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FOR REGIONAL STUDIES IN THE HUMID TROPICS

MONTHLY
MICROCLIMATIC SUMMARY

SEPTEMBER 1966

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MONTHLY MICROCLIMATIC SUMMARY

Introduction

Monthly microclimatic data summarized in this series of reports were collected by the US Army Tropic Test Center and the Weather Engineers of Panama Corporation under the project, Environmental Data Base for Regional Studies in the Humid Tropics. The project is sponsored by the Advanced Research Projects Agency of the Department of Defense and by the Army Research Office, Office of the Chief of Research and Development. It is an investigation of microclimatic, air chemistry, vegetation, soils, microbiological, and macrofaunal conditions at selected sites in the principal tropical environments of the Panama Canal Zone and the Rio Hato Military Reservation. The objective of the project is to assemble quantitative environmental data for RDT&E purposes.

Sites. Data summarized in this report were collected principally at the Albrook Forest and Chiva Chiva sites. Supplementary data were collected at four satellite sites. Figure 1 shows the site locations within the Isthmus of Panama. Geographic coordinates are shown below:

Albrook Forest	09° 01'N, 79° 33'W
Chiva Chiva	09° 01'N, 79° 35'W
Rio Hato (satellite)	08° 24'N, 80° 06'W
Fort Kobbe (satellite)	08° 54'N, 79° 34'W
Fort Sherman (satellite)	09° 16'N, 79° 59'W
Albrook (satellite)	09° 00'N, 79° 33'W

The Chiva Chiva open site and the Albrook Forest site are paired for comparative study of environmental conditions in a tropical semideciduous forest and in a large clearing. Both are located in a region where the annual precipitation is approximately 80 inches and there is a pronounced dry season. The Rio Hato satellite site is located in an appreciably drier area (approximately 40 inches annually). The other satellite sites were located primarily for soil studies purposes. The Fort Sherman site receives much higher precipitation, with a less pronounced dry season. Albrook and Fort Kobbe have climatic regimes similar to the principal sites.

The Albrook and Chiva Chiva main sites are approximately four kilometers apart. Each has a 46 meter walk-up tower and an air-conditioned building to house the recording equipment and observers. Both sites are approximately 30 meters above sea level. The top of the forest canopy at the Albrook site is about 26.5 meters above the ground.

Instrumentation. A number of climatic elements are measured at the Albrook and Chiva Chiva sites, but observations at the Rio Hato site are limited to temperature, precipitation, relative humidity, and wind. Types of observations and frequencies are shown on Figure 2. The towers at the Albrook and Chiva Chiva sites are similarly oriented. Sensing equipment is mounted at several levels on the towers to provide measurements through the vertical profile. Additional instruments are emplaced in the immediate vicinity on or near the ground. All instrument exposures are duplicated at each site. Figures 3, 4, and 5 show the instrument array at these sites.

Data Reduction and Storage. All data, as applicable, are recorded at or reduced to each full hour and transposed to punch cards. These punch cards, together with all raw data, are stored in the Tropic Test Center Technical Library Annex.

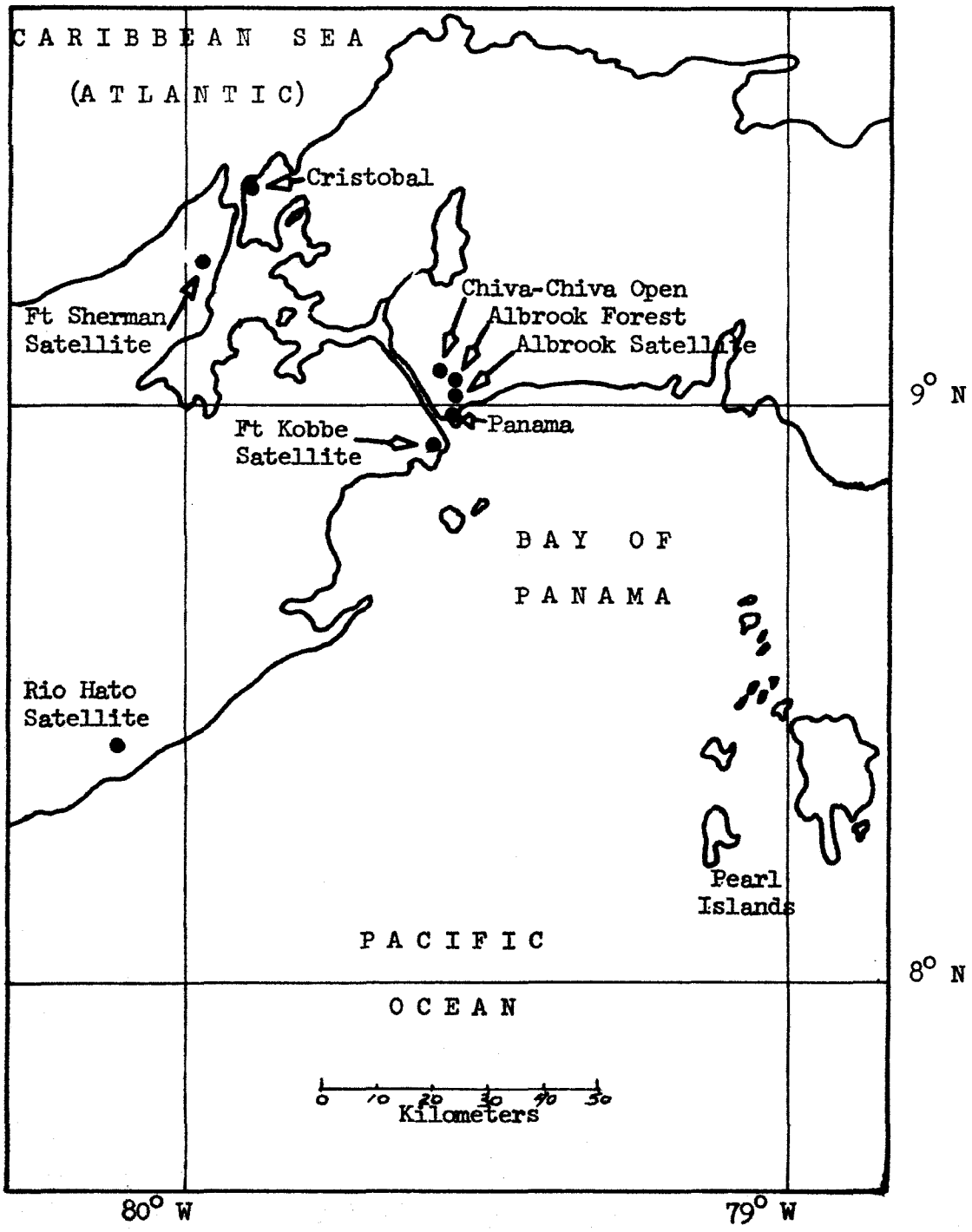

FIGURE 1.

LOCATION MAP, ISTHMUS OF PANAMA

FIGURE 2. FREQUENCY OF OBSERVATIONS

# Element	Height (meters) Sfc	0.5	1.0	2.0	4.0	8.0	13.5	26.5	46.0	Frequency
Temperature:										
Dry Bulb	2	2	1	2	2	2	2	2	2	Hourly*/Continuously
Wet Bulb	-	2	-	2	2	-	-	-	-	Hourly*/Continuously
Grass Minimum	4	-	-	-	-	-	-	-	-	Once Daily
WBGT Index	-	-	2	-	-	-	-	-	-	Hourly(0600-1900 EST)
Relative Humidity	-	2	1	2	2	2	2	2	2	Hourly*/Continuously
Barometric Pressure	-	-	2	-	-	-	-	-	-	Continuously
Evaporation	2	-	-	-	-	-	-	3	3	Once Daily
Precipitation:										
Recording Gage	-	-	1	-	-	-	-	-	3	Continuously
Manual Gage	-	-	3	-	-	-	-	-	-	4 Times Daily
Stem Flow	-	-	3	-	-	-	-	-	-	4 Times Daily
Wind:										
Direction	-	-	-	-	5	-	-	-	2	Continuously
Speed	-	-	-	2**	5	-	2**	2**	2	Hourly**/Continuously

1. All sites
2. Albrook and Chiva Chiva
3. Albrook only
4. Chiva Chiva only
5. Main sites and Rio Hato

* Observation made with sling psychrometer when recorders are inoperative.

** Hourly.

Instrument descriptions are contained in the Environmental Data Base semiannual reports.

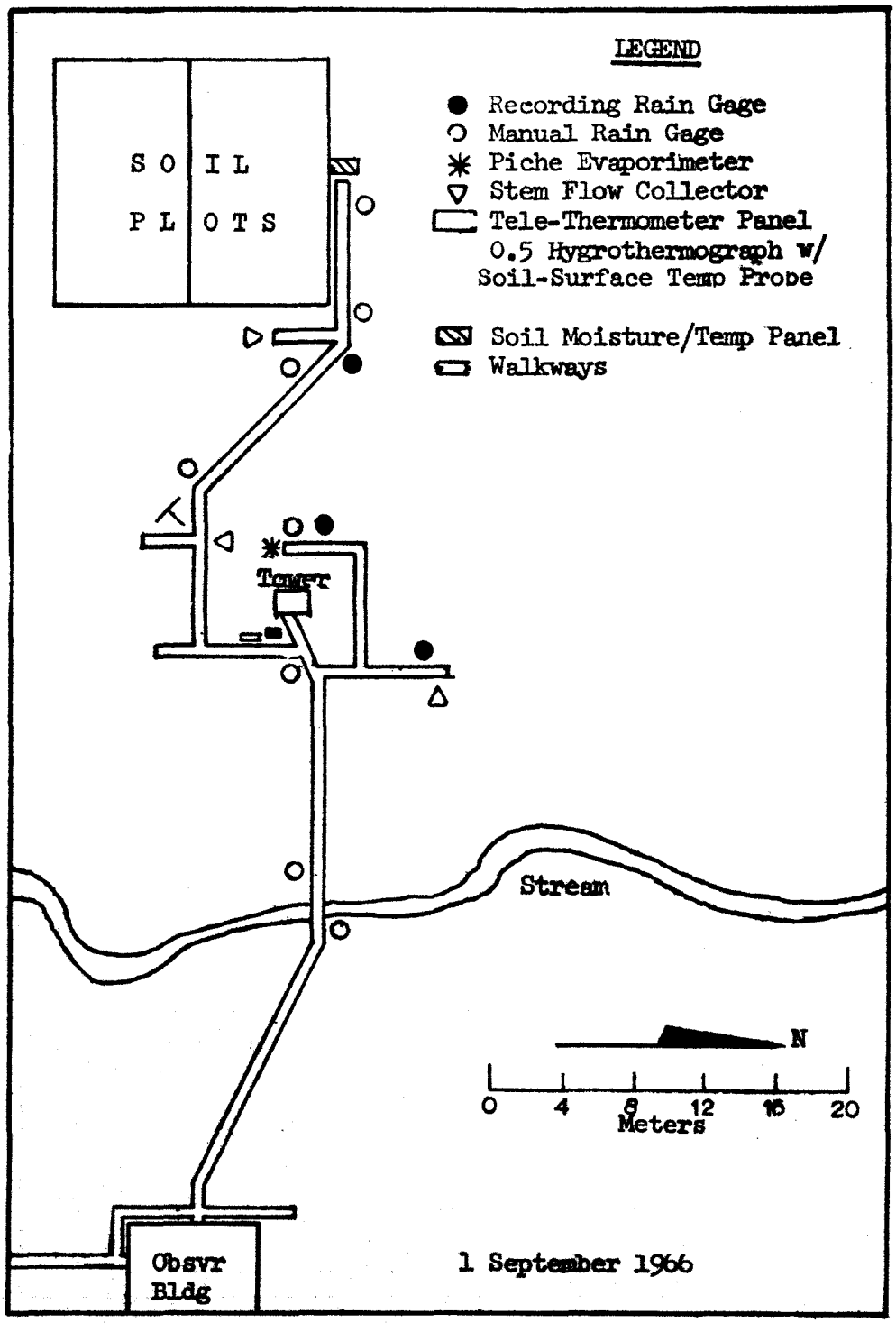

FIGURE 3.

ALBROOK FOREST SITE, GENERALIZED PLOT

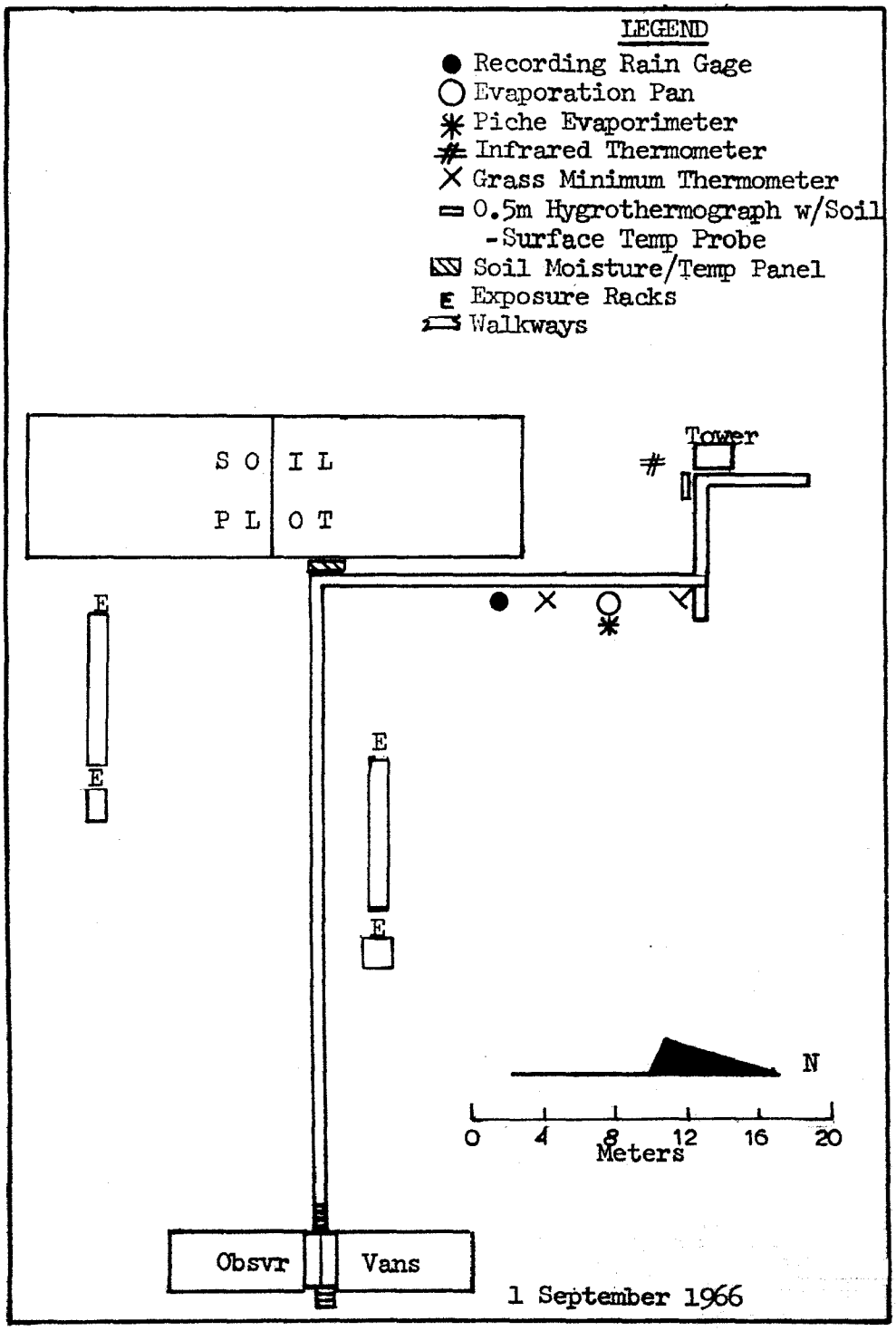

FIGURE 4.

CHIVA CHIVA OPEN, GENERALIZED PLOT

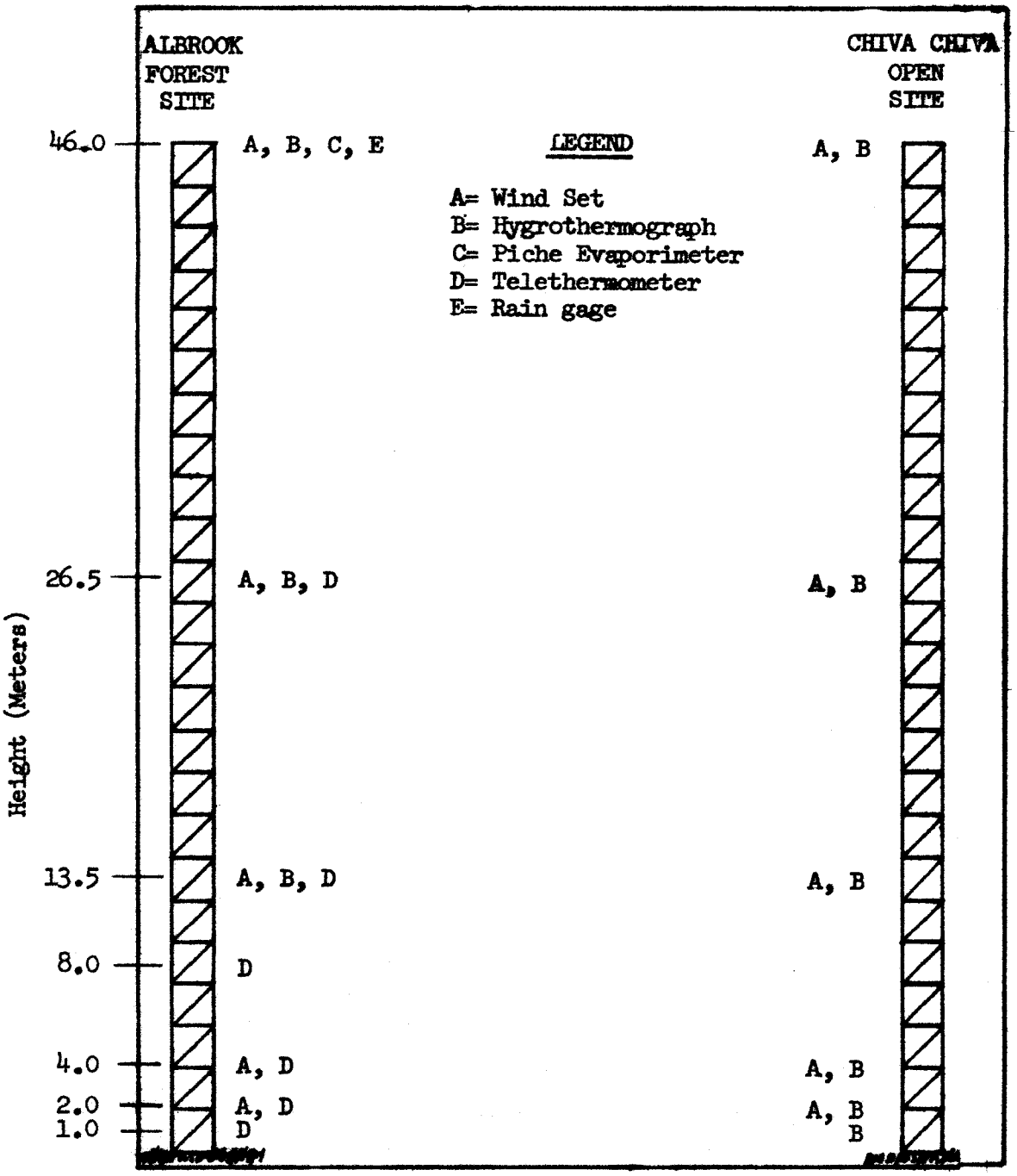

FIGURE 5.

