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ATOLL RESEARCH BULLETIN

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by David I. Blumenstock and Daniel F. Rex,

with a special section on Vegetation

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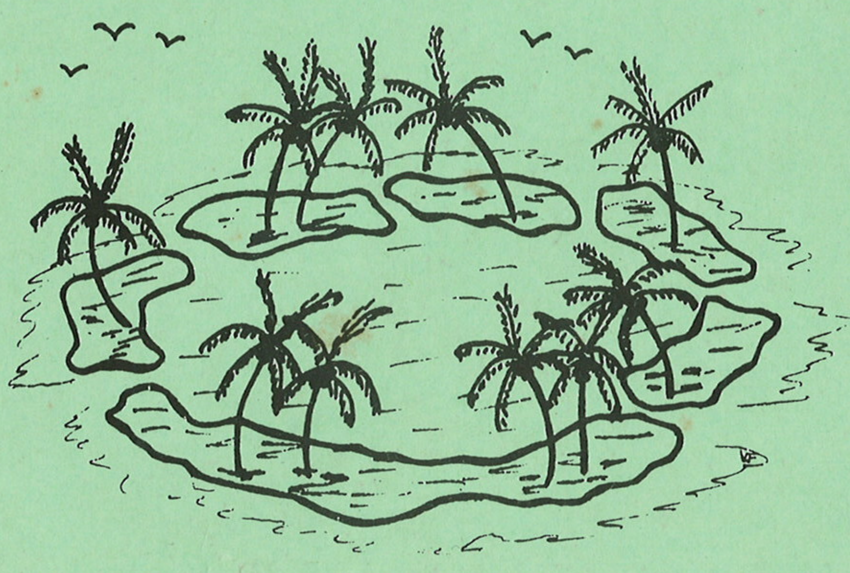

Issued by

THE PACIFIC SCIENCE BOARD

National Academy of Sciences—National Research Council

Washington, D. C., U.S.A.

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ACKNOWLEDGMENT

It is a pleasure to commend the far-sighted policy of the Office of Naval Research, with its emphasis on basic research, as a result of which a grant has made possible the continuation of the Coral Atoll Program of the Pacific Science Board.

It is of interest to note, historically, that much of the fundamental information on atolls of the Pacific was gathered by the U. S. Navy's South Pacific Exploring Expedition, over one hundred years ago, under the command of Captain Charles Wilkes. The continuing nature of such scientific interest by the Navy is shown by the support for the Pacific Science Board's research programs during the past thirteen years.

The preparation and issuance of the Atoll Research Bulletin is assisted by funds from Contract N7onr-2300(12).

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Washington 25, D. C., U.S.A.

FOREWORD

The Eniwetok Microclimatic Project was established in the summer of 1957 under the joint auspices of the University of Hawaii, the U. S. Weather Bureau, and Joint Task Force Seven of the U. S. Department of Defense. The ultimate goal of the project was to determine to what extent a deep, large atoll in the open ocean trade wind zone creates its own weather and climate.

This report, originally issued to a restricted distribution list by Joint Task Force Seven as JTFMC TP-16, December 18, 1959, is essentially a data report. It presents the observational findings from which some answers to the basic inquiry can be deduced through further investigation.

Since the data presented are of basic significance for the study of coral atoll ecology and are of great interest to the Coral Atoll Program of the Pacific Science Board, they are being made generally available as an issue of the Atoll Research Bulletin.

Editors

PREFACE

Although weather observations have for many years been obtained on various oceanic islands, many fundamental questions concerning the local climates and microscale weather on such islands remain unanswered. In particular, the problem of to what extent an oceanic atoll creates its own local weather and microclimates has not been satisfactorily resolved. Is there significantly more rainfall upon an atoll than there would be were the atoll replaced by open ocean? Are there significant differences in air temperature between the windward and leeward sides? With a large deep lagoon like that at Eniwetok, is the heat exchange between lagoon water and air essentially the same as the exchange between water and air over the ocean nearby? These and other questions have long given rise to considerable controversy. The present study was undertaken to provide at least somewhat better answers to such questions than have heretofore been possible.

