrument is mechanically

* Personnel of the Texas A&M Research Foundation, under the direction of Professor Maurice Halstead, constructed the optical targets and made the time series observations.
Max Scoggins, General Electric Company, Richland, Washington, helped in installation of the equipment and in making the profile observations.

limited to measuring converging angles; consequently, in lapse conditions it was necessary to use targets separated by a vertical distance less than the separation of the lenses. The separation used in lapse conditions was 90 or 95 cm, whereas the separation of lenses is 100 cm. For this reason, in lapse conditions the upper path sloped slightly with respect to the lower path, but not enough to affect the measurements appreciably. From Figure 11.1 and Eq. (1) of reference 1, it follows that

$$h_1' = \frac{h_1 x'}{x} = \frac{xx'(n-1)}{2nT}\left[\frac{g}{R} + \left(\frac{\partial T}{\partial z}\right)_1\right] \qquad (1)$$

$$h_2' = \frac{h_2 x'}{x} = \frac{xx'(n-1)}{2nT}\left[\frac{g}{R} + \left(\frac{\partial T}{\partial z}\right)_2\right] \qquad (2)$$

where n represents index of refraction for air; T, absolute temperature; z, height coordinate; x, horizontal distance between instrument and target; and x', apparent distance to point of convergence of tangent lines (instrumental reading). Also, Figure 11.1 shows that

$$h_2' - h_1' = (Z-L)\frac{x'}{x} - Z \qquad (3)$$

where L represents the vertical separation at the target lines and Z the vertical separation of the lenses. Substitution of Eqs. (1) and (2) in Eq. (3) gives

$$\left(\frac{\partial T}{\partial z}\right)_2 - \left(\frac{\partial T}{\partial z}\right)_1 = \frac{2nT}{x(n-1)}\left[\frac{Z-L}{x} - \frac{Z}{x'}\right] \qquad (4)$$

For L = Z, Eq. (4) reduces to Eq. (5) of reference 1. Nine targets, each consisting of two (or more) horizontal black lines on white backgrounds were mounted at varying distances from the instrument. The black lines are indicated as target lines in Figure 11.1. Flashlight bulbs were installed at a vertical separation of 100 cm for night observations. Heights of the lower black line, equal to height of the lower lens, were chosen as

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indicated in the accompanying data. In order to minimize effects of inhomogeneities in terrain, targets were placed as close as was feasible to a radial line running outward from the instrument. For the first 50 yards the land was extremely flat, the main obstructions to vision being small tufts of grass. On July 11, the grass was cut to lawn height along the light path out to about 100 yards permitting observations at a mean height of about 6 cm above the soil. Between 50 and 300 yards the land was flat except for a few areas of small scale roughness. Between 300 and 500 yards a ridge in the terrain may have influenced the 500 yard (50 cm) readings. However, the portion of the light path near the target is less important than the portion near the lenses, so that the effect of inhomogeneous terrain probably was small compared with the effect of variations in time.

11.2 Observations

The differences in lapse rates at the heights of the upper and lower lenses computed from Eq. (1) are tabulated in Tables 11.1, 11.2, and 11.3. Five of the nine profiles are shown in Figure 11.2. On July 10 at 1715 CST, prior to grass cutting, the anomaly was unmistakable at about 16 cm. On July 11 and 12, after the grass was cut, the anomaly was present at a height of about 12 cm; but the height of the anomaly above the effective radiating surface was comparable to the earlier observations.

In order to develop the temperature profile from the differences in lapse rate, the lapse rate at one height must be known. The lapse rate at 150 cm was approximated by extrapolating the curves of the type shown in Figure 11.2 linearly to 150 cm and assuming that this value represents the lapse rate at this height. Although this assumption may be grossly in error, the lapse rate is in any case small enough in magnitude at this height that subsequent calculations are not significantly affected. Numerical integration then gives the temperature profiles shown in Figure 11.3. The anomaly is evident on all but the inversion profile, and in this case the data reveal a slight anomaly at about 25 cm height.

A time series of observations at 12 cm (50 yard range) was made on 25 July, 26 July, and 2 August. On 2 August four observations were taken during each 5 minutes for 25 minutes out of each hour between 1155 and 1620 CST. These data are tabulated and are shown in Figure 11.4. They show that the variations encountered in 25 minutes are as large as one-fourth to one-half of the difference on lapse rate, itself. It must be concluded that the profiles shown in Figures 11.2 and 11.3 are subject to error from time variation in lapse rate. However, the reality of the anomaly is not in doubt because the anomaly appeared consistently and because the anomaly in lapse rate exceeds the variation in time by roughly an order of magnitude.

REFERENCE

1. Fleagle, R. G., "The temperature distribution near a cold surface." J. Meteor. 13, 160-165, 1956.

Table 11.1 Values of $\Delta(\partial T/\partial z)$ Found by Optical Method*

Lower Lens Height (cm)	Distance (yd)	$\Delta(\partial T/\partial z)$ (°C/cm) 1715 10 July	1110 11 July	1845 11 July	2155 11 July	1130 12 July	1550 12 July	2135 12 July
100	500	+.006						
50	500				-.008			-.027
50	300	.015	+.021 to .024	+.005	-.006	.00	+.011	-.110
30	200	.025	.040 to .049	.011	.00	+.050	.017	-.600 to +.004
20	125	.041	.059 to .069	.024	.00	.074 to .090	.029	+.007
.18	75	.060						
17	50	.076						
15	75		.073 to .082	.042	-.025	.110	.040	+.018
14	30	.013						
12	50		.120 to .159	.050	-.048	.170	.045	-.380
12	20	.462						
10	30		.121	.00	-.066	.105	.016	.00
8	25			.027	-.080	.399	.096	-1.20
6	20		1.29	.096	-.092	.438	.204	-.48 to -2.1

Table 11.2 Values of $\Delta(\partial T/\partial z)$ Found by Optical Method*

Date	Time (CST)	Lower Lens Height (cm)	Distance (yd)	$\Delta(\partial T/\partial z)$ (°C/cm)
21 July	1300	6	20	+.280
	1309	12	50	.100
	1425	12	50	.255
23 July	0800	12	50	.073
	0803	6	20	.261
	0805	8	25	.140
	0808	10	30	.098
	0810	12	50	.110
	0813	15	75	.064
	0815	20	125	.050
	0819	30	200	.034
	0822	50	300	.020
	0905	8	25	.200
	0909	10	30	.160
	0913	12	50	.127
	0917	15	75	.098
	0921	20	125	.064
	0925	30	200	.047
	0955	12	50	.145
	1007	12	50	.138
	1015	12	50	.174
	1200	12	50	.150
	1210	12	50	.188
	1355-1400	12	50	.158, .171, .171, .175, .200
	1510	12	50	.160, .160, .135
	1555	12	50	.130, .138, .128
	1655	12	50	.105, .097, .103
	1755	12	50	.063, .065, .058
31 July	1130	6	20	.200

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Table 11.3 Time Series of Δ(∂T/∂z) at Height of 12 cm

Date	Time (CST)	Δ (∂T/∂z) (°C/cm)
24 July	0555	-.005, +.003, -.003
	0615	+.005, .002, .002
	0655	.015, .022, .015
	0717	.034, .040, .030
	0755	.055, .055, .058
	0815	.073, .071, .071
	0855	.080, .078, .088
	0915	.090, .093, 082
	0955	.107, .112, .109
	1015	.097, .097, .104
	1055	.106, .106, .104
	1115	.109, .118, .112
	1155	.118, .119, .120
	1215	.135, .139, .140
	1255	.148, .149, .154
	1315	.144, .160, .156
	1355	.144, .144, .152
	1415	.144, .152, 142
	1455	.164, .148, .130
	1515	.125, .168, .125
	1555	.119, .117, .121
	1755	.092, .095, .086
	1815	.097, .092, .102
	1855	.043, .060, .054
	1915	.052, .060, .052
	1955	-.011, -.016, -.009
	2015	-.030, -.030, -.032
	2055	-.192, -.180, - 184
	2115	-.120, -.117, -.120
	2155	-.094, -.102, -.130
	0555	.000, .009, .000
	0615	.007, .013, .011
	0655	.037, .034, .046
	0715	.060, .071, .063
	0755	.037, .031, .033
	0815	.041, .045, .045
	0855	.073, .075, .085
	0915	.115, .115, .106
	0955	.137, .125, .132
	1015	.100, .097, .093

Date	Time (CST)	Δ (∂T/∂z) (°C/cm)
24 July	2215	-.097, -.124, -.120
	2255	-.098, -.100, -.102
	2358	-.133, -.146, -.150
25 July	0015	-.130, -.104, -.128
	0100	-.107, -.126, -.098
	0115	-.127, -.137, -.140
	0155	-.157, -.128, -.126, -.130
	0215	-.197, -.193, -.222, -.257
	0256	-.140, -.156, -.157, -.152
	0315	-.150, -.138, -.142, -.126
	0355	-.130, -.132, -.138, -.113
	0415	-.112, -.111, -.075, -.092
	0455*	-.105, -.097, -.098, -.094
	0455*	-.004, -.014, -.010
	0515	-.004, -.014, -.002
	0555	-.000, -.004, -.006
	0615	.010, .020, .015
	0655	.063, .063, .061
	0715	.079, .074, .063
	0755	.060, .065, .067
	0815	.078, .068, .068
	0855	.063, .061, .063
	0915	.057, .061, .055
	0955	.090, .092, 088
	1015	.086, .092, .096
	1055	.124, .129, .134
	1115	.109, .092, .096
	1155	.134, .137, .140
	1215	.128, .134, .134
	1255	.126, .123, .129

Date	Time (CST)	Δ (∂T/∂z) (°C/cm)
25 July	1315	.135, .143, .140
	1355	.123, .123, .125
	1415	.120, .117, .119
	1455	.119, .117, .115
	1515	.123, .117, .115
	1555	.108, .102, .106
	1615	.094, .102, .096
	1655	.088, .090, .086
	1715	.080, .076, .080
	1755	.046, .048, .039
	1816	.053, .055, .058
	1855	.025, .027, .036
	1917	.017, .025, .021
	1955*	.025, .023, .015
	1955*	-.079, -.076, -.069, -.072
	2054	-.107, -.092, -.101, -.100
	2124	-.096, -.082, -.078, -.094
	2155	-.080, -.105, -.081, -.066
	2255	-.113, -.098, -.094
	2315	-.112, -.112, -.107, -.111
	2315	-.071, -.063, -.063
26 July	0015	-.036, -.031, -.047, -.047
	0056	-.053, -.056, -.057, -.059
	0150	-.052, -.063, -.047, -.036
	0215	-.054, -.052, -.052, -.053
	0255	-.047, -.039, -.049, -.047
	0315	-.058, -.050, -.051, -.047
	0355	-.072, -.096, -.098, -.099
	0415	-.100, -.080, -.102, -.107
	0515	.017, .017, .017

*Observations were made at 0455 and 1955 on 25 July 1956 using both lights mounted 100 cm apart and black lines 90 cm apart. The members of each pair of observations differ significantly from one another. This indicates an error in one or both types of observation. An error in positioning of one of the target lights of two millimeters would result in an error 0.1C cm^{-1} in the lapse rate measurements. An error in positioning of this magnitude easily may have occurred, so that all nighttime observations may be in error by roughly -0.1C cm^{-1}.

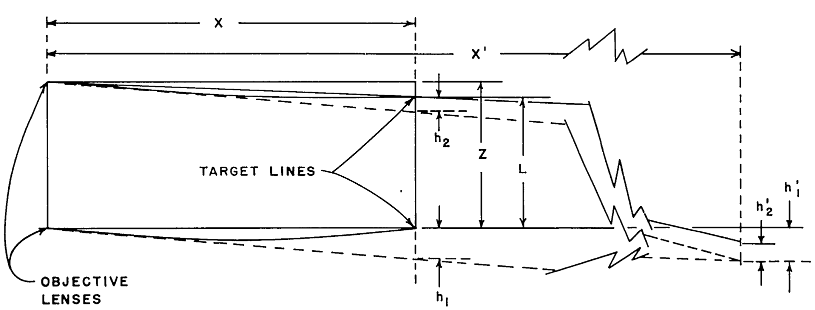

Figure 11.1 Light paths and related geometry.

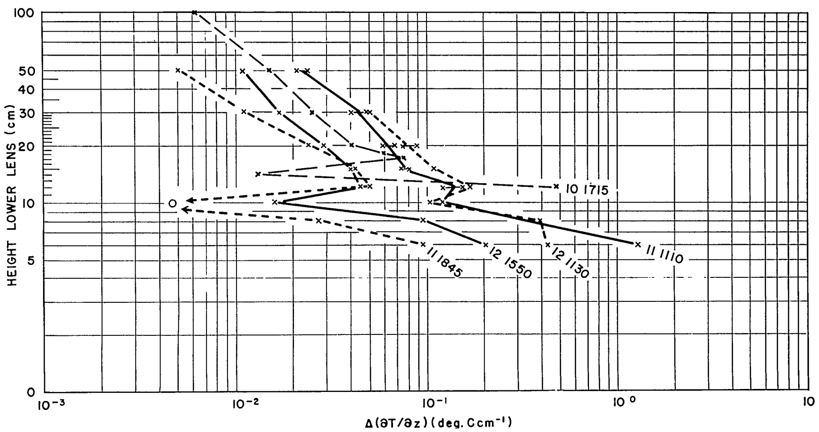

Figure 11.2 Optical observation of $\Delta(\partial T/\partial z)$, O'Neill, Nebraska, 10-12 July 1956.

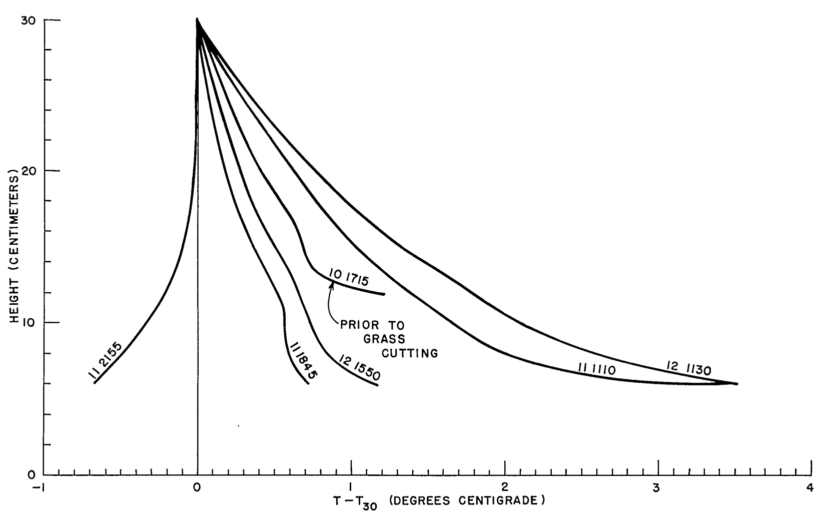

Figure 11.3 Optical temperature profiles, O'Neill, Nebraska, 10-12 July 1956.

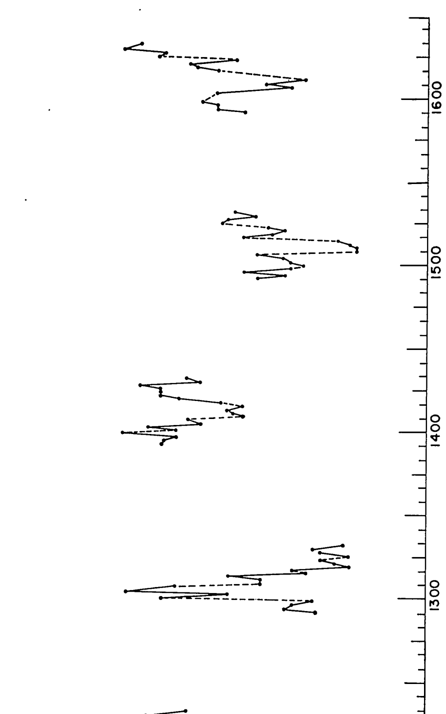

Figure 11.4 Time series of Δ (∂T/∂z) at a height of 12 cm, O'Neill, Nebraska, 2 August 1956.

CHAPTER 12
RAWINSONDE DATA

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The table in this chapter contains rawinsonde measurements made by the 6th Weather Squadron (Mobile), Tinker AFB, Oklahoma. A rawinsonde ascent was made at the test site for all gas releases except those numbered 35s and 48s. For each ascent, GMD-1A equipment was used and tabular data computed according to the instructions contained in the USWB Circular P and Air Weather Service Addenda. The computations were reviewed by an independent group using the same techniques.

Values of pressure, height, temperature and relative humidity are given for the significant and mandatory levels. The pressure is given in whole millibars, the height in meters above the ground (elevation of site above mean sea level is 603 meters), the temperature in tenths of degrees centigrade and the relative humidity in percent.

Values of the wind are given for standard heights. The height is given in meters above the ground, the direction in degrees (360 degree compass) to the nearest ten degrees, and the speed to the nearest tenth of a meter per second.