INSTRUMENT LOCATION ON TOWERS

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

SEPTEMBER 1966

Exposure		Monthly Means of Air Temperature by Hour (°F)																							Monthly Summary			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No of obs.	Min.	Mean	Max.
Albrook (Forest site)	46.0m	75.3	75.1	74.9	74.7	74.6	75.5	78.6	80.3	81.8	82.0	82.2	82.3	82.2	81.0	80.4	79.7	78.4	77.0	76.8	76.5	76.1	76.0	75.7	75.5	720	70.6	77.7	88.4
	28.5m	This level was not instrumented for air temperature at this time																											
	26.5m	74.5	74.4	74.1	74.0	73.9	73.8	75.6	79.4	81.2	82.6	83.5	84.2	83.4	82.4	82.1	81.0	79.1	78.1	76.5	76.1	75.7	75.3	75.0	74.7	696	69.6	77.9	90.8
	13.5m	74.2	74.0	73.8	73.7	73.4	73.4	74.4	76.3	78.8	80.5	81.7	82.2	82.2	81.6	80.1	79.6	78.6	77.6	76.7	76.2	75.8	74.4	74.1	74.8	672	69.8	77.0	88.2
	8.0m	74.4	74.3	74.1	73.9	73.8	73.7	74.1	76.4	78.6	80.2	81.5	81.9	81.8	81.1	80.2	79.4	78.3	77.3	76.5	76.1	75.7	75.4	75.1	74.7	720	69.8	77.0	86.8
	4.0m	74.3	74.1	74.0	73.8	73.6	73.4	74.0	76.7	79.0	80.3	81.4	81.9	82.0	81.3	80.1	79.1	78.1	77.1	76.3	75.9	75.5	75.4	74.9	74.5	703	69.5	76.9	86.1
	2.0m	74.3	74.1	74.0	73.8	73.6	73.4	74.0	76.6	78.8	80.1	81.2	81.6	81.7	81.0	79.9	79.0	78.1	77.1	76.3	75.9	75.5	75.4	74.9	74.4	703	70.0	76.9	86.0
	1.0m	74.8	74.6	74.4	74.2	74.0	73.9	74.2	75.6	77.7	79.3	80.4	81.0	81.1	80.8	80.2	79.4	78.5	77.6	77.0	76.5	76.0	75.7	75.5	75.2	719	70.0	76.9	83.4
	0.5m	74.7	74.6	74.5	74.3	74.1	74.1	74.3	76.5	78.2	79.5	80.2	80.6	80.7	80.3	79.5	78.9	77.8	77.0	76.4	75.9	75.7	75.4	75.2	75.0	720	71.6	76.8	84.0
Chiva Chiva (Open site)	46.0m	74.8	74.6	74.4	74.1	74.0	73.9	75.2	78.0	80.1	81.4	82.0	81.9	82.0	80.8	79.9	79.1	77.8	77.3	76.5	76.3	76.1	75.8	75.5	75.3	708	68.9	77.4	87.2
	28.5m	This level was not instrumented for air temperature at this time																											
	26.5m	74.8	74.6	74.4	74.3	74.2	74.0	75.6	78.6	80.7	82.4	83.1	83.1	83.1	82.1	80.9	80.0	79.0	78.0	77.0	76.5	76.2	76.0	75.5	75.3	710	70.1	77.9	89.0
	13.5m	74.9	74.7	74.5	74.4	74.4	74.1	75.5	78.7	81.2	82.8	83.7	83.5	83.8	82.7	81.4	80.1	78.9	78.1	77.0	76.5	76.0	75.9	75.4	75.3	711	70.0	78.1	91.6
	8.0m	This level was not instrumented for air temperature at this time																											
	4.0m	73.9	73.7	73.4	73.3	73.2	73.0	75.9	78.9	81.4	83.6	84.7	84.4	85.0	83.6	81.7	80.3	79.0	77.7	76.5	75.9	75.4	75.2	74.8	74.4	719	68.5	77.9	92.8
	2.0m	73.8	73.6	73.3	73.2	73.0	72.9	75.5	80.0	81.6	84.0	85.1	84.8	85.2	83.7	81.6	80.2	78.9	77.9	76.8	76.2	75.5	75.2	74.6	74.2	719	68.4	78.0	92.6
	1.0m																												
	0.5m	74.5	74.2	73.9	73.8	73.8	73.4	75.2	78.2	81.0	83.4	84.8	85.1	85.8	83.9	82.5	80.9	78.9	77.9	77.0	76.3	75.7	75.4	75.3	74.8	720	70.0	78.1	91.9
Rio Hato	1.5m	75.1	74.7	74.4	74.4	74.2	74.0	75.4	78.0	80.3	82.3	83.8	84.7	84.9	84.5	83.9	83.0	82.3	80.6	78.4	77.7	77.1	76.8	76.5	75.9	682	70.0	76.8	89.0

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Exposure		Monthly Ranges of Air Temperature by Hour (°F)																							Monthly Summary*			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	'17	18	19	20	21	22	23	24				
Albrook (Forest site)	46.0m	5.0	4.8	6.0	5.9	5.6	6.0	7.0	12.5	10.6	15.0	14.3	11.1	11.6	15.1	15.0	16.8	12.0	7.5	6.5	5.1	6.0	6.0	5.6	5.5				
	28.5m	This level was not instrumented for air temperature at this time																											
	26.5m	6.5	7.1	7.9	7.6	7.5	7.4	9.0	16.2	13.0	17.5	16.0	14.0	18.0	18.0	15.7	17.9	12.0	12.1	6.5	6.5	6.7	6.8	6.6	7.5				
	13.5m	5.3	4.8	5.2	5.4	5.6	6.0	7.1	7.1	9.1	11.5	13.2	12.8	13.0	13.0	13.7	12.2	7.5	5.8	4.8	5.2	5.5	5.6	6.6	6.7				
	8.0m	6.0	6.3	6.0	7.0	7.3	7.5	7.8	9.3	8.1	9.8	10.8	10.2	11.9	13.0	14.3	11.2	7.6	7.2	7.0	5.5	6.0	5.2	6.1	6.0				
	4.0m	5.0	5.5	6.5	6.5	6.8	7.0	6.4	7.2	7.5	9.3	10.3	9.2	10.1	12.1	12.0	12.0	8.5	5.5	6.0	5.5	5.0	6.0	5.0	5.0				
	2.0m	5.8	5.5	6.7	7.5	7.0	6.5	5.9	7.6	7.5	8.1	8.9	10.1	10.2	12.0	12.0	11.5	7.0	5.5	5.8	5.5	6.0	6.5	5.5	5.0				
	1.0m	5.9	5.7	6.7	7.3	7.8	7.4	7.7	7.9	7.8	8.4	8.3	9.0	8.9	10.3	10.3	11.8	6.1	6.0	4.8	4.5	4.3	3.9	4.9	4.9				
	0.5m	4.5	4.0	4.5	4.8	5.0	4.9	5.4	5.7	5.5	6.7	7.6	7.2	6.4	8.1	8.5	9.0	6.2	6.0	4.5	5.0	4.5	4.5	4.3	4.5				

* No monthly summary was computed for the ranges.

Chiva Chiva (Open site)	46.0m	8.2	9.1	9.9	9.9	9.9	7.7	9.8	12.3	13.4	15.0	14.1	12.2	13.0	16.5	15.8	18.4	15.8	9.7	5.8	6.0	4.8	4.7	5.2	7.5				
	28.5m	This level was not instrumented for air temperature at this time																											
	26.5m	6.3	6.5	6.9	6.4	7.0	7.0	8.4	14.1	15.0	15.9	14.4	13.5	14.0	16.0	15.5	15.1	15.5	10.0	6.5	5.5	6.0	6.0	7.0	7.0				
	13.5m	6.6	7.3	7.1	7.3	6.6	6.8	8.0	10.0	13.4	18.2	17.2	16.5	15.2	19.3	17.5	16.1	14.7	9.3	6.7	5.7	6.2	5.9	6.7	6.8				
	8.0m	This level was not instrumented for air temperature at this time																											
	4.0m	6.0	7.0	7.0	8.4	7.0	8.0	9.0	15.0	11.5	14.0	17.0	14.5	13.0	15.0	17.0	16.0	14.5	8.5	6.0	5.0	5.5	4.5	7.0	5.5				
	2.0m	5.5	7.0	7.5	7.5	7.5	8.0	9.0	13.8	11.8	14.8	17.8	15.8	14.0	14.4	17.7	15.7	14.0	8.5	6.0	4.5	5.0	5.5	8.0	6.0				
	0.5m	4.5	5.5	6.0	6.6	6.5	6.0	6.0	7.6	8.6	11.1	13.1	15.6	14.6	16.0	14.7	14.2	12.5	7.0	6.0	5.0	5.0	4.5	5.0	5.0				

Rio Hato	1.5m	4.5	5.0	5.0	5.0	5.0	5.5	9.0	9.0	10.5	12.5	13.5	11.0	9.5	9.5	10.0	9.5	11.0	9.5	7.0	6.5	5.0	5.0	4.5	4.0				

SEPTEMBER 1966

Exposure		Monthly Means of Relative Humidity by Hour (%)																							Monthly Summary			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No of obs.	Min.	Mean	Max.
Albrook (Forest site)	46.0m	97.0	97.0	97.0	97.0	97.0	97.0	96.0	91.0	86.0	81.0	77.0	76.0	77.0	81.0	83.0	85.0	89.0	92.0	95.0	96.0	96.0	97.0	97.0	97.0	720	56.0	91.0	98.0
	28.5m	This level was not instrumented for relative humidity at this time																											
	26.5m	97.0	97.0	97.0	97.0	97.0	97.0	95.0	93.0	88.0	84.0	81.0	81.0	83.0	85.0	86.0	89.0	91.0	95.0	97.0	97.0	97.0	97.0	97.0	97.0	720	57.0	92.0	100.0
	13.5m	97.0	97.0	97.0	97.0	97.0	97.0	97.0	96.0	91.0	87.0	83.0	83.0	85.0	86.0	89.0	92.0	92.0	95.0	96.0	96.0	96.0	96.0	97.0	97.0	719	62.0	93.0	100.0
	8.0m	This level was not instrumented for relative humidity at this time																											
	4.0m	98.0	98.0	98.0	98.0	98.0	98.0	98.0	96.0	91.0	87.0	85.0	84.0	83.0	85.0	89.0	91.0	94.0	95.0	97.0	97.0	98.0	98.0	98.0	98.0	703	65.0	94.0	100.0
	2.0m	98.0	98.0	98.0	98.0	98.0	98.0	98.0	96.0	93.0	89.0	87.0	86.0	85.0	87.0	90.0	92.0	94.0	96.0	97.0	97.0	97.0	98.0	98.0	98.0	703	64.0	94.0	100.0
	1.0m	97.0	97.0	97.0	97.0	97.0	97.0	98.0	100.0	98.0	94.0	91.0	89.0	88.0	89.0	90.0	92.0	93.0	94.0	95.0	96.0	97.0	97.0	97.0	97.0	719	68.0	95.0	100.0
	0.5m	97.0	97.0	97.0	96.0	96.0	97.0	96.0	93.0	93.0	92.0	91.0	91.0	90.0	91.0	91.0	92.0	95.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	720	76.0	95.0	100.0
Chiva Chiva (Open site)	46.0m	96.0	97.0	97.0	96.0	96.0	96.0	95.0	93.0	83.0	77.0	73.0	74.0	75.0	78.0	82.0	84.0	85.0	88.0	93.0	93.0	94.0	95.0	95.0	95.0	693	54.0	89.0	100.0
	28.5m	This level was not instrumented for relative humidity at this time																											
	26.5m	96.0	97.0	97.0	96.0	96.0	96.0	95.0	90.0	83.0	79.0	76.0	76.0	76.0	79.0	82.0	86.0	87.0	91.0	94.0	94.0	95.0	96.0	95.0	96.0	718	56.0	89.0	100.0
	13.5m	97.0	97.0	97.0	97.0	97.0	97.0	96.0	93.0	83.0	78.0	75.0	75.0	75.0	79.0	84.0	86.0	89.0	91.0	94.0	95.0	95.0	96.0	96.0	96.0	715	57.0	90.0	100.0
	8.0m	This level was not instrumented for relative humidity at this time																											
	4.0m	96.0	97.0	97.0	97.0	97.0	97.0	92.0	82.0	79.0	74.0	71.0	72.0	71.0	74.0	80.0	82.0	86.0	91.0	94.0	95.0	96.0	96.0	96.0	96.0	719	52.0	88.0	100.0
	2.0m	98.0	97.0	97.0	97.0	98.0	97.0	94.0	81.0	78.0	73.0	70.0	70.0	70.0	73.0	78.0	81.0	88.0	92.0	95.0	95.0	97.0	97.0	97.0	97.0	719	51.0	88.0	100.0
	1.0m	97.0	97.0	97.0	97.0	97.0	97.0	96.0	91.0	81.0	74.0	70.0	72.0	72.0	78.0	81.0	85.0	88.0	94.0	96.0	96.0	97.0	97.0	97.0	97.0	710	44.0	89.0	100.0
	0.5m	96.0	96.0	96.0	96.0	95.0	95.0	95.0	89.0	85.0	80.0	78.0	77.0	76.0	79.0	80.0	83.0	88.0	92.0	94.0	95.0	95.0	96.0	95.0	95.0	720	58.0	89.0	100.0
Rio Hato	1.5m	100.0	100.0	100.0	100.0	100.0	100.0	99.0	93.0	88.0	85.0	82.0	83.0	83.0	85.0	86.0	88.0	91.0	97.0	100.0	100.0	100.0	100.0	100.0	100.0	658	63.0	94.0	100.0

Exposure		Monthly Ranges of Relative Humidity by Hour (%)																							Monthly Summary*			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	46.0m	3.0	5.0	3.0	4.0	4.0	4.0	10.0	22.0	28.0	36.0	35.0	34.0	35.0	41.0	38.0	42.0	32.0	20.0	8.0	7.0	7.0	7.0	7.0	7.0				
	28.5m	This level was not instrumented for relative humidity at this time																											
	26.5m	2.0	2.0	2.0	2.0	2.0	2.0	23.0	34.0	34.0	40.0	41.0	43.0	40.0	37.0	35.0	39.0	31.0	23.0	7.0	5.0	3.0	5.0	3.0	3.0				
	13.5m	9.0	10.0	9.0	9.0	10.0	14.0	14.0	15.0	27.0	33.0	35.0	37.0	38.0	34.0	33.0	28.0	29.0	19.0	10.0	11.0	10.0	9.0	9.0	11.0				
	8.0m	This level was not instrumented for relative humidity at this time																											
	4.0m	7.0	5.0	7.0	8.0	5.0	5.0	8.0	9.0	19.0	25.0	22.0	26.0	33.0	34.0	34.0	27.0	17.0	13.0	11.0	9.0	9.0	9.0	5.0	5.0				
	2.0m	5.0	8.0	7.0	9.0	5.0	5.0	5.0	12.0	14.0	21.0	23.0	28.0	31.0	34.0	34.0	27.0	17.0	15.0	12.0	9.0	9.0	9.0	5.0	5.0				
	1.0m	6.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	14.0	17.0	23.0	25.0	31.0	32.0	31.0	32.0	20.0	13.0	10.0	9.0	7.0	6.0	6.0	5.0				
	0.5m	10.0	8.0	10.0	10.0	10.0	10.0	12.0	10.0	13.0	12.0	14.0	14.0	20.0	21.0	22.0	20.0	16.0	10.0	8.0	8.0	8.0	6.0	8.0	8.0				

* No monthly summary was computed for the ranges.

Chiva Chiva (Open site)	46.0m	7.0	6.0	6.0	7.0	8.0	9.0	12.0	14.0	37.0	36.0	37.0	40.0	46.0	46.0	44.0	42.0	20.0	28.0	12.0	8.0	10.0	6.0	6.0	14.0				
	28.5m	This level was not instrumented for relative humidity at this time																											
	26.5m	4.0	4.0	4.0	6.0	7.0	8.0	11.0	30.0	32.0	36.0	38.0	41.0	44.0	43.0	42.0	40.0	36.0	28.0	8.0	10.0	8.0	8.0	7.0	9.0				
	13.5m	9.0	9.0	9.0	9.0	9.0	9.0	9.0	23.0	33.0	32.0	34.0	38.0	43.0	37.0	36.0	39.0	35.0	30.0	9.0	7.0	7.0	7.0	7.0	8.0				
	8.0m	This level was not instrumented for relative humidity at this time																											
	4.0m	7.0	7.0	5.0	7.0	5.0	7.0	19.0	39.0	28.0	34.0	31.0	45.0	30.0	43.0	41.0	36.0	29.0	17.0	17.0	11.0	9.0	10.0	9.0	9.0				
	2.0m	5.0	10.0	16.0	11.0	6.0	7.0	24.0	33.0	31.0	38.0	38.0	43.0	36.0	40.0	43.0	35.0	30.0	20.0	14.0	11.0	8.0	8.0	6.0	6.0				
	1.0m	7.0	5.0	5.0	4.0	4.0	7.0	23.0	35.0	45.0	50.0	56.0	53.0	54.0	52.0	47.0	42.0	42.0	22.0	10.0	7.0	5.0	4.0	5.0	4.0				
	0.5m	8.0	6.0	7.0	7.0	10.0	9.0	8.0	14.0	16.0	21.0	24.0	30.0	31.0	24.0	30.0	35.0	37.0	14.0	10.0	11.0	13.0	11.0	13.0	11.0				

Rio Hato	1.5m	1.0	1.0	1.0	2.0	1.0	1.0	3.0	18.0	22.0	26.0	28.0	28.0	37.0	56.0	28.0	30.0	26.0	15.0	9.0	2.0	1.0	1.0	2.0	1.0				

Exposure		Monthly Means[2] of other Elements by Hour																								Monthly Summary			
Site	Code[1]	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No of obs.	Min.	Mean	Max.
Albrook (Forest site)	ST	75.0	75.0	75.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	720	74.0	75.0	76.0
	WB (4.0m)	73.9	73.7	73.6	73.4	73.1	73.0	73.6	75.8	77.1	77.2	77.9	78.0	77.8	77.6	77.2	77.0	76.6	76.0	75.5	75.2	75.0	74.8	74.5	74.1	703	69.0	75.0	81.5
	WB (2.0m)	73.9	73.7	73.6	73.4	73.1	73.0	73.6	75.8	77.3	77.5	78.1	78.2	78.1	77.9	77.3	77.0	76.6	76.1	75.6	75.2	75.0	74.9	74.5	74.1	703	69.0	75.5	81.5
	WB (0.5m)	74.1	73.8	73.8	73.6	73.4	73.4	73.5	74.9	76.6	77.6	78.1	78.4	78.4	78.0	77.5	77.2	76.7	76.3	75.9	75.4	75.1	74.9	74.7	74.4	720	69.7	75.6	80.8
	BP	.752	.739	.723	.717	.717	.727	.744	.757	.774	.781	.780	.767	.736	.720	.696	.687	.683	.693	.710	.726	.745	.762	.772	.767	720	.645	.736	.825
	P1	0.04	0.01	0.01	0.04	0.01	0.00	0.01	0.00	0.01	0.05	0.15	0.23	0.25	0.30	0.17	0.05	0.06	0.03	0.05	0.02	0.01	0.00	0.00	0.02	551	0.00	7.31	1.00
	P2	0.06	0.01	0.01	0.01	0.03	0.04	0.05	0.08	0.14	0.07	0.07	0.18	0.33	0.07	0.15	0.10	0.05	0.05	0.09	0.00	0.00	0.00	0.00	0.00	720	0.00	5.95	0.80
	P3	0.04	0.00	0.01	0.00	0.02	0.04	0.03	0.11	0.14	0.11	0.03	0.18	0.46	0.07	0.16	0.16	0.04	0.03	0.08	0.00	0.00	0.00	0.00	0.00	720	0.00	6.14	1.09
	P4	0.09	0.02	0.00	0.01	0.03	0.08	0.07	0.12	0.13	0.25	0.15	0.27	0.34	0.31	0.15	0.24	0.05	0.05	0.09	0.00	0.00	0.00	0.00	0.00	720	0.00	10.52	1.10

Note: Total (Mean) for P1 includes 6-hourly readings which are not included in hourly means.

Chiva Chiva (Open site)	ST	76.0	76.0	75.0	75.0	75.0	75.0	76.0	80.0	85.0	88.0	92.0	91.0	94.0	90.0	88.0	85.0	83.0	81.0	79.0	79.0	78.0	77.0	77.0	76.0	720	72.0	81.0	106.0
	WB (4.0m)	73.2	73.1	72.9	72.6	72.6	72.4	74.6	75.3	76.2	76.7	76.9	76.8	77.2	76.6	76.0	75.6	76.2	76.0	75.6	75.2	74.8	74.6	74.2	73.6	719	67.5	74.9	80.2
	WB (2.0m)	73.3	73.1	72.9	72.8	72.6	72.4	74.4	75.6	76.1	77.4	77.6	77.3	77.6	77.1	76.4	75.8	76.3	76.2	75.8	75.2	74.8	74.6	74.1	73.8	695	67.6	75.1	81.3
	WB (0.5m)	73.7	73.3	73.2	72.9	72.8	72.5	74.0	75.9	77.4	78.5	79.0	79.1	79.4	78.7	77.5	76.5	76.4	76.2	75.7	75.2	74.7	74.6	74.4	73.9	720	68.3	75.6	82.9
	BP	.805	.788	.774	.772	.778	.788	.805	.822	.835	.840	.838	.818	.791	.769	.752	.745	.743	.755	.772	.789	.806	.824	.829	.819	720	.705	.794	.880
	PS	0.03	0.07	0.01	0.01	0.02	0.02	0.05	0.08	0.16	0.08	0.07	0.22	0.07	0.13	0.23	0.16	0.17	0.06	0.04	0.10	0.05	0.00	0.00	0.04	720	0.00	6.79	0.66

[1] ST - Soil surface temperature (°F)
WB - Wet bulb temperature (°F)
BP - Barometric pressure (in. of Hg minus 29.0)
PS - Precipitation at 1.0 m in open area (in.)
P1 - Precipitation at 46.0 m, above canopy (in.)
P2 - Precipitation under full canopy (in.)
P3 - Precipitation under drip canopy (in.)
P4 - Precipitation under open canopy (in.)

[2] Monthly means of precipitation are computed for precipitation days. Precipitation totals are substituted for the mean in the monthly summary.

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Exposure		Monthly Ranges[2] of other Elements by Hour																							Monthly Summary *			
Site	Code[1]	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	ST	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
	WB (4.0m)	5.5	6.0	6.0	6.3	6.8	7.0	6.6	5.9	4.2	4.7	6.2	5.3	4.3	8.0	6.5	7.0	8.0	5.5	4.5	3.5	4.5	4.5	4.9	4.2				
	WB (2.0m)	5.5	6.0	6.0	6.3	6.8	6.8	6.4	5.3	4.4	5.0	5.7	5.5	3.7	7.5	6.5	7.0	7.0	5.5	4.0	3.5	4.2	4.5	4.9	4.2				
	WB (0.5m)	4.5	5.0	5.5	5.7	6.7	6.7	6.6	6.5	4.9	5.0	5.3	5.2	5.0	7.0	7.0	7.5	5.5	5.5	4.5	4.0	4.0	4.3	4.5	4.5				
	BP	.065	.075	.070	.075	.085	.060	.090	.100	.085	.115	.095	.080	.105	.120	.070	.065	.060	.085	.085	.060	.050	.055	.070	.075				
	P1	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.99	0.87	0.49	0.13	0.13	0.10	0.05	0.02	0.00	0.00	0.00	0.00				
	P2	0.02	0.00	0.00	0.00	0.05	0.00	0.06	0.00	0.26	0.12	0.12	0.28	0.73	0.19	0.40	0.29	0.14	0.05	0.00	0.00	0.00	0.00	0.00	0.00				
	P3	0.03	0.00	0.00	0.00	0.01	0.07	0.04	0.00	0.23	0.00	0.04	0.22	1.07	0.29	0.39	0.54	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00				
	P4	0.00	0.01	0.00	0.00	0.03	0.05	0.06	0.00	0.35	0.00	0.00	0.33	1.03	0.88	0.58	1.09	0.12	0.08	0.14	0.00	0.00	0.00	0.00	0.00				
Chive Chiva (Open site)	ST	4.0	4.0	5.0	5.0	6.0	6.0	5.0	12.0	19.0	22.0	26.0	24.0	26.0	24.0	25.0	16.0	14.0	8.0	8.0	6.0	4.0	3.0	3.0	4.0				
	WB (4.0m)	5.0	6.5	7.0	7.0	7.0	8.0	5.5	6.3	5.5	6.0	7.0	6.0	5.5	6.5	7.0	8.0	7.8	5.8	3.8	4.5	3.5	4.5	7.0	5.5				
	WB (2.0m)	5.0	6.5	8.0	7.0	7.0	8.0	5.5	6.0	5.5	5.0	7.0	6.0	5.5	7.5	7.5	8.0	8.0	6.5	4.0	4.5	4.0	4.5	7.5	5.5				
	WB (0.5m)	4.5	4.9	5.5	6.0	7.0	7.4	6.2	6.4	6.0	6.1	6.9	7.4	6.9	10.0	9.6	8.9	8.2	6.0	4.2	4.0	4.0	4.0	5.0	4.0				
	BP	.070	.075	.070	.075	.090	.080	.090	.100	.080	.120	.080	.075	.100	.100	.080	.075	.060	.075	.080	.075	.060	.065	.075	.080				
	PS	0.04	0.04	0.00	0.00	0.04	0.01	0.06	0.13	0.18	0.11	0.00	0.50	0.14	0.31	0.54	0.30	0.61	0.13	0.00	0.00	0.00	0.00	0.00	0.00				

* No monthly summary was computed for the ranges.