Initial impetus for this study was provided by Professor Maxwell S. Doty of the Department of Botany, University of Hawaii. Professor Doty had been conducting phytoplankton productivity studies at Eniwetok and wished to know whether there were significant differences in mean rainfall from one to another part of the atoll. He suggested to the authors that it might be worthwhile to establish raingages at several different sites and obtain comparative rainfall readings over a period of at least a year. After several discussions among Professor Doty and the authors, it was decided to carry this suggestion still further and to obtain observations of several different kinds on a micro-scale. Accordingly, a field plan was worked out and the Eniwetok Microclimatic Project was formally established under the joint auspices of the University of Hawaii ((under AEC Contract No. AT-(04-3)-15)), U. S. Weather Bureau, and Joint Task Force SEVEN.

The period of investigation was chosen so as to derive maximum possible support from Task Force operations planned for the spring and summer of 1958. The nuclear test series known as Operation HARDTACK was conducted during this period; and during the build-up for these tests as well as during the test period itself it was possible to draw on logistic and meteorological support not usually available at Eniwetok.

The University of Hawaii, the U. S. Weather Bureau, and Joint Task Force SEVEN each provided funds, equipment, and personnel in support of the study. In addition to the senior authors, those participating in the observational program at Eniwetok were:

1.	Mr. Dominic D. Conte	Pacific Supervisory Office U. S. Weather Bureau, Honolulu, Hawaii
2.	Mr. Wilson Floe	Pacific Supervisory Office U. S. Weather Bureau, Honolulu, Hawaii
3.	S/Sgt. F. E. Haas, USAF	JTF SEVEN Meteorological Center Pearl Harbor, Hawaii
4.	Prof. Irwin E. Lane	Botany Department, University of Hawaii Honolulu, Hawaii
5.	Mr. Tetsuo Matsui	Botany Department, University of Hawaii Honolulu, Hawaii
6.	Mr. Mikihiko Oguri	Botany Department, University of Hawaii Honolulu, Hawaii
7.	Prof. Jimmie Bob Smith	Botany Department, University of Hawaii Honolulu, Hawaii

Without the excellent work of these field personnel and the outstanding support of many other persons in the sponsoring agencies and the U. S. Atomic Energy Commission it would have been impossible to conduct this study. We wish to express our sincere thanks to all those concerned with the project for their genuine interest and valuable assistance. In particular we wish to acknowledge the active and continuing support provided by Mr. Ernest Wynkoop and Mr. Ray C. Emens of the U. S. Atomic Energy Commission and Professor Doty. We also wish to thank Professor Irwin Lane for his special field investigation of the distribution of vegetation on two of the islets of Eniwetok and for his preparation of one of the principal sections of this study. Finally, we wish to thank the personnel of the USAF Air Weather Service detachment at Eniwetok, who made radarscope and other special observations in direct support of this study.

David I. Blumenstock

Daniel F. Rex

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MICROCLIMATIC OBSERVATIONS AT ENIWETOK

1. INTRODUCTION

For a one-year period, from August, 1957, to August, 1958, the authors together with their other field colleagues conducted a study of microclimatic conditions at Eniwetok Atoll in the Marshall Islands. The primary purpose of the study was to determine to what extent a deep, large atoll lying far at sea in a trade wind zone creates its own weather and climate. Stated differently, how and to what degree do the weather and climate of Eniwetok differ from the weather and climate that would obtain if there were only open ocean where Eniwetok lies?

This report on our study does not attempt to answer the fundamental question raised above. Instead, it merely presents our observational findings. It is a data report, designed to make available to meteorologists and others data that we hope will be useful to them in many different kinds of inquiries.

We are including in this report not only the data themselves, together with information concerning the observational sites and procedures used, but also a modicum of information concerning the nature of the atoll and of broad-scale weather conditions in the Eniwetok area. This additional information is provided to make our results most useful to as many different investigators as possible, including those unfamiliar with Eniwetok and with the Marshall Islands Atoll area.