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Table 12.1

Gas Release No. 1 3 July 1956 1050C				Gas Release No. 2 3 July 1956 1450C			
P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
945	0	22.5	65	945	0	24.0	66
934		20.0	67	933		21.8	61
900	420	17.6	78	900	423	19.0	72
860		14 4	91	850	912	14.7	86
850	906	13.8	91	844		14.3	88
800	1416	11 1	93	800	1423	11.5	93
744		7.9	94	771		9.4	96
730		5.5	81	729		7.5	100
706		3.8	45	700	2530	5.4	100
700	2522	4.7	52	679		3.9	100
694		5.5	58	655		3.5	100
638		1.6	61	620		- 1.6	100
600	3767	1.1	70	609		- 1.5	97
				604		0.0	89
				600	3778	- 0.1	82
	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	120	1.	SFC	02	140	1.6
	350	140	2.7		370	120	2.0
	630	160	2.2		690	140	2.6
	920	180	3.0		960	170	3.1
	1200	190	3.9		1250	160	2.6
	1470	200	4.1		1530	160	2.1
	1770	190	3.5		1820	170	2.3
	2050	220	2 6		2120	190	2.2
	2320	250	3.2		2410	230	2.7
	2630	250	3.4		2710	250	3.9
	2920	230	3.2		3030	270	8.8
	3190	210	3.0		3320	260	10.6
	3470	190	2.9		3620	250	9.0
	3750	190	2.1		3930	270	10.3
	4020	190	3.2				

Table 12.1 (Continued)

Gas Release No. 3 5 July 1956 2150C				Gas Release No. 4 6 July 1956 0050C			
P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
948		19.8	85	947		19.1	94
940		24.8	61	926		25.8	74
900	454	21.9	62	900	446	23.4	61
882		20.5	63	880		21.6	52
850	948	18.1	54	851		19.0	63
837		17.1	50	850	941	19.0	63
805		14.5	58	800	1459	15.6	56
800	1464	14.1	56	731		10.6	45
762		11.9	45	700	2578	8.2	44
725		9.0	60	661		4.1	42
700	2578	6.5	62	626		0.9	57
695		5.9	62	611		0.9	35
672		4.0	64	600	3831	- 0.1	35
636		0.8	54				
600	3823	- 3.1	55				
	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	140	1	SFC	02	180	2
	250	140	3.2		380	190	5.4
	520	160	3.0		630	180	4.3
	810	180	1.9		910	170	3.8
	1080	140	1.8		1170	160	3.2
	1380	130	2.2		No Data		
	1630	190	0.6		2990	290	9.9
	1920	270	0.6		3280	290	8.1
	2220	300	4 5		3600	310	9.5
	2460	290	5.0		3850	300	10.8
	2710	280	5.2				
	2980	290	5.0				
	3230	300	5.2				
	3490	300	6.0				
	3730	280	8.2				

Table 12.1 (Continued)

Gas Release No. 5
6 July 1956 1350C

P (mb)	Z (m)	T (°C)	R.H. (%)
946	0	31.1	34
932		27.5	38
900	440	24.1	43
885		22.6	44
856		22.0	33
850	938	21.5	34
800	1462	17.8	47
720		11.5	67
700	2591	9.4	71
660		4.9	76
632		2.8	47
600	3849	0.0	40

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	160	4
	280	170	7.4
	550	170	6.8
	850	190	6.2
	1130	200	6.2
	1470	210	5.8
	1800	210	5.9
	2100	220	7.7
	2440	220	11.0
	2750	230	10.6
	3050	240	9.8
	3380	230	13.9
	3700	230	16.0
	4020	220	15.6

Gas Release No. 6
6 July 1956 1650C

P (mb)	Z (m)	T (°C)	R.H. (%)
944	0	31.5	34
900	425	26.8	42
866		23.1	50
850	926		
822		20.8	39
800	1449	20.2	45
734		13.1	38
700	2579	10.0	42
660		6.0	50
600	3843	2.5	34

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	170	5
	300	180	11.8
	700	180	13.4
	Signal Failure		
	No Data		

Table 12.1 (Continued)

Gas Release No. 7
10 July 1956 1350C

P (mb)	Z (m)	T (°C)	R.H. (%)
946	0	31 0	30
938		26.8	28
904		24.5	35
900	439	24.1	37
850	935	19.5	49
800	1433	14.6	59
732		7.4	76
702		5.5	61
700	2564	5.4	60
666		4.1	23
655		5.1	mb
633		3.8	mb
600	3817	1.0	mb

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	190	4.1
	310	210	6 1
	670	210	5.1
	1050	210	4.7
	1430	220	4 8
	1780	260	3.4
	2130	300	5 6
	2460	310	8 5
	2800	310	9.4
	3130	310	9.5
	3450	310	9 6
	3780	300	9 5
	4120	300	10.1

Gas Release No. 8
10 July 1956 1650C

P (mb)	Z (m)	T (°C)	R.H. (%)
945	0	31.6	30
930		28.9	30
900	433	25.9	35
850	931	20.9	42
837		19.4	45
821		18.6	52
800	1451	16.7	55
705		8.0	66
700	2571	7.3	65
674		4.5	59
655		3.5	32
644		4.5	21
600	3824	1 1	mb

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	190	4.1
	330	170	4.7
	690	190	5.8
	1060	200	7 2
	1410	220	6.4
	1710	230	6.8
	2100	250	8.3
	2400	290	9.4
	2660	310	7.8
	2940	330	6.7
	3200	330	8.4
	3460	320	7.8
	3720	320	7.1
	4000	330	7.4

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Table 12.1 (Continued)

Gas Release No. 9 — 11 July 1956 0950C | Gas Release No. 10 — 11 July 1956 1150C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
941		27 2	52	941	0	30.8	44
930		24.9	48	925		26.5	47
900	390	22.2	52	900	394	24.4	52
890		21.4	54	850	892	19.9	63
874		23.4	57	846		19.4	64
850	888	22.4	53	832		20.5	57
803		20.5	48	800	1415	18.6	50
800	1414	20.2	47	768		16.5	43
716		12.5	35	714		10.9	56
700	2548	10.9	40	700	2545	9.7	52
635		4.4	64	663		6.1	46
600	3812	0.7	66	600	3804	0.2	65

Winds

	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	4.6	SFC	02	220	3.6
	350	210	10 0		280	230	6.0
	680	220	8.2		580	230	5.9
	960	220	7 5		900	220	6.0
	1220	210	8.5		1220	210	8.0
	1520	210	8.8		1600	210	7.8
	1830	220	7 0		1950	220	6.8
	2120	230	7.2		2300	240	6.7
	2410	250	8 0		2670	250	7.5
	2720	260	6.9		3000	260	9.5
	3000	290	6 3		3330	270	11.2
	3240	290	8.5		3690	280	11.2
	3510	290	11 0		4070	290	13.2
	3750	290	12.1				
	4000	290	14.2				

Table 12.1 (Continued)

Gas Release No. 11 — 14 July 1956 0750C | Gas Release No. 12 — 14 July 1956 0950C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
944	0	24.5	66	944	0	30.0	48
933		22.4	65	936		26.0	56
902		22.8	68	900	421	22.9	67
900	417	22.8	68	896		22.5	68
850	916	21.7	48	890		23.5	64
816		20.8	34	850	920	23.1	35
800	1442	19.4	36	843		23.1	30
727		12.2	42	800	1446	19.9	30
700	2570	9.4	52	752		15.8	32
664		5.3	63	700	2577	10.3	49
624		3.4	34	648		4.4	66
600	3829	1.2	48	624		3.2	42
				604		1.4	60
				600	3836	1.1	59

Winds

	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	4.6	SFC	02	190	3.6
	300	190	11.8		300	200	11.0
	630	210	14.7		680	200	12.8
	940	210	12.8		1030	200	12.5
	1280	210	10.0		1400	200	10.3
	1650	210	6.8		1780	210	6.5
	1960	210	4.7		2130	210	5.0
	2250	210	4.6		2470	220	4.4
	2600	230	3.5		2850	250	4.4
	2980	230	3.5		3270	280	5.2
	3350	280	6.5		3530	310	9.4
	3730	290	8.5		3850	290	9.8
	4080	300	10.6				

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Table 12.1 (Continued)

Gas Release No. 13 — 22 July 1956 1950C; Gas Release No. 14 — 22 July 1956 2150C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
949	0	21.9	69	950	0	16.4	89
940		22.8	59	940		22.2	64
900	459	19.9	65	900	467	19.8	58
850	950	15.9	73	898		19.7	57
800	1462	11.8	82	860	957	15.7	70
747		7.1	92	802		11.5	86
700	2566	4.4	80	800	1468	11.4	85
685		3.4	76	700	2569	4.0	77
645		- 0.4	80	654		0.2	72
634		1.0	80	631		0.5	49
622		- 0.1	34	620		0.6	21
601		- 0.6	22	600	3807	- 0.8	mb
600	3807	- 0.6	mb				

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	170	1.0	SFC	02	160	1.0
	350	180	4.6		290	170	4.8
	700	180	4.6		610	180	4.5
	1020	180	5.0		900	190	3.0
	1340	180	4.0		1210	230	3.2
	1660	180	3.0		1500	260	2.9
	1960	190	1.8		1800	270	1.3
	2270	260	1 1		2100	300	2.1
	2670	310	2.9		2390	310	5.0
	2880	320	4.7		2660	310	7.5
	3200	320	6 0		2930	310	8.2
	3520	340	7.6		3210	310	7.8
	3840	340	9.3		3500	.310	7.9
					3800	330	8.3

Table 12.1 (Continued)

Gas Release No. 15 — 23 July 1956 0750C; Gas Release No. 16 — 23 July 1956 0950C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
949		21.0	64	948	0	26.5	48
940		19.4	66	935		23.3	54
924		21.1	67	900	454	20.8	60
900	458	20.8	59	850	945	16.7	69
897		20.7	58	841		15.9	70·
853		17.0	66	810		14.4	33
850	948	16.8	65	800	1458	13.6	34
800	1462	13.0	48	769		10.9	38
728		7.2	19	728		7.1	59
700	2569	6.8	mb	715		6.7	50
698		6.7	mb	708		6.4	27
644		4 0	mb	700	2564	6.4	26
600	3820	0.0	mb	681		6.4	22
				658		3.9	46
				600	3812	- 0.5	37

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	230	2.1	SFC	02	180	2.1
	300	230	4 4		300	200	2.6
	600	240	2.8		610	190	2.6
	910	230	1 8		950	190	2.0
	1210	230	1.0		1300	180	1.1
	1500	260	0.9		1650	360	4.2
	1800	330	2 0		1980	010	7.3
	2090	360	4.7		2280	010	10.6
	2380	360	7.8		2600	010	12.5
	2680	350	9 5		2910	010	13.5
	2980	350	10.7		3230	010	13.2
	3290	340	10.9		3570	010	12.4
	3580	350	10.0		3880	350	10.2
	3850	350	8.9				

Table 12.1 (Continued)

Gas Release No. 17 — 23 July 1956 1950C | Gas Release No. 18 — 23 July 1956 2150C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
943	0	28.0	39	943	0	23.6	54
928		29.0	32	926		27.6	35
900	414	27.0	35	900	411	26.0	33
850	916	23.1	40	898		25.9	33
804		19.5	43	850	911	23.1	39
800	1441	19.1	45	841		22.8	39
700	2571	9.8	64	800	1435	18.9	47
600	3829	- 0.7	85	700	2564	9.0	64
				684	2755	7.2	67

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	170	2.1	SFC	02	180	2.1
	310	190	9.8		300	200	13.1
	620	200	1.5		650	220	15.2
	930	220	12.5		1000	240	13.2
	1280	230	13.6		1310	260	13.6
	1620	250	12.0		1670	280	15.0
	2000	270	10.4		2000	290	14.5
	2330	310	10.8		2310	300	14.5
	2670	320	13.9				
	3010	320	15.8				
	3350	320	16.8				
	3700	320	18.1				
	4060	230	18.9				

Table 12.1 (Continued)

Gas Release No. 19 — 25 July 1956 1050C | Gas Release No. 20 — 25 July 1956 1250C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
945	0	28.8	38	942	0	31.0	30
932		25.8	41	917		36.6	33
900	429	22.8	47	900	406	25.1	35
878		20.5	51	870		22.0	38
850	923	20.5	26	850	904	22.3	27
823		20.8	21	838		22.5	18
800	1447	19.1	24	804		21.2	23
711		11.9	38	800	1430	20.9	24
700	2577	11.1	36	700	2565	11.5	38
678		9.5	28	687		10.6	24
600	3844	2.4	30	610		2.6	31
				600	3827	1.8	34

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	160	3.6	SFC	02	160	6.7
	320	170	6.3		360	180	12.8
	620	180	7.6		700	180	11.2
	900	180	8.8		1020	190	9.6
	1130	190	9.0		1370	200	6.8
	1380	190	6.6		1700	240	5.5
	1620	210	2.8		2050	250	5.1
	1820	220	2.0		2420	260	4.8
	2060	250	1.4		2770	270	5.7
	2280	300	2.0		3140	270	7.0
	2480	310	2.3		3380	270	7.4
	2700	300	2.4		3630	270	7.8
	2880	300	3.0		3900	290	10.0
	3080	290	4.5				
	3260	280	5.0				
	3430	250	4.0				

Table 12.1 (Continued)

Gas Release No. 21 — 25 July 1956 2150C; Gas Release No. 22 — 25 July 1956 2350C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
938	0	29.0	41	937	0	26.5	45
911		27.1	39	910		25.5	45
900	367	28.3	34	900	355	26.3	43
889		29.6	30	896		26.8	42
861		28.5	27	850	859	25.2	36
850	875	26.5	27	800	1390	23.4	27
844		25.5	27	749		19.0	29
806		24.8	25	700	2532	13.4	38
800	1408	24.2	26	636		5.7	50
728		16.8	35	600	3800	2.0	55
700	2557	14.0	41				
678		11.6	44				
632		4.7	59				
620	3563	3.0	70				

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	4.1	SFC	02	170	4.6
	160	200	8.0		300	190	20.0
	370	220	11.3		660	200	25.0
	540	220	12.3		930	210	24.6
	780	230	12.3		1220	220	25.3
	1030	250	14.4		1500	240	22.0
	1300	260	17.0		1800	260	16.0
	1630	260	14.0		2080	260	16.0
	2020	260	15.0		2360	250	18.8
	2380	265	20.8		2630	250	21.0
	2660	260	17.5		2930	250	19.5
	2950	270	9.0		3180	250	17.0
	3150	270	12.0		3450	250	17.0
	3340	260	19.5		3750	250	13.0
	3550	260	19.5		4080	270	11.4

Table 12.1 (Continued)

Gas Release No. 23 — 29 July 1956 2050C; Gas Release No. 24 — 29 July 1956 2250C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
944	0	23.9	70	945	0	22.2	80
900	417	21.7	78	936		22.4	80
860		19.4	84	900	424	19.9	85
850	911	19.5	82	897		19.7	85
838		19.1	80	854		20.9	75
804		17.5	76	850	919	20.9	75
800	1432	17.6	70	815		19.5	65
776		18.6	47	800	1443	18.5	69
700	2567	11.9	45	774		16.3	72
696		11.4	44	750		15.9	64
685		10.1	54	700	2576	11.1	66
614		3.9	63	684		9.6	67
600	3837	2.2	65	659		7.0	57
				600	3842	1.0	72

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	120	4.6	SFC	02	130	3.8
	290	130	13.1		290	150	13.3
	600	120	15.0		600	160	14.4
	890	090	11.5		930	190	13.7
	1190	070	11.5		1270	210	14.2
	1480	050	11.1		1620	230	12.4
	1730	020	7.8		1920	250	10.2
	2020	030	5.6		2270	260	8.1
	2290	030	4.1		2600	260	6.1
	2520	020	3.7		2910	260	5.3
	2820	010	5.3		3230	260	5.3
	3100	010	6.4		3590	270	5.7
	3360	360	6.6		3880	270	6.0
	3630	360	6.5				
	3920	360	6.0				

Table 12.1 (Continued)

Gas Release No. 25
1 Aug 1956 1257C

Gas Release No. 26
2 Aug 1956 1150C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
946	0	24.7	66	942	0	30.3	56
934		22.4	70	922		25.4	64
900	436	19.7	78	900	404	23.6	70
878		18.0	84	883		22.1	73
850	927	16.6	84	850	901	20.7	70
800	1443	13.9	84	800	1424	18.4	64
700	2559	8.2	83	790		18.0	62
694		7.8	83	705		10.6	78
636		3.8	83	700	2555	10.1	79
620		3.4	79	648		5.9	85
600	3819	1.8	78	600	3822	2.4	83

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	2.1	SFC	02	170	3.6
	350	190	4.5		230	180	9.7
	680	200	6.1		500	190	11.2
	960	200	6.5		770	200	11.0
	1200	210	5.6		1030	200	11.5
	1450	210	5.9		1300	210	12.5
	1780	220	6.9		1590	210	13.8
	2120	220	7.3		1910	210	13.5
	2420	220	7.1		2210	210	13.5
	2720	220	9.0		2520	210	14.7
	3080	230	11.1		2820	230	16.0
	3460	220	9.3		3130	230	17.0
	3670	220	5.7		3420	230	17.0
	3990	220	5.5		3730	230	18.0
					4030	230	19.0

Table 12.1 (Continued)

Gas Release No. 27
2 Aug 1956 1350C

Gas Release No. 28
3 Aug 1956 0035C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
941	0	32.2	48	940	0	25.9	66
934		29.6	52	925		28.0	59
900	398	26.6	56	900	385	26.6	55
850	898	22.0	60	892		26.1	54
813		18.5	65	878		26.6	51
800	1421	18.6	56	850	889	24.2	51
700	2551	10.5	69	810		21.0	51
668		7.7	73	800	1416	20.0	54
600	3817	2.6	72	721		13.1	74
				700	2551	11.1	78
				630		4.1	90
				600	3818	1.9	89

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	170	5.1	SFC	02	170	3.1
	280	190	9.2		300	200	13.2
	580	180	7.0		590	210	18.4
	880	180	8.5		830	210	22.2
	1200	190	12 0		1090	210	21.3
	1500	200	13.9		1320	210	20.5
	1800	210	14.0		1580	210	20.1
	2100	210	15.6		1870	220	21.5
	2420	210	17.0		2200	220	24.0
	2720	210	18.5		2490	220	20.0
	3020	220	18.5		2770	210	18.5
	3320	220	19.8		3020	210	18.5
	3620	210	19.8		3300	210	18.7
	3920	210	19.3		3550	210	18.7
					3820	210	17.0