[1] ST - Soil surface temperature (°F)
WB - Wet bulb temperature (°F)
BP - Barometric pressure (in. of Hg minus 29.0)
PS - Precipitation at 1.0 m in open area (in.)
P1 - Precipitation at 46.0 m, above canopy (in.)
P2 - Precipitation under full canopy (in.)
P3 - Precipitation under drip canopy (in.)
P4 - Precipitation under open canopy (in.)

[2] Monthly ranges of precipitation are computed for precipitation days. Precipitation totals are substituted for the mean in the monthly summary.

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Exposure		Monthly Means of Wind Speed by Hour (miles/hr.)																							Monthly Summary			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No of obs.	Min.	Mean	Max.
Albrook (Forest site)	46.0 m	1.0	1.0	1.0	1.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	4.0	5.0	5.0	4.0	2.0	3.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0	719	0.0	2.0	28.0
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	720	0.0	1.0	7.0
	13.5 m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	720	0.0	0.0	4.0
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	720	0.0	0.0	2.0
	2.0 m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	720	0.0	0.0	0.0
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											
Cnuva Chiva (Open site)	46.0 m	3.0	3.0	3.0	3.0	4.0	3.0	3.0	4.0	5.0	6.0	7.0	7.0	8.0	7.0	7.0	7.0	7.0	5.0	5.0	5.0	4.0	3.0	3.0	3.0	720	0.0	5.0	20.0
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	0.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	3.0	4.0	5.0	5.0	6.0	6.0	5.0	4.0	4.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	712	0.0	2.0	22.0
	13.5 m	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	3.0	4.0	4.0	5.0	4.0	3.0	2.0	2.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	712	0.0	2.0	15.0
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	2.0	2.0	1.0	2.0	2.0	2.0	1.0	2.0	3.0	4.0	5.0	6.0	6.0	6.0	6.0	5.0	5.0	3.0	2.0	2.0	2.0	1.0	2.0	2.0	718	0.0	3.0	14.0
	2.0 m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	3.0	3.0	4.0	4.0	3.0	2.0	2.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	712	0.0	1.0	10.0
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											
Rio Hato	4.0 m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	4.0	2.0	2.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	432	0.0	1.0	11.0

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Exposure		Monthly Ranges of Wind Speed by Hour (miles/ hr.)																						Monthly Summary *			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No. of obs.	Min.	Mean	Max.
Albrook (Forest site)	46.0 m	6.0	7.0	6.0	8.0	14.0	15.0	5.0	7.0	12.0	10.0	9.0	14.0	28.0	15.0	18.0	13.0	20.0	9.0	10.0	10.0	13.0	9.0	9.0	9.0				
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	3.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	3.0	3.0	6.0	4.0	6.0	6.0	4.0	5.0	7.0	3.0	3.0	6.0	7.0	3.0	1.0	1.0				
	13.5 m	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	1.0	2.0	3.0	2.0	2.0	4.0	1.0	2.0	2.0	0.0	1.0	2.0	2.0	1.0	0.0	0.0				
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	2.0	0.0	2.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0				
	2.0 m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

* No monthly summary was computed for the ranges.

Chiva Chiva (Open site)	46.0 m	9.0	8.0	7.0	8.0	10.0	8.0	6.0	10.0	10.0	9.0	20.0	15.0	17.0	11.0	13.0	10.0	15.0	8.0	11.0	16.0	19.0	9.0	10.0	8.0				
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	2.0	7.0	5.0	5.0	6.0	4.0	5.0	8.0	8.0	7.0	15.0	13.0	18.0	11.0	15.0	12.0	15.0	7.0	7.0	15.0	22.0	7.0	6.0	4.0				
	13.5 m	1.0	3.0	3.0	3.0	2.0	4.0	5.0	7.0	7.0	7.0	13.0	12.0	15.0	9.0	7.0	7.0	10.0	3.0	3.0	5.0	15.0	2.0	2.0	2.0				
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	4.0	6.0	8.0	5.0	6.0	5.0	5.0	8.0	7.0	8.0	7.0	10.0	14.0	8.0	9.0	10.0	9.0	6.0	6.0	8.0	11.0	4.0	6.0	4.0				
	2.0 m	2.0	2.0	2.0	2.0	2.0	2.0	4.0	4.0	5.0	5.0	8.0	8.0	10.0	8.0	8.0	8.0	10.0	3.0	2.0	3.0	10.0	1.0	3.0	1.0				
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

Rio Hato	4.0 m	0.0	1.0	2.0	1.0	3.0	3.0	5.0	3.0	1.0	3.0	6.0	7.0	11.0	4.0	6.0	2.0	2.0	2.0	3.0	1.0	1.0	1.0	1.0	0.0				

ALBROOK (Forest site) SEPTEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 46.0 m

(%)

Dir. \ Hr	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	3.3				3.3		3.3	3.3	3.3	3.3	3.3		3.6	3.3	6.7	3.3	3.3	3.3			3.3	3.3		
NNE		6.7		3.3		3.3						3.6	3.6					3.3						
NE	3.3				6.7		3.3	3.3	3.3		6.7		3.6					3.3		3.3	3.3	3.3	6.7	6.7
ENE			3.3		3.3									3.3										
E								3.3	3.3	3.3	3.3	3.6	3.6		3.3		6.7			3.3	3.3			
ESE												3.6	3.6											
SE									6.7	10.0	3.3	3.6	3.6	3.3	10.0			3.3						3.3
SSE										10.0	10.0	3.6	6.9	3.3	3.3									
S								6.7	6.7	3.3	6.7	23.5	30.3	20.0	20.0	23.3	3.3							
SSW													3.6	3.3										
SW												6.9		3.3	3.3		6.7							
WSW												3.6				3.3								
W	3.3	3.3	3.3	3.3	3.3		6.7	10.0	6.7	3.3	13.3	3.6	6.9	3.3	6.7	10.0	3.3	3.3	3.3	3.3	6.7	3.3	6.7	3.3
WNW	3.3	3.3	3.3	6.7	6.7	3.3	13.3		6.7	3.3		3.6	3.6	6.7			6.7		6.7		3.3	3.3		
NW	16.7	16.7	10.0	13.3	10.0	23.3	13.3	6.7		13.3	3.3	3.6	3.6	6.7	13.3	16.7	23.3	10.0	20.0	6.7	20.0	13.3	16.7	13.3
NNW			6.7		3.3					3.3		3.6		3.3				6.7	6.7	10.0		3.3	6.7	3.3
CALM	70.0	70.0	73.3	73.3	63.3	70.0	60.0	66.7	63.3	46.7	50.0	33.6	26.6	36.7	33.3	43.3	46.7	66.7	63.3	73.3	60.0	70.0	63.3	70.0

* Note: Due to rounding, percentage totals do not equal 100%.

ALBROOK (Forest site) SEPTEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 4.0 m
(%)

Hr. / Dir.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N																								
NNE																								
NE																								
ENE																								
E																		12.5						
ESE																								
SE									14.3	14.3			14.3											
SSE															12.5									
S											14.3													
SSW																								
SW																								
WSW																								
W																12.5								
WNW																								
NW																								
NNW																								
CALM	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	85.7	85.7	85.7	100.0	85.7	100.0	87.5	87.5	100.0	87.5	100.0	100.0	100.0	100.0	100.0	100.0

* Note: Due to rounding, percentage totals do not equal 100%.

CHIVA CHIVA (Open site) SEPTEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 46.0 m
(%)

Hr. / Dir.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N		6.7	6.7	10.0	3.3	10.0	16.7	6.7	6.7	16.7	3.3	6.7	6.7	3.3	6.7	13.3			16.7	13.3	16.7	16.7	13.3	10.0
NNE	6.7	3.3		3.3	10.0		3.3				3.3	3.3			10.0	6.7	3.3	3.3	10.0	13.3	3.3	3.3		3.3
NE	3.3	3.3	3.3		3.3		3.3	3.3		3.3		6.7	3.3	3.3	3.3	3.3	3.3	6.7			3.3		3.3	10.0
ENE			3.3	3.3	3.3	6.7					3.3			3.3	3.3					3.3	3.3	3.3	6.7	3.3
E		3.3			6.7	3.3	10.0	10.0	3.3	3.3			6.7		3.3		3.3	10.0	6.7	3.3		10.0	3.3	
ESE			3.3	3.3	3.3	3.3			3.3			3.3	3.3				3.3	6.7	10.0	3.3	6.7	3.3		
SE						3.3		3.3	3.3	3.3	13.3	10.0	13.3	3.3	3.3	13.3	10.3	3.3	6.7	3.3		3.3	3.3	3.3
SSE	3.3								3.3	3.3	6.7	6.7	6.7	13.3	13.3	13.3		3.3						
S			3.3	3.3				6.7	13.3	26.7	20.0	30.0	30.0	40.0	26.7	6.7	16.7	10.0						3.3
SSW				3.3			3.3								3.3	3.3				3.3			3.3	
SW	3.3			3.3				6.7	3.3	6.7	6.7			6.7	3.3	6.7	3.3	3.3			3.3			
WSW		3.3			3.3	3.3				3.3							3.3			6.7			3.3	3.3
W	6.7	10.0	23.3	13.3	3.3	10.0	13.3	3.3	10.0	6.7	16.7	6.7	3.3	3.3	3.3	3.3	3.3	6.7	3.3	6.7	13.3		10.0	3.3
WNW	10.0	16.7	10.0		10.0	6.7	6.7	16.7	10.0	6.7	3.3	10.0	16.7	6.7	6.7	13.3	13.3	16.7	10.0	10.0	13.3	10.0	13.3	3.3
NW	30.0	23.3	10.0	23.3	26.7	30.0	26.7	6.7	20.0	16.7	10.0	10.0	10.0	13.3	3.3	13.3	26.7	6.7	23.3	23.3	13.3	23.3	23.3	26.7
NNW	20.0	23.3	16.7	16.7	13.3	6.7	6.7	20.0	6.7	3.3	10.0	3.3		3.3	6.7	3.3	6.7	23.3	13.3	6.7	10.0	16.7	6.7	16.7
CALM	16.7	6.7	20.0	16.7	13.3	16.7	10.0	16.7	16.7		3.3	3.3			3.3		3.3			3.3	13.3	10.0	10.0	13.3

* Note: Due to rounding, percentage totals do not equal 100%.

CHIVA CHIVA (Open site) SEPTEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 4.0 m

(%)

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	6.7	6.7	6.7	10.0	6.7	3.3	10.0	6.7		10.0		3.3	3.3	6.7	13.3	13.3	3.3	6.7	6.7				3.6	3.6
NNE	3.3		3.3	6.7	10.0	6.7		3.3				3.3			3.3	3.3		6.7	10.0	6.7	3.3	10.0		10.3
NE	13.3	10.0	6.7		6.7	6.7	6.7	3.3			3.3	3.3	3.3	6.7	3.3			3.3	3.3			6.7	7.0	10.3
ENE				6.7	10.0	3.3	3.3				3.3		3.3				3.3					3.3		
E	3.3		6.7						6.7	6.7	3.3		3.3				6.7	20.0		3.3			7.0	
ESE					3.3		3.3	3.3	3.3					3.3	3.3	6.7	6.7		3.3			6.7		3.6
SE	3.3						3.3	6.7	3.3	3.3	10.0	16.7	13.3	6.7	13.3	16.7	3.3	6.7				3.3	3.6	3.3
SSE						3.3	3.3			6.7	6.7	13.3	6.7	10.0	6.7	6.7	3.3		3.3					
S	6.7	3.3		3.3		3.3	6.7	6.7	16.7	33.3	23.3	23.3	30.0	33.3	23.3	6.7	10.0	6.7	3.3					7.0
SSW			3.3											3.3	3.3	3.3	6.7	3.3						
SW		6.7	3.3							3.3	6.7	3.3				3.3	6.7	3.3	3.3		3.3			
WSW	3.3		3.3				6.7		3.3				3.3	6.7		10.0			3.3	6.7	3.3		10.4	
W	3.3	3.3	6.7	20.0	10.0	10.0	16.7	10.0	10.0	3.3	13.3	6.7	10.0	10.0	10.0	3.3	3.3	13.3	3.3	6.7	10.0	6.7	3.6	7.0
WNW		3.3	3.3		6.7	3.3	3.3	10.0	6.7	6.7	6.7	10.0	6.7	3.3	6.7	6.7	20.0	13.3	13.3	13.3	16.7	16.7	10.4	7.0
NW	30.0	26.7	10.0	13.3	16.7	20.0	3.3	10.0	23.3	20.0	16.7	10.0	6.7	6.7	3.3	13.3	20.0	10.0	6.7	10.0	10.0	3.3	10.4	10.3
NNW	3.3	6.7	6.7	10.0	3.3	3.3		10.0	6.7	3.3	6.7		6.7	3.3	10.0	3.3	6.7	3.3	16.7	10.0	3.3	10.0	7.0	13.6
CALM	23.3	33.3	40.0	30.0	26.7	36.7	33.3	30.0	20.0	3.3		6.7	3.3			3.3		3.3	23.3	26.7	50.0	33.3	37.0	23.6

* Note: Due to rounding, percentage totals do not equal 100%.

RIO HATO SEPTEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 4.0 m
(%)

Hr. / Dir.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N						5.5	5.5	12.0		5.8		11.9		5.5	16.8			5.0	5.0	10.6	5.2			
NNE			5.3	5.3	11.5			5.8	6.6				5.5	5.5			5.1				5.2			
NE																					5.2			
ENE																						5.2		
E															5.5									
ESE										12.0	6.2	11.9	11.2		5.5	5.5								
SE									6.6	5.8	31.2	36.0	11.2		5.5	11.2								
SSE										18.0	12.5	5.8	22.3	28.4	16.8	16.8	10.5							
S										12.0	19.0	18.0	28.2	39.6	11.2	5.5	10.5							
SSW														5.5	11.2	11.2								
SW																								
WSW											6.2		11.2	5.5										
W							5.5	5.8		5.8	6.2			5.5		5.5								
WNW				5.3	11.5	5.5				5.8							5.0							
NW		5.0	5.3			5.5	11.2					5.8							5.0				5.1	
NNW					5.5				13.0		6.2		5.5					5.0	5.0	5.2			5.1	4.8
CALM	100.0	95.0	90.7	90.7	72.3	85.0	77.9	77.8	73.4	36.0	12.5	11.9	5.5	5.5	28.2	45.0	74.5	85.0	85.0	85.2	85.2	95.8	90.5	95.4

* Note: Due to rounding, percentage totals do not equal 100%.

Summary of Elements with Non-hourly Frequencies of Observation

Site	Element, Units and Exposure	Description	Number of Obs.	Minimum Value	Mean or Total Value	Maximum Value
Albrook (Forest site)	WBGT Index[1] (at 1.5 meters)	Index value	420	69.3	77.2	82.1
		Dry bulb temp.	420	70.0	78.0	87.5
		Wet bulb temp.	420	69.0	76.7	81.0
		Black bulb temp.	420	70.0	78.7	88.5
	Evaporation[3] (in. at 3 levels)	Piche (46.0 m)	30	0.000	4.785*	0.433
		Piche (26.5 m)	30	0.000	3.381*	0.274
		Piche (0.5 m)	28	0.000	0.367*	0.043
	Precipitation from Raingauge Network[2] (in. at 1.0 meters)	Gauge # 1	120	0.00	8.17*	1.76
		Gauge # 2	120	0.00	9.19*	1.72
		Gauge # 3	120	0.00	8.09*	1.62
		Gauge # 4	120	0.00	6.70*	1.11
		Gauge # 5	120	0.00	6.94*	1.28
		Gauge # 6	120	0.00	6.93*	0.95
		Gauge # 7	120	0.00	8.30*	1.44
		Gauge # 8	120	0.00	6.46*	1.09
	Stem Flow[2] (in. at 2.0 meters)	Small tree	120	0.00	5.94*	1.25
		Medium tree	120	0.00	32.59*	15.42
		Large tree	120	0.00	173.22*	68.97
Chiva Chiva (Open site)	WBGT Index[1] (at 1.5 meters)	Index value	420	67.9	80.0	90.0
		Dry bulb temp.	420	68.0	80.8	98.0
		Wet bulb temp.	420	68.0	77.1	82.2
		Black bulb temp.	420	67.5	89.7	122.0
	Evaporation[3] (in. at 0.5 meters)	Piche	30	0.000	3.260*	0.207
		Pan	29	0.000	4.034*	0.299
	Minimum Grass temp[3] (°F at grass tips)	None	30	69.0	72.0	75.0
Albrook **	Maximum temp. (°F at 1.5m)		23	78.0	83.5	87.0
	Minimum temp. (°F at 1.5m)		23	71.0	73.9	76.5
	Maximum R.H. (% at 1.5m)		23	94.0	98.0	100.0
	Minimum R.H. (% at 1.5m)		23	62.0	84.0	100.0
	Precipitation[3] (in. at 1.0m)	In open area	25	0.00	7.41*	1.22
		Under canopy	25	0.00	7.29*	1.47
Ft. Kobbe **	Maximum temp. (°F at 1.5m)		22	78.0	82.3	85.0
	Minimum temp. (°F at 1.5m)		22	72.0	73.7	75.0
	Maximum R.H. (% at 1.5m)		22	85.0	97.0	100.0
	Minimum R.H. (% at 1.5m)		22	65.0	83.0	98.0
	Precipitation[3] (in. at 1.0m)	In open area	25	0.00	5.58*	1.20
		Under canopy	25	0.00	2.87*	0.62
Ft. Sherman **	Maximum temp. (°F at 1.5m)		26	76.5	80.7	84.0
	Minimum temp. (°F at 1.5m)		26	70.5	74.2	76.0
	Maximum R.H. (% at 1.5m)		26	98.0	99.0	100.0
	Minimum R.H. (% at 1.5m)		26	70.0	88.0	99.0
	Precipitation[3] (in. at 1.0m)	In open area	27	0.00	12.45*	1.74
		Under canopy	27	0.00	8.59*	1.46

1 - Hourly observations between 0600 and 1900 hours inclusive
2 - Six hourly observations
3 - Daily observations

* Total Values
** Satellite

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This report contains detailed microclimatic data for September 1966 from specific sites in the Panama Canal Zone and vicinity. The data are presented in tabular form, summarized for hourly and/or daily observations from surface to 46-meter levels. Elements listed are: temperature, pressure, precipitation, wind speed and direction, relative humidity, and evaporation.

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ENVIRONMENTAL DATA BASE
FOR REGIONAL STUDIES IN THE HUMID TROPICS

MONTHLY
MICROCLIMATIC SUMMARY

NOVEMBER 1966

Prepared by

Michael A. Fradel, Project Officer
and
Dr. Wilfried H. Portig, Meteorologist

USATECOM Project No. 9-4-0013-01

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MONTHLY MICROCLIMATIC SUMMARY

Introduction

Monthly microclimatic data summarized in this series of reports were collected by the US Army Tropic Test Center and the Weather Engineers of Panama Corporation under the project, Environmental Data Base for Regional Studies in the Humid Tropics. The project is sponsored by the Advanced Research Projects Agency of the Department of Defense and by the Army Research Office, Office of the Chief of Research and Development. It is an investigation of microclimatic, air chemistry, vegetation, soils, microbiological, and macrofaunal conditions at selected sites in the principal tropical environments of the Panama Canal Zone and the Rio Hato Military Reservation. The objective of the project is to assemble quantitative environmental data for RDT&E purposes.

Sites. Data summarized in this report were collected at the Albrook Forest and Chiva Chiva sites. Figure 1 shows the site locations within the Isthmus of Panama. Geographic coordinates are shown below:

Albrook Forest	09° 01'N, 79° 33'W
Chiva Chiva	09° 01'N, 79° 35'W

The Chiva Chiva open site and the Albrook Forest site are paired for comparative study of environmental conditions in a tropical semideciduous forest and in a large clearing. Both are located in a region where the annual precipitation is approximately 80 inches and there is a pronounced dry season.

The Albrook and Chiva Chiva main sites are approximately four kilometers apart. Each has a 46-meter walk-up tower and an air-conditioned building to house the recording equipment and observers. Both sites are approximately 30 meters above sea level. The top of the forest canopy at the Albrook site is about 26.5 meters above the ground.

Instrumentation. A wide range of climatic elements are measured at the Albrook and Chiva Chiva sites. Types of observations and frequencies are shown on Figure 2. The towers at the Albrook and Chiva Chiva sites are similarly oriented. Sensing equipment is mounted at several levels on the towers to provide measurements through the vertical profile. Additional instruments are emplaced in the immediate vicinity on or near the ground. All instrument exposures are duplicated at each site. Figures 3, 4, and 5 show the instrument array at these sites.

Data Reduction and Storage. All data, as applicable, are recorded at or reduced to each full hour and transposed to punch cards. These punch cards, together with all raw data, are stored in the Tropic Test Center Technical Library Annex.