Since the observational plan of this study is described in detail in Section 7, all that will be done here is to indicate its nature in very broad terms. During two different two-week periods, one during August, 1957, and the other during January-February, 1958, weather observations were made at seven different sites in the atoll. These sites were on the islets of FRED, BRUCE, KEITH, ELMER, JANET, and YVONNE; and also in the lagoon at MACK[1]. (See Figure 1.) At FRED there were hourly observations, made by the USAF, Air Weather Service. At BRUCE and KEITH, observations were 3-hourly. Elsewhere, observations were made daily.

[1]For convenience, American code names are used for most islets and reefs referred to. Both code names and native names appear in Figure 1.

Observations varied from site to site, but among the sites they included all the usual kinds of surface weather observations and also rawinsondes twice daily, cloud photographs, and radarscope photographs. During these two 2-week periods observations were also made on trans-lagoon runs aboard an M-boat (LCM) and on ocean runs outside the reef in an aircraft rescue boat (ARP). On lagoon and ocean runs surface water temperatures were measured through making bucket hauls at frequent intervals.

During the remainder of the year, outside these two intensive-study periods, the observations were restricted to the usual comprehensive hourly observations at FRED and to daily, semi-monthly, and monthly rainfall observations at various other sites[2]. Circumstances did not permit making regular rainfall observations throughout the entire year at all of the sites listed above. It is hoped nonetheless that the observations obtained will be found to be useful in supplementing the observations for the two intensive-study periods.

Those who wish to use the primary data appearing in Appendix I or listed in Appendix II may find Appendix III helpful to them. Appendix III lists several major sources for additional meteorological data for Eniwetok.

2. GENERAL GEOGRAPHIC RELATIONSHIPS[3]

Eniwetok is situated in the Marshall Islands, a group of islands lying north of the Gilbert Islands and east of the Caroline Islands. It is located at 11.4°N., 162.3°E. Most of the atolls which make up the Marshall Islands are distributed along two chains which are nearly parallel and trend northwestward. The easternmost is the Ratak (Sunrise) Chain; the westernmost, the Ralik (Sunset)

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[2] Except for the intensive-study periods, only the daily rainfall values are presented for FRED. Sources of other data for FRED are given in Appendix III.

[3] A large part of the factual information contained in this section was obtained from "Geology of Bikini and Nearby Atolls" by Emery, Tracy, Ladd et al, USGS Prof. Paper No. 260-A, Part I, 1954. The reader is referred to this publication for a more detailed presentation.

Chain. In addition to these two main chains there are several isolated outlying atolls. Altogether the group contains twenty-nine atolls, five islands having no interior lagoon and two, known, submerged banks shallower than ten fathoms. The highest land elevation within the group is about twenty-eight feet.

Eniwetok is an isolated atoll lying west of the Ralik Chain and is located some 2,500 statute miles west-southwest of Honolulu, Hawaii and some 4,700 miles from San Francisco. The atoll is some 190 statute miles due west of Bikini Atoll, which together with Ujelang, located some 130 miles southwestward from Eniwetok, are the closest exposed land areas. It appears that Eniwetok Atoll was originally a volcanic cone, since basalt was found there in 1950 as a result of several deep drilling explorations. The cone probably initially emerged some feet above the water and later was eroded away and absorbed by wave and water action. When the critical depth of sea water required for coral existence and growth was reached by the emerging cone, coral growth probably began.

Today Eniwetok Atoll consists of a chain of about thirty small, low islets surrounding an oval lagoon 25 miles long by about 20 miles wide (Figure 1). The total dry-land area of these islets is only 2.5 square statute miles compared with a total lagoon area of 360 square statute miles. The total reef area exposed at low tide is about 32 square statute miles. Most of the islets are less than 13 feet high but are, in some instances, covered by coconut palms reaching up to 80 to 100 feet above low tide level. Three entrances penetrate the reef. Deep Entrance at the southeast side is only about 3/4 of a mile wide but it has a depth of 31 fathoms between ELMER and Japtan Islets (Figure 1). South Channel, on the other hand, is very wide, about six miles, and is usually known as Wide Passage. Charted depths in Wide Passage are only 6 to 12 fathoms. Southwest