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Table 12.1 (Continued)

Gas Release No. 29
3 Aug 1956 0150C

P (mb)	Z (m)	T (°C)	R.H. (%)
941	0	25.5	61
928		26.6	56
900	393	25.4	54
893		25.1	53
870		25.1	48
850	895	23.8	50
800	1422	20.4	54
787		19.4	55
700	2557	10.9	72
668		7.5	80
601		1.9	79
600	3824	1.8	80

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	4.3
	300	200	16 0
	620	210	20 0
	950	210	23 0
	1270	210	23.8
	1600	220	21.0
	1900	220	19 0
	2210	220	19.0
	2530	220	18.0
	2850	220	15.5
	3150	210	16.2
	3470	210	17.0
	3780	200	19.0
	4100	200	19.0

Gas Release No. 30
3 Aug 1956 1250C

P (mb)	Z (m)	T (°C)	R.H. (%)
941	0	34.6	36
932		31.6	42
900	401	28.7	49
850	906	23.9	56
846		23.5	57
800	1432	19.1	63
757		14.8	70
732		14.3	60
700	2564	11.5	62
630		4.8	68
607		3.7	66
600	3834	3.0	66

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	190	5.1
	290	190	9.5
	580	190	11.7
	880	190	11.8
	1180	190	8.4
	1450	200	8.6
	1800	200	13.4
	2150	210	18.5
	2480	210	18.5
	2780	210	18.5
	3040	210	19.0
	3300	210	21.0
	3560	220	20.0
	3810	220	20.5
	4100	220	20.8

Table 12.1 (Continued)

Gas Release No. 31
3 Aug 1956 1450C

P (mb)	Z (m)	T (°C)	R.H. (%)
941	0	34.0	37
932		31.5	40
900	400	28.8	46
850	906	24.2	56
800	1433	19.7	66
738		13.6	80
700	2565	10.5	76
617		3.5	68
600	3833	2.7	72

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	200	5.1
	320	200	9.7
	690	210	9.0
	1010	210	10.1
	1360	210	12.0
	1690	210	12.0
	2000	210	11.8
	2300	210	12.9
	2620	220	13.6
	2930	220	15.9
	3390	220	15.5
	3620	220	13.5
	3940	230	15.0

Gas Release No. 32
6 Aug 1956 1950C

P (mb)	Z (m)	T (°C)	R.H. (%)
945	0	24.3	36
933		27.0	35
900	430	24.7	38
850	929	21.0	43
800	1450	17.3	48
783		16.0	49
770		15.0	41
758		14.4	51
700	2576	9.2	60
647		4.1	67
600	3834	0.3	53

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	130	2.1
	300	170	11.0
	630	160	14.5
	980	160	17.0
	1300	150	16.0
	1680	140	16.2
	2030	130	16.2
	2400	130	13.1
	2720	140	8.8
	3080	160	8.8
	3470	220	9.6
	3840	260	12.2

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Table 12.1 (Continued)

Gas Release No. 33
7 Aug 1956 1258C

P (mb)	Z (m)	T (°C)	R.H. (%)
944	0	28.8	48
900	422	24.2	49
894		23.6	49
864		23.3	38
850	921	22.2	40
800	1444	18.0	48
700	2570	9.0	66
677		6.9	70
640		5.5	51
600	3832	1.8	43

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	170	4.6
	300	170	13.3
	600	170	15.2
	960	170	14.5
	1320	180	14.5
	1700	190	14.0
	2080	180	8.4
	2450	150	5.3
	2830	150	7.2
	3170	170	8.0
	3470	200	7.8
	3800	230	7.3

Gas Release No. 34
7 Aug 1956 1455C

P (mb)	Z (m)	T (°C)	R.H. (%)
944	0	30.5	38
928		26.0	46
900	422	23.6	53
868		20.7	58
850	918	20.3	55
800	1440	18.7	42
798		18.6	41
700	2569	10.3	48
620		3.3	55
600	3833	1.0	57

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	170	4.6
	340	150	13.0
	620	160	15.4
	960	170	15.5
	1290	180	13.8
	1630	190	11.9
	1930	200	11.0
	2210	210	12.1
	2500	220	14.1
	2800	230	13.7
	3060	240	12.0
	3330	240	9.5
	3620	240	6.8
	3900	240	6.1

Table 12.1 (Continued)

Gas Release No. 35
11 Aug 1956 2122C

P (mb)	Z (m)	T (°C)	R.H. (%)
945	0	20.0	62
938		24.8	59
900	426		
850	920		
806		15.0	67
800	1436		
700	2549	5.4	90
682		4.9	77
656		4.0	24
600	3799	1.3	mb

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	170	1.6
	300	160	6.1
	630	180	7.0
	940	200	7 0
	1240	220	8.6
	1580	240	9 8
	1950	250	10.8
	2250	260	11.9
	2510	260	11.5
	2760	260	11.4
	3000	270	11.2
	3260	280	13.1
	3480	290	16.2
	3710	300	17.8

Gas Release No. 36
11 Aug 1956 2328C

P (mb)	Z (m)	T (°C)	R.H. (%)
943	0	18.8	85
930		23.5	79
900	406	21.8	74
860		19.5	66
850	900	19.0	68
800	1418	15.7	74
738		11.3	83
700	2537	7.6	70
693		6.8	68
677		6.3	24
650		6.0	mb
618		3.4	24
600	3794	1.3	30

	Winds		
	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	1.6
	350	180	11.3
	600	190	10.0
	880	200	8.0
	1170	220	7.0
	1420	240	9.0
	1700	250	13.0
	2000	260	15.7
	2300	260	15.0
	2600	260	13.3
	2930	270	12.0
	3270	280	12.0
	3580	300	13.8
	3900	300	16.2

Table 12.1 (Continued)

Gas Release No. 37
12 Aug 1956 0250C

P (mb)	Z (m)	T (°C)	R.H. (%)
942	0	20.0	75
912		22.8	77
900	398	22.2	71
883		21.3	61
850	894	19.3	61
823		17.6	62
800	1413	16.0	66
726		11.0	81
702		9.3	69
700	2538	9.0	64
677		7.6	23
622		2.0	30
600	3794	- 0.1	41

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	3.1
	300	190	14.9
	630	190	15.8
	950	200	12.3
	1240	220	13.4
	1520	230	15.4
	1830	250	14.8
	2140	270	12.5
	2410	270	11 2
	2700	260	10.9
	3000	260	9.0
	3300	260	7.8
	3640	260	7.4
	3960	260	6.8

Gas Release No. 38
12 Aug 1956 0450C

P (mb)	Z (m)	T (°C)	R.H. (%)
942	0	20.0	81
905		22.5	55
900	395	22.5	51
886		22.5	45
852		20.5	45
850	891	20.3	45
800	1411	16.9	59
735		12.1	78
712		10.5	54
700	2534	9.1	59
673		6.0	66
656		5.0	34
633		3.5	24
600	3787	0.2	33

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	3.6
	330	180	14.0
	680	190	18.3
	1020	200	19.7
	1370	210	17.5
	1670	230	12.5
	1950	240	10.0
	2300	250	8.8
	2600	260	8.5
	2900	240	10.0
	3220	240	9.0
	3480	240	10.0
	3760	230	13.0
	4000	230	14.6

Table 12.1 (Continued)

Gas Release No. 39
13 Aug 1956 2220C

P (mb)	Z (m)	T (°C)	R.H. (%)
948	0	20.5	41
937		25.4	38
930		27.4	35
900	457	25.4	30
886		24.6	28
850	955	21.9	36
800	1477	17.9	48
761		14.5	56
700	2599	8.6	69
680		6.4	71
637		2.5	26
600	3849	- 0.2	24

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	160	2.6
	420	150	10.3
	850	170	9.0
	1200	200	9.0
	1580	230	10.3
	2030	260	12.0
	2460	280	13.0
	2780	290	13.0
	3170	300	14.0
	3580	300	14.6
	4000	310	16.0

Gas Release No. 40
14 Aug 1956 0020C

P (mb)	Z (m)	T (°C)	R.H. (%)
948	0	20.6	62
940		25.5	49
932		27.6	40
900	457	25.1	42
850	955	21.0	46
805		17.0	49
800	1476	16.9	50
763		15.0	56
700	2598	8.4	49
676		5.8	46
628		0.1	53
609		0.0	24
600	3849	- 0.6	mb

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	200	2.0
	300	200	12.8
	600	210	14.2
	900	210	13.8
	1230	210	12.3
	1570	230	10.2
	1870	270	9.5
	2160	300	9.3
	2470	310	11.4
	2760	320	14.0
	3080	320	15.5
	3400	320	16.5
	3700	320	15.5
	3990	320	12.5

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Table 12.1 (Continued)

Gas Release No. 41
14 Aug 1956 0250C

Gas Release No. 42
14 Aug 1956 0450C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
947	0	20.0	66	947	0	21.7	55
933		24.2	60	920		26.6	31
915		26.0	40	900	448	26.0	30
900	446	25.3	40	869		24.9	30
850	946	22.8	36	850	948	22.9	41
840		22.2	36	841		22.0	46
800	1470	18.9	52	800	1473	20.0	53
793		18.2	55	792		19.5	54
700	2597	9.3	59	733		12.7	67
696		8.9	59	711		11.1	53
600	3850	- 2.3	65	700	2603	10.0	52
				674		7.1	51
				614		- 0.8	73
				600	3858	- 2.0	69

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	3.1	SFC	02	210	4.6
	280	210	13.2		340	230	20.9
	530	220	14.2		690	230	20.6
	830	220	14.0		1020	240	16.3
	1130	240	12.2		1330	260	17.1
	1450	260	11.0		1680	260	16.5
	1780	270	10.8		2000	270	14.0
	2100	280	12.0		2330	270	12.4
	2430	290	12.8		2630	270	11.0
	2730	290	14.0		2940	280	12.0
	3050	300	14.2		3270	290	12.0
	3400	310	15.0		3590	290	14.0
	3680	310	15.0		3910	300	15.5
	4000	310	16.5				

Table 12.1 (Continued)

Gas Release No. 43
15 Aug 1956 1150C

Gas Release No. 44
15 Aug 1956 1350C

P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
945	0	34.5	24	943	0	36.8	19
931		30.4	26	930		31.9	22
900	436	27.6	30	900	418	29.1	25
850	937	22.9	35	874		26.8	27
846		22.4	36	850	922	24.5	30
832		23.3	18	806		20.6	35
800	1462	20.1	24	800	1448	20.1	37
762		17.2	49	746		16.5	52
746		16.1	41	718		13.3	54
705		12.0	56	700	2585	11.9	43
700	2598	11.8	53	695		11.6	40
685		10.7	47	658		8.5	37
630		4.2	53	600	3853	1.2	64
600	3863	0.9	69				

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	160	1.5	SFC	02	150	4.1
	280	160	5.0		280	150	6.0
	570	150	4.2		570	150	8.5
	750	140	5.0		880	160	9.2
	1130	150	5.8		1210	170	8.3
	1430	200	4.4		1550	200	7.7
	1720	220	5.7		1920	230	8.4
	2050	250	7.0		2300	250	10.2
	2390	260	8.7		2650	250	11.9
	2700	260	9.8		3000	240	11.5
	3000	260	10.7		3380	240	10.2
	3300	260	11.2		3720	250	9.2
	3600	260	11.2		4080	250	10.1
	3910	260	11.2				

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Table 12.1 (Continued)

Gas Release No. 45 15 Aug 1956 1658C				Gas Release No. 46 15 Aug 1956 1835C			
P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
940	0	36.5	21	939	0	33.5	24
930		33.6	22	919		33.2	22
900	392	31.0	26	900	379	31.6	26
862		27.8	30	850	888	26.9	34
850	899	26.6	31	842		26.0	37
800	1429	22.0	40	800	1420	22 3	41
700	2569	12.0	59	778		20 4	44
600	3839	2.6	77	700	2564	12.9	62
				687		11 6	65
				656		7.6	63
				600	3834	1.9	71
	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	160	4.1	SFC	02	140	4.6
	310	160	7 4		300	140	11.2
	620	160	9 0		600	140	12 7
	980	160	9 2		900	160	12.3
	1300	170	9.5		1210	180	13.5
	1610	190	9 6		1570	190	12 9
	1870	210	8.5		1890	210	12.8
	2180	230	9 5		2210	220	14.0
	2470	230	12 0		2590	230	14.6
	2760	240	12 6		2910	240	14 0
	3020	240	11 3		3240	240	13 6
	3290	240	11 2		3570	250	13 6
	3550	240	13 5		3880	260	13 0
	3800	250	13.5				
	4060	260	13 9				

Table 12.1 (Continued)

Gas Release No. 47 20 Aug 1956 1005C				Gas Release No. 48 21 Aug 1956 0850C			
P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
955	0	19.0	50	947	0	18.8	59
945		16.5	40	930		15.8	63
900	502	13.1	51	900	433	13.5	69
850	979	9.1	63	888		14.5	62
842		8.4	65	850	915	12.3	48
800	1477	4.9	60	849		12.3	48
754		0.9	56	824		10.5	51
729		- 0.4	75	812		10.9	22
706		- 1.8	43	800	1420	11 8	mb
700	2550	- 1.1	39	792		12.3	mb
694		- 0.5	34	756		11.6	mb
666		- 3.1	24	716		8.5	mb
645		- 3.3	mb	700	2532	8.0	mb
600	3768	- 6.5	mb	686		7.7	mb
				610		1.6	mb
				600	3787	0.5	mb
	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	250	3.1	SFC	02	180	5.7
	320	230	3.7		330	210	9.0
	690	250	2.5		680	230	10.8
	1050	260	0.8		1030	240	12.3
	1420	010	2.7		1400	250	11.0
	1800	350	2.8		1730	260	9.7
	2150	320	3.9		2050	260	9.0
	2530	320	6.5		2380	290	11.2
	2900	340	8 9		2730	290	14.0
	3270	340	9.5		3050	290	16.0
	3620	340	10.0		3400	290	16.5
	3990	340	11.4		3710	300	16.8
					4030	300	16.0

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Table 12.1 (Continued)

Gas Release No. 49
21 Aug 1956 1050C

P (mb)	Z (m)	T (°C)	R.H. (%)
946	0	23.8	44
912		17.1	44
900	430	16.5	48
874		14.9	54
860		15.3	54
850	914	14.8	56
800	1424	11.2	65
796		11.0	66
782		9.6	20
767		11.8	mb
728		8.8	mb
715		9.8	mb
700	2533	8.6	mb
608		1.4	mb
600	3788	0.5	mb

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	5.7
	330	210	7.8
	700	230	10.3
	1050	250	12.2
	1400	260	13.8
	1780	260	13.3
	2120	270	13.2
	2480	280	13.2
	2800	290	14.5
	3130	290	15.3
	3480	290	16.5
	3800	290	17.5

Gas Release No. 50
21 Aug 1956 1350C

P (mb)	Z (m)	T (°C)	R.H. (%)
943	0	29.0	38
937		25.7	40
900	408	22.3	48
895		21.9	49
850	901	19.0	40
826		17.4	35
800	1417	14.1	37
793		13.3	37
764		11.9	20
742		11.9	mb
700	2533	8.8	mb
600	3790	0.9	mb

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	200	5.1
	230	200	8.0
	480	220	8.0
	700	240	7.6
	950	250	9.7
	1200	270	11.0
	1480	280	11.0
	1750	290	12.0
	2010	300	13.5
	2290	300	15.0
	2590	300	14.8
	2870	300	13.5
	3110	300	16.0
	3320	300	17.5
	3620	300	18.5
	3910	300	17.0

Table 12.1 (Continued)

Gas Release No. 51
21 Aug 1956 1520C

P (mb)	Z (m)	T (°C)	R.H. (%)
942	0	31.0	33
932		26.7	36
900	403	23.9	41
850	899	19.4	50
818		16.4	57
800	1417	14.6	60
770		11.6	66
733		8.3	54
722		8.3	22
700	2530	7.6	mb
695		7.5	mb
600	3784	0.8	mb

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	240	4.6
	320	240	9.5
	680	250	13.0
	1010	250	13.5
	1370	260	12.8
	1710	270	10.4
	2050	280	9.5
	2400	290	11.8
	2780	300	12.0
	3080	300	13.2
	3400	300	14.5
	3720	310	15.6
	4030	310	17.0

Gas Release No. 52
24 Aug 1956 1105C

P (mb)	Z (m)	T (°C)	R.H. (%)
952	0	25.0	22
932		20.7	29
900	485	18.2	33
850	971	14.1	39
848		13.9	39
800	1482	13.3	49
793		13.1	50
740		8.5	60
713		8.9	25
700	2593	7.4	42
688		6.5	30
676		5.5	41
600	3842	- 2.7	56

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	140	3 1
	400	110	6.1
	760	110	5.0
	1100	080	2.8
	1460	340	3.6
	1810	320	5.9
	2190	310	7.2
	2600	310	8.5
	3020	330	8.4
	3400	330	8.1
	3760	330	9.2

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Table 12.1 (Continued)

Gas Release No. 53, 24 Aug 1956 1950C				Gas Release No. 54, 24 Aug 1956 2150C			
P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
948	0	18.0	44	949	0	20.0	51
940		22.7	41	918		20.8	42
900	450	21.0	35	904		20.0	35
850	941	17.2	42	900	459	19.8	35
825		15.1	45	850	950	17.3	43
800	1455	14.4	42	800	1466	14.6	50
774		13.8	38	772		13.6	32
700	2572	8.0	41	700	2583	8.7	42
686		7.0	42	600	3833	- 2.0	67
600	3822	- 1.4	63				

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
Equipment Failure No Sounding				SFC	02	150	3.1
					380	160	12.5
					730	180	13.2
					1080	190	9.2
					1450	210	4.9
					1760	240	2.0
					2100	270	3.0
					2460	280	5.9
					2800	300	7.3
					3160	310	8.9
					3520	320	10.2
					3900	320	11.6