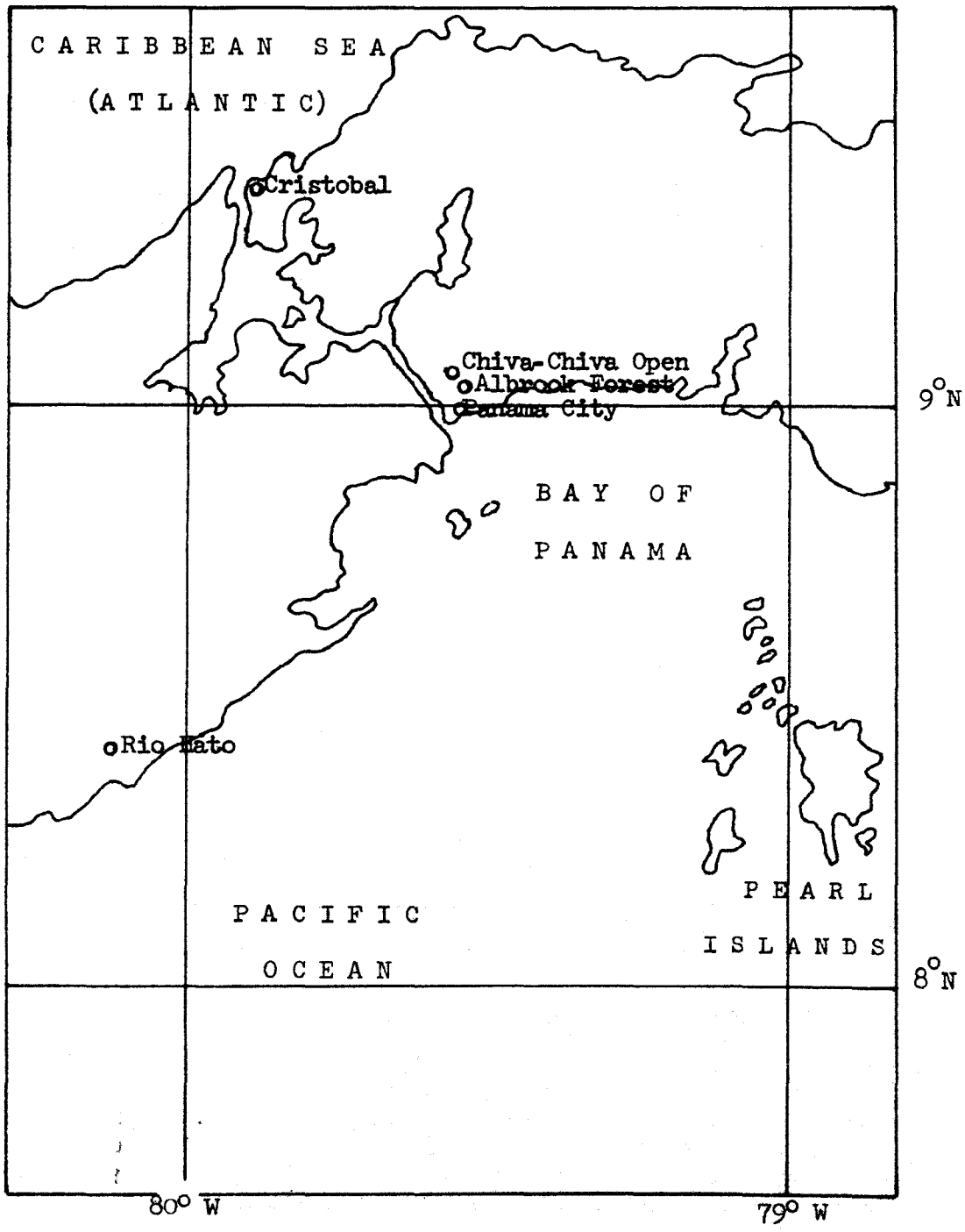

FIGURE 1. LOCATION MAP, ISTHMUS OF PANAMA

FIGURE 2. FREQUENCY OF OBSERVATIONS

# Element	Height (meters) Sfc	0.5	1.0	2.0	4.0	8.0	13.5	26.5	28.5	46.0	Frequency
Temperature:											
Dry Bulb	1	1	1	1	1	2	1	1	2	1	Hourly*/Continuously
Wet Bulb	-	1	-	1	1	-	-	-	-	-	Hourly*/Continuously
Grass Minimum	3	-	-	-	-	-	-	-	-	-	Once Daily
WBGT Index	-	-	1	-	-	-	-	-	-	-	Hourly (0600-1900 EST)
Relative Humidity	-	1	1	1	1	-	1	1	-	1	Hourly*/Continuously
Barometric Pressure	-	-	1	-	-	-	-	-	-	-	Continuously
Evaporation	-	-	1	-	-	-	2	2	-	2	Once Daily
Precipitation:											
Recording Gage	-	-	1	-	-	-	-	-	-	2	Continuously
Manual Gage	-	-	2	-	-	-	-	-	-	-	4 Times Daily
Stem Flow	-	-	2	-	-	-	-	-	-	-	4 Times Daily
Wind:											
Direction	-	-	-	-	1	-	-	1	-	1	Continuously
Speed	-	-	-	3**	1	-	3**	1**	-	1	Hourly**/Continuously

1. Albrook and Chiva Chiva
2. Albrook only
3. Chiva Chiva only

* Observations made with sling psychrometer when recorders are inoperative.

** Hourly

Instrument descriptions are contained in the Environmental Data Base semiannual reports.

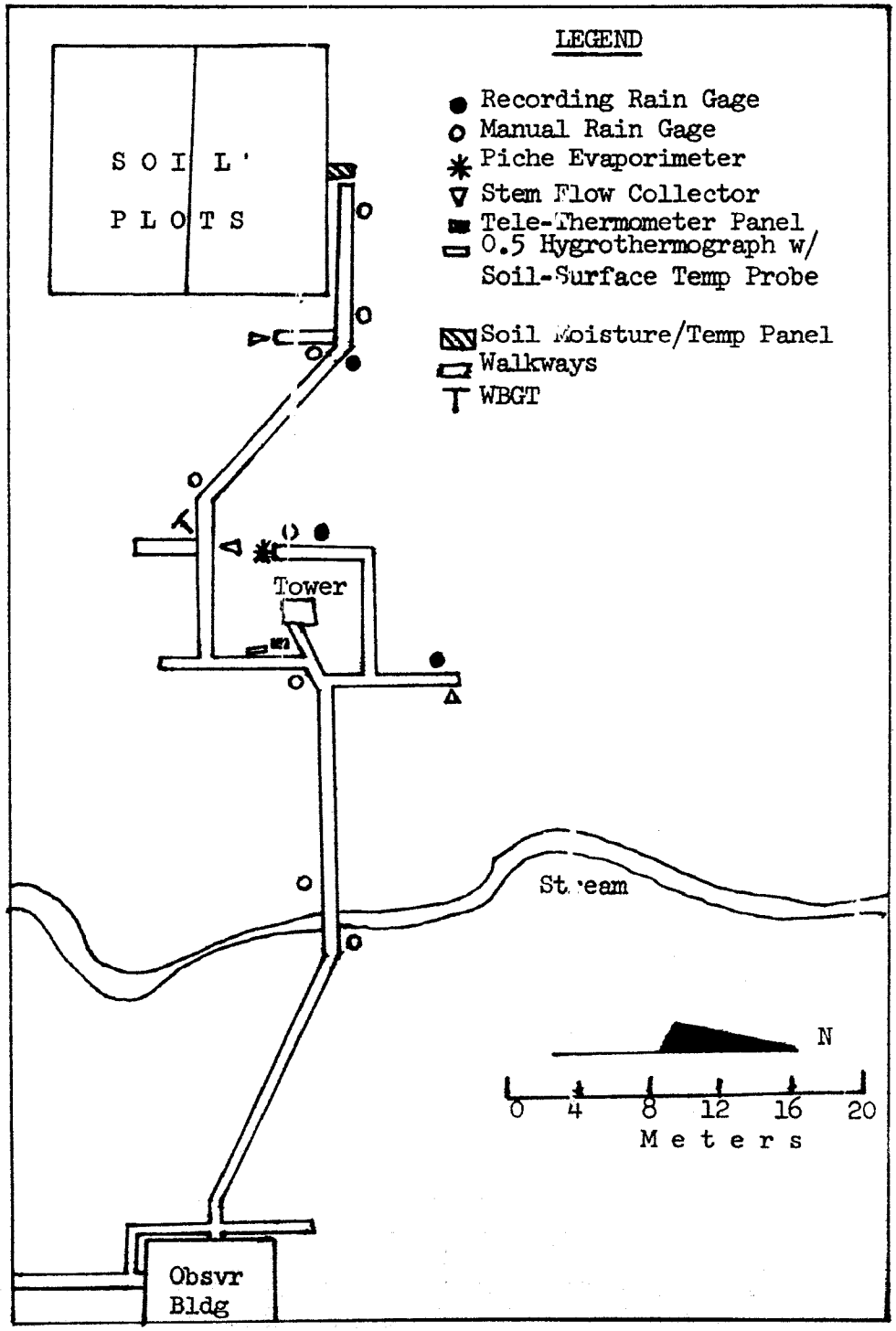

FIGURE 3. ALBROOK FOREST SITE, GENERALIZED PLOT

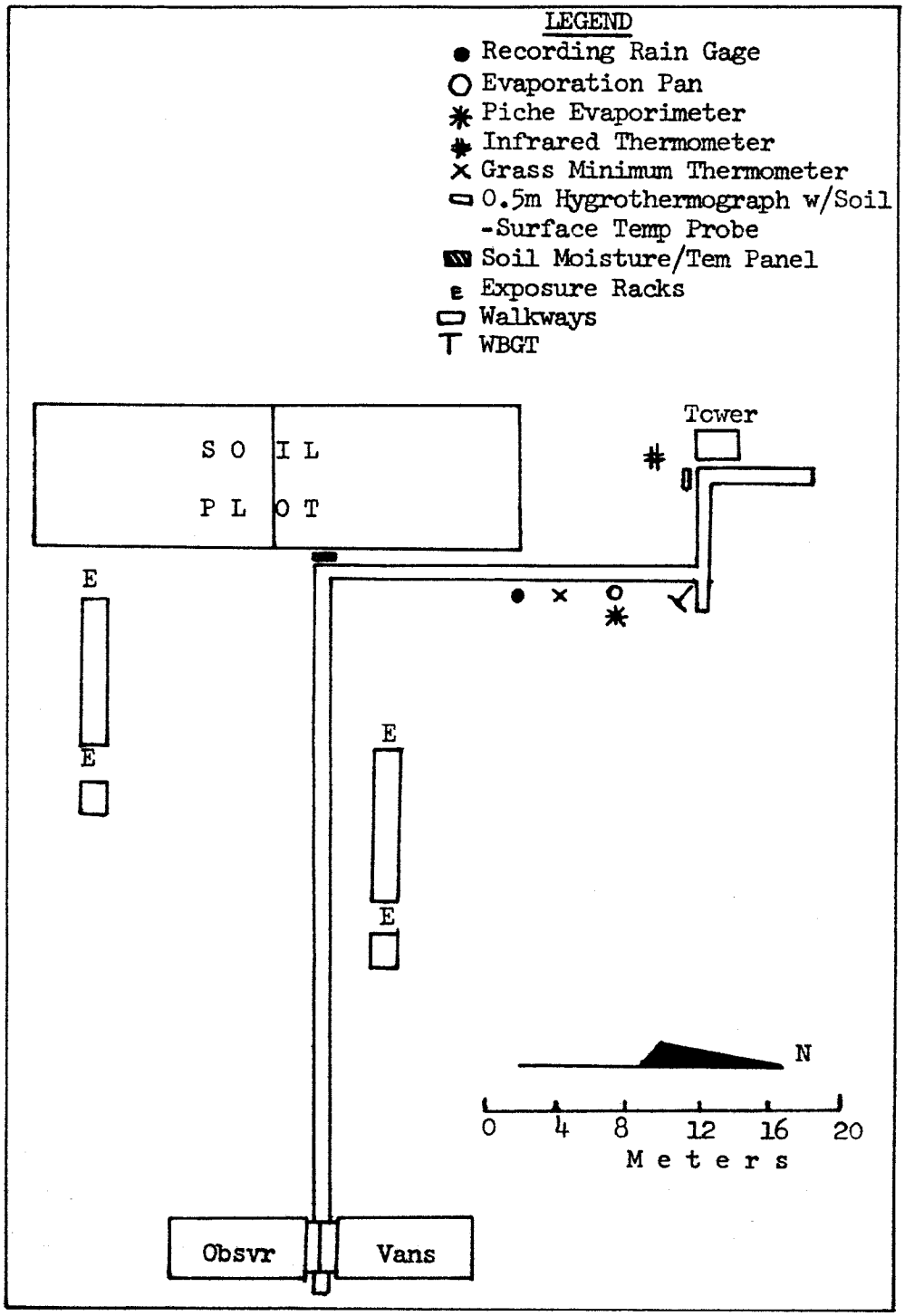

FIGURE 4. CHIVA CHIVA OPEN, GENERALIZED PLOT

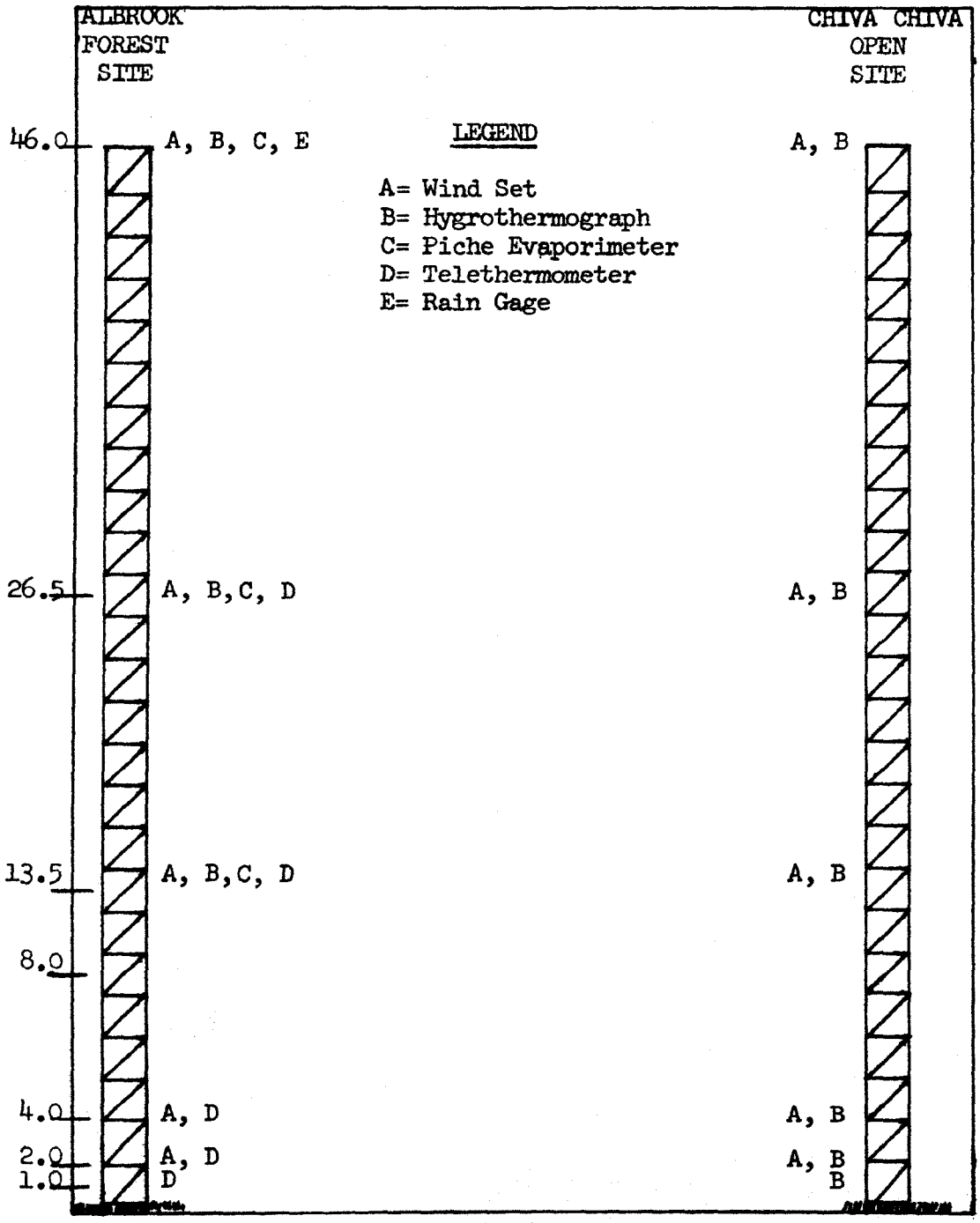

FIGURE 5. INSTRUMENT LOCATION ON TOWERS

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

NOVEMBER 1966

Exposure		Monthly Means of Air Temperature by Hour (°F)																								Monthly Summary			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No of obs.	Min.	Mean	Max.
Albrook (Forest site)	46.0 m	74.0	73.8	73.6	73.5	73.5	73.4	74.3	76.1	78.2	79.6	80.7	80.8	80.4	79.8	79.3	78.2	77.1	75.8	75.2	74.8	74.5	74.3	74.3	74.1	715	71.7	76.2	85.6
	28.5 m	73.8	73.6	73.4	73.2	73.1	73.1	74.5	76.8	79.2	81.1	81.9	81.7	81.4	80.4	80.2	79.1	77.7	76.2	75.4	75.1	74.6	74.4	74.2	74.0	718	69.2	76.6	88.1
	26.5 m	73.8	73.8	73.4	73.2	73.2	73.1	74.6	77.1	79.8	81.7	82.7	82.3	82.0	81.0	80.6	79.6	77.9	76.2	75.3	75.0	74.5	74.4	74.2	73.9	718	69.7	76.8	89.9
	13.5 m	73.6	73.4	73.3	73.1	72.9	72.8	73.6	75.9	78.0	79.6	80.8	80.9	81.0	80.2	79.5	78.6	77.4	76.0	75.1	74.7	74.3	74.2	73.9	73.7	720	68.4	76.1	86.9
	8.0 m	73.5	73.2	73.2	73.0	72.9	72.7	73.5	75.4	77.8	79.4	80.6	80.8	80.8	80.1	79.4	78.5	77.3	76.0	74.9	74.6	74.2	74.0	73.8	73.5	720	69.9	76.0	86.3
	4.0 m	73.1	72.9	72.9	72.6	72.5	72.3	73.2	75.6	77.5	79.1	80.3	80.5	80.2	79.4	78.7	77.8	76.8	75.5	74.5	74.2	73.8	73.6	73.4	73.2	718	69.5	75.6	85.2
	2.0 m	73.1	73.0	72.9	72.6	72.5	72.3	73.2	75.3	77.2	78.8	79.9	80.1	79.9	79.3	78.7	77.8	76.7	75.5	74.5	74.2	73.8	73.6	73.5	73.2	718	69.5	75.5	85.0
	1.0 m	73.4	73.3	73.1	73.0	72.8	72.6	73.2	75.1	77.0	78.3	79.4	79.6	79.6	79.5	78.8	77.7	76.7	75.5	74.6	74.6	74.1	73.9	73.7	73.5	720	70.0	75.6	85.0
	0.5 m	73.5	73.4	73.3	73.2	73.0	72.9	73.3	74.8	76.5	77.7	78.6	78.9	79.0	78.7	78.5	77.5	76.8	75.8	74.9	74.6	74.2	74.0	73.8	73.6	720	69.8	75.4	83.5
Chiva Chiva (Open site)	46.0 m	74.1	73.8	73.6	73.5	73.5	73.4	74.0	75.9	78.4	79.8	80.7	80.8	80.6	80.8	79.9	79.0	77.5	76.4	75.6	75.3	74.9	74.7	74.5	74.2	696	71.1	76.5	85.6
	28.5 m	This level was not instrumented for air temperature at this time																											
	26.5 m	74.1	73.7	73.6	73.5	73.4	73.3	74.0	76.0	78.5	80.0	80.8	80.9	80.7	80.7	80.0	79.1	77.9	76.7	75.8	75.3	74.9	74.7	74.5	74.2	720	70.8	76.5	86.4
	13.5 m	73.9	73.6	73.4	73.3	73.2	73.2	73.8	76.2	78.7	80.4	81.3	81.4	81.2	81.0	80.3	79.4	78.0	76.8	75.8	75.3	74.9	74.6	74.4	74.0	716	70.6	76.6	87.5
	8.0 m	This level was not instrumented for air temperature at this time																											
	4.0 m	73.3	73.2	72.9	72.9	72.9	73.0	74.4	77.1	80.0	81.6	82.3	82.5	82.0	81.8	81.3	80.2	78.4	76.7	75.7	75.1	74.7	74.2	74.0	73.5	715	69.0	76.8	88.8
	2.0 m	73.1	72.9	72.7	72.7	72.7	72.7	74.5	77.5	80.2	81.7	82.4	82.7	82.3	82.0	81.1	80.2	78.2	76.4	75.4	74.8	74.4	73.9	73.7	73.2	715	68.5	76.7	89.4
	1.0 m	73.4	73.1	72.9	72.9	72.7	72.3	74.4	77.7	81.0	82.8	83.2	83.6	83.1	82.7	81.4	80.1	78.2	76.1	75.1	74.9	74.5	74.1	73.8	73.6	719	68.0	77.0	91.0
	0.5 m	73.5	73.2	73.0	72.9	72.8	72.8	74.0	76.9	80.0	82.6	84.0	83.9	84.2	83.5	81.9	80.3	78.7	76.5	75.4	74.8	74.4	74.1	73.9	73.7	720	68.9	77.1	95.5

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

NOVEMBER 1966

Exposure		Monthly Ranges of Air Temperature by Hour (°F)																							Monthly Summary*			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	46.0 m	4.2	2.8	3.2	2.9	2.7	3.1	6.1	6.3	7.6	10.8	10.7	12.0	11.4	11.3	11.6	11.5	8.6	6.3	5.8	4.9	4.4	4.0	3.8	4.0				
	28.5 m	3.9	5.5	5.0	5.0	5.7	4.1	6.1	6.3	8.6	12.1	14.4	14.3	13.1	13.9	15.2	12.6	11.2	6.6	5.0	4.5	4.5	5.2	4.9	5.2				
	26.5 m	4.0	5.4	5.3	4.5	5.2	4.0	6.2	7.3	10.0	12.6	15.7	13.1	13.0	14.8	16.5	13.0	11.6	6.1	5.3	5.0	5.1	5.5	5.1	5.1				
	13.5 m	3.8	5.1	5.6	4.0	6.0	4.2	5.3	5.8	7.0	9.2	12.3	10.3	11.9	12.6	11.7	10.5	10.8	6.2	5.1	4.3	5.1	5.5	5.0	4.6				
	8.0 m	3.6	5.1	5.7	4.0	4.0	4.4	5.2	5.0	6.6	9.1	12.2	10.2	11.2	12.5	11.6	10.3	10.5	6.2	4.5	4.6	5.1	6.0	5.0	4.6				
	4.0 m	3.8	4.8	5.9	4.2	5.0	4.2	4.0	4.3	5.9	8.5	9.5	9.6	9.6	11.0	9.3	9.3	8.5	4.5	3.1	4.0	5.5	5.0	5.5	5.7				
	2.0 m	3.9	4.8	5.7	3.9	4.5	4.2	4.2	3.1	6.2	7.4	8.8	9.0	9.8	10.0	9.3	9.0	7.3	4.5	3.0	3.8	5.0	4.8	5.5	5.7				
	1.0 m	4.9	4.7	5.2	4.5	4.7	4.0	4.3	3.7	5.7	7.7	8.7	8.5	10.0	12.5	10.5	9.5	8.5	5.4	4.0	4.4	4.9	4.7	4.9	5.3				
	0.5 m	4.8	4.4	5.0	4.8	4.5	4.6	4.1	3.7	3.6	6.1	7.2	7.8	7.7	8.5	8.5	8.1	6.4	5.0	3.9	3.5	4.3	4.8	4.8	4.3				

* No monthly summary was computed for the ranges.

Chiva Chiva (Open site)	46.0 m	4.7	3.0	3.5	3.9	4.8	4.5	4.0	5.1	8.8	10.7	11.7	11.7	11.4	12.1	12.8	11.6	8.9	7.7	7.2	6.5	5.3	4.9	4.8	4.6				
	28.5 m	This level was not instrumented for air temperature at this time																											
	26.5 m	5.4	3.7	4.0	4.3	4.5	4.4	4.1	3.9	7.5	9.1	11.9	11.0	10.5	11.9	13.1	10.6	8.6	6.9	5.8	5.3	5.5	5.8	5.4	5.3				
	13.5 m	6.5	4.9	5.1	5.1	4.9	4.8	5.1	5.0	7.9	10.3	12.7	12.7	12.7	12.2	11.8	10.7	9.0	7.8	6.2	4.8	5.2	5.2	5.2	5.6				
	8.0 m	This level was not instrumented for air temperature at this time																											
	4.0 m	6.3	4.9	6.3	6.3	6.3	7.2	5.8	6.3	11.3	12.6	11.7	14.4	12.6	13.9	14.8	12.8	11.7	6.5	4.9	5.4	5.9	6.1	5.9	6.3				
	2.0 m	7.1	5.8	6.3	6.3	6.2	7.2	6.7	8.0	10.6	12.0	12.9	14.6	13.1	13.8	15.1	13.2	9.8	6.0	4.4	4.5	4.9	5.8	5.8	6.2				
	1.0 m	7.0	5.7	5.7	4.5	5.2	7.0	4.8	8.0	14.5	14.5	13.8	16.0	16.0	14.8	16.5	13.1	10.8	6.5	5.0	4.6	5.4	5.8	5.8	6.3				
	0.5 m	5.6	5.0	5.0	5.1	4.7	6.1	4.9	8.9	11.3	15.6	17.5	18.8	18.0	19.9	18.8	14.3	12.4	7.0	3.9	3.7	4.4	5.0	5.3	4.7				

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

NOVEMBER 1966

Exposure		Monthly Means of Relative Humidity by Hour (%)																								Monthly Summary			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No. of obs.	Min.	Mean	Max.
Albrook (Forest site)	46.0 m	92	93	93	93	93	93	91	88	82	79	77	76	78	79	81	83	85	88	90	91	92	92	93	93	695	63	87	96
	28.5 m	This level was not instrumented for relative humidity at this time																											
	26.5 m	94	95	95	95	95	95	93	89	82	78	76	76	78	79	80	83	86	89	92	93	93	94	95	94	719	62	88	98
	13.5 m	96	96	96	96	96	96	96	93	88	83	79	79	80	82	83	85	87	90	92	93	94	95	95	95	718	61	90	99
	8.0 m	This level was not instrumented for relative humidity at this time																											
	4.0 m	97	98	98	98	98	98	97	94	89	85	82	81	83	85	87	89	91	93	96	96	96	97	97	97	718	60	93	100
	2.0 m	97	97	98	98	98	98	97	95	92	87	84	84	85	86	88	90	92	94	96	96	97	97	97	98	718	62	93	100
	1.0 m	97	97	97	97	97	97	97	96	93	90	87	87	87	88	89	91	92	94	95	96	96	96	97	97	718	73	94	100
	0.5 m	97	97	97	97	97	97	96	96	95	94	92	91	91	92	92	94	95	95	96	96	97	97	97	97	720	73	95	100

NOTE: Due to inconsistencies in the behavior of the hygrometers hairs, these data have been adjusted to corrections established by psychrometer measurements.

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Chiva Chiva (Open site)	46.0 m	94	95	95	95	94	94	93	89	83	77	74	75	75	77	78	81	85	89	91	92	93	93	94	94	702	56	87	97
	28.5 m	This level was not instrumented for relative humidity at this time																											
	26.5 m	95	95	96	95	95	95	93	88	81	77	75	75	76	77	78	81	84	89	91	92	93	94	94	95	715	59	88	98
	13.5 m	95	95	96	96	95	95	93	88	81	77	74	75	76	77	78	81	85	89	91	92	93	94	94	95	708	54	88	98
	8.0 m	This level was not instrumented for relative humidity at this time																											
	4.0 m	97	97	97	97	97	96	94	88	81	76	74	73	74	76	76	79	83	88	91	93	93	95	95	96	715	53	88	100
	2.0 m	96	97	97	97	96	96	93	87	81	77	75	74	75	76	77	80	85	89	93	94	94	96	96	96	715	53	88	100
	1.0 m	96	96	96	96	96	96	95	89	80	76	74	75	75	76	79	82	87	91	95	95	95	96	96	96	716	55	89	99
	0.5 m	95	95	96	96	96	96	95	91	84	78	75	75	75	76	79	82	85	90	93	94	94	95	95	95	719	50	89	100

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

NOVEMBER 1966

Exposure		Monthly Ranges of Relative Humidity by Hour (%)																								Monthly Summary*			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	46.0 m	11	8	7	6	8	7	16	15	26	28	33	31	30	31	31	33	24	22	17	19	13	14	13	12				
	28.5 m	This level was not instrumented for relative humidity at this time																											
	26.5 m	11	9	9	7	9	9	9	21	27	27	32	28	31	33	34	32	24	21	17	14	14	15	9	10				
	13.5 m	10	10	10	11	10	9	9	16	25	29	35	34	36	38	32	33	28	23	14	14	15	15	15	11				
	8.0 m	This level was not instrumented for relative humidity at this time																											
	4.0 m	6	6	8	7	9	5	10	17	22	29	32	38	39	40	29	27	24	16	10	11	14	12	12	9				
	2.0 m	6	8	8	7	9	5	9	12	24	24	30	36	38	32	29	27	18	16	9	11	10	12	12	9				
	1.0 m	6	5	6	7	5	5	6	8	17	20	24	26	26	27	23	21	17	14	8	8	9	9	7	5				
	0.5 m	7	8	8	7	7	8	9	12	13	14	20	27	25	22	25	16	13	13	9	10	10	10	8	6				

* *No monthly summary was computed for the ranges.*

Chiva Chiva (Open site)	46.0 m	10	9	8	9	9	10	11	16	27	32	32	39	39	38	38	35	27	26	18	12	14	11	9	9				
	28.5 m	This level was not instrumented for relative humidity at this time																											
	26.5 m	11	11	10	11	10	10	12	17	27	31	31	37	35	36	38	33	29	25	19	13	14	11	9	10				
	13.5 m	11	9	10	12	10	8	12	17	26	33	34	41	41	37	39	32	29	26	18	16	15	11	9	8				
	8.0 m	This level was not instrumented for relative humidity at this time																											
	4.0 m	12	10	12	13	10	12	17	21	29	31	31	43	41	38	45	36	40	24	13	16	16	14	13	13				
	2.0 m	11	8	12	10	10	10	18	25	26	30	32	42	41	38	45	38	34	23	12	13	14	12	10	9				
	1.0 m	8	5	7	9	5	6	14	20	38	33	35	39	41	40	39	36	25	36	9	8	10	8	4	4				
	0.5 m	7	7	8	7	9	9	14	21	30	37	44	47	48	48	43	38	34	22	12	11	14	10	10	9				

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

NOVEMBER 1966

Exposure		Monthly Means[2] of other Elements by Hour																							Monthly Summary			
Site	Code[1]	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No. of obs.	Min.	Mean	Max.
Alnrook (Forest site)	WB (4.0 m)	72.5	72.5	72.4	72.2	72.1	71.9	72.7	74.3	75.2	75.6	75.9	75.9	76.1	75.7	75.6	75.3	74.8	74.0	73.5	73.3	73.1	73.0	72.9	72.7	718	69.2	73.9	79.8
	WB (2.0 m)	72.6	72.5	72.4	72.3	72.1	71.9	72.7	74.4	75.3	75.8	76.1	76.3	76.2	76.0	75.9	75.6	75.0	74.1	73.6	73.3	73.1	73.0	72.9	72.7	718	69.2	74.0	79.8
	WB (0.5 m)	72.9	72.8	72.7	72.5	72.4	72.3	72.6	74.1	75.5	76.3	76.7	76.8	76.8	76.8	76.6	76.2	75.6	74.8	74.1	73.8	73.5	73.4	73.2	73.1	720	69.5	74.4	79.8
	BP	.744	.727	.712	.708	.713	.725	.752	.766	.780	.785	.775	.759	.731	.708	.686	.681	.687	.701	.721	.739	.757	.767	.769	.763	720	.620	.736	.850
	P1	0.42	0.28	0.04	0.09	0.15	0.16	0.08	0.14	0.04	0.15	0.10	0.41	0.09	0.09	0.34	0.08	0.19	0.01	0.00	0.01	0.06	0.01	0.01	0.19	77	0.00	11.52	1.47
	P2	0.52	0.22	0.07	0.08	0.15	0.22	0.06	0.10	0.02	0.32	0.08	0.28	0.08	0.10	0.13	0.11	0.09	0.00	0.00	0.03	0.06	0.00	0.01	0.30	59	0.00	8.29	1.06
	P3	0.56	0.36	0.11	0.08	0.10	0.26	0.12	0.10	0.07	0.25	0.18	0.46	0.10	0.15	0.24	0.14	0.07	0.01	0.00	0.01	0.07	0.00	0.00	0.30	52	0.00	9.51	1.21
	P4	2.08	0.28	0.12	0.09	0.18	0.32	0.14	0.14	0.06	0.27	0.15	0.55	0.18	0.07	0.28	0.16	0.11	0.22	0.00	0.08	0.02	0.00	0.00	0.11	53	0.00	11.76	2.08
Chiva Chiva (Open site)	WB (4.0 m)	72.6	72.5	72.3	72.3	72.3	72.2	73.2	74.5	75.2	75.7	75.6	75.5	75.4	75.6	75.2	75.0	74.5	74.0	73.8	73.5	73.3	73.1	73.0	72.7	715	69.0	73.9	78.7
	WB (2.0 m)	72.3	72.2	72.1	72.0	72.0	71.9	73.0	74.5	75.5	76.0	76.0	75.9	75.7	75.9	75.4	75.2	74.6	74.0	73.8	73.4	73.1	72.9	72.8	72.5	716	68.4	73.9	79.3
	WB (0.5 m)	72.5	72.3	72.1	72.1	71.9	72.0	73.0	74.9	76.2	77.0	77.3	77.3	77.3	77.0	76.4	75.7	75.0	74.2	73.9	73.5	73.2	73.1	73.0	72.7	719	67.8	74.3	81.0
	BP	.825	.804	.790	.782	.788	.799	.823	.840	.856	.861	.855	.833	.811	.785	.765	.758	.762	.775	.794	.813	.832	.842	.846	.839	720	.700	.812	.925
	PS	1.05	0.10	0.06	0.12	0.15	0.07	0.05	0.07	0.09	0.09	0.06	0.12	0.47	0.09	0.12	0.13	0.12	0.10	0.03	0.03	0.09	0.09	0.15	1.50	77	0.00	11.70	2.04

WB - Wet bulb temperature (°F)
BP - Barometric pressure (in. of Hg minus 29.0)

PS - Precipitation at 1.0 m. in open area (in.)
P1 - Precipitation at 46.0 m. above canopy (in.)
P2 - Precipitation under full canopy (in.)

P3 - Precipitation under drip canopy (in.)
P4 - Precipitation under open canopy (in.)

[2] Monthly means of precipitation are computed for precipitation days. Precipitation totals are substituted for the mean in the monthly summary.

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

NOVEMBER 1966

Exposure		Monthly Ranges[2] of other Elements by Hour																							Monthly Summary*			
Site	Code[1]	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	WB (4.0 m)	3.4	4.7	4.8	4.0	4.5	4.0	3.7	3.0	3.9	4.3	4.6	5.5	6.7	6.2	7.8	7.0	6.0	4.0	3.8	3.0	3.3	3.8	4.0	4.3				
	WB (2.0 m)	3.4	4.5	4.8	3.9	4.3	4.0	3.8	2.5	3.4	5.1	4.3	5.5	7.0	6.1	7.8	6.2	5.3	4.2	3.5	3.0	3.8	3.7	4.0	4.4				
	WB (0.5 m)	3.8	4.8	4.8	4.8	4.8	4.3	4.1	3.1	3.1	4.3	4.2	5.1	5.2	5.5	6.8	6.3	4.8	3.7	2.7	2.6	2.9	3.0	3.3	3.7				
	BP	.120	.105	.105	.105	.115	.125	.110	.110	.120	.125	.140	.130	.130	.155	.155	.145	.150	.140	.140	.135	.120	.105	.105	.105				
	P1	1.20	0.69	0.09	0.06	0.21	0.02	0.14	0.17	0.02	0.82	0.33	1.46	0.22	0.45	0.79	0.25	0.69	0.00	0.00	0.00	0.10	0.00	0.00	0.00				
	P2	0.97	0.42	0.00	0.03	0.00	0.14	0.00	0.13	0.00	0.60	0.24	1.05	0.17	0.34	0.44	0.27	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	P3	1.08	0.00	0.00	0.05	0.17	0.14	0.00	0.13	0.08	0.70	0.34	1.20	0.28	0.51	0.65	0.47	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	P4	0.00	0.00	0.00	0.08	0.27	0.19	0.00	0.15	0.05	0.46	0.30	1.51	0.27	0.11	0.99	0.66	0.37	0.24	0.00	0.00	0.00	0.00	0.00	0.12				
Chiva Chiva (Open site)	WB (4.0 m)	4.2	4.2	5.1	4.5	4.5	4.5	3.1	3.1	4.5	4.1	4.4	5.9	3.8	3.6	5.2	3.7	3.7	3.1	2.8	3.0	2.9	3.0	3.0	4.0				
	WB (2.0 m)	5.9	5.1	5.1	5.1	4.6	5.0	3.4	3.3	5.0	4.6	5.9	6.3	4.2	4.2	6.3	3.8	4.1	3.5	2.9	3.4	3.4	3.4	3.4	4.6				
	WB (0.5 m)	4.9	5.1	5.1	5.1	5.2	5.9	5.2	5.0	5.1	6.8	8.3	7.7	6.0	5.6	5.4	4.9	3.9	5.3	3.7	3.1	3.4	4.1	3.9	4.3				
	BP	.095	.110	.105	.110	.115	.115	.110	.105	.125	.120	.135	.120	.135	.145	.145	.140	.140	.140	.130	.120	.120	.110	.100	.095				
	PS	0.00	0.13	0.10	0.06	0.11	0.21	0.09	0.09	0.19	0.23	0.08	0.27	2.03	0.38	0.39	0.34	0.20	0.15	0.00	0.03	0.22	0.12	0.00	0.00				

* No monthly summary was computed for the ranges.

WB - Wet bulb temperature (°F)
BP - Barometric pressure (in. of Hg minus 29.0)

PS - Precipitation at 1.0 m. in open area (in.)
P1 - Precipitation at 46.0 m. above canopy (in.)
P2 - Precipitation under full canopy (in.)

P3 - Precipitation under drip canopy (in.)
P4 - Precipitation under open canopy (in.)

[2] Monthly ranges of precipitation are computed for precipitation days.

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

NOVEMBER 1966

Exposure		Monthly Means of Wind Speed by Hour (miles/hr.)																								Monthly Summary			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No of obs.	Min.	Mean	Max.
Albrook (Forest site)	46.0 m	5	5	5	5	5	5	6	5	6	6	7	7	7	7	6	6	5	5	5	4	4	5	5	5	624	0	5	18
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	1	1	1	1	1	1	1	1	2	2	3	3	3	3	2	2	1	1	1	1	1	1	1	1	505	0	1	12
	13.5 m	This level was not instrumented for wind speed at this time																											
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	560	0	0	7
	2.0 m	This level was not instrumented for wind speed at this time																											
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

Chiva Chiva (Open site)	46.0 m	6	6	6	6	5	6	7	7	8	8	10	11	12	10	11	10	9	8	8	7	7	7	7	6	712	0	8	24
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	2	2	2	2	2	2	3	3	4	6	8	8	8	8	8	7	7	6	3	3	4	4	3	2	451	0	4	18
	13.5 m	2	2	1	1	1	1	2	3	4	5	7	7	7	7	6	5	4	3	2	2	1	1	1	1	720	0	3	19
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	3	3	3	3	3	3	4	4	6	6	7	8	8	7	8	7	6	5	4	4	3	3	3	3	712	0	5	16
	2.0 m	2	1	1	1	1	1	1	2	3	5	6	6	6	6	6	5	3	2	2	1	1	1	1	1	720	0	3	18
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

NOVEMBER 1966

Exposure		Monthly Ranges of Wind Speed by Hour (miles/hr.)																								Monthly Summary*			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	46.0 m	15	12	10	9	10	12	15	11	13	16	16	15	15	16	18	16	16	12	17	12	13	13	10	14				
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	10	7	7	5	4	6	10	11	8	6	7	9	12	11	12	10	9	8	10	8	3	7	5	4				
	13.5 m	This level was not instrumented for wind speed at this time																											
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	2	1	3	0	2	0	0	5	5	4	2	7	5	5	3	2	2	2	0	2	2	1	1	3				
	2.0 m	This level was not instrumented for wind speed at this time																											
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

* No monthly summary was computed for the ranges.

Chiva Chiva (Open site)	46.0 m	14	16	24	16	10	13	16	14	14	16	14	13	20	16	19	19	21	13	17	14	17	13	12	18				
	28.5m	This level was not instrumented for wind speed at this time																											
	26.5 m	9	6	7	9	6	10	9	10	11	10	18	12	15	16	13	15	17	12	13	8	9	9	10	15				
	13.5 m	12	10	15	8	5	4	9	8	8	12	17	11	18	18	14	13	13	10	13	10	4	5	7	13				
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	8	10	13	9	7	8	10	8	10	11	13	12	13	11	13	13	12	8	12	11	8	8	7	8				
	2.0 m	8	8	15	9	4	18	7	6	7	12	14	11	12	15	12	10	9	7	7	10	4	5	7	12				
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

ALBROOK (Forest site) NOVEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 46.0 m.
(%)

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	3.5	7.2		3.5	7.2	7.2	3.5	3.6	3.6	7.2	14.2	7.4	7.4	7.4	14.2	7.2	10.7	3.5	3.5	3.6				3.5
NNE				7.2	3.5	3.5	3.5		7.4		7.2	3.6	3.6	3.6	7.2	7.2		3.5						
NE	3.5	3.5		3.5	3.5		3.5		3.6	10.1	3.5	3.6	7.4	7.4	3.5	6.7			7.2		3.5		3.5	3.5
ENE				3.5				3.6	3.6				14.7		6.7									
E					3.5									3.6		3.5	3.5							
ESE									3.6						3.5			3.5						
SE												3.6	3.6	7.4	3.5									
SSE			3.5				3.5					3.6												
S								3.6	3.6	3.5	7.2	3.6	7.4	3.6	3.5	10.7								
SSW											3.5						3.5							
SW							3.5	3.6	3.6			3.6	11.1	11.1	10.7			3.5				3.5		
WSW	3.5	3.5			3.5			3.6	3.6	10.7	7.2	3.6	7.4	7.4	7.2					3.6				
W	17.8	10.7	21.4	10.7	10.7	24.9	7.2	14.7	7.4	7.2	10.7	7.4	7.4	3.6	3.5	7.2	7.2	10.7	10.7		14.2	24.9	21.4	17.8
WNW	10.7	21.4	32.1	39.3	21.4	17.8	21.4	29.6	14.7	17.8	7.2	14.7	11.1	25.8		17.8	14.2	24.9	46.3	22.2	28.5	24.9	24.9	17.8
NW	35.6	21.4	21.4	21.4	28.5	21.4	28.5	25.8	25.8	14.2	28.5	22.2	14.7	7.4	28.5	28.5	28.5	17.8	10.7	40.7	35.6	21.4	28.5	35.6
NNW	10.7	14.2	7.2	3.5	7.2	7.2	14.2		18.5	14.2	7.2	7.4	3.6	3.6			10.7	14.7	10.7	18.5	7.2	14.2	10.7	7.2
CALM	14.2	17.8	14.2	7.2	10.7	17.8	10.7	11.1		14.2	3.5	14.7		7.4	7.2	10.7	21.4	17.8	10.7	11.1	10.7	10.7	10.7	14.2

* Note: Due to rounding, percentage totals do not equal 100%.

ALBROOK (Forest site) NOVEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 26.5 m.
(%)

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N		4.9	4.9		10.0	4.9	4.9	5.2	9.5		4.7	14.9	4.9	4.9	10.0	10.0	10.0			9.5	4.7		4.7	4.7
NNE					4.9				5.2			4.9	4.9	4.9		10.0	4.9					4.7		
NE													4.9	4.9	4.9									
ENE											4.7		4.9											
E														4.9					4.9					
ESE									5.2	4.7														
SE													4.9	4.9			4.9							
SSE																								
S									5.2	4.7	4.7	4.9	4.9	4.9	4.9									
SSW											4.7													
SW					4.9			10.5					4.9	4.9										
WSW											4.7			4.9										
W			4.9	4.9		14.9				4.7		4.9	10.0		4.9				4.9			4.7	9.5	4.7
NW		4.9	4.9		10.0			5.2	5.2	14.2	9.5				4.9		4.9	4.9						
NW	10.0	4.9	24.8	14.9		4.9	19.8	10.5	19.8	4.7	14.2	29.8	4.9	24.8	4.9	10.0		24.8	4.9	4.7	14.2	4.7	4.7	18.9
NNW	10.0	14.9	4.9	4.9	4.9	4.9		5.2	9.5	4.7	18.9	4.9	10.0		14.9	10.0	14.9	4.9	4.9	9.5	18.9	9.5	9.5	
CALM	79.4	69.5	54.7	74.5	64.5	69.5	74.5	62.8	40.9	61.4	33.0	34.7	39.8	34.7	49.6	60.0	59.6	64.5	79.4	75.7	61.4	75.7	71.0	71.0

* Note: Due to rounding, percentage totals do not equal 100%.

ALBROOK (Forest site) NOVEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 4.0 m.
(%)

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N								4.1				4.1			4.0	4.0	4.0	4.0						
NNE			4.0									4.1												
NE									4.1		4.0				8.0								4.0	
ENE												4.1	4.1		8.0									
E													4.1									4.0		
ESE											4.0			4.0										
SE																								
SSE			4.0							4.0			4.1											
S										4.0				12.0		4.0								
SSW														8.0	8.0									
SW									12.5	4.0	4.0		8.0					4.0			4.0		4.0	
WSW	4.0							4.1							8.0	4.0	4.0			4.0				4.0
W													4.1	4.0										
WNW	4.0								4.1		4.0	4.1		4.0			4.0							
NW		4.0			4.0						4.0	8.0				8.0								
NNW			4.0									4.1	4.1	8.0	8.0			4.0						
CALM	92.0	96.0	88.0	100.0	96.0	100.0	100.0	92.8	79.3	88.0	80.0	70.9	70.9	60.0	56.0	80.0	88.0	88.0	100.0	96.0	96.0	96.0	92.0	96.0

* Note: Due to rounding, percentage totals do not equal 100%.