Table 12.1 (Continued)

Gas Release No. 55, 25 Aug 1956 0055C				Gas Release No. 56, 25 Aug 1956 0250C			
P (mb)	Z (m)	T (°C)	R.H. (%)	P (mb)	Z (m)	T (°C)	R.H. (%)
948	0	17.0	60	948	0	15.0	66
904		20.0	43	900	444	20.0	47
900	446	19.9	43	850	936	19.4	49
862		19.0	48	815		18.8	50
850	938	18.4	49	800	1457	17.2	51
800	1456	15.0	52	761		13.3	56
756		11.9	56	726		10.7	44
710		9.2	41	700	2579	8.2	50
700	2576	8.2	50	600	3829	- 2.1	74
694		7.3	54				
615		- 0.5	70				
600	3825	- 2.1	70				

	Winds				Winds		
	Z (m)	ddd (deg)	ff (m/sec)		Z (m)	ddd (deg)	ff (m/sec)
SFC	02	150	8.2	SFC	02	160	6.9
	360	160	14.3		260	170	11.8
	700	180	12.0		560	190	14.6
	1030	200	10.2		1040	200	12.9
	1350	210	9.2		1500	220	8.1
	1680	220	6.0		1900	230	7.5
	1980	230	4.0		2370	240	8.6
	2280	240	4.6		2760	240	8.5
	2600	250	5.8		3190	250	7.9
	2900	260	5.7		3550	270	6.0
	3230	270	7.0		3900	290	6.5
	3600	290	7.7				
	3920	300	7.4				

Table 12.1 (Continued)

Gas Release No. 57
25 Aug 1956 1720C

P (mb)	Z (m)	T (°C)	R.H. (%)
940	0	34.5	18
900	390	30.5	22
850	897	25.2	30
800	1425	19.9	39
784		18.0	42
738		15.0	23
700	2557	11.1	31
600	3819	0.4	50

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	200	9.8
	430	200	13.0
	870	200	13.0
	1250	210	14.0
	1640	210	17.8
	2200	220	17.5
	2650	230	15.8
	3000	240	14.0
	3300	250	10.2
	3620	200	9.0
	3950	270	8.0

Gas Release No. 58
25 Aug 1956 1920C

P (mb)	Z (m)	T (°C)	R.H. (%)
939	0	29.2	25
932		31.5	25
900	379	29.0	27
850	884	25.0	30
800	1410	20.6	33
762		17.1	36
744		15.5	23
700	2546	11.3	33
610		20.0	52
600	3812	1.0	55

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	2.1
	360	200	12.8
	730	200	14.5
	1110	210	14.6
	1500	220	15.0
	1900	220	15.0
	2280	240	11.9
	2630	240	11.1
	3020	250	10.4
	3350	250	8.5
	3750	260	8.9
	4030	260	9.5

Table 12.1 (Continued)

Gas Release No. 59
25 Aug 1956 2220C

P (mb)	Z (m)	T (°C)	R.H. (%)
939	0	25.5	38
913		31.0	23
900	378	30.2	24
855		27.4	24
850	886	26.9	25
800	1417	21.9	32
716		12.9	45
700	2554	11.3	43
648		6.1	37
600	3816	0.3	57

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	190	2.6
	400	200	15.8
	780	210	16.6
	1170	210	15.3
	1570	220	15.0
	1960	230	14.0
	2350	240	11.3
	2730	240	11.0
	3160	240	10.8
	3600	250	8.0
	4000	260	6.6

Gas Release No. 60
26 Aug 1956 0020C

P (mb)	Z (m)	T (°C)	R.H. (%)
938	0	25.5	35
907		29.1	26
900	375	29.0	35
860		27.4	25
850	882	26.6	35
800	1413	22.0	28
784		20.6	29
720		14.0	42
700	2552	11.8	47
605	3818	0.4	72

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	210	6.2
	440	220	22.5
	850	220	24.1
	1200	220	19.2
	1520	220	21.8
	1850	220	14.2
	2270	220	15.3
	2750	220	11.2
	3150	210	7.9
	3490	210	8.1
	3850	200	9.0

Table 12.1 (Continued)

Gas Release No. 61
27 Aug 1956 1050C

P (mb)	Z (m)	T (°C)	R.H. (%)
934	0	31.8	26
916		28.0	30
900	330	26.0	30
888		24.5	30
874		26.2	27
850	832	24.3	29
800	1358	20.2	32
735		14.4	39
700	2492	10.9	47
634		3.8	62
600	3754	- 0.1	62

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	5.7
	317	200	9.7
	660	210	11.8
	990	220	8.0
	1290	220	7.0
	1600	210	8.7
	1900	210	8.4
	2180	210	9.0
	2490	220	9.2
	2800	220	7.3
	3070	230	7.5
	3370	230	8.6
	3650	230	9.7
	3950	240	10.5

Gas Release No. 62
27 Aug 1956 1350C

P (mb)	Z (m)	T (°C)	R.H. (%)
934	0	29.0	37
924		28.0	30
900	329	26.9	30
869		25.4	30
850	831	23.9	32
800	1357	19.6	38
744		14.5	43
700	2488	10.3	54
635		3.8	71
600	3749	0.2	75

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	1.6
	280	210	6.5
	550	200	4.2
	800	200	3.0
	1050	210	4.4
	1250	220	5.6
	1500	230	5.6
	1730	220	5.9
	1950	220	8.0
	2200	220	9.5
	2500	220	10.5
	2800	230	12.0
	3090	230	11.2
	3350	230	11.7
	3700	230	12.0
	4000	220	10.5

Table 12.1 (Continued)

Gas Release No. 63
27 Aug 1956 1950C

P (mb)	Z (m)	T (°C)	R.H. (%)
931	0	24.5	47
923		30.7	34
900	302	29.0	34
853		25.4	34
850	807	25.1	34
800	1335	21.3	32
773		19.1	31
700	2473	11.8	34
654		6.9	36
600	3739	1.1	45

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	240	1.0
	230	230	3.4
	480	220	5.0
	720	210	6.1
	990	210	7.7
	1290	210	6.0
	1520	210	3.7
	1810	210	3.5
	2100	210	3.2
	2370	220	3.5
	2660	220	3.5
	2940	230	2.4
	3200	240	1.8
	3450	260	2.5
	3680	280	3.8
	3970	280	4.0

Gas Release No. 64
27 Aug 1956 2220C

P (mb)	Z (m)	T (°C)	R.H. (%)
932	0	19.6	67
921		29.1	40
900	309	29.6	30
894		29.7	28
858		27.3	28
850	816	26.6	28
800	1346	22.0	29
742		16.5	29
700	2484	11.9	35
600	3747	6.0	41

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	Calm	
	360	230	3.0
	720	230	4.6
	1080	230	6.6
	1460	230	8.0
	1780	230	7.7
	2110	240	5.8
	2450	240	5.3
	2790	240	4.4
	3100	240	3.3
	3490	240	4.6
	3880	230	5.8

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Table 12.1 (Continued)

Gas Release No. 65
29 Aug 1956 1920C

P (mb)	Z (m)	T (°C)	R.H. (%)
933	0	26.5	28
900	315	24.9	32
850	812	19.9	40
800	1331	15.8	50
786		14.4	52
700	2447	7.1	42
658		3.4	39
600	3696	- 1.2	24

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	3.1
	360	180	11.8
	700	180	13.6
	1080	190	13.0
	1440	200	11.0
	1830	220	10.6
	2200	240	11.0
	2530	250	11.5
	2900	260	11.2
	3220	260	12.2
	3580	270	12.2
	3900	270	10.0

Gas Release No. 66
29 Aug 1956 2120C

P (mb)	Z (m)	T (°C)	R.H. (%)
933	0	21.0	42
916		25.6	37
900	316	24.9	33
850	814	22.1	23
848		22.0	23
800	1336	18.0	28
750		13.4	34
700	2460	8.4	46
650		3.0	58
600	3711	- 2.0	56

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	3.6
	380	180	15.3
	750	190	17.4
	1100	200	14.5
	1420	220	14.1
	1800	220	13.9
	2150	230	10.2
	2460	250	9.1
	2750	250	9.6
	3130	260	12.0
	3520	260	14.1
	3920	270	15.0

Table 12.1 (Continued)

Gas Release No. 67
30 Aug 1956 0020C

P (mb)	Z (m)	T (°C)	R.H. (%)
932	0	21.0	47
911		24.6	37
900	304	23.8	40
876		21.9	45
850	801	21.1	34
830		20.5	24
800	1323	17.8	30
700	2444	7.9	46
686		6.4	49
600	3687	- 2.4	59

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	3.1
	380	190	16.0
	730	200	16.5
	1030	210	16.8
	1320	220	17.3
	1680	220	16.4
	2000	220	13.6
	2300	210	13.0
	2620	210	11.0
	2950	230	7.0
	3230	260	5.0
	3530	250	6.0
	3900	260	7.3

Gas Release No. 68
30 Aug 1956 0220C

P (mb)	Z (m)	T (°C)	R.H. (%)
931	0	21.0	45
916		24.2	40
900	295	23.6	37
850	791	21.3	30
830		20.4	27
800	1312	17.7	30
700	2434	8.0	43
672		5.2	47
635		2.2	43
600	3685	- 1.8	50

Winds

	Z (m)	ddd (deg)	ff (m/sec)
SFC	02	180	4.6
	400	210	14.6
	800	220	15.3
	1160	220	13.8
	1530	210	13.8
	1920	210	12.7
	2290	200	10.2
	2640	200	9.7
	3020	210	7.7
	3380	240	6.4
	3770	260	8.3

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CHAPTER 13
AIRPLANE OBSERVATION DATA

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13.1 Introduction

The aircraft soundings taken at O'Neill, Nebraska at the times of the diffusion experiments are tabulated on the following pages. The data were recorded on an AFCRC Aerograph (Kollsman KS-4). In addition, altitude was read from a calibrated sensitive altimeter by an observer who also noted air conditions.

The pattern for the sounding which was regularly followed consisted of horizontal passes at constant airspeed and altitude along the north mile of the site section for altitudes up to 1000 ft. Then a box climb was made with observations on each side in level flight for 30 seconds. Unless clouds intervened, this was continued to 7000 ft above the site itself (9000 ft mean sea level indicated altitude). A spiral descent followed with one observation at either 1000 ft or 300 ft and a final traverse at an altitude similar to the initial run.

13.2 Tabulated Data

The first column, Z_p, gives the pressure altitude obtained from altimeter readings. The height of the lowest level was adjusted to match the pilot's intention to fly by his own calibrated altimeter and by visual reference to 50-foot instrument towers nearby. The other levels were corrected for scale and installation errors but can be as much as 25 feet too high due to a lack of up-to-date information on these errors and on the airport elevation.

The P_{mb} column is the pressure in millibars obtained by converting altimeter readings through use of a standard altitude table.

The T column is the temperature in °C read from a thermistor bead in a stagnation type probe on a boom on the wing. The value represents an average for the traverse when the trace was changeable and a value at the end of the traverse when a drift of temperature was noted. The value represents a free air temperature because it has been corrected for dynamic heating using a recovery factor of 0.85, found to be typical for the equipment used. The accuracy was of the order ± 0.2°C. Part of this spread was due to a modification to make the recorder more sensitive, which allowed the indicator to hunt through this range during the time of high ambient temperatures.

A column marked # refers to the behavior of the temperature trace. The code used is similar to the one used for pressure tendency reports. The first figure indicates the trend shown by the trace during the traverse, which lasted about 30 seconds. (The time taken to cover the one mile at 100 knots indicated air speed.) The second figure is the amount of change (plus or minus) indicated by an oscillating trace or the amount of temperature shift as indicated by the drifting of the trace. The significant values are given in the legend prefacing the table.

The RH column lists the estimated relative humidity obtained from a carbon-element electric hygrometer. The calibration curve used was that for a batch of pre-production elements. This was checked against apron values of a sling psychrometer before and after the flights. Comparison was made with the daily radiosonde upper air observations (lithium chloride elements) and the calibration curve was shifted to match the deviation of the overall average. As is customary, allowance was made for a small temperature shift; also in this RH column an allowance was made for the increase in probe pressure of 15 mb. The same element was used throughout because no deterioration nor regular shift could be proven in the field. The accuracy is of the order of 5 percent.

The VP column for vapor pressure in millibars and the DP column for dew point in °C are slide rule values. They are computed without allowance for the above mentioned probe-pressure effect. The gradient

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values are considered good due to the fast response of the humidity element at these high temperatures. The accuracy of the absolute values is limited as noted above.

The TIME shown for each sounding is generally that of the time of gas release for convenient reference. The sounding actually started with the first pass; this first pass almost always corresponded with the start of the ground meteorological observations which was 5 minutes before gas release time. The first traverse followed the radiosonde balloon release by 5 minutes. The top level of a complete sounding was reached about 30 minutes and the final run about 45 minutes after the first traverse.

13.3 Remarks

Aircraft observations were not made for tests 23, 24, 31, 32, 33, and 34. At these times the aircraft was at Omaha for engine change and installation of additional instruments. An extra run of note was made and this is included as Field Test No. 48S.

The aircraft used was a standard USAF L-20, instrumented by the Research Airborne Engineering Branch of the Hanscom Air Force Base, Bedford, Mass. The crew consisted of Lt. George A. Sexton, Lt. E. E. Clark, pilots, and A/1c John I. Knutila, A/1c Joseph H. Driever, crew chiefs.

The thermistor used was modified for a response time of about three seconds and calibrated by James H. Meyer of the Lincoln Laboratory. The calibration used with the carbon element was provided by Alfred Spatola of the Cloud Physics Section of GRD.

Table 13.1 Aircraft Observations

LEGEND

Code for the # symbol

First Figure	Temperature Behavior
2	Unsteady or oscillating trace, may include a jump or a hump.
3	Drift to warmer temperature which is maintained.
8	Drift to colder temperature which is maintained.
dash	Smooth trace, no temperature change.

Second Figure	Temperature Oscillation	Temperature Drift
none	± 0.2°C	less than 0.5°C
2	± 0.3	0.5
4	± 0.5	1.0
5	± 0.6	1.2
6	± 0.8	1.5

Abbreviations used are those of the airways teletype code and contractions whose meaning is evident.

The observer's initials are listed because non-meteorological aides made frequent flights on which their observations are sparse. The pilots alternated in flying and no difference in techniques was noted.

Table 13.1 (Continued)

FIELD TEST NO. 1 — 3 JULY 1956 — 1100 CST

Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	943.5	21.0		97	24.4	20.7	
100	941.5	21.3		95	24.4	20.6	
180	939.0	21.1	22	91	23.0	19.7	
390	932.0	20.4	--	91	22.0	19.0	
610	924.0	19.2		94	21.2	18.4	
830	917.0	19.1		98	21.9	19.0	
1000	911.0	18.6		>100	21.4	18.6	
1520	893.5	17.3		>100	19.7	17.3	Ocnl bump lower levels
2015	876.0	16.3		>100	18.5	16.3	In clear
2400	865.0	15.1		>100	17.2	15.1	Base of clouds-in wisps
990	911.5	17.5		>100	20.0	17.5	
130	940.5	20.6		>100	24.3	20.6	
50	943.5	21.1		96	24.4	20.7	
50	943.5	21.2		95	24.4	20.7	Second pass Obsr P.H.

FIELD TEST NO. 2 — 3 JULY 1956 — 1500 CST

Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	943.0	23.5		82	24.0	20.4	
85	941.5	23.4		83	24.1	20.5	
160	939.0	23.4		83	24.1	20.5	Bump
430	931.0	22.6		85	23.2	19.9	
630	923.0	21.9		86	22.8	19.6	
840	916.0	21.1		85	21.6	18.8	
1025	909.5	20.7		89	22.0	19.0	
1515	893.5	19.6	82	92	21.2	18.5	
2025	876.5	18.2		96	20.4	17.8	Steady
2535	860.0	17.0		99	19.4	17.0	Ocnl bump
3020	844.5	15.7	--	100	17.8	15.7	In clds
3545	828.0	14.4		>100	16.4	14.4	Thru hole in clds
4065	812.0	13.6	82	>100	15.6	13.6	Thru thin clds
5040	782.5	11.7		>100	13.7	11.7	Between clds
							First bump about 1200'
1000	910.5	18.8	32	>100	21.7	18.8	Descending 500'/minute
60	943.0	21.4	22	100	25.4	21.4	Abrupt descent to here
60	943.0	22.3		94	25.4	21.4	Traverse after 30 seconds
							Obsr P.H.

See Legend

No. 1 & 2

Table 13.1 (Continued)

FIELD TEST NO. 3 — 5 JULY 1956 — 1100 CST

Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
		22.4		95	25.7	21.5	
220	940.0	26.0		58	19.7	17.3	
160	942.0	25.8		60	20.2	17.7	
390	934.5	25.2	21	60	19.6	17.2	
600	927.0	24.5		63	19.7	17.2	
840	919.0	24.0	62	65	19.7	17.2	
1010	913.0	24.3		66	20.0	17.6	
1520	896.5	23.0	82	67	19.1	16.8	
2010	880.0	21.9	82	67	17.9	15.7	
2505	864.0	20.6		72	17.6	15.5	
3025	847.5	19.1		67	15.0	13.0	
3505	832.5	18.0		65	13.8	11.7	
4045	815.5	16.5		60	11.5	9.0	
5025	786.0	14.7		64	11.0	8.4	
220	940.0	23.9	32	73	21.8	18.9	Obsr P.H.