CHIVA CHIVA (Open site) NOVEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 46.0 m.
(%)

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	23.3	6.7	6.7	6.7	10.0	10.0	3.3	6.7	13.3	23.3	10.0	13.3	6.7	13.3	23.3	3.3		10.0	13.3	3.3		3.3	6.7	6.7
NNE		6.7		3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	6.7	10.0	3.3		10.0		3.3	3.3	3.3				
NE			3.3								3.3		3.3					3.3						
ENE		3.3			3.3					3.3	3.3													3.3
E		3.3					3.3		3.3				3.3											
ESE									3.3	3.3	3.3	3.3	3.3		6.7		3.3							
SE	3.3											6.7	3.3	3.3	3.3	3.3		3.3			3.3			
SSE						3.3					3.3					3.3								
S						3.3	6.7		3.3	6.7		6.7	3.3	3.3	3.3	6.7								
SSW														3.3		3.3								3.3
SW	6.7											3.3				3.3						3.3		
WSW	6.7	3.3					3.3	3.3			3.3			3.3	10.0		3.3	6.7	3.3				3.3	
W	3.3	3.3	20.0	6.7	13.3	6.7	6.7	3.3	3.3	6.7	3.3	3.3	3.3	3.3	13.3	3.3	6.7	6.7	10.0	3.3	6.7	10.0	3.3	10.0
WNW	20.0	10.0	10.0	10.0	16.7	10.0	13.3	10.0	16.7	26.7	6.7	10.0	10.0	13.3	6.7	20.0	16.7	10.0	10.0	13.3	13.3	16.7	23.3	20.0
NW	23.3	50.0	33.3	46.7	26.7	30.0	23.3	46.7	26.7	6.7	30.0	23.3	23.3	26.7	20.0	26.7	33.3	53.3	43.3	40.0	46.7	40.0	46.7	40.0
NNW	13.3	13.3	20.0	23.3	23.3	23.3	33.3	20.0	26.7	20.0	26.7	20.0	30.0	16.7	16.7	16.7	30.0	3.3	16.7	33.3	30.0	26.7	16.7	16.7
CALM			6.7	3.3	3.3	6.7		3.3					3.3				3.3			3.3				

* Note: Due to rounding, percentage totals do not equal 100%.

CHIVA CHIVA (Open site) NOVEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 26.5 m.

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	9.5	9.5		9.5	10.0	10.0	4.9	9.5	9.5	18.9	9.5	9.5	14.2	10.0	14.2		18.1	4.7	4.5	13.6	4.5		4.7	14.2
NNE	4.7	4.7				4.9	4.9		4.7			14.2	9.5	4.9	4.7	9.1								4.7
NE		4.7								9.5	4.7		4.7					9.5						
ENE	4.7	4.7						4.7			9.5													
E			4.7									4.7												4.7
ESE					4.9						4.7		4.7	4.9		4.5	4.5	4.7						
SE	4.7								4.7		4.7	4.7		4.9										
SSE									4.7			9.5			4.7	4.5								
S						10.0	4.9		4.7	9.5		4.7	4.7			9.1								
SSW														10.0										
SW	4.7		4.7		4.9										9.5	4.5						4.5		
WSW					10.0		4.9	4.7		4.7			4.7	4.9	4.7								4.7	4.7
W	4.7	4.7	4.7	4.7	4.9	10.0	4.9			4.7	9.5		4.7	4.9	14.2		4.5	14.2				18.1	9.5	
WNW		4.7	14.2	4.7	4.9	4.9		9.5		9.5		9.5				9.1			9.1	9.1	4.5	9.1	18.9	
NW	23.7	23.7	28.4	18.9	10.0	14.9	10.0	28.4	23.7	9.5	23.7	23.7	16.9	24.8	33.0	36.3	27.2	33.0	31.6	36.3	40.8	27.2	18.9	23.7
NNW	4.7	9.5		4.7	4.9	4.9	24.8	18.9	23.7	23.7	23.7	9.5	18.9	19.8	9.5	9.1	27.2	18.9	27.2	27.2	31.6	22.7	18.9	9.5
CALM	37.9	33.0	42.6	56.8	44.7	39.7	39.7	23.7	23.7	14.2	9.5	9.5	14.2	10.0	4.7	13.6	18.1	14.2	27.2	13.6	18.1	18.1	23.7	37.9

* Note: Due to rounding, percentage totals do not equal 100%.

CHIVA CHIVA (Open site) NOVEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 4.0 m.
(%)

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	6.7	23.3	3.3	3.3	20.0	20.0	10.0	10.0	6.7	26.7	16.7	10.0	20.0	16.7	26.7		13.3	16.7	10.0	20.0	6.7	3.3	10.0	6.7
NNE	3.3					6.7	3.3		3.3	3.3	6.7	10.0	13.3	3.3	3.3	10.0	3.3	10.0	3.3			3.3	6.7	
NE	10.0	6.7	6.7	10.0	6.7	6.7			3.3			3.3	3.3	3.3					6.7					6.7
ENE	6.7	3.3	3.3	3.3	3.3	3.3	6.7														3.3			3.3
E		3.3					3.3	3.3	3.3		3.3													3.3
ESE	3.3		3.3			3.3				3.3	3.3	3.3	3.3	6.7		3.3	3.3						3.3	3.3
SE			3.3		3.3	3.3	3.3		3.3		3.3		3.3					3.3			3.3			3.3
SSE	3.3	3.3														6.7								
S				3.3			3.3		3.3	6.7		10.0	3.3	6.7	3.3	3.3								
SSW				3.3										6.7	3.3									6.7
SW			3.3				3.3	6.7		3.3		3.3	3.3	3.3		3.3	3.3							
WSW															3.3	3.3	3.3	3.3	3.3	3.3		3.3		3.3
W	10.0	3.3	6.7	3.3	20.0	3.3	13.3	3.3	6.7		3.3	13.3			16.7	6.7	10.0	10.0	3.3	10.0	10.0	10.0	10.0	10.0
WNW	10.0	6.7	3.3	13.3	3.3	3.3	13.3	10.0	6.7	10.0	6.7	3.3	3.3	13.3	6.7	6.7	6.7	13.3	3.3	13.3	10.0	13.3	3.3	
NW	13.3	20.0	26.7	10.0	16.7	23.3	6.7	36.7	43.3	23.3	36.7	20.0	26.7	23.3	20.0	33.3	16.7	16.7	33.3	23.3	33.3	30.0	40.0	20.0
NNW	23.3	16.7	23.3	26.7	10.0	13.3	30.0	23.3	16.7	23.3	20.0	20.0	20.0	13.3	13.3	23.3	36.7	23.3	20.0	26.7	13.3	16.7	10.0	20.0
CALM	10.0	13.3	16.7	23.3	16.7	10.0		3.3	3.3								3.3		16.7	3.3	20.0	20.0	16.7	13.3

* Note: Due to rounding, percentage totals do not equal 100%.

SUMMARY OF NON HOURLY DATA

NOVEMBER 1966

Summary of Elements with Non-hourly Frequencies of Observation

Site	Element, Units and Exposure	Description	Number of Obs.	Minimum Value	Mean or Total Value	Maximum Value
Albrook (Forest site)	WBGT Index[1] (at 1.0 meters)	Index value	420	69.7	76.0	82.4
		Dry bulb temp.	420	70.0	77.0	87.6
		Wet bulb temp.	420	69.5	75.4	87.6
		Black bulb temp.	420	70.2	77.6	91.8
	Evaporation[3] (in. at 3 levels)	Piche (46.0 m)	29	0.049	5.688*	0.457
		Piche (26.5 m)	29	0.018	4.253*	0.354
		Piche (0.5 m)	22	0.006	0.745*	0.073
	Precipitation from Raingauge Network[2] (in. at 1.0 meters)	Gauge # 1	60	0.01	11.82*	2.91
		Gauge # 2	62	0.01	13.24*	3.20
		Gauge # 3	60	0.01	10.62*	2.39
		Gauge # 4	59	0.01	9.94*	2.51
		Gauge # 5	58	0.01	10.70*	2.69
		Gauge # 6	62	0.01	10.99*	2.93
		Gauge # 7	62	0.01	12.37*	3.19
		Gauge # 8	60	0.01	10.91*	2.88
	Stem Flow[2] (in. at 2.0 meters)	Small tree	14	0.01	12.94*	2.87
		Medium tree	15	0.01	19.29*	8.75
		Large tree	18	0.01	612.58*	184.27
Chiva Chiva (Open site)	WBGT Index[1] (at 1.0 meters)	Index value	419	67.8	78.6	91.0
		Dry bulb temp.	420	68.0	79.5	91.0
		Wet bulb temp.	420	68.0	75.7	91.0
		Black bulb temp.	415	67.0	88.0	123.0
	Evaporation[3] (in. at 0.5 meters)	Piche	28	0.006	4.556*	0.335
		Pan	28	0.004	3.621*	0.280
	Minimum Grass temp[3] (^{o}F at grass tips)	None	29	66.8	70.2	81.3

1 - Hourly observations between 0600 and 1900 hours inclusive

2 - Six hourly observations

3 - Daily observations

* Total Values

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13. ABSTRACT

This report contains detailed microclimatic data for Nov 1966 from specific sites in the Panama Canal Zone and vicinity. The data are presented in tabular form, summarized for hourly and/or daily observations from surface to 46-meter levels. Elements listed are: temperature, pressure, precipitation, wind speed and direction, relative humidity, and evaporation.

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Panama Canal Zone Microclimatology						
Data Base						

ENVIRONMENTAL DATA BASE FOR REGIONAL STUDIES IN THE HUMID TROPICS

MONTHLY MICROCLIMATIC SUMMARY

December 1966

Prepared by

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and
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MONTHLY MICROCLIMATIC SUMMARY

Introduction

Monthly microclimatic data summarized in this series of reports were collected by the US Army Tropic Test Center and the Weather Engineers of Panama Corporation under the project, Environmental Data Base for Regional Studies in the Humid Tropics. The project is sponsored by the Advanced Research Projects Agency of the Department of Defense and by the Army Research Office, Office of the Chief of Research and Development. It is an investigation of microclimatic, air chemistry, vegetation, soils, microbiological, and macrofaunal conditions at selected sites in the principal tropical environments of the Panama Canal Zone and the Rio Hato Military Reservation. The objective of the project is to assemble quantitative environmental data for RDT&E purposes.

Sites. Data summarized in this report were collected at the Albrook Forest and Chiva Chiva sites. Figure 1 shows the site locations within the Isthmus of Panama. Geographic coordinates are shown below:

Albrook Forest	09° 01'N, 79° 33'W
Chiva Chiva	09° 01'N, 79° 35'W

The Chiva Chiva open site and the Albrook Forest site are paired for comparative study of environmental conditions in a tropical semideciduous forest and in a large clearing. Both are located in a region where the annual precipitation is approximately 80 inches and there is a pronounced dry season.

The Albrook and Chiva Chiva main sites are approximately four kilometers apart. Each has a 46-meter walk-up tower and an air-conditioned building to house the recording equipment and observers. Both sites are approximately 30 meters above sea level. The top of the forest canopy at the Albrook site is about 26.5 meters above the ground.

Instrumentation. A wide range of climatic elements are measured at the Albrook and Chiva Chiva sites. Types of observations and frequencies are shown on Figure 2. The towers at the Albrook and Chiva Chiva sites are similarly oriented. Sensing equipment is mounted at several levels on the towers to provide measurements through the vertical profile. Additional instruments are emplaced in the immediate vicinity on or near the ground. All instrument exposures are duplicated at each site. Figures 3, 4, and 5 show the instrument array at these sites.

Data Reduction and Storage. All data, as applicable, are recorded at or reduced to each full hour and transposed to punch cards. These punch cards, together with all raw data, are stored in the Tropic Test Center Technical Library Annex.

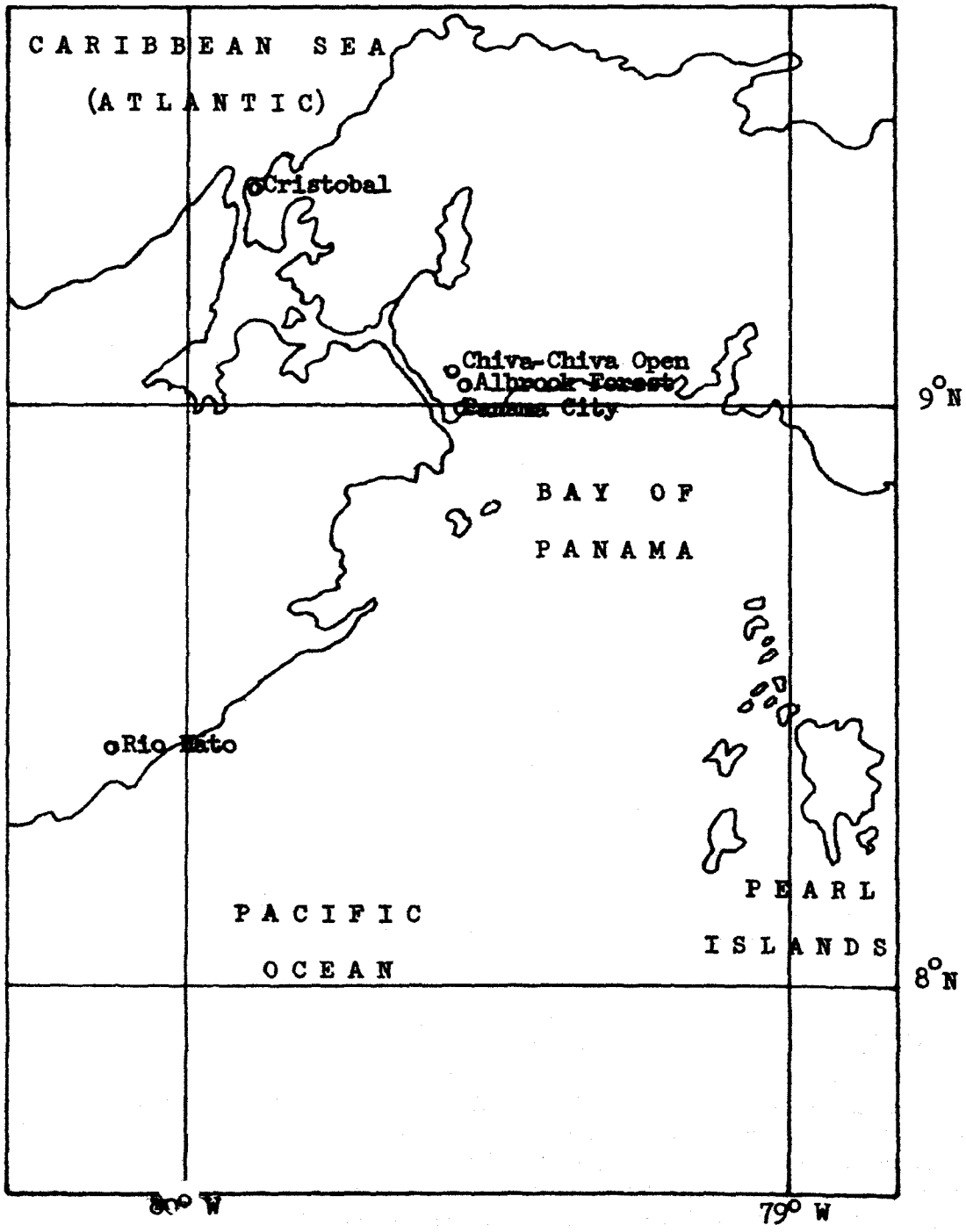

FIGURE 1. LOCATION MAP, ISTHMUS OF PANAMA

FIGURE 2. FREQUENCY OF OBSERVATIONS

# Element	Height (meters) Sfc	0.5	1.0	2.0	4.0	8.0	13.5	26.5	28.5	46.0	Frequency
Temperature:											
Dry Bulb	-	1	1	1	1	2	1	1	2	1	Hourly*/Continuously
Wet Bulb	-	1	-	1	1	-	-	-	-	-	Hourly*/Continuously
Grass Minimum	3	-	-	-	-	-	-	-	-	-	Once Daily
WBGT Index	-	-	1	-	-	-	-	-	-	-	Hourly (0600-1900 EST)
Relative Humidity	-	1	1	1	1	-	1	1	-	1	Hourly*/Continuously
Barometric Pressure	-	-	1	-	-	-	-	-	-	-	Continuously
Evaporation	-	1	-	-	-	-	2	2	-	2	Once Daily
Precipitation:											
Recording Gage	-	-	1	-	-	-	-	-	-	2	Continuously
Manual Gage	-	-	2	-	-	-	-	-	-	-	4 Times Daily
Stem Flow	-	-	2	-	-	-	-	-	-	-	4 Times Daily
Wind:											
Direction	-	-	-	-	1	-	-	1	-	1	Continuously
Speed	-	-	-	3**	1	-	3**	1**	-	1	Hourly**/Continuously

1. Albrook and Chiva Chiva
2. Albrook only
3. Chiva Chiva only

* Observations made with sling psychrometer when recorders are inoperative.

** Hourly

Instrument descriptions are contained in the Environmental Data Base semiannual reports.