FIELD TEST NO. 4 — 6 JULY 1956 — 0100 CST

Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
		20.6		92	21.8	18.9	Equip Osc ±0.2°C per 10 sec-taxiing
180	941.0	25.9	--	60	20.2	17.7	Tmp max on Sdg
405	933.5	26.1	--	60	20.4	17.8	
615	926.0	25.4	--	60	19.6	17.2	
820	919.5	24.8	21	60	19.0	16.7	
1010	913.0	24.4	22	59	18.5	17.3	
1500	896.5	23.4		60	17.4	15.3	
1995	880.0	22.0		59	15.8	13.8	
2495	860.5	20.6		69	16.9	14.9	
3000	848.0	19.2		75	16.8	14.8	Pireps slight turbc
3505	832.0	17.8		74	15.2	13.3	above 3000'
3990	817.0	16.6		71	13.6	11.5	
5025	785.5	14.4		58	9.8	6.7	
190	941.0	23.6	44	82	23.8	20.3	Pireps slight turbc Sharp 2° inversion Obsr J.D.

See Legend

No. 3 & 4

Table 13.1 (Continued)

FIELD TEST NO. 5 — 6 JULY 1956 — 1400 CST

Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
60	944.0	29.4		47	19.2	16.9	
75	943.5	29.4		47	19.3	17.0	Ocnl gust all levels
170	940.0	29.3		47	19.2	16.9	
375	933.0	28.5	22	48	18.8	16.5	
630	924.5	27.8		49	18.6	16.3	
820	918.0	27.2	22	50	18.2	16.1	Bumpy below
990	912.0	26.2	22	53	18.3	16.1	
1500	895.0	25.3	82	52	17.0	1.50	One gust
2000	878.5	23.8	82	54	16.3	14.3	
2505	862.5	22.3	22	56	15.5	13.6	
3005	846.5	21.2	22	49	12.6	10.4	
3495	831.0	20.1	22	49	11.5	9.1	
4030	814.5	18.2		49	10.9	8.2	
5045	784.0	17.4		52	10.4	7.6	
300	935.5	26.5	32	63	·22.1	19.1	Obsr J.D.
35	945.0	28.5	32	52	20.0	17.5	

FIELD TEST NO. 6 — 6 JULY 1956 — 1700 CST

Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	942	30.3	22	43	18.5	17.3	
75	941	30.7	--	46	20.3	17.8	
165	938	30.2		46	19.8	17.3	
375	930.5	29.0		46	18.4	16.2	
635	922	29.0	82	46	18.6	16.4	
805	916	28.3		46	17.8	15.7	
1005	909.5	27.8		48	18.1	15.9	
1515	892.5	26.7		46	16.3	14.3	
1995	876.5	25.3	82	50	16.4	14.4	
2500	860.5	23.3	82	54	15.6	13.6	
3020	843.5	22.8		50	14.2	12.2	
3560	827.0	21.2		46	11.5	9.1	
4000	813.0	20.5		42	10.3	7.4	
5010	783.0	18.3		49	10.4	7.4	
275	934.0	27.7	33	54	20.3	17.7	Obsr J.D.
65	941.0	30.0		47	20.0	17.5	

See Legend

No. 5 & 6

Table 13.1 (Continued)

FIELD TEST NO. 7 — 10 JULY 1956 — 1400 CST

Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	944.5	30.1	22	38	16.3	14.3	
90	943.0	29.6		39	16.3	14.3	Obrep sounding
180	940.0	29.2	22	40	16.0	14.1	Rough aloft
390	933.0	28.6		39	15.3	13.4	
590	926.0	27.8		41	15.5	13.5	
820	916.0	27.2	22	42	15.4	13.4	
1000	912.0	26.9		42	14.8	12.8	
1520	894.5	25.3		45	14.4	12.4	
2015	878.5	23.8	22	47	13.8	11.8	
2505	862.5	21.8		50	13.0	10.9	
3005	846.5	20.5	82	52	12.6	10.4	
3515	830.5	18.9	82	56	12.4	10.2	
4035	814.5	17.3		59	11.9	9.6	
5045	784.0	14.6	82	62	10.4	7.6	
6085	753.5	12.3	82	66	9.6	6.4	
7090	725.0	9.8		68	8.4	4.5	Turbulence noted
290	936.0	26.4	32	45	15.6	13.6	
90	943.0	29.1	32	41	17.0	15.0	Obsr J.D.

FIELD TEST NO. 8 — 10 JULY 1956 — 1400 CST

Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	943.0	30.5	22	39	17.1	15.0	Ocnl bumps and drafts
90	941.5	30.1	23	39	16.7	14.7	Drafts
180	938.5	29.8	23	41	17.4	15.2	
395	931.0	29.3	22	42	17.3	15.2	Ocnl bumps
640	922.5	28.2		43	16.4	14.4	
830	916.0	27.8		42	15.8	13.8	Bumpy
1000	910.5	27.0		44	15.5	13.6	
1500	894.0	25.7		45	14.7	12.7	
2015	877.0	23.8		48	14.2	12.1	Ocnl yaw
2525	860.5	22.1	22	50	13.4	11.3	
3035	844.0	20.5		54	13.4	11.3	Smoother
3545	828.0	19.0		59	13.2	11.0	Bumps
4045	813.0	17.6		59	13.0	10.8	Yawing
5065	782.0	14.6		68	11.6	9.1	Smooth, some cloud bases
6075	752.5	11.9		73	10.3	7.4	Cloud bases these altitudes
7090	723.5	9.3		79	9.5	6.2	Wallowy
320	937.0	29.1	32	39	15.8	13.8	Obsr P.H.
95	941.5	30.7	22	39	17.3	15.2	

See Legend

No. 7 & 8

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Table 13.1 (Continued)

FIELD TEST NO. 9				11 JULY 1956			1000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	939.0	25.9	23	62	21.2	18.4	Bumpy
100	937.5	25.6	23	62	20.8	18.2	
165	935.0	25.3	22	65	21.2	18.4	
335	927.5	24.7	22	67	21.0	18.3	Drafts
610	920.0	23.9	22	70	21.1	18.4	
825	912.5	23.1	22	72	20.4	17.8	
990	907.0	23.2		72	19.3	16.9	Bumps lift
1490	890.5	21.1	23	73	18.4	16.2	
2025	875.0	21.4	16	73	18.8	16.5	Slow osc
2515	857.0	22.4	23	66	18.3	16.1	Steady
3015	841.5	21.5	22	68	17.6	15.5	Hazy vsb 8 to 10
3495	826.5	20.9		65	16.4	14.4	
4035	809.5	20.6		54	13.2	11.1	
5025	780.0	18.6		50	11.0	8.4	
6035	750.5	16.1		47	8 7	5.0	Ac clds 5000' above
7060	721.5	13.1		49	7.4	2.6	Hazy
280	931.5	25.2	34	70	22.7	19.5	
55	939.0	26.6	23	60	21.3	18.5	Obsr P.H.

FIELD TEST NO. 10				11 JULY 1956			1200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
45	939.0	28.4	22	55	21.5	18.7	
90	937.5	28.2	23	56	21.8	18.8	
185	934.0	27.8	22	56	21.2	18.5	
405	926.5	26.9	22	60	21.7	18.8	
635	919.0	26.3	23	63	21.8	18.8	
820	912.5	25.4		66	21.7	18.8	
990	907.0	25.5	22	66	21.8	18.9	
1490	890.5	23.6	22	70	20.8	18.2	
2005	873.5	21.9	22	72	19.3	17.0	Pireps rough below
2505	857.5	20.4	22	74	18.0	15.8	Relatively smooth above
3015	841.5	19.7	14	70	16.3	14.3	
3515	825.5	20.3	32	62	15.0	13.0	
4015	810.0	19.7	22	54	12.5	10.3	
5015	780.0	18.1		54	11.4	8.8	
6025	750.5	15.5	22	53	9.5	6.3	
7040	722.0	12.9	22	60	9.1	5.6	
290	930.5	27.7	22	58	21.9	19.0	
60	938.5	29.0	32	55	22.3	19.2	Obsr J.D.

See Legend

No. 9 & 10

Table 13.1 (Continued)

FIELD TEST NO. 11				14 JULY 1956			0800 CST
Z_p. (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
40	942.5	23.5	23	83	24.2	20.6	Bump
90	941.0	32.4	23	88	24.2	20.5	
190	937.5	23.1	22	83	23.7	20.2	Drafts
380	931.0	22.4	22	83	22.7	19.5	
640	922.0	21.8	22	85	22.4	19.3	
840	915.5	22.4	23	84	23.0	19.8	Bumps
1040	908.5	23.1	23	76	21.8	18.8	Steadier
1520	892.5	22.8	32	82	22.8	19.6	
2010	876.5	23.6		50	14.8	12.8	Smooth
2495	861.0	22.6	22	55	15.2	13.2	
3025	844.0	22.4		42	11.5	9.0	
3495	829.0	22.2		42	11.4	8.8	
4035	812.5	20.8		39	9.7	6.5	Oscillation
5035	782.5	17.7		46	9.4	6.2	Smooth
6035	753.0	15.5		46	8.1	4.0	
7080	723.5	12.5		43	6.3	0.4	Oscillation bumps at 1300'
290	934.0	23.8	32	85	25.2	21.3	
50	942.5	23.9	83	80	23.8	20.3	Obsr P.H.

FIELD TEST NO. 12				14 JULY 1956			1000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
75	941.0	27.8	22	66	24.8	21.0	
160	939.5	27.2	22	66	24.3	20.6	Bumpy
360	931.5	26.7	22	70	24.8	21.0	Lifts begin
620	922.5	25.9	22	73	24.7	20.9	
800	916.5	25.4	22	77	25.4	21.4	Gusts at end
1000	909.5	24.9	22	78	24.8	21 0	
1510	892.5	24.4	24	72	22.2	19.1	Occasional bumps
2005	876.5	24.6	23	52	16.4	14.4	Smooth
2485	861.0	23.9	22	50	14.8	12.9	
3015	844.0	23.1	22	39	11.1	8.5	Steady
3495	829.0	21.9	--	38	10.0	7.0	
4030	812.5	21.1		35	8.8	5.0	
5035	782.5	18.4		39	8.4	4.4	Yaw
6035	753.0	16.1		40	7.3	2.4	
7040	724.5	13.0		48	7.1	2.1	Steady Bumps at 1900
280	934.0	27.6	34	44	16.4	14.4	
70	941.5	29.2	24	50	20.8	18.2	Bump Obsr P.H.

See Legend

No. 11 & 12

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Table 13.1 (Continued)

FIELD TEST NO. 13				22 JULY 1956			2000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
45	947.0	23.3	82	62	18.1	16.0	SC vesperalis 9000'
80	945.5	22.8		65	18.2	16.0	Sun low at the horizon
180	942.5	23.1	--	59	17.0	15.0	Smooth
400	935.0	23.0		59	16.9	14.9	
620	927.0	21.8	32	62	16.6	14.6	Very smooth
830	920.0	21.2		65	16.5	14.5	One lift; sunset
1000	914.5	20.9		67	16.9	14.9	
1505	897.5	19.6	82	71	16.5	14.5	
2000	881.0	18.0		72	15.0	13.1	Very light turbc
2500	865.0	16.6		72	13.8	11.8	Smooth
3020	848.0	15.1		73	12.8	10.6	
3505	833.0	13.7		77	12.2	10.0	R H Osc
4045	816.5	12.6		90	13.3	11.2	Smooth
5030	786.5	10.4		97	12.4	10.1	
6070	756.0	8.1		100	11.3	8.1	Cloud base 5800
7080	727.0	6.3		96	9.4	6.0	Top about 6500 vrbl
285	938.5	22.3		62	17.0	15.0	
180	942.5	22.6	22	60	16.8	14.8	Obsr P.H.

FIELD TEST NO. 14				22 JULY 1956			2200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
170	943.5	21.7	22	57	15.0	13.0	
355	937.0	22.4		54	14.8	12.9	
600	928.5	21.8		60	15.8	13.8	
820	921.0	21.4	22	59	15.2	13.2	
985	915.5	21.0		56	14.3	12.3	
1500	898.5	19.6		62	14.4	12.4	
1985	882.5	18.1		73	15.4	13.4	
2485	866.0	16.7	22	81	15.6	13.6	Light turbc
2985	850.0	15.0		83	14.4	12.4	Light turbc
3495	834.0	14.4		90	15.0	13.0	
4005	818.0	13.1		99	15.0	13.1	
4990	788.0	11.3		82	11.2	8.7	Ocnl bump above
6025	758.0	9.4		75	9.0	5.4	
7020	729.5	6.9		87	8.8	5.1	
260	940.0	22.3		54	14.8	12.8	
170	943.5	22.3	22	53	14.5	12.5	Obsr J.D.

See Legend

No. 13 & 14

Table 13.1 (Continued)

FIELD TEST NO. 15				23 JULY 1956			0800 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	947.0	19.4	22	84	19.2	16.8	
75	942.5	19.2	22	83	18.8	16.5	
185	942.0	19.0		84	18.8	16.5	
395	935.0	18.9		84	18.6	16.4	Occasional H turbc
635	926.5	20.1	22	80	19.1	16.8	
845	919.5	20.3		81	19.6	17.2	
1005	914.0	20.1		82	19.6	17.2	Hazy level not sharp
1525	897.0	20.0		65	15.8	13.6	
2020	880.5	18.8		69	15.2	13.2	
2500	865.0	17.1	--	78	15.5	13.5	
3030	848.0	15.9		84	15.3	13.3	
3520	832.5	15.2		59	10.4	7.5	Above smoky layer
4050	816.0	13.9	--	47	7.5	2.8	
5040	786.0	11.7		42	5.9	-0.4	
6060	756.0	9.4		36	4.3	-4.1	
7085	727.0	7.8		32	3.5	-6.5	Few Ac on horizon
285	938.5	20.4	32	84	20.3	17.8	A few little bumps
60	946.5	21.3		75	19.3	14.9	Obsr P.H.

FIELD TEST NO. 16				23 JULY 1956			1000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	946.5	24.4	24	62	19.4	17.0	
100	944.5	24.4	24	62	19.2	16.9	
190	938.0	24.1	22	62	18.8	16.6	
400	934.0	23.3	22	65	18.8	16.6	
610	927.0	22.6	82	64	17.8	15.7	
830	919.5	21.9	22	72	19.3	17.0	
1010	913.5	21.5	22	76	19.7	17.3	Obreps bumpy to here
1500	897.0	20.3	22	73	17.6	15.5	
2005	880.5	18.8	22	74	16.2	14.2	
2495	864.5	17.9	--	78	15.5	13.5	
3015	848.0	16.0		78	14.5	12.5	
3495	833.0	14.8	22	71	12.2	9.9	
4035	816.0	14.7		42	7.3	2.2	A light layer of scattered clouds
5025	786.0	12.4		38	5.5	1.2	
6045	756.0	10.3		54	6.9	1.8	
7050	727.0	8.0		74	8.1	3.9	
300	937.5	24.4	32	58	18.1	16.9	
50	946.0	25.8	32	50	16.7	14.7	Obsr J.D.

See Legend

No. 15 & 16

Table 13.1 (Continued)

FIELD TEST NO. 17				23 JULY 1956			2000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	941.0	29.0		37	14.6	12.6	
80	940.0	28.8		37	14.4	12.4	
180	936.5	29.3	--	35	14.4	12.4	
390	929.0	29.5	22	33	13.7	11.6	
620	921.5	29.4		29	12.0	9.6	
820	914.5	28.6	22	31	12.2	10.0	
990	909.5	28.2		33	10.7	10.5	
1480	892.5	26.9	22	32	11.9	9.5	
2005	875.5	25.5		34	11.3	8.8	Pireps temp 72° F
2505	859.0	24.8	12	36	11.2	8.7	
2985	844.0	23.2		38	10.8	8.2	
3505	827.5	21.7		39	10.2	7.3	
3995	812.5	20.3		44	10.4	7.6	
5015	781.5	17.5		49	9.9	6.8	
6005	752.5	14.9		52	8.9	5.4	
7040	723.5	11.8		60	8.4	4.5	Very lgt turbc Pireps 53°F
280	933.0	28.4	--	35	13.7	11.6	
180	936.5	28.4	22	36	14.1	12.1	Obsr J.D.

FIELD TEST NO. 18				23 JULY 1956			2200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
160	939.0	27.6	32	39	14.3	12.2	(St Cu drifted out,
345	932.5	27.9	22	35	13.3	11.2	wind varied with
605	923.5	27.9	32	36	13.4	11.2	cloud cover)
815	916.5	27.7	82	33	12.4	10.2	
985	911.0	27.2	22	33	12.1	9.8	
1475	894.5	26.4		32	11.1	8.6	Fst bump
1980	878.0	25.6	--	36	11.7	9.3	Lgt turbc continuous
2490	861.5	24.4		39	11.8	9.4	Bumps not gusts
2970	846.0	23.4	22	39	11.3	8.8	(Pireps alt changes rather than airspeed changes noted)
3510	829.0	21.8	82	42	11.1	8.6	
4010	813.5	20.3	22	46	10.9	8.2	Bumps small but pitching
5010	783.5	17.4	22	54	10.8	8.2	Choppy
6010	754.0	14.6		61	10.3	7.4	Wallowy
7030	725.5	11.5		65	9.0	5.5	Up & down drafts
255	935.5	26.4	62	42	14.4	12.4	Smooth below about 1200'
155	939.0	26.7		43	15.0	13.1	Obsr P.H.