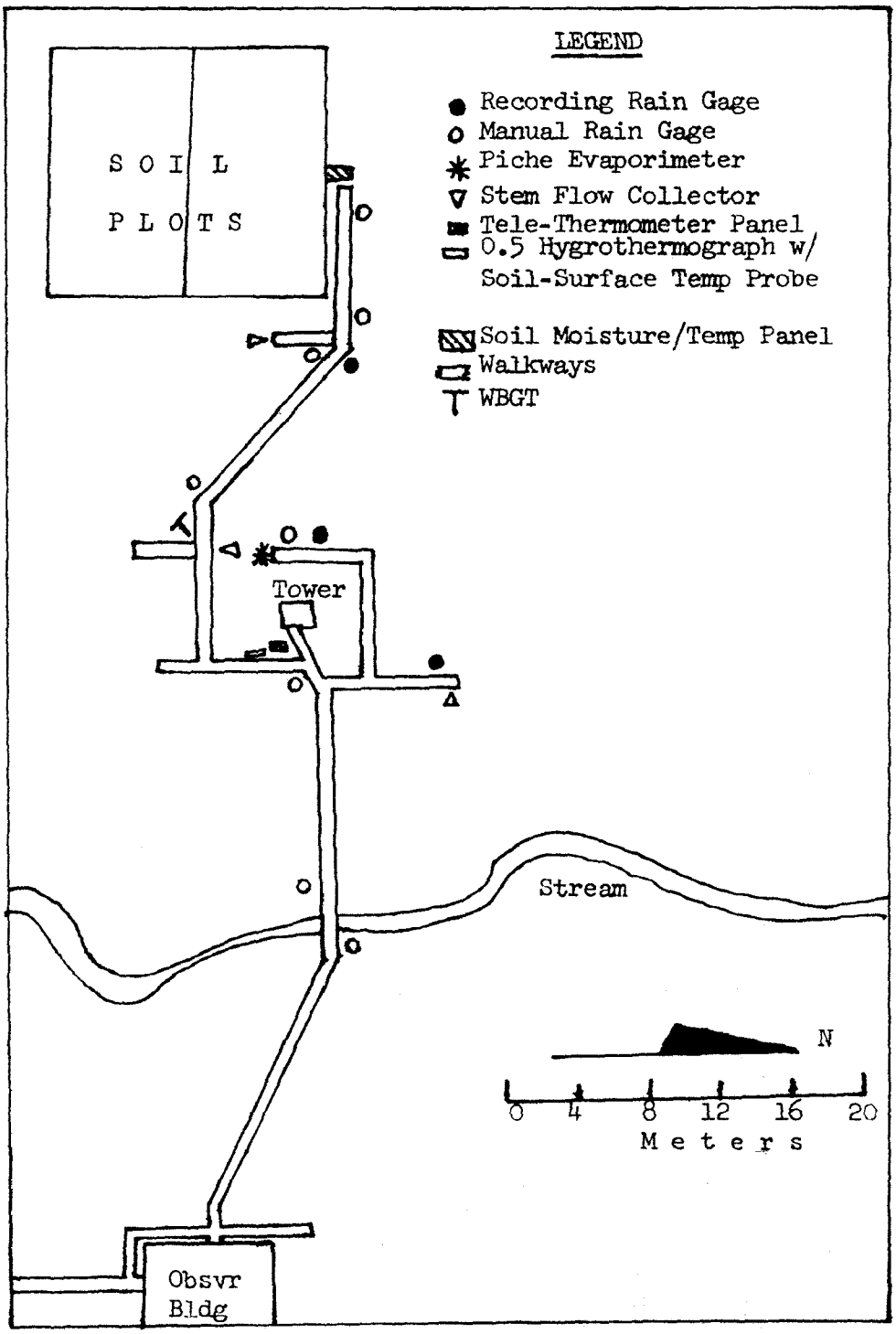

FIGURE 3. ALBROOK FOREST SITE, GENERALIZED PLOT

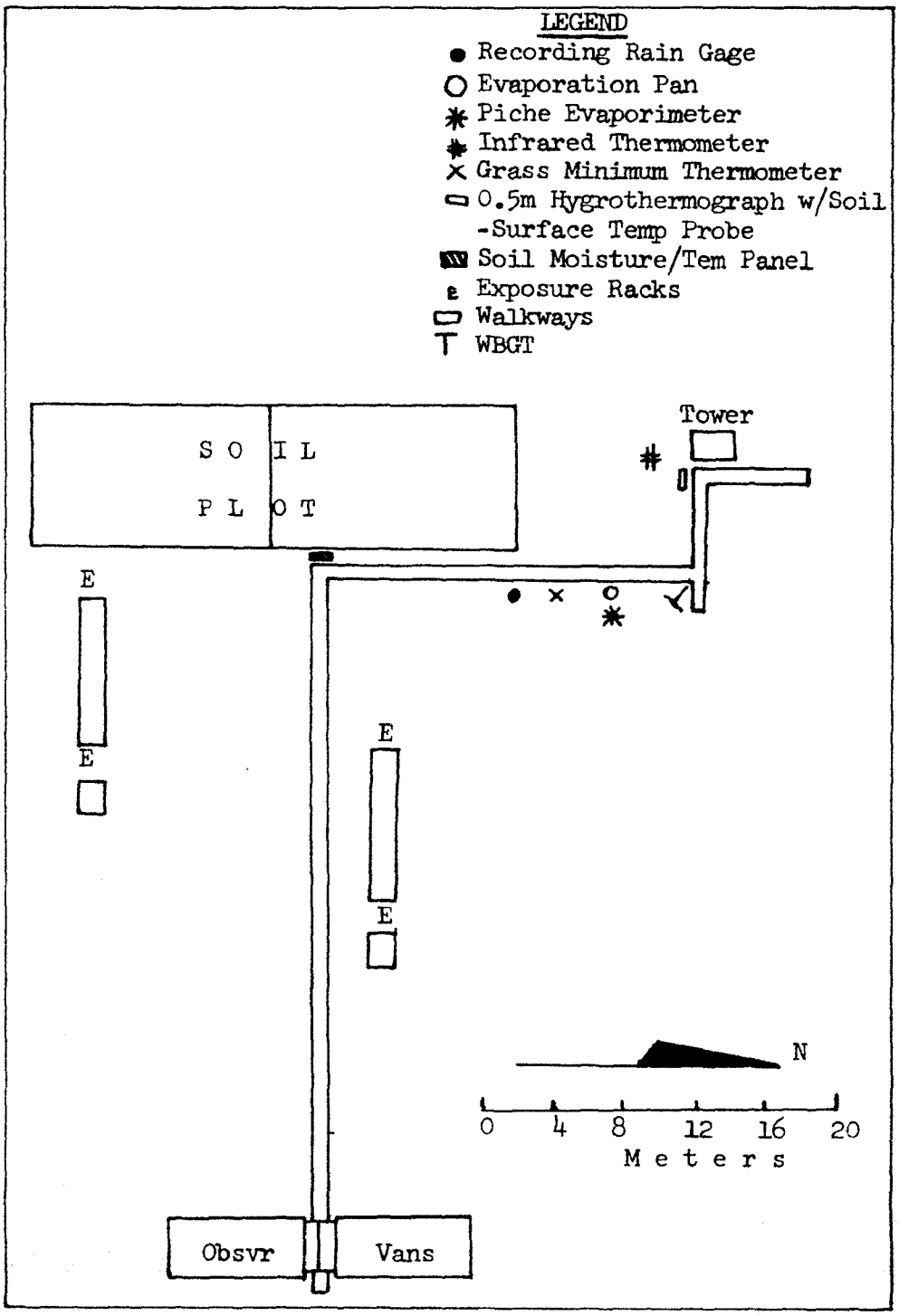

FIGURE 4. CHIVA CHIVA OPEN, GENERALIZED PLOT

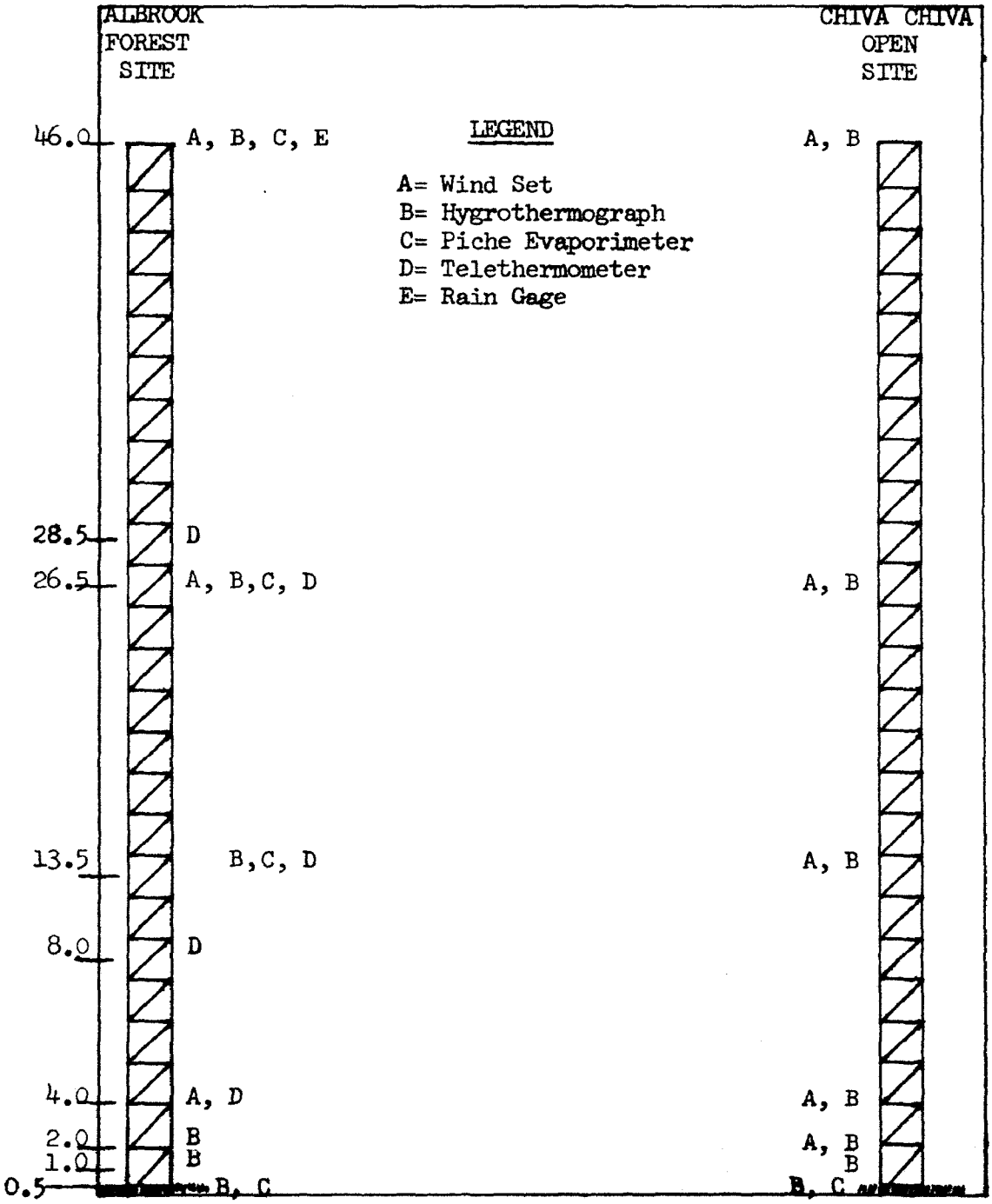

FIGURE 5. INSTRUMENT LOCATION ON TOWERS

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

DECEMBER 1966

Exposure		Monthly Means of Air Temperature by Hour (°F)																								Monthly Summary			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No of obs.	Min.	Mean	Max.
Albrook (Forest site)	46.0 m	73.8	73.7	73.5	73.2	73.2	73.1	73.4	75.3	78.5	80.4	82.1	82.1	81.5	81.0	80.3	79.0	77.9	76.5	75.4	74.9	74.5	74.3	74.1	74.1	718	70.2	76.5	87.6
	28.5 m	This level was not instrumented for air temperature at this time																											
	26.5 m	73.2	73.2	73.0	72.9	72.8	72.6	73.0	75.2	78.6	80.5	82.2	82.3	82.2	81.4	80.9	79.4	78.1	76.3	75.1	74.6	73.9	73.8	73.6	73.5	737	70.3	76.3	88.5
	13.5 m	73.2	73.2	73.1	73.0	72.7	72.6	72.6	74.6	77.0	79.1	80.6	80.9	81.0	80.2	80.1	79.0	77.9	76.1	75.1	74.7	74.3	73.9	73.7	73.5	719	69.6	75.9	88.1
	8.0 m	73.1	73.0	72.9	72.8	72.5	72.5	72.4	74.3	76.7	78.8	80.3	80.4	80.6	80.0	79.9	78.8	77.7	75.9	75.0	74.5	74.0	73.8	73.6	73.4	719	69.7	75.7	88.2
	4.0 m	72.8	72.6	72.4	72.3	72.1	72.0	72.2	74.6	76.9	79.0	80.4	80.6	80.9	79.8	79.5	78.3	77.1	75.6	74.6	74.2	73.7	73.4	73.2	73.0	742	69.0	75.5	86.0
	2.0 m	72.9	72.6	72.5	72.3	72.1	72.0	72.1	74.4	76.6	78.5	79.9	80.3	80.5	79.5	79.3	78.3	77.1	75.6	74.6	74.2	73.7	73.4	73.3	73.0	743	69.0	75.3	86.0
	1.0 m	72.8	72.7	72.6	72.4	72.2	72.2	72.3	74.2	76.5	78.2	79.8	80.0	80.1	79.8	79.4	78.4	77.3	75.8	74.8	74.2	73.8	73.5	73.3	73.1	744	69.4	75.4	86.3
	0.5 m	73.3	73.1	73.0	72.8	72.7	72.5	72.5	73.7	75.7	77.4	78.9	79.4	79.6	79.3	79.5	78.5	77.5	76.3	75.2	74.7	74.2	73.9	73.7	73.5	732	70.0	75.4	85.8
Chiva Chiva (Open site)	46.0 m	74.3	74.2	73.9	73.7	73.5	73.3	73.6	75.3	78.0	80.1	81.8	81.7	82.0	80.6	80.4	79.6	78.3	76.9	75.9	75.3	75.0	74.7	74.6	74.4	725	71.0	76.7	86.6
	28.5 m	This level was not instrumented for air temperature at this time																											
	26.5 m	74.0	73.9	73.6	73.3	73.2	73.0	73.3	75.4	78.3	80.3	81.9	81.9	81.8	80.7	80.4	79.8	78.4	77.1	75.9	75.3	74.8	74.5	74.4	74.2	744	70.2	76.6	86.7
	13.5 m	73.8	73.7	73.4	73.2	73.0	72.9	73.2	75.6	78.8	80.9	82.5	82.5	82.4	81.1	81.0	80.2	78.6	77.2	75.9	75.3	74.7	74.4	74.2	74.0	744	69.9	76.8	87.6
	8.0 m	This level was not instrumented for air temperature at this time																											
	4.0 m	73.6	73.2	72.9	72.9	72.5	72.4	73.4	76.8	79.4	81.5	82.9	82.7	82.8	81.3	81.2	80.2	78.5	76.8	75.6	75.1	74.6	74.4	73.9	73.9	720	68.8	76.8	89.7
	2.0 m	73.4	73.3	72.9	72.8	72.5	72.4	73.4	77.0	79.9	81.8	83.4	83.1	83.2	81.7	81.5	80.5	78.7	76.8	75.7	75.0	74.5	74.4	73.9	73.8	719	69.2	76.9	89.9
	1.0 m	73.3	73.2	72.7	72.7	72.3	72.0	73.5	78.0	80.8	82.8	84.4	84.2	84.4	82.7	81.6	80.8	78.7	76.6	75.3	74.8	74.2	73.8	73.5	73.3	744	66.2	77.1	92.6
	0.5 m	73.5	73.3	72.9	72.8	72.6	72.4	73.1	76.8	80.6	83.3	84.9	84.6	84.8	83.3	82.6	81.5	79.3	76.8	75.4	74.7	74.1	73.8	73.7	73.6	744	68.5	77.3	92.5

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

DECEMBER 1966

Exposure		Monthly Ranges of Air Temperature by Hour (°F)																							Monthly Summary*			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	46.0 m	4.5	5.6	5.2	5.4	5.0	5.4	5.4	7.2	10.8	11.3	12.8	10.8	12.4	12.6	13.0	13.8	11.5	9.8	8.3	7.6	7.4	6.2	5.5	4.1				
	28.5 m	This level was not instrumented for air temperature at this time																											
	26.5 m	4.8	5.1	5.5	5.2	4.8	4.7	4.8	8.2	11.8	11.9	13.2	11.4	13.3	14.5	14.5	14.8	12.7	9.9	8.1	6.6	6.5	6.1	5.2	5.0				
	13.5 m	5.1	4.5	5.1	5.3	5.1	4.5	5.0	6.1	8.9	10.7	12.4	12.1	11.1	13.7	13.7	12.4	9.9	6.9	6.0	6.7	6.0	5.2	5.3	4.8				
	8.0 m	4.7	4.6	5.1	5.0	4.8	4.6	5.0	5.3	8.7	11.2	12.6	13.6	11.5	13.9	13.5	12.0	9.4	7.2	6.0	6.9	6.2	5.2	5.1	4.7				
	4.0 m	5.1	5.1	4.9	5.2	4.9	5.8	6.1	5.6	7.8	9.5	10.6	11.3	9.7	12.0	12.5	12.0	8.5	6.7	6.5	5.3	6.5	6.1	5.5	5.2				
	2.0 m	5.0	5.4	4.8	5.2	4.8	5.6	6.0	4.9	7.4	9.4	9.8	10.2	9.0	11.8	12.7	11.3	8.8	7.2	6.0	5.5	6.5	6.0	6.8	4.9				
	1.0 m	4.2	4.2	4.0	4.8	4.8	5.3	5.6	4.5	7.3	9.2	10.1	9.9	10.3	11.9	13.0	11.0	8.8	6.3	5.8	5.7	6.1	5.9	5.7	5.0				
	0.5 m	4.7	4.3	4.0	4.2	4.4	4.3	4.8	4.4	6.6	8.1	8.5	8.6	8.8	9.6	12.2	10.9	9.1	6.8	6.3	6.0	5.6	5.9	5.3	4.7				

* No monthly summary was computed for the ranges.

Chiva Chiva (Open site)	46.0 m	4.8	4.8	4.4	4.3	4.3	4.5	4.4	7.0	10.0	10.7	12.7	8.8	12.4	12.3	11.6	11.8	11.1	9.9	8.6	6.3	6.1	5.6	5.1	5.0				
	28.5 m	This level was not instrumented for air temperature at this time																											
	26.5 m	4.6	5.5	4.6	5.1	5.3	6.1	5.6	7.2	10.8	11.5	13.0	9.7	12.2	12.7	12.1	12.2	11.5	8.8	7.8	6.9	6.9	5.6	5.4	4.9				
	13.5 m	4.9	5.2	4.9	5.0	5.4	6.0	5.1	8.2	10.9	11.8	13.2	9.5	12.3	12.7	12.0	11.6	11.6	8.5	7.2	5.8	6.1	5.0	4.7	4.6				
	8.0 m	This level was not instrumented for air temperature at this time																											
	4.0 m	5.9	6.3	5.4	5.8	6.0	8.1	6.3	9.6	11.2	15.2	15.7	11.8	13.8	15.1	13.5	12.6	10.4	8.1	7.2	6.3	5.8	4.5	5.2	5.9				
	2.0 m	6.3	6.4	5.8	5.9	5.8	7.3	5.8	8.9	11.1	14.5	16.0	11.4	14.6	15.1	13.6	12.0	10.9	8.0	7.6	6.7	6.0	4.4	5.3	5.3				
	1.0 m	5.0	5.4	6.7	6.8	7.0	8.0	7.7	14.1	15.0	16.9	18.6	15.5	14.8	16.7	15.7	15.5	12.2	9.1	8.0	7.4	6.3	5.4	4.8	5.7				
	0.5 m	5.1	5.5	5.5	5.7	6.9	7.4	6.8	10.6	14.5	14.6	17.2	15.9	15.8	17.5	17.5	15.4	12.8	7.7	6.4	5.6	4.9	4.0	5.0	5.0				

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

DECEMBER 1966

Exposure		Monthly Means of Relative Humidity by Hour (%)																							Monthly Summary			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No. of Obs	Min.	Mean	Max.
Albrook (Forest site)	46.0 m	93	93	93	94	93	93	92	89	79	74	70	70	72	74	76	79	83	86	89	91	92	93	93	93	705	51	86	99
	28.5 m	This level was not instrumented for relative humidity at this time																											
	26.5 m	94	94	94	95	94	94	93	89	81	74	71	72	73	76	77	81	84	88	91	92	93	94	94	94	737	52	87	100
	13.5 m	96	96	95	96	96	96	96	93	87	81	77	77	77	79	80	83	86	90	92	93	93	94	94	95	744	53	89	100
	8.0 m	This level was not instrumented for relative humidity at this time																											
	4.0 m	97	98	98	97	98	98	98	95	90	84	80	80	79	83	84	87	90	93	94	95	96	96	97	97	743	58	92	100
	2.0 m	97	98	98	97	98	98	98	96	92	87	83	83	82	85	86	88	91	93	95	95	96	96	97	98	743	62	93	100
	1.0 m	97	97	97	97	97	97	98	97	94	90	86	86	85	87	87	90	92	93	95	95	96	96	97	97	739	68	94	100
	0.5 m	96	97	97	97	97	97	97	96	93	91	88	87	87	86	87	89	91	92	94	94	95	95	96	96	732	70	93	100
Chiva Chiva (Open site)	46.0 m	90	91	91	91	92	91	91	87	81	76	72	72	72	76	76	79	82	85	88	89	89	90	90	90	744	52	85	98
	28.5 m	This level was not instrumented for relative humidity at this time																											
	26.5 m	91	91	92	92	92	92	91	88	82	76	72	72	73	76	77	79	82	86	89	90	90	91	91	91	744	54	85	99
	13.5 m	91	92	92	92	93	93	92	87	81	75	71	72	72	76	76	79	82	86	89	90	91	91	91	91	744	53	85	99
	8.0 m	This level was not instrumented for relative humidity at this time																											
	4.0 m	92	93	93	93	94	94	93	87	80	74	71	71	72	76	75	79	82	86	89	90	91	92	92	92	720	55	85	100
	2.0 m	94	94	95	94	95	95	94	87	80	74	71	71	72	75	76	78	82	87	90	92	93	93	94	94	719	55	86	99
	1.0 m	94	94	95	94	95	95	94	88	81	75	71	72	72	76	77	79	83	88	91	92	93	93	94	94	744	55	87	98
	0.5 m	94	94	94	94	94	94	94	88	80	73	70	71	70	75	75	78	82	87	91	92	93	93	94	94	744	51	86	100

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

DECEMBER 1966

Exposure		Monthly Ranges of Relative Humidity by Hour (%)																								Monthly Summary*			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	46.0 m	20	20	21	19	18	21	21	21	32	31	46	40	45	47	48	43	36	28	21	18	16	17	12	18				
	28.5 m	This level was not instrumented for relative humidity at this time																											
	26.5 m	15	15	15	15	15	15	16	16	33	34	42	34	45	48	48	42	34	24	15	15	15	15	15	14				
	13.5 m	10	13	13	12	13	9	10	18	26	33	39	43	43	47	43	36	28	23	22	18	18	17	16	14				
	8.0 m	This level was not instrumented for relative humidity at this time																											
	4.0 m	12	9	7	9	8	8	8	13	21	31	38	39	38	41	37	33	26	21	16	14	14	13	14	8				
	2.0 m	12	10	7	7	8	7	5	10	19	29	31	34	35	38	33	33	28	21	14	14	14	13	12	6				
	1.0 m	5	6	7	6	5	6	8	18	23	21	25	24	29	31	28	25	21	16	12	11	9	7	7	6				
	0.5 m	8	8	7	9	9	9	11	10	12	16	20	22	26	29	28	24	19	15	12	16	10	11	9	6				

* No monthly summary was computed for the ranges.

Chiva Chiva (Open site)	46.0 m	14	17	13	12	11	11	9	12	21	25	38	36	35	41	44	36	36	24	14	11	10	11	9	11				
	28.5 m	This level was not instrumented for relative humidity at this time																											
	26.5 m	14	18	10	13	12	10	7	12	21	26	35	37	36	39	41	34	34	25	13	10	8	8	6	12				
	13.5 m	12	16	11	12	10	10	8	18	25	28	38	38	37	40	43	36	34	25	12	9	10	7	8	10				
	8.0 m	This level was not instrumented for relative humidity at this time																											
	4.0 m	15	20	13	15	13	14	12	21	27	29	38	38	40	42	42	36	34	26	17	16	14	12	12	12				
	2.0 m	13	17	14	13	8	11	9	21	25	31	39	37	42	40	39	39	34	26	18	15	15	10	15	11				
	1.0 m	10	12	11	10	8	8	10	19	28	33	39	37	42	41	43	36	34	22	12	9	10	9	9	9				
	0.5 m	11	11	13	9	10	8	11	26	34	37	41	41	46	47	48	37	39	25	18	11	15	10	10	9				

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

DECEMBER 1966

Exposure		Monthly Means[2] of other Elements by Hour																							Monthly Summary			
Site	Code[1]	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No of obs.	Min.	Mean	Max.
Albrook (Forest site)	WB (4.0 m)	72.3	72.1	72.0	71.8	71.7	71.6	71.8	73.6	74.7	75.2	75.6	75.8	75.6	75.4	75.7	75.2	74.9	74.0	73.4	73.1	72.8	72.6	72.6	72.5	743	68.7	73.6	80.0
	WB (2.0 m)	72.4	72.2	72.0	71.8	71.7	71.6	71.8	73.6	74.9	75.4	75.8	76.2	76.2	75.7	75.8	75.5	75.0	74.1	73.4	73.2	72.8	72.7	72.7	72.5	743	68.6	73.7	80.0
	WB (0.5 m)	72.6	72.4	72.3	72.1	72.0	71.9	71.9	72.8	74.3	75.3	76.0	76.3	76.5	76.0	76.2	75.8	75.5	74.7	73.9	73.5	73.2	73.1	72.8	72.7	732	69.3	73.9	79.5
	BP	.730	.716	.701	.695	.700	.711	.733	.751	.765	.768	.759	.740	.710	.691	.670	.666	.670	.683	.697	.717	.736	.747	.748	.745	744	.630	.719	.810
	P1	0.72	0.03	0.02	0.01	0.02	0.03	0.10	0.08	0.04	0.03	0.06	0.07	0.22	0.15	0.18	0.21	0.18	0.02	0.01	0.01	0.01	0.04	0.02	0.21	93	0.00	6.36	0.73
	P2	0.52	0.04	0.00	0.00	0.02	0.07	0.35	0.10	0.03	0.02	0.05	0.09	0.10	0.28	0.35	0.40	0.14	0.03	0.00	0.00	0.00	0.00	0.00	0.03	60	0.00	4.54	0.73
	P3	0.50	0.00	0.02	0.01	0.00	0.05	0.20	0.16	0.04	0.01	0.10	0.07	0.01	0.37	0.52	0.34	0.18	0.04	0.00	0.00	0.00	0.00	0.00	0.35	59	0.00	5.18	0.70
	P4	0.81	0.03	0.00	0.00	0.00	0.05	0.09	0.07	0.06	0.03	0.03	0.13	0.00	0.46	0.85	0.43	0.17	0.06	0.01	0.01	0.00	0.00	0.00	0.15	63	0.00	6.16	0.89
Chiva Chiva (Open site)	WB (4.0 m)	72.0	71.8	71.5	71.4	71.3	71.1	71.9	73.8	74.7	75.1	75.4	75.4	75.5	75.1	74.9	74.8	74.2	73.6	73.2	72.9	72.7	72.6	72.2	72.2	720	68.4	73.3	79.3
	WB (2.0 m)	72.3	72.2	71.9	71.7	71.6	71.5	72.3	74.2	75.1	75.4	75.9	75.7	75.8	75.4	75.2	75.1	74.5	73.8	73.6	73.3	73.0	72.9	72.6	72.6	720	68.4	73.6	79.1
	WB (0.5 m)	72.2	72.0	71.7	71.7	71.4	71.3	71.9	74.2	75.6	76.4	76.8	76.7	76.8	76.6	76.1	75.8	74.9	73.9	73.5	73.1	72.7	72.5	72.5	72.4	744	67.2	73.9	79.6
	BP	.817	.798	.785	.778	.785	.794	.813	.836	.850	.854	.844	.821	.797	.773	.757	.750	.756	.768	.782	.802	.822	.831	.832	.823	744	.715	.803	.890
	PS	0.07	0.01	0.00	0.01	0.02	0.09	0.31	0.09	0.04	0.04	0.28	0.04	0.38	0.21	0.09	0.19	0.03	0.02	0.00	0.00	0.00	0.01	0.02	0.00	43	0.00	5.45	0.70

WB - Wet bulb temperature (°F)
BP - Barometric pressure (in. of Hg minus 29.0)

PS - Precipitation at 1.0 m. in open area (in.)
P1 - Precipitation at 46.0 m. above canopy (in.)
P2 - Precipitation under full canopy (in.)
P3 - Precipitation under drip canopy (in.)
P4 - Precipitation under open canopy (in.)