See Legend

No. 17 & 18

Table 13.1 (Continued)

FIELD TEST NO. 19				25 JULY 1956			1100 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	943.0	27.0	23	40	14.2	12.1	Cirrus clouds sun out
75	942.0	26 7	22	40	14.0	11.9	Bouncy
175	939.0	26.4	22	41	14.0	12.0	
390	931.5	25.7	22	42	13.9	11.9	Bumps
620	923.5	25.2		43	13 8	11.8	
850	916.0	24.5	22	45	14 0	12.0	Drafts
1000	908.5	24.0	22	45	13 5	11.4	
1500	894.0	22.4	23	50	13.5	11.4	Bouncing
2015	877.0	21.0	22	53	13.4	11.4	
2505	861.0	20.5	24	35	8.4	4.5	Less drafty
3025	844.5	20 3	22	25	6.0	-0.3	RH data doubtful this test, response sluggish
3515	929.5	20.0	22	25	5.9	-0.5	
4035	813 5	20.0	22	25	5.9	-0.5	
5035	783.0	18 2	12	28	6.0	-0.3	Smooth
6045	753.5	16.2		31	5.7	-0.4	
7080	724.0	13.5		36	5.7	-0.9	Slow osc
							Bumps at 2500'
300	934.5	26.8	22	43	15.1	13.1	Lift at 800
100	941 5	28.4	22	40	15.4	13.4	Big bump Obsr P.H.

FIELD TEST NO. 20				25 JULY 1956			1300 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
		32.8					Humidity element
75	939.5	29 4	23	31	12.7	10.6	inspected
175	936.0	29.3	23	29	11.8	9.4	
375	929 0	28.6	22	31	12.1	9.8	
595	921 5	27.7	22	33	12.4	10.1	
805	914.5	27.0	22	36	12 8	10.6	
1015	907.5	26.2	22	36	12 4	10.2	
1505	891 0	25.1	22	35	11.3	8.8	
2000	875.0	23 2		35	10.2	7.2	
2480	859.5	21.8	22	43	11.1	8.5	
3020	842.5	21.8	26	28	7.4	2.6	
3490	827 5	22.0	24	25	6 6	1.0	
4010	811.5	21.4	23	25	6 8	0.6	
5020	781.0	19.4	22	28	6.4	0.6	
6030	751.5	17.0		28	5.6	-1.1	
7045	723.0	13 8		36	5.8	-0 6	
							Turbc below 3000 ft
275	932.5	30.0	33	25	10 5	7.7	
85	939.0	30.5	82	24	10.8	8.0	Obsr J.D.

See Legend

NO. 19 & 20

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Table 13.1 (Continued)

FIELD TEST NO. 21				26 JULY 1956			2100 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
175	932.0						
390	924.5						
600	917.5						Rough
850	909.0	28.6	32	34	13.3	11.2	Ltng to N
1020	903.5	29.5	22	32	13.2	11.1	Smooth suddenly
1490	888.0	28.8	32	29	11.5	9.0	
2015	870.5	27.7		28	10.4	7.6	
2495	855.0	27.6		24	8.9	5.3	Steady
2995	839.5	26.9		25	8.9	5.3	
3495	824.0	25.4		26	8.5	4.6	Temp min sharp about 3800'
3995	808.0	24.4		29	8.8	5.2	Smooth
5020	778.5	21.2	24	31	7.8	3.4	Bumpy then steady
6045	749.0	18.1		35	7.3	2.4	Hvy ltng to N Smooth
7070	719.5	16.5	32	27	5.1	-2.2	-1.5°C tmp blip on climb Equipment looks OK
295	928.0	28.7		31	12.2	10.0	Bumps at 800'
180	932.0	28.7		30	11.8	9.4	Obsr P.H.

FIELD TEST NO. 22				26 JULY 1956			0000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
180	931.0	27.6		37	13.7	11.6	Pireps strong winds aloft
400	923.5	27.1	22	37	13.3	11.1	Bumpy
640	915.5	26.6	35	37	12.9	10.8	
850	908.0	26.4	24	38	13.0	10.9	
1030	902.0	26.2	25	38	12.9	10.8	
1500	886.5	27.5	84	34	12.5	10.2	
2025	869.5	27.4		29	10.6	7.8	
2515	853.5	27.5	22	25	9.2	5.8	
3035	837.5	27.0	22	24	8.6	4.8	
3515	822.5	25.9	22	23	7.7	3.2	Very lgt turbc
4035	806.5	24.9		23	7.3	2.4	Lgt turbc at 4500'
5025	776.5	21.6		23	5.9	-0.4	Smooth at 5500'
6045	747.0	19.5	22	23	5.2	-1.9	
7080	719.0	16.6	22	23	4.4	-4.0	Lt turbc at 5600' descent into haze at 4400'
280	927.5	26.6	--	36	12.6	10.4	Out haze at 1400'
200	930.0	26.9		36	12.8	10.6	Bumps at 300' Obsr J.D.

See Legend

No. 21 & 22

Table 13.1 (Continued)

FIELD TEST NO. 25				1 AUGUST 1956			1300 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	944.0	22.6	22	96	26.5	22.0	Bouncy
100	942.5	22.6	22	94	25.8	21.6	
190	939.5	22.0	22	96	25.5	21.4	
410	932.0	21.4	22	94	24.3	20.6	Drafts and acceleration
630	924.5	20.7		>100	24.7	20.7	R H sluggish
845	917.0	20.0		>100	24.4	20.0	Bumpy
1035	910.5	19.5		>100	23.7	19.5	R H sluggish
1510	895.0	18.2		>100	22.2	18.2	Bumpy at base about 1600' In clouds at 1750' and drafts
1000	912.0	19.4		>100	23.2	19.4	Bumpy
50	944.0	22.9	32	96	27.0	22.4	Est 60 ft by the tower 40 ft indicated Obsr P.H.

FIELD TEST NO. 26				2 AUGUST 1956			1200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	940.0	27.3	24	66	24.2	20.5	
80	939.0	26.9	23	68	24.4	20.6	
190	935.5	26.9	23	67	24.0	20.4	Drafts
395	928.0	26.3	23	72	24.8	21.0	Bumpy
630	920.0	25.6	22	75	24.9	21.0	
830	913.5	25.6	22	71	23.7	20.2	Bumpy
1010	907.5	24.4	22	78	23.9	20.4	
1490	891.5	23.0	82	82	23.2	19.9	
2005	874.5	21.2		92	23.4	20.0	Turbc
2460	860.0	20.4	14	91	22.0	19.1	Wobbles no drafts
2985	843.0	18.6	66	88	19.0	16.7	
3495	827.0	18.6	24	81	17.6	15.4	Sctd cld bases below
4035	810.5	18.4		63	13.6	11.5	Passing cld bases at 3700'
5025	781.0	16.2	83	82	15.3	13.3	Climb in clear
6045	751.0	14.0	--	78	13.7	10.6	
7050	722.5	11.8		95	12.9	9.6	In clds 4500 to 4800 ft on descent
1020	907.0	24.8	34	73	23.1	19.8	Bases est 3500 ft Bumps
295	931.5	27.6	33	57	21.4	18.6	Bumps
50	940.0	28.4	22	54	21.2	18.4	Low 50' pass Obsr P.H.

See Legend

No. 25 & 26

Table 13.1 (Continued)

FIELD TEST NO. 27				2 AUGUST 1956			1400 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	939.5	29.9	24	50	21.2	18.5	Bumpy
80	938.5	30.1	23	49	21.0	18.3	Drafts already
175	935.5	29.6	23	50	20.8	18.2	
390	927.5	29.2	63	50	20.5	17.8	Drafts
615	920.0	27.9	23	52	20.0	17.5	Occasional gusts
830	913.0	27.5	22	54	20.2	17.6	Ups & Downs
1020	906.5	26.9	22	56	20.4	17.8	Negative G acceleration
1500	890.5	25.4		67	22.0	19.0	Bumpy
2015	873.5	23.6		79	23.2	19.0	
2495	858.0	22.1		80	21.4	18.6	Now under clouds, bumpy
3025	841.5	20.6		84	20.6	18.0	
3515	826.0	19.0	22	93	20.7	18.0	Wobbly
4025	810.5	17.6		98	19.9	17.4	Base of clouds just above
5035	780.0	16.4	22	72	13.7	11.6	Cloud haze at 4800 ft
6045	750.5	14.6		75	12.6	10.4	Cld tops 5000-5500 ft
7065	721.5	11.7		81	11.3	8.7	Deck Ac est 1000' above Lgt moisture content in clds
290	931.0	30.1	22	50	21.6	18.7	Bumps at 300'
70	938.5	31.0	23	49	22.0	19.0	Bumpy Obsr P.H.

FIELD TEST NO. 28				3 AUGUST 1956			0000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
		26.2					
165	934.5	26.4	22	72	25.0	21.1	Bumpy
385	927.0	26.5	22	70	24.6	20.8	Lgt rain bumps
605	919.5	26.4	22	70	24.6	20.8	Humidity sluggish
835	911.5	26.5	22	65	22.8	19.6	
1005	906.0	26.9		61	20.3	17 7	
1505	889.5	26.4	22	52	18.2	16.0	
1980	873.5	25.2		51	16.7	14.7	Ltng to N
2490	857.5	23.8		52	15.5	13.6	Ocnl bump
2980	841.5	23.8	22	51	15.4	13.4	Smooth
3510	825.0	23.0		49	13.7	11.6	
4030	809.0	21.4		50	12.8	10.6	
5040	779.0	19.1		54	12.1	9.8	Smooth
6050	749.5	15.6		76	13.6	11.6	Strong S Wind
7025	722.0	12.8		82	12.3	10.0	Freq ltng N -3°C at about 700' due R
1475	890.5	26.4		50	17.2	15 1	High pass account wea
175	934.0	27.4	22	55	20.4	17.8	Obsr P.H.

See Legend

No. 27 & 28

Table 13.1 (Continued)

FIELD TEST NO. 29				3 AUGUST 1956			0200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
165	935.0	27.4	22	50	18.4	16.2	
365	928.0	26.8	22	50	17.7	15.6	
595	920.0	26.5	12	50	17.6	15.5	Gusts
795	913.5	25.9		49	16.5	14.5	Accelerations felt
995	906.5	26.0	22	50	16.7	14.7	
1475	890.5	26.2		45	15.3	13.4	Smoother ltng E & SW
2000	873.5	25.8	32	45	15.0	13.0	
2470	858.5	24.2		45	13.8	11.8	Smooth
3010	841.0	22.7		46	12.6	10.4	
3490	826.0	21.3	22	47	12.1	9.8	
4000	810.5	19.8		49	11.3	8.8	Rain encountered approaching tstrm
965	907.5	26.2	32	48	16.3	14.3	Bumps at 700 No low pass Obsr P.H.

FIELD TEST NO. 30				3 AUGUST 1956			1300 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
75	938.0	31.8	23	42	19.8	17.3	Rough Obsr P.H.
175	935.0	31.4	23	43	19.7	17.2	Bumpy
375	928.0	30.8	23	45	20.2	17.7	Drafts
625	919.5	30.0	23	46	19.5	17.1	Drafts.
850	912.0	29.4	--	50	20.7	18.0	Drafts
995	907.0	28.6	63	47	18.5	16.2	
1465	891.5	27.4	12	50	18.4	16.2	
2030	873.0	25.7	22	54	18.2	16.0	Occasional light bumps
2505	857.5	23.9	22	61	18.3	16.1	Drafts
3020	841.0	22.5	12	64	17.8	16.7	
3525	825.5	20.7		72	17.8	15.7	Wallowy
4010	810.5	19.0	22	76	17.0	15.0	
5060	779.0	16.4	--	83	15.7	13.7	Occasional bump
6050	750.0	14.8		64	11.0	8.4	(Approaching base level at
7105	720.0	11.9	32	76	10.8	8.1	5800) Edge of FrCu Base clds 6000' tops 7000'
985	907.5	28.6	62	47	18.2	16.0	No level pass account of boom oscillation

See Legend

No. 29 & 30

Table 13.1 (Continued)

FIELD TEST NO. 35				11 AUGUST 1956			2100 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
		22.6					Smooth Ocnl draft
160	939.0	25.6		55	18.3	16.1	Tiny bumps
360	932.0	25.5		53	17.4	15.3	
590	924.5	25.4	22	51	16.7	14.7	
810	917.0	24.5	22	54	16.7	14.7	
980	911.0	23.7		54	16.1	14.1	Occasional bump
1490	894.0	22.5	22	58	16.2	14.2	
1995	877.5	20.8		68	16.8	14.8	
2465	862.5	19.5		70	16.1	14.1	Blue sky above
3000	845.5	18.3		74	15.7	13.7	
3470	830.5	17.4		72	14.5	12.5	
4030	813.0	16.4		68	13.0	10.8	Altostratus deck
5015	783.5	13.7		78	12.3	10.0	
6015	754.0	11.3	--	84	11.3	8.8	Hazy
7030	725.5	8.9		89	10.3	7.4	Possible draft
980	911.0	23.7		51	15.2	13.3	Smooth
140	940.0	24.0		63	19.0	16.7	Obsr P.H.

FIELD TEST NO. 36				11 AUGUST 1956			2300 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
165	939.0	22.9		66	18 7	16.4	
365	932.0	23.7		60	18.0	15.8	
595	924.0	24.8		54	17.2	15.2	
815	916.5	24.4	--	54	16.8	14.8	
995	910.5	24.0		52	15.6	13.6	
1495	894.0	22.5		53	14.6	12.6	
1990	877.0	21.1		59	15.1	13.1	
2480	861.5	19.9		68	16.1	14.1	
2970	846.0	18.5		72	15.5	13.5	
3480	830.0	17.5		74	15.1	13.1	
3990	814.5	16.5		77	14.6	12.6	
5010	783.5	13.4		84	13.2	11.1	
6010	754.0	11.7		90	12.5	10.3	
7035	725.0	9.6		96	11.6	9.2	
985	911.0	23.5		54	15 8	13.8	
165	938.5	22.9		66	19.9	16.8	Obsr J.D.

See Legend

No. 35 & 36

Table 13.1 (Continued)

FIELD TEST NO. 37				12 AUGUST 1956			0300 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
		19.1					
165	936.5	21.1	32	84	21.3	18.5	Bumps ltng N & NE
385	929.0	22.4		78	21.6	18.7	
605	921.5	22.9		74	20.8	18.1	
810	914.5	22.9		72	20.4	17.8	
975	909.0	23.0		58	16.7	14.7	
1475	892.5	22.6	--	54	15.0	13.0	
2000	875.0	21.5	--	53	13.8	11.8	Lgt trubc pirep
2510	858.5	20.6		53	13.1	11.0	
2995	843.0	19.8		53	13.5	10.2	
3470	828.5	18.4		52	11.2	8.7	
4000	812.0	17.2		53	10.7	8.0	Very light turbc
5010	781.5	16.2		76	10.2	7.3	
6020	752.0	14.2		74	12.1	9.8	
7040	723.0	11.3		83	11.2	8.7	Ltng E Light turbc at 3500
975	909.0	22.1	--	77	20.9	18.2	
155	937.0	21.2	12	84	21.5	18.6	Bumpy Obsr P.H.

FIELD TEST NO. 38				12 AUGUST 1956			0500 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
		21.2					
170	936.0	21.1		85	21.5	18.6	Pireps sfc the same
380	929.0	22.6	33	78	21.5	18.6	
630	920.5	23.2	22	70	20.2	17.6	
830	914.0	23.3		61	17.6	15.5	
1010	907.5	23.6		49	14.3	12.3	
1510	891.0	24.0		42	12.6	10.4	
2015	874.5	22.4		48	13.2	11.1	
2495	859.0	21.7		44	11.8	9.4	
3005	843.0	20.0	--	47	10.9	8.2	
3515	827.0	18.6		50	10.7	8.0	
4015	811.5	17.8		59	12.3	10.0	Light turbc
5025	781.0	16.5		51	9.7	6.5	
6035	751.5	13.9		87	14.0	12.0	R H jump about 5200'
7040	723.5	11.2		89	12.0	9.7	Pireps lgt turbc R H drop about 5600'
990	908.5	22.5		63	17.4	15.3	
30	941.0	20.5	82	89	21.8	18.9	Obsr J.D.

See Legend

No. 37 & 38

Table 13.1 (Continued)

FIELD TEST NO. 39				13 AUGUST 1956			2200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
190	941.5	26.2	12	44	15.3	13.4	Ocnl bump at 300'
420	933.5	27.1	63	43	15.8	13.8	
620	927.0	27.3		42	15.3	13.3	Smooth
850	919.0	27.3	22	40	14.4	12.4	One bump, ocnl draft
1060	912.0	26.4	22	40	13.8	11.8	
1525	896.5	25.7	--	39	12.8	10.6	
2045	879.0	24.3		39	11.8	9.4	Smooth
2515	864.0	23.0	22	39	11.0	8.4	
3035	847.5	21.8		42	11.0	8.3	
3525	832.0	20.0		47	11.0	8.3	
4040	816.0	18.3		50	10.6	7.9	Pireps added power needed
5040	785.5	16.3	62	55	10.3	7.4	Several bumps, lgt turbc
6070	755.5	14.3		67	11.1	8.5	Some bases at 5500, turbc
7090	726.5	11.3		72	9.8	6.7	Clds above, turbc, drafts
1000	914.0	26.4	--	40	13.7	11.6	Bumps at 500
205	941.0	25.0		32	14.2	12.2	Turbc noted thruout Obsr P.H.

FIELD TEST NO. 40				14 AUGUST 1956			0030 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
150	942.5	26.4	82	44	15.1	13.1	
385	934.5	27.2	22	44	15.8	13.8	No turbc noted
610	926.5	27.9	22	43	16.2	14.2	
810	919.5	27.3	22	43	15.6	13.7	Pireps strong wind
1000	913.5	27.3	22	43	15.6	13.7	
1510	896.5	25.5		45	14.8	12.8	
2010	880.0	24.3		45	13.8	11.7	Pireps less power rqrd
2500	864.0	22.7		47	13.2	11.1	
3000	848.0	21.2		47	11.8	9.4	Pireps ditto
3490	832.5	20.0		48	11.2	8.7	
4000	817.0	18.4		48	10.2	7.2	
5030	785.5	16.3		63	11.8	9.4	Ocnl drafts
6040	756.0	14.1		66	10.8	8.1	Lgt turbc 5600 ft
7070	726.5	11.3		71	9.6	6.4	Bumps, wallowy
980	914.0	26.4	32	47	16.4	14.4	Turbc at 300' Obsr P.H.
150	942.5	24.4		47	14.4	12.4	

See Legend

No. 39 & 40

Table 13.1 (Continued)

FIELD TEST NO. 41				14 AUGUST 1956			0300 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
160	941.5	24 4		49	15.0	13.0	
385	934.0	26.2		45	15.3	13.3	Gusts
615	926.0	27.0	32	43	15.4	13.4	Ocnl gust
825	919.0	26.7		43	15.1	13.1	Ltng N
985	913.5	26.7		42	14.7	12.7	
1485	897.0	25.5	22	41	13.4	11.3	
2005	879.5	24.9		41	12.9	10.7	3 ltng cells N & NE
2500	863.5	23.6		42	12.4	10.2	
3030	846.5	22.7	22	42	11.7	9.3	
3520	831.5	21.8		46	11.9	9.6	
4025	815.5	20.3		50	11.9	9.6	
4500	801.0	19.1		53	11.8	9.4	
5025	785.5	17.8		55	11.3	8.8	
6060	755.0	15.2		67	11.8	9.4	Ocnl draft
7065	726.5	12.3	--	65	9.5	6.2	Bumps
							Lgt turbc around 2000'
1005	913.0	26.4		40	13.7	11.7	
175	941.0	23.8	22	50	14.8	12.8	Sfc turbc Obsr P.H.

FIELD TEST NO. 42				14 AUGUST 1956			0500 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
180	940.5	22.6		52	14.4	12.4	
410	932.5	23.2	23	49	14.0	12.0	
650	924.5	26.1	22	42	14.2	12.2	
840	918.0	27.0		37	13.1	11.0	
1040	911.0	26.7		39	13.6	11.6	
1540	894.5	25.8	22	39	12.9	10.8	
2025	878.5	24.3		42	12.8	10.6	
2525	862.5	24.0	22	39	11.6	9.2	
3025	846.5	23.4		41	11.8	9.5	
3535	830.5	21.6		43	11.0	8.4	
4045	814.5	20.3		46	10.9	8.2	Lgt turbc
5065	784.0	17.2	32	64	12.7	10.5	
6055	754.5	15.6	--	69	12.3	19.1	Turbc
7010	727.5	12.7		60	9.0	5.4	Turbc
1000	912.5	25.9		42	14.0	12.0	
60	944.5	22.3		46	12.4	10.2	Obsr J.D.

See Legend

No. 41 & 42

Table 13.1 (Continued)

FIELD TEST NO. 43				15 AUGUST 1956			1200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	943.5	31.7	22	33	15.4	13.4	(Temp adjustment too sluggish,
80	942.5	31.7	23	31	15.4	13.3	accuracy ± 0.3 this run only)
190	938.5	31.2	22	33	15.1	13.2	Bumpy
380	932.0	30.4	22	35	15.4	13.4	Drafts ocnl
600	924.5	29.7	22	33	14.0	12.0	Bump
820	917.0	29.0	12	36	14.6	12.6	Draft
1010	910.5	28.4	82	36	14.0	12.0	Smooth over cldy grd
1510	894.0	27.4	32	37	13.3	11.2	Draft
2005	878.0	25.8	22	35	11.8	9.5	Wallowy
2515	861.5	25.0	23	30	9.6	6.4	Gusty
3015	845.5	23.7	22	25	7.3	2.5	Small ocnl gusts
3525	829.5	23.2	13	25	7.1	2.1	
4015	814.0	21.8	--	28	7.4	2.6	
5030	783.5	18.7		41	3.9	5.3	Relatively smooth
6035	754.0	17.2		50	9.9	6.8	
7065	725.0	14.8		50	8.5	4.7	
							Drafts noted at 1500'
990	911.5	29.1	12	35	14.3	12.3	Bouncy
75	942.5	33.6	22	33	17.3	15.2	

FIELD TEST NO. 44				15 AUGUST 1956			1400 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	942.5	34.3	22	29	15.6	13.6	(Temp amp closely adjusted,
95	941.0	34.2		29	15.5	13.5	eqp osc ± 0.3°C per 15 sec at this temp)
180	938.0	33.8	24	29	15.1	13.1	(Jitters at high temp.)
380	931.0	32.8	22	29	14.3	12.3	
640	922.0	32.1	13	29	13.9	11.9	
850	915.0	31.6	22	29	13.6	11.5	
1000	910.0	30.6	22	29	12.7	10.5	
1540	892.0	29.3		33	13.6	11.6	
2015	876.0	27.6		33	12.4	10.2	
2515	860.5	26.2	22	36	12.2	9.9	
3025	844.0	24.4	82	-36	11.0	8.4	
3515	829.0	22.8	22	39	10.8	8.1	
4055	812.0	21.2		39	9.9	6.8	
5065	781.5	19.1	32	47	10.4	7.5	
6065	752.5	17.0		50	10.0	7.0	
7070	724.0	14.0		63	10.2	7.3	(Jitter ± 0.1°C at this temp)
995	910.5	30.9		29	13.0	10.8	
70	942.0	34.3	33	26	13.8	11.8	Height estimated Obsr P.H.

See Legend

No. 43 & 44

Table 13.1 (Continued)

FIELD TEST NO. 45				15 AUGUST 1956			1700 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
75	938.0	35.3	22	29	16.4	14.4	Fqt bumps Obsr P.H.
190	934.0	34.6	23	29	15.9	13.9	Ocnl drafts
380	927.5	33.9	22	29	15.1	13.1	
620	919.5	33.3	22	29	14.8	12.8	Drafts
835	912.0	32.4	22	29	14.1	12.1	Drafts
1020	906.0	32.0	22	31	14.8	12.8	Wallow
1525	889.0	30.1		31	13.3	11.2	Lgt gusts
2035	872.5	28.7	62	33	13.1	11.0	
2490	857.5	27.1		36	12.8	10.6	
3025	840.5	25.6	22	35	11.7	9.3	
3525	825.0	24.0		38	11.4	8.9	Draft
4025	809.5	22.5		39	10.7	8.0	
5045	779.5	19.7		46	10.5	7.7	
6055	749.5	17.0		52	10.2	7.3	
7065	721.0	14.2		61	10.1	7.1	Brkn clds 2000' above
							Bumpy about 1200
1005	906.5	31.6	33	28	13.3	11.2	Steady run
100	937.0	35.0	63	25	14.4	12.4	Gain 30' on traverse; gusty

FIELD TEST NO. 46				15 AUGUST 1956			1840 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
45	937.5	34.5	22	29	15.7	13.7	Bumpy flight
90	936.0	34.0	22	25	13.6	11.6	
180	933.0	34.0	22	25	13.7	11.6	
400	925.5	33.4	63	25	13.2	11.1	
620	918.0	32.6	22	29	14.3	12.3	
840	910.5	31.6	62	29	13.4	11.3	
1020	904.5	31.2	--	29	13.1	11.0	
1500	888.5	29.8		33	13.9	11.9	
2035	871.0	28.1		35	13.4	10.4	
2515	855.5	26.8		39	13.8	11.7	
3025	839.5	25.9	12	39	13.1	11.0	
3535	823.5	24.4		41	12.6	10.4	
4035	808.0	22.8		41	11.4	8.9	
5065	777.5	20.1		46	10.8	8.1	
6075	749.0	17.0		55	10.9	8.2	(Cld to cld ltng,
7080	719.5	14.4		61	10.2	7.3	strong ltng W & N, crew felt static shock
1010	905.0	30.8	32	29	12.8	10.6	on final approach)
60	937.0	32.8	23	25	12.8	10.6	Sprinkling Obsr J.D.

See Legend

No. 45 & 46

Table 13.1 (Continued)

FIELD TEST NO. 47			20 AUGUST 1956				1000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	953.5	15.5		55	9.9	6.8	
80	952.5	15.5	23	54	9.7	6.6	
180	949.0	15.2		55	9.7	6.6	Bumps
400	941.0	14.7		55	9.4	6.1	
640	933.0	13.8		60	9.7	6.5	Bumps
870	925.0	13.3		63	9.8	6.7	
1010	920.5	12.7		65	9.7	6.5	
1520	903.0	11.6		58	8.1	3.9	
2025	886.5	10.5		62	8.1	3.9	
2535	869.5	9.1		66	7.8	3.4	
3025	854.0	8.4		76	8.5	4.7	
3525	841.5	7.0		80	8.2	4.1	
4025	822.5	5.9		70	6.7	1.2	
5055	791.5	3.6	82	71	5.7	-0.8	Lwt sctd cld at 4500
6055	762.0	1.7		71	5.0	-2.4	
7080	732.5	0.2		90	5.7	-0.9	
							Lgt turbc at 2400
1000	921.0	12.8	32	64	9.7	6.5	Turbc
40	953.5	16.5	32	52	10.0	7.0	Obsr J.D.

FIELD TEST NO. 48S			20 AUGUST 1956				1200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50		18.0	32	49	10.3	7.4	
85	951.5	17.4	22	46	9.2	5.7	
175	948.5	17.5		49	9.8	6.8	
385	941.5	16.9	22	49	9.6	6.3	
625	933.0	16.2		51	9.5	6.3	
835	926.0	15.5		51	9.2	5.8	
1015	920.0	15.0		53	9.2	5.8	Turbc
1525	902.5	13.6		62	9.8	6.7	Hvy turbc
2520	870.0	10.8		66	8.7	5.0	
3020	854.0	9.3		77	9.2	5.8	
3510	838.5	8.0		80	8.8	5.1	
4030	822.0	6.5		83	8.3	4.0	
5040	791.5	4.3	32	88	7.5	2.8	Cloud layer
6040	762.0	2.2		90	6.6	1.0	4600-5400'
7075	732.5	-0.2	--	95	6.3	-0.5	
995	920.5	15.1	36	56	9.7	6.6	Turbc
65	952.5	18.6	22	49	10.6	7.9	Obsr J.D.

See Legend

No. 47 & 48S

Table 13.1 (Continued)

FIELD TEST NO. 48R			21 AUGUST 1956				0900 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
							(T eq response rate checked)
75	944.5	16.2		74	13.9	11.9	Bouncy - sudden drafts
185	940.5	15.8		72	13.2	11.0	
405	933.0	15.2		75	13.2	11.1	Bouncy
645	925.0	14.5		79	13.3	11.2	Continual turbc
830	918.5	13.8	22	81	13.1	11.0	
1015	912.5	13.4		82	12.9	10.7	Less turbc
1595	895.5	13.3	28	80	12.4	10.2	Inversion osc ± 0.6°C in half mile
2040	878.5	14.2		65	10.8	8.1	Smooth ocnl bump
2520	863.0	13.0		69	10.5	7.7	
3050	846.0	11.7		65	9.2	5.8	Smooth
3540	830.5	11.3		60	8.4	4.1	(Vsby exceptional. Haze)
4050	815.0	10.8		47	6.7	1.0	(Dark to S)
5050	784.5	11.7		39	5.4	-1.5	(White streak E horizon)
6060	755.0	10.9		36	5.1	-2.2	
7095	725.5	9.1		40	4.6	-3.4	
							Bumps at 1500', temp drops
995	913.0	14.2	34	81	13.3	11.2	
95	944.0	17.4	32	66	13.3	11.2	Gusts Obsr P.H.

FIELD TEST NO. 49			21 AUGUST 1956				1100 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
75	943.0	20.5	23	49	11.9	9.5	(T eq response + 0.1°C/10 sec) Side gust felt
165	940.0	19.9	22	50	11.7	9.3	
375	933.0	19.6		50	11.5	9.0	Up & downs
615	924.5	18.5		52	11.3	8.8	
835	917.0	18.1		55	11.7	9.2	Bumpy
995	912.0	17.5		58	11.8	9.4	Drafts
1505	895.0	16.3	22	64	12.1	9.8	Sharp gusts, wallowy
2000	878.5	15.6	22	64	11.6	9.1	
2510	862.0	14.5		62	10.4	7.6	
3040	845.0	14.2	32	70	11.3	9.0	Lgt drafts felt to 3500'
3520	830.0	14.0		60	9.8	6.7	
4030	814.0	13.0		62	9.5	6.3	RH dip around 3800'
5030	784.0	11.7		33	4.5	-3.5	RH drop about 4800'
6060	754.0	11.1		35	4.7	-3.2	
7075	725.0	9.0		35	4.1	-4.8	
							Neg 1/2 G at about 1800'
995	912.0	18.4	34	60	12.8	10.7	Rough
85	943.0	21.9		49	12.8	10.6	Obsr P.H.

See Legend

No. 48R & 49

Table 13.1 (Continued)

FIELD TEST NO. 50				21 AUGUST 1956			1400 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
110	939.0	26.3	23	43	14.7	12.7	
185	936.5	25.6	23	43	14.1	12.1	
390	929.5	25.2	23	43	13.8	11.8	
650	921.5	24.3	23	45	13.8	11.7	
850	914.0	23.7	22	45	13.3	11.2	
1020	908.0	22.9	22	46	13.0	10.8	
1530	891.0	21.3		52	12.6	10.4	
2045	873.5	19.8	22	54	12.8	10.6	
2535	858.5	18.6		52	11.4	9.9	
3055	842.0	17.8	82	36	7.4	2.6	Sharp temp drop
3555	826.0	16.8	32	36	6.9	1.7	
4045	811.0	15.4		38	6.7	1.4	
5055	780.5	12.7		38	5.6	-1.0	
6085	750.5	10.8	82	35	4.6	-3.4	
7040	723.5	10.1		29	3.6	-6.3	
							at 3400 turbc
1010	908.5	23.7		45	13.4	11.2	
100	939.5	27.8	23	36	13.3	11.2	Obsr J.K.

FIELD TEST NO. 51				21 AUGUST 1956			1530 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
		30.5					
75	939.0	27.4		39	14.1	12.1	Yawing in cross wind
175	935.5	27.4	22	39	14.2	12.1	Drafts, Pireps
365	929.0	26.8	22	40	14.0	12.0	Hard to hold El at 600
615	920.5	26.4	23	42	14.4	12.5	Wallows, bumps, drafts
805	914.0	25.7	62	41	13.6	11.5	Drafts
1015	907.0	25.0	--	42	13.3	11.2	
1525	890.0	23.5	22	43	12.5	10.2	
1990	875.0	21.6		45	11.7	9.4	
2520	858.0	20.4	22	46	11.2	8.6	Hard to hold wings level
3015	842.0	18.8		47	10.2	7.3	
3500	827.0	17.0		50	9.9	6.8	Bumpy
4015	811.0	15.4		68	12.0	9.8	Rocky like boat
5030	780.5	12.9		71	10.8	8.1	
6035	751.9	9.9		80	10.0	7.0	Rocky
6975	724.5	8.0	22	50	5.5	-1.3	R H Response marked
6500	737.8	8.4		82	9.3	5.9	In clear (base at 6800')
							In cloud tmp drops 2°C
1015	907.0	25.3		39	12.6	10.4	
85	939.5	28.6		37	14.4	12.4	Obsr P.H.

See Legend

No. 50 & 51

Table 13.1 (Continued)

FIELD TEST NO. 52				24 AUGUST 1956			1115 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	950.5	22.9	23	38	10.5	7.7	
115	948.0	22.3	23	38	10.3	7.4	
175	946.0	22.0	22	38	10.1	7.1	
385	938.5	21.4	22	39	10.0	6.9	
630	930.0	20.8	22	39	9.6	6.4	Bumpy
825	923.5	19.8		44	9.6	6.3	
1015	917.0	19.3		42	9.5	6.2	
1515	900.5	17.8	82	47	9.6	6.4	Drafts
2010	884.0	16.6		45	8.5	4.6	Drafts
2535	867.0	15.2		47	8.2	4.0	
3030	851.0	13.6		50	7.9	4.5	
3535	835.0	13.2	23	47	7.1	2.1	Undulations on traverse
4030	819.5	12.8	33	50	7.4	2.7	Smooth R H change 4500'
5060	788.5	12.5		70	10.3	7.4	Shallow Ac to S at
6060	759.0	10 3		75	9.6	6.4	Top haze layer
7085	730.0	8.5		60	6.8	1.4	Cold noted on descent. Bumpy around 4000'
1005	917.5	19.5	32	42	9.6	7.4	Pireps updraft, also recorded
60	950.0	23.1	23	35	10.1	7.1	Obsr P.H.

FIELD TEST NO. 53				24 AUGUST 1956			2000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
				37	8.7	5.0	
165	942.5	22.7	--	39	10.7	8.0	One bump
395	934.5	22.5		39	10.6	7.8	Very smooth
635	926.0	21.6	--	39	10.1	7.2	
835	919.5	21.1		41	11.3	7.4	
1015	913.5	20.7		41	10.1	7.1	Smooth
1520	896.5	20.1		38	8.9	5.4	
2020	880.0	18.6		39	8.4	4.4	
2520	863.5	17.1		41	8.1	4.0	Minor bump
3030	847.5	16.0		43	7.8	3.4	
3530	831.5	15.0	32	47	8.0	3.8	Tiny bump
4035	816.0	15.2	22	48	8.3	4.3	
5045	785.5	13.9		50	8.0	3.8	
6065	755.5	12.3		43	6.2	0.2	
7070	727.0	10.1		48	5.9	-0.4	Above haze
995	914.0	20.8		39	9.6	6.4	
185	941.5	21.4		42	10.7	8.0	Obsr P.H.