[2] Monthly means of precipitation are computed for precipitation days. Precipitation totals are substituted for the mean in the monthly summary.

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

DECEMBER 1966

Exposure		Monthly Ranges[2] of other Elements by Hour																							Monthly Summary*			
Site	Code[1]	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	WB (4.0 m)	4.5	4.6	4.6	5.0	5.0	5.5	6.1	3.9	4.8	5.2	5.3	7.0	5.5	7.2	6.7	6.7	6.7	5.2	5.3	4.8	5.3	4.9	5.4	4.7				
	WB (2.0 m)	4.5	4.6	4.7	4.9	5.0	5.4	6.3	3.9	4.9	6.0	5.5	6.3	6.1	7.0	6.7	6.7	6.7	5.5	5.0	4.8	5.2	5.0	5.6	4.8				
	WB (0.5 m)	4.5	3.8	3.7	3.7	4.2	4.2	4.2	3.8	4.6	5.2	5.5	5.0	4.9	5.1	6.5	6.0	6.5	5.4	5.2	4.5	4.5	4.2	4.3	4.5				
	BP	.105	.100	.085	.095	.095	.085	.080	.075	.070	.080	.090	.080	.085	.080	.080	.075	.070	.080	.080	.080	.080	.070	.090	.090				
	P1	0.00	0.04	0.03	0.00	0.01	0.08	0.32	0.13	0.03	0.00	0.17	0.16	0.61	0.57	0.65	0.72	0.34	0.04	0.00	0.00	0.00	0.00	0.01	0.00				
	P2	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.16	0.04	0.00	0.07	0.16	0.00	0.08	0.40	0.21	0.16	0.04	0.00	0.00	0.00	0.00	0.00	0.00				
	P3	0.00	0.00	0.01	0.00	0.00	0.07	0.27	0.00	0.00	0.00	0.11	0.11	0.00	0.57	0.00	0.67	0.31	0.06	0.00	0.00	0.00	0.00	0.00	0.00				
	P4	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.16	0.00	0.03	0.03	0.24	0.00	0.70	0.00	0.78	0.32	0.04	0.00	0.00	0.00	0.00	0.00	0.00				
Chiva Chiva (Open site)	WB (4.0 m)	5.0	4.6	5.0	4.8	5.9	5.9	4.6	4.5	5.5	6.9	5.5	5.8	5.9	5.0	4.6	7.2	5.4	4.7	4.8	4.6	4.6	4.3	4.1	4.1				
	WB (2.0 m)	4.6	4.5	4.7	5.2	5.1	5.6	4.2	4.2	5.3	6.3	5.5	5.3	5.5	4.8	4.2	6.3	5.0	4.2	4.2	4.5	4.1	4.0	3.8	3.8				
	WB (0.5 m)	5.1	5.7	5.4	6.2	6.5	7.0	5.3	4.6	5.6	5.8	5.5	5.1	5.3	5.7	5.9	7.0	5.6	5.0	4.6	4.7	4.2	4.6	5.1	5.4				
	BP	.085	.080	.095	.090	.080	.080	.075	.080	.075	.075	.085	.090	.075	.080	.080	.070	.070	.075	.080	.080	.085	.065	.085	.080				
	PS	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.09	0.05	0.00	0.68	0.02	0.10	0.46	0.16	0.52	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00				

* No monthly summary was computed for the ranges.

WB - Wet bulb temperature (°F)
BP - Barometric pressure (in. of Hg minus 29.0)

PS - Precipitation at 1.0 m. in open area (in.)
P1 - Precipitation at 46.0 m. above canopy (in.)
P2 - Precipitation under full canopy (in.)

P3 - Precipitation under drip canopy (in.)
P4 - Precipitation under open canopy (in.)

[2] Monthly ranges of precipitation are computed for precipitation days.

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

DECEMBER 1966

Exposure		Monthly Means of Wind Speed by Hour (miles/hr.)																							Monthly Summary			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	No of obs.	Min.	Mean	Max.
Albrook (Forest site)	46.0 m	5	5	6	5	6	5	4	6	5	7	8	8	8	8	7	6	6	5	6	5	5	5	6	6	741	0	6	18
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	1	0	1	1	0	0	0	0	1	1	2	1	1	2	1	1	0	0	1	0	1	0	0	0	741	0	1	15
	13.5 m	This level was not instrumented for wind speed at this time																											
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	741	0	0	6
	2.0 m	This level was not instrumented for wind speed at this time																											
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

Chiva Chiva (Open site)	46.0 m	6	6	6	6	6	5	4	5	7	8	9	10	10	10	9	9	8	7	6	6	6	5	6	5	740	0	7	19
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	5	5	4	4	4	4	3	4	6	8	8	10	10	9	9	8	7	6	5	5	5	4	4	4	716	0	6	19
	13.5 m	2	2	2	1	2	1	1	2	4	5	6	8	8	7	8	6	5	3	2	2	2	1	2	1	741	0	3	25
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	3	3	2	3	3	2	2	3	5	5	7	7	7	7	6	6	5	4	3	3	3	2	2	3	728	0	4	19
	2.0 m	1	1	1	1	1	1	0	1	3	4	5	6	6	5	5	4	3	2	1	1	1	1	1	1	741	0	2	14
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

SUMMARY OF METEOROLOGICAL OBSERVATIONS

HOURLY DATA

DECEMBER 1966

Exposure		Monthly Ranges of Wind Speed by Hour (miles/hr.)																							Monthly Summary*			
Site	Level	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
Albrook (Forest site)	46.0 m	12	12	13	13	15	10	11	14	14	16	18	17	17	17	18	18	18	14	15	10	11	11	10	14				
	28.5 m	This level was not instrumented for wind speed at this time																											
	26.5 m	3	3	4	3	5	2	4	4	5	8	15	10	9	14	5	4	5	6	7	3	5	4	3	3				
	13.5 m	This level was not instrumented for wind speed at this time																											
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	0	0	0	0	0	1	0	0	1	2	5	6	3	6	4	0	3	2	0	0	0	0	0	0				
	2.0 m	This level was not instrumented for wind speed at this time																											
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

* No monthly summary was computed for the ranges.

Chiva Chiva (Open site)	46.0 m	13	16	12	17	10	9	10	10	11	17	15	15	16	16	16	17	13	11	13	11	13	10	14	12				
	28.0 m	This level was not instrumented for wind speed at this time																											
	26.5 m	11	15	11	11	12	8	8	10	10	18	17	16	16	17	18	14	12	9	15	10	12	9	10	9				
	13.5 m	10	20	11	11	11	5	5	6	11	17	17	22	25	15	20	20	15	15	12	7	11	7	6	5				
	8.0 m	This level was not instrumented for wind speed at this time																											
	4.0 m	8	7	8	8	7	7	8	9	11	13	18	13	14	14	13	15	12	8	10	9	9	7	7	6				
	2.0 m	6	9	6	5	5	3	4	6	10	11	11	14	14	11	12	14	10	6	7	4	7	4	4	4				
	1.0 m	This level was not instrumented for wind speed at this time																											
	0.5 m	This level was not instrumented for wind speed at this time																											

ALBROOK (Forest site) DECEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 46.0 m.
(%)

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N			3.2	3.2	3.2	3.2	3.2	3.2	6.4	22.6	12.9	16.6	20.0	20.0	16.1	16.1	3.2				3.2	3.2		
NNE			3.2							9.7	9.7	3.3	6.6	6.6	9.7	3.2				3.2	3.2	3.2	3.2	6.4
NE			3.2	3.2				6.4	3.2	12.9	6.4	3.3				9.7								
ENE						3.2		6.4		3.2	9.7		3.3		3.2			3.2		3.2		3.2	3.2	
E						3.2		3.2			3.2	3.3	6.6	3.3	3.2									
ESE									9.7	6.4			3.3	3.3		3.2								
SE												6.6	3.3	6.6			3.2							
SSE											3.2	6.6	6.6	3.3		3.2		3.2						
S														3.3	3.2		3.2							
SSW		3.2											3.3	3.3										
SW	3.2	6.4								3.2	3.2	6.6	6.6		3.2	6.4								
WSW	3.2		3.2		3.2	6.4	3.2		3.2						3.2	3.2	6.4				3.2	3.2	6.4	6.4
W	29.0	32.2	41.9	38.7	38.7	19.4	29.0	41.9	25.8	19.4	22.6	16.6	13.3	20.0	16.1		22.6	22.6	35.5	32.2	29.0	32.2	38.7	45.2
WNW	29.0	29.0	29.0	32.2	32.2	32.2	32.2	22.6	3.2	6.4	6.4	6.6		3.3	9.7	6.4	12.9	25.8	25.8	19.4	38.7	19.4	32.2	25.8
NW	9.7	6.4	3.2	9.7	6.4	16.1	3.2	9.7	19.4	6.4	6.4	6.6	6.6	6.6	3.2	29.0	35.5	25.8	12.9	16.1	3.2	19.4	6.4	6.4
NNW	3.2	3.2				9.7			3.2	3.2	9.7	10.0	13.3	6.6	12.9	6.4		9.7	6.4	12.9		3.2		
CALM	22.6	19.4	12.9	12.9	16.1	6.4	29.0	6.4	25.8	6.4	6.4	13.3	6.6	13.3	16.1	12.9	12.9	9.7	19.4	12.9	19.4	12.9	9.7	9.7

* Note: Due to rounding, percentage totals do not equal 100%.

ALBROOK (Forest site) DECEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 26.5 m.
(%)

Hr. / Dir.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	6.4	6.4	3.2	12.9	6.4	3.2			3.2	6.4	6.4	3.3	3.3	13.3	9.7	6.4	3.2	6.4	3.2	3.2	9.7	6.4	6.4	6.4
NNE												6.6												
NE										3.2		3.3	3.3	3.3										
ENE											3.2		6.6											
E													3.3			3.2								
ESE										3.2	3.2												3.2	
SE											3.2													
SSE																								
S												6.6	3.3		3.2									
SSW														3.3										
SW												3.3			3.2									
WSW	6.4												3.3	3.3										
W													3.3			3.2								
WNW							3.2	3.2	9.7	3.2	3.2	3.3	3.3	3.3			9.7	3.2	3.2		3.2			3.2
NW	6.4	6.4	12.9	3.2	6.4	3.2	6.4	12.9	6.4	3.2	19.4	10.0	6.6	6.6	9.7	6.4	3.2		6.4	9.7	6.4	9.7	6.4	3.2
NNW	9.7	3.2	6.4	9.7	3.2	3.2	6.4	6.4	3.2	3.2	12.9	6.6	3.3	13.3	9.7	3.2	3.2	9.7	9.7		9.7		6.4	9.7
CALM	71.0	83.9	77.4	74.2	83.9	90.3	83.9	77.4	77.4	77.4	48.4	56.4	59.8	53.1	64.5	77.4	80.6	80.6	77.4	87.1	71.0	83.9	77.4	77.4

* Note: Due to rounding, percentage totals do not equal 100%.

ALBROOK (Forest site) DECEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 4.0 m.
(%)

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N												3.3												
NNE										3.2							3.2							
NE																								
ENE																								
E																								
ESE													3.3											
SE																								
SSE											3.2													
S											3.2													
SSW																								
SW									6.4		3.2			3.3										
WSW									3.2						6.4			3.2						
W											3.2													
WNW														3.3										
NW											3.2				3.2									
NNW						3.2																		
CALM	100.0	100.0	100.0	100.0	100.0	96.8	100.0	100.0	90.3	96.8	83.9	96.3	96.3	93.0	90.3	100.0	96.8	96.8	100.0	100.0	100.0	100.0	100.0	100.0

* Note: Due to rounding, percentage totals do not equal 100%.

CHIVA CHIVA (Open site) DECEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 46.0 m.
(%)

Dir. \ Hr.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	3.2	9.7	6.4	9.7	16.1	9.7	12.9	6.4	16.1	16.1	25.8	22.6	19.4	22.6	32.2	22.6	25.8	22.6	16.1	13.3	6.6	13.3	19.4	9.7
NNE	3.2	6.4	6.4	6.4	6.4	3.2	6.4	3.2	9.7	9.7	9.7	12.9	9.7	12.9	6.4	6.4	3.2	3.2						3.2
NE		6.4						3.2		6.4			3.2	3.2	3.2	6.4				3.3		3.3		
ENE		6.4					3.2		3.2		3.2				3.2				6.4		3.3	3.3		
E	3.2					3.2		12.9	3.2	3.2	3.2	3.2	6.4	3.2		3.2	3.2	3.2	3.2	3.3	3.3		3.2	
ESE								3.2	3.2	3.2			3.2		3.2					3.3		3.3		3.2
SE				3.2				3.2			3.2	9.7	6.4	3.2	6.4	3.2		3.2						3.2
SSE									3.2	3.2	3.2			6.4		3.2	3.2		3.2	3.3	3.3			
S		6.4	3.2							3.2	6.4	3.2	3.2		3.2	3.2				3.3	3.2			
SSW												3.2	6.4		3.2		3.2							
SW	3.2	3.2			3.2	3.2	3.2		3.2				3.2	3.2		3.2	3.2	3.2			3.3	6.6	3.2	
WSW	3.2				3.2			3.2			3.2			3.2		3.2					3.3			6.4
W		12.9	25.8	3.2	6.4	9.7	6.4	9.7	3.2	3.2	12.9	6.4					19.4					3.3	3.2	6.4
WNW	9.7	6.4	12.9	16.1	6.4	16.1	12.9	12.9	3.2	6.4		3.2	3.2	6.4	12.9	12.9		19.4	6.4	3.3	6.6	3.3	12.9	16.1
NW	29.0	19.4	25.8	32.2	29.0	32.2	25.8	25.8	29.0	29.0	9.7	12.9	12.9	16.1	16.1	12.9	19.4	19.4	51.6	39.9	29.9	36.6	35.5	25.8
NNW	41.9	22.6	19.4	19.4	29.0	22.6	22.6	16.1	22.6	16.1	19.4	22.6	22.6	19.4	9.7	19.4	19.4	25.8	12.9	26.6	36.6	26.6	22.6	22.6
CALM	3.2			9.7			6.4																	3.2

* Note: Due to rounding, percentage totals do not equal 100%.

CHIVA CHIVA (Open site) DECEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 26.5 m.

(%)

Hr. / Dir.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	16.6	10.0	16.6	16.6	10.0	16.6	20.0	10.0	20.0	17.1	29.9	20.0	29.9	20.0	22.6	25.8	16.1	25.8	19.4	23.3	16.6	20.0	16.6	23.3
NNE	3.3	6.6		6.6	13.3			3.3	6.6	6.8	10.0	16.6	6.6	10.0	12.9	6.4	9.7		3.2	6.6	3.3			3.3
NE		6.6		10.0	3.3		6.6	3.3	6.6	10.3		6.6	3.3	6.6	3.2	6.4	3.2	3.2		3.3	3.3	3.3		
ENE		3.3	3.3					3.3			3.3			3.3	3.2	3.2			3.2			6.6	6.6	
E	3.3		3.3					6.6	10.0		3.3		3.3	3.3	3.2					3.3		3.3		
ESE												6.6	3.3			3.2					3.3	3.3		6.6
SE		3.3							3.3	3.4	3.3	6.6	3.3		3.2	3.2		3.2	3.2	3.3	3.3	3.3		
SSE										10.3	3.3		3.3	10.0	3.2	3.2	3.2					3.3		
S		3.3									6.6	6.6	6.6		3.2	3.2	3.2				3.3			
SSW					3.3		3.3						6.6		3.2					3.3				
SW	3.3		6.6			3.3			3.3					3.3		3.2	3.2	3.2		3.3				6.6
WSW		3.3	3.3			3.3					3.3		3.3			6.4	3.2							
W	3.3	6.6	13.3	3.3	3.3	10.0	13.3	10.0	3.3		6.6	3.3	3.3		3.2		9.7	3.2		3.3	3.3	3.3	3.3	3.3
WNW	13.3	6.6	10.0	6.6	6.6	13.3	3.3	20.0	3.3	3.4	3.3			3.3	6.4	3.2	6.4	12.9	6.4	3.3	3.3	3.3	10.0	13.3
NW	26.6	13.3	13.3	23.3	23.3	13.3	13.3	16.6	20.0	20.6	6.6	13.3	3.3	16.6	22.6	12.9	12.9	29.0	29.0	16.6	20.0	23.3	26.6	10.0
NNW	26.6	26.6	26.6	23.3	33.2	36.6	13.3	16.6	23.3	24.0	16.6	20.0	23.3	23.3	9.0	19.4	29.0	19.4	29.0	26.6	36.6	23.3	23.3	23.3
CALM	3.3	10.0	3.3	10.0	3.3	3.3	26.6	10.0		3.4	3.3								6.4	3.3	3.3	3.3	13.3	10.0

* Note: Due to rounding, percentage totals do not equal 100%.

CHIVA CHIVA (Open site) DECEMBER 1966

Relative Frequencies* of Wind Directions by Hour at 4.0 m.
(%)

Hr. / Dir.	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N	12.9	3.2	6.4	22.6	6.4	12.9	12.9	9.7	22.6	6.4	29.0	19.4	22.6	22.6	19.4	22.6	29.0	22.6	16.1	16.6	3.3	20.0	6.4	12.9
NNE	6.4	3.2	3.2		3.2	6.4	3.2	3.2	3.2	6.4	12.9	16.1	6.4	6.4	19.4	22.6	9.7	6.4	9.7	10.0	13.3		3.2	6.4
NE	6.4	6.4	6.4	16.1	12.9		6.4		3.2	12.9	3.2	6.4	3.2	9.7		3.2			3.2	6.6	3.3	10.0	6.4	6.4
ENE	3.2	3.2		6.4			3.2	9.7	6.4				3.2		3.2			3.2		3.3		3.3	9.7	
E	3.2	3.2	6.4	3.7	3.2	3.2		3.2	3.2		3.2	6.4	3.2		3.2	6.4	3.2		6.4		3.3	3.3		
ESE		3.2																3.2			3.3	6.6		3.2
SE		3.2				3.2					6.4	3.2	6.4			3.2				6.6	3.3			
SSE									3.2	3.2			3.2	3.2	3.2									
S		3.2			3.2		3.2			3.2	12.9	9.7	9.7	9.7	9.7	6.4	3.2				6.6		3.2	
SSW					3.2				3.2	6.4			3.2				6.4	3.2		3.3			3.2	3.2
SW	3.2			3.2	3.2			6.4	3.2	3.2			3.2	3.2	3.2	9.7	3.2					6.6		3.2
WSW		6.4	3.2	3.2			3.2	6.4			3.2			3.2				3.2			3.3		6.4	
W	6.4	3.2	9.7	6.4	3.2	6.4	3.2	6.4			6.4	3.2		3.2	6.4		6.4		3.2	3.3	3.3	6.6	6.4	3.2
WNW	3.2	6.4	6.4	6.4	3.2	6.4	12.9	9.7	6.4	6.4	6.4	3.2		3.2		6.4	3.2	12.9	12.9			3.3	3.2	9.7
NW	12.9	9.7	3.2	6.4	22.6	19.4		16.1	19.4	25.8	6.4	22.6	16.1	19.7	19.4	9.7	22.6	29.0	19.4	20.0	20.0	20.0	9.7	12.9
NNW	25.8	25.8	29.0	16.1	22.6	22.6	19.4	12.9	22.6	22.6	9.7	9.7	19.4	25.8	12.9	9.7	12.9	16.1	19.4	20.0	29.0	16.6	19.4	19.4
CALM	16.1	19.4	25.8	9.7	12.9	19.4	32.2	16.1	3.2	3.2									9.7	10.0	6.6	3.3	22.6	19.4

* Note: Due to rounding, percentage totals do not equal 100%.

SUMMARY OF NON HOURLY DATA

DECEMBER 1966

Summary of Elements with Non-hourly Frequencies of Observation

Site	Element, Units and Exposure	Description	Number of Obs.	Minimum Value	Mean or Total Value	Maximum Value
Albrook (Forest site)	WBGT Index[1] (at 1.0 meters)	Index value	434	69.2	75.8	81.8
		Dry bulb temp.	434	69.4	77.1	86.3
		Wet bulb temp.	434	69.0	75.1	86.3
		Black bulb temp.	434	69.7	77.5	87.0
	Evaporation[3] (in. at 4 levels)	Piche (46.0 m)	31	0.012	7.954*	0.793
		Piche (26.5 m)	30	0.012	5.351*	0.464
		Piche (13.5 m)	17	0.012	1.806*	0.214
		Piche (0.5 m)	24	0.006	1.190*	0.171
	Precipitation from Raingauge Network[2] (in. at 1.0 meters)	Gauge # 1	52	0.01	5.88*	2.00
		Gauge # 2	53	0.01	6.24*	1.48
		Gauge # 3	54	0.01	6.02*	1.18
		Gauge # 4	52	0.01	4.70*	0.82
		Gauge # 5	52	0.01	5.26*	1.08
		Gauge # 6	56	0.01	6.06*	1.18
		Gauge # 7	55	0.01	5.81*	1.14
		Gauge # 8	50	0.01	5.27*	1.15
	Stem Flow[2] (in. at 2.0 meters)	Small tree	22	0.01	6.61*	1.65
		Medium tree	20	0.01	5.85*	1.20
		Large tree	11	0.02	231.37*	75.59
Chiva Chiva (Open site)	WBGT Index[1] (at 1.0 meters)	Index value	434	67.2	78.5	91.1
		Dry bulb temp.	434	66.2	79.7	92.6
		Wet bulb temp.	434	67.2	75.4	92.6
		Black bulb temp.	432	66.8	88.3	124.0
	Evaporation[3] (in. at 0.5 meters)	Piche	31	0.006	4.807*	0.342
		Pan	28	0.006	3.488*	0.220
	Minimum Grass temp[3] (°F at grass tips)	None	28	66.0	70.1	81.5

1 - Hourly observations between 0600 and 1900 hours inclusive
2 - Six hourly observations
3 - Daily observations

* Total Values

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13. ABSTRACT

This report contains detailed microclimatic data for Dec 1966 from specific sites in the Panama Canal Zone and vicinity. The data are presented in tabular form, summarized for hourly and/or daily observations from surface to 46-meter levels. Elements listed are: temperature, pressure, precipitation, wind speed and direction, relative humidity, and evaporation.

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