See Legend

No. 52 & 53

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Table 13.1 (Continued)

FIELD TEST NO. 54					24 AUGUST 1956		2200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	948.5	18.1		53	11.2	8.6	Take off
160	943	19.9		47	11.2	8.6	Slight turbc
370	936	20.2		46	11.3	8.8	
610	928	21.0		41	10.5	7.7	
820	920.5	20.4		42	10.2	7.4	Smooth
990	915	20.5		42	10.4	7.5	Bump
1505	897.5	19.6		40	9.5	6.2	
2195	875.0	18.8		43	9.6	6.4	
2495	865.5	18.0		45	9.5	6.2	
3000	849.0	17.4		45	9.1	5.6	
3495	833.5	17.0		46	9.1	5.6	
4005	817.5	16.3		45	8.4	4.4	
5005	787.5	14.4		47	8.0	3.7	
6030	757	12.6	--	36	5.7	-1.6	
7050	728	10.3		64	8.2	4.1	
970	916	20.2		42	10.1	7.1	(Pireps higher engine output rqrd all traverses)
160	943	19.5		47	10.9	8.2	
6	948.5	19.1	--	50	10.8	8.2	Landing Obsr P.H.

FIELD TEST NO. 55					25 AUGUST 1956		0100 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6		16.4		67	12.7	10.6	Take off
155	942.5	17.1		58	11.8	9.4	
405	934.0	17.4	32	54	11.2	8.6	
615	927.0	18.7		50	11.2	8.6	
845	919.0	19.6		46	10.8	8.2	Pireps turbc noted below
1015	913.5	19.6		46	10.6	7.8	
1525	896.0	20.0		43	10.1	7.2	
2000	880.5	19.8		45	10.4	7.6	
2490	864.5	19.1		48	10.8	8.1	
3020	847.5	19.2		49	11.2	8.6	
3515	832	18.1		49	10.2	7.2	
4025	816.5	17.1		52	10.2	7.6	Steady going
5020	786	15.0		52	9.2	5.7	
6040	756.5	13.2		48	7.4	2.6	
7035	728	11.2		41	5.5	-1.2	
985	914.5	19.3		45	10.2	7.2	
195	941	16.4		62	12.0	9.7	
6	948	16.5		60	11.6	9.1	Landing Obsr J.K.

See Legend

No. 54 & 55

Table 13.1 (Continued)

FIELD TEST NO. 56					25 AUGUST 1956		0300 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	948	16.4		70	13.2	11.2	Take off
155	942.5	16.0		68	12.8	10.6	Lgt turbc
385	934.5	17.2		63	12.8	10.6	Lgt turbc
625	926.5	17.9		57	12.0	9.7	
855	918.5	19.3		49	11.1	8.5	
1015	913.5	19.6		47	10.9	8.2	Possible Neg G
1515	896.5	20.3	32	46	11.0	8.4	
2020	880.0	19.9		48	11.3	8.8	
2510	864.0	19.6		49	11.2	8.6	
3020	847.5	19.7		48	11.0	8.4	Possible Neg G
3510	832.5	18 9		49	10.8	8.1	
4030	816	18.4	32	48	10.3	7.4	
5040	785.5	16.3		46	8.7	4.9	Some lgt turbc
6040	756.5	13.2		53	18.8	4.4	Draft
7055	727.5	10.2		66	8.5	4.6	Down Draft. Undulations Ac E15000MSL
985	914.5	19.7	62	46	10.5	7.7	
165	942.5	16.2		68	12.8	10.6	Rough now
6	948.0	16.5		66	12.6	10.4	Landing Obsr P.H.

FIELD TEST NO. 57					25 AUGUST 1956		1730 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
50	938.5	33.7		25	13.4	11.3	
95	936.5	33 7		26	13.4	11.4	Turbc
195	933.5	33.1	22	29	14.6	12.6	
395	926.5	32.7	82	29	14.4	12.4	
615	919.0	32.1	22	29	13.9	11.9	
845	911.0	31.1		29	13.2	11.1	Turbc
1015	905.5	30.5	22	29	12.6	10.4	
1545	888.0	22.8		30	8.4	4.5	
2035	872.0	27.6	22	34	9.2	5.8	
2535	856.0	25.7		34	10.8	9.4	
3030	841.0	23.9		36	10.7	8.0	
3550	824.0	22.2		39	10.5	7.7	
4040	809.0	21.4		38	9.7	6.5	
5070	778.0	18.2		41	8.7	5.0	
6070	749.0	16.2		40	7.3	2.5	
7075	720.5	13 4		31	4.8	-3.0	
1015	905.5	30.4		29	12.7	10.4	
60	938.0	33.4		29	14.9	12.9	Obsr J.D.

See Legend

No. 56 & 57

Table 13.1 (Continued)

FIELD TEST NO. 58				25 AUGUST 1956			1930 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks Temp eq damping checked OK
190	932.0	31.1		31	14.0	12.0	Smooth
410	924.0	32.2	--	26	12.4	10.1	Anvil cld West
660	916.0	32.1	62	26	12.4	10.1	Floccus overhead
870	909.0	31.2	22	26	11.7	9.3	
1060	902.5	30.5	62	29	12.6	10.4	
1560	886.0	29.2		29	11.8	9.4	Bluish haze noted
2055	870.0	27.6	22	29	10.8	8.0	
2545	854.5	26.2		29	10.0	7.0	
3070	837.5	24.9	--	33	10.3	7.4	Ocnl very lgt updraft
3565	822.0	22.7		35	9.6	6.4	
4075	806.5	21.2	22	35	8.8	5.1	Clear overhead
5080	776.5	18.4	22	35	7.4	2.6	
6075	747.5	16.3	--	25	4.7	-3.2	
7100	718.5	13.3		29	4.4	-3.9	Floccus overhead
1010	904.5	30.3	62	28	12.1	9.8	Ocnl bump
215	931.0	30.1	13	30	13.8	10.6	Obsr P.H.

FIELD TEST NO. 59				25 AUGUST 1956			2230 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
		23.8		44	13.0	10.8	
190	935.0	28.0		35	13.4	11.2	
400	928.0	29.8		31	13.0	10.8	
630	920.0	31.2		26	11.7	9.2	
850	912.5	30.8		26	11.5	9.0	
1050	906.0	30.9		26	11.5	9.1	
1530	890.0	29.7	--	26	10.8	8.1	
2030	873.5	28.5	--	26	10.1	7.1	
2525	857.5	26.8	--	29	10.3	7.4	
3035	841.5	25.4		28	9.2	5.7	
3525	826.0	23.9		30	9.0	5.5	
4025	811.0	22.3	22	30	8.2	4.1	
5035	780.5	19.1	22	36	8.0	3.8	
6075	750.0	15.9		40	7.2	2.2	
7060	722.0	13.1	--	46	7.0	1.9	T lag test 63% in few sec
1020	907.0	30.5		26	11.4	8.8	Obsr J.D.
170	936.0	27.8		35	13.2	11.1	

\# See Legend

No. 58 & 59

Table 13.1 (Continued)

FIELD TEST NO. 60				27 AUGUST 1956			0030 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	938.0	24.2		40	12.1	9.8	Take off
185	932.0	26.8		34	12.0	9.7	Turbc below 600 ft
385	925.0	28.1	23	31	11.8	9.4	
625	917.0	28.8		28	11.1	8.5	
825	910.0	29.0		29	11.6	9.2	
1015	903.5	28.3		29	11.2	8.6	
1515	887.0	29.0		26	10.3	7.4	
2005	871.0	27.9		29	10.9	8.3	
2490	855.5	26.6		28	9.8	6.7	
3025	838.5	25.3		28	9.1	5.6	
3510	823.5	23.8		30	9.0	5.4	
4030	807.5	22.2	--	33	8.8	5.2	
5020	777.5	19.1		33	7.2	2.4	
6030	748.5	16.1		36	6.8	1.2	
7085	718.5	13.1		42	6.5	0.8	
1025	903.5	29.9		25	10.4	7.5	
195	931.5	26.6	--	34	11.8	9.5	
6	938.0	25.7		36	11.9	9.5	Landing Obsr J.D.

FIELD TEST NO. 61				27 AUGUST 1956			1100 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	934.0	32.5	23	39	19.1	16.8	Take off
90	931.0	28.7	23	33	13.2	11.0	Bouncy
190	927.5	28.6	23	33	13.0	10.0	
380	921.0	28.0	22	33	12.6	10.4	Lift
645	912.0	27.3	23	33	12.1	9.8	Bouncy
845	905.5	26.5		32	11.2	8.7	G felt in drafts
1015	900.0	26.2	22	34	11.8	9.4	Drafts
1525	883.0	24.9	24	35	11.0	9.4	
2030	866.5	24.9	62	32	10.2	7.3	Small bumps
2525	850.5	24.4	64	32	10.0	7.0	
3040	834.0	22.5	--	32	8.8	5.1	
3540	819.0	21.0		35	8.7	4.9	Bumps with drafts
4040	803.5	20.3	22	32	7.8	3.4	
5045	773.5	17.4		38	7.6	3.1	Wallowy
6050	744.5	14.7	22	47	7.9	3.6	
7065	716.0	11.8	--	50	7.0	1.9	Not smooth
995	900.5	26.4	33	34	11.8	9.4	Bouncy & drafts
90	931.0	29.6	14	31	12.8	10.7	
6	934.0	30.2		32	13.6	11.6	Landing Obsr P.H.

\# See Legend

No. 60 & 61

Table 13.1 (Continued)

FIELD TEST NO. 62				27 AUGUST 1956			1400 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	934.0	28.9		43	17.0	15.0	Take off
90	931.0	28.3		39	15.2	13.2	Turbc
180	928.0	28.3	22	36	14.0	12.0	
380	921.5	27.8		36	13.6	11.6	
620	913.0	27.8		35	13.2	11.1	
810	907.0	28.0		31	11.8	9.4	
1010	900.0	27.7		31	11.6	9.1	
1505	883.5	26.4	32	32	11.0	8.4	
2015	867.0	25.5		30	9.9	6.8	
2505	851.5	24.3	22	30	9.2	5.8	
3015	835.5	22.6	62	32	8.9	5.2	Bumps
3515	820.0	20.9		36	9.0	5.4	
4025	804.0	19.4	22	39	8.8	5.1	Bumps
5035	774.0	16.6		43	8.1	4.0	
6045	744.5	13.6		49	7.7	3.2	
7050	716.5	12.6		51	7.4	2.8	
990	901.0	28.2	--	30	11.4	9.0	
80	931.5	31.6	62	26	12.0	9.6	
6	934.0	31.4		32	14.6	12.7	Landing Obsr J.D.

FIELD TEST NO. 63				27 AUGUST 1956			2000 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	931.0	28.3		31	11.9	9.6	Take off
195	925.0	31.4	--	33	15.2	13.2	Smooth
385	918.5	31.2		33	15.1	13.2	Smooth
630	910.0	30.6		31	13.8	11.7	
835	903.0	30.0		33	14.2	12.2	
1015	897.0	29.7	--	33	13.8	11.8	
1525	880.5	28.2	--	33	12.8	10.6	Smooth
2020	864.5	26.8		36	12.6	10.4	
2520	845.5	25.4		36	11.6	9.2	
3050	831.5	23.7		36	10.6	7.8	Slight lift
3540	816.5	22.5		35	9.6	6.4	Smooth
4055	801.0	21.6		30	8.2	4.0	
5050	771.0	18.5		33	6.9	1.6	
6070	741.5	16.0		32	5.9	-0.4	Smooth
7075	713.5	13.1	--	33	5.0	-2.4	
1005	897.5	29.1	32	33	13.4	11.4	
180	925.5	31.2		33	15.0	13.0	
6	931.0	28.7		38	15.0	13.0	Landing Obsr P.H.

See Legend

No. 62 & 63

Table 13.1 (Continued)

FIELD TEST NO. 64				27 AUGUST 1956			2200 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	931.0	20.5		69	16.6	14.6	Take off
205	924.0	30.0		33	14.0	12.0	
435	916.0	30.4	22	33	14.4	12.4	Very steady going
670	908.5	30.0	22	31	13.2	11.2	
890	901.0	30.0	22	29	12.4	10.1	
1065	895.0	29.7		29	12.1	9.8	
1560	879.0	28.8		29	11.6	9.1	
2080	862.0	27.5		29	10.7	8.0	
2575	846.0	26.1	22	30	10.2	7.3	
3070	830.5	24.8		32	10.0	7.0	
3565	815.5	23.0		32	9.2	5.8	
4070	800.0	21.8		28	7.4	2.7	
5090	769.5	18.7		33	7.2	2.0	
6080	741.0	15.6		33	5.9	-0.5	
7105	712.5	12.6		40	5.8	-0.6	
1045	896.0	28.9		31	12.5	10.3	
195	924.5	27.7	24	42	15.6	13.6	
6	931.0	25.9		43	14.4	12.4	Landing Obsr J.K.

FIELD TEST NO. 65				29 AUGUST 1956			1900 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	932.0	24.5		33	10.3	7.4	Take off
190	925.5	26.4	22	30	10.2	7.4	Smooth ocnl bump
335	919.0	26.3		28	9.6	6.4	
645	910.0	25.8		28	9.3	6.0	Sunset 19:12 by tables
875	902.5	25.2		30	9.7	6.5	
1045	897.0	24.7		32	10.0	7.0	
1530	881.0	22.6		32	9.0	5.4	
2020	865.0	21.7		36	9.3	6.0	
2510	849.0	20.0		39	9.0	5.6	
3040	832.5	18.6	22	43	9.2	5.8	
3540	817.0	17.5	--	46	9.2	5.8	
4050	801.5	15.8		49	8.7	5.0	Slight draft
5050	771.5	13.3		50	7.6	3.0	Occasional light turbc
6080	741.5	11.8		43	6.0	-0.2	
7105	713.0	9.4		36	4.3	-4.2	
1005	898.0	24.9		32	10.2	7.4	
195	925.5	25.7	33	32	10.6	7.8	Slt turbc
6	932.0	24.7		33	10.4	7.4	Landing Obsr P.H.

See Legend

No. 64 & 65

Table 13.1 (Continued)

FIELD TEST NO. 66				29 AUGUST 1956			2133 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	932.0	20.7	82	46	11.2	8.8	Take off delay - flat tire
190	925.5	23.6		36	10.5	7.6	
400	918.5	25.8	65	32	10.5	7.8	Gust or bump
640	910.5	25.7		30	10.0	7.0	Draft or bump
885	902.0	25.2	--	32	10.4	7.5	
1060	896.5	24.4	82	33	10.0	7.0	
1560	880.0	23.1	13	30	8.6	4.8	
2085	863.0	22.8	13	25	7.0	1.8	
2555	848.0	22.1	12	25	6.8	1.2	Smooth
3085	831.0	20.6	22	25	6.1	0.0	
3580	816.0	19.4	32	31	6.9	1.8	
4090	800.0	18.0	32	32	6.8	1.5	
5080	770.5	15.2	22	36	6.3	0.2	
6095	741.5	12.6	32	39	5.7	-0.8	Slt turbc
7120	712.5	9.9	.	40	4.9	-2.8	Slt turbc
1030	897.5	24.5		32	10.0	7.0	
205	925.0	22.3	--	41	11.1	8.5	Slight turbc
6	932.0			38	10.2	7.2	Landing Obsr P.H.

FIELD TEST NO. 67				30 AUGUST 1956			0020 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	932.0	19.7	--	48	10.5	8.2	Take off
220	924.5	21.7		41	10.7	8.0	Bumpy below 300 ft
430	917.5	24.6	25	36	11.0	8.4	Slight turbc
670	909.5	24.6	82	35	10.9	8.2	
880	902.5	23.7	62	37	10.2	7.2	Smooth
1080	896.0	23.2	82	36	10.4	7.4	
1570	879.5	21.6		46	12.0	9.6	
2075	863.5	21.0		42	10.5	7.8	
2545	848.5	20.5		33	7.9	3.5	
3065	832.0	20.0	22	29	6.8	1.4	
3565	816.5	19.6	32	25	5.7	-1.0	Ltng SW
4085	800.5	18.4	32	28	6.1	-0.2	Pireps slt turbc
5085	771.0	15.2		35	6.2	0.0	Slt turbc
6090	741.5	12.6		36	5.4	-1.6	
7110	713.0	9.7		40	4.8	-2.8	Turbc wallowy
1040	897.0	23.2		41	11.7	9.3	
225	924.5	22.1	62	39	10.4	7.5	Rough at 200' Bumps
6	932.0	22.1		37	9.9	6.8	Landing Obsr P.H.

See Legend

No. 66 & 67

Table 13.1 (Continued)

FIELD TEST NO. 68				30 AUGUST 1956			0230 CST
Z_p (ft)	P (mb)	T (°C)	#	RH (%)	e (mb)	T_d (°C)	Remarks
6	931.0	21.6	22	43	11.2	8.6	Take off Obsr P.H.
200	924.5	22.8	64	39	10.8	8.1	Bump not turbc
420	917.0	23.4	14	36	10.3	7.4	
675	908.0	23.8	24	35	10.5	7.6	Turbc
880	902.0	23.6	12	32	9.3	6.0	
1050	896.0	23.2		32	9.1	5.6	Turbc draft
1540	879.5	22.2	22	32	8.7	5.0	
2040	863.5	22.2	12	28	7.7	3.2	Lgt bump
2525	848.0	22.8	32	25	6.9	1.8	
3045	831.5	21.4	62	25	6.4	0.7	Wallowy
3565	815.5	20.2	--	25	5.9	-0.4	
4055	800.5	18.9	12	28	6.3	0.4	Pireps rocky
5065	770.5	16.0	22	28	5.2	-2.0	Down draft at 4500
6075	741.0	13.2		33	5.0	-2.3	
7100	712.5	10.1		36	4.5	-3.8	Turbc
							Gusts in descent
1010	897.0	25.0	23	27	8.8	5.0	Bouncy
200	924.0	23.6	82	38	11.0	8.4	Down draft at 250'
6	931.0	24.1		35	10.6	7.8	Mild wind shift encountered.
							In about 2 miles 2 cycles + 1°C tmp change at 725', updraft with ΔT 2.1°C in about 1/2 mile

See Legend

No. 68

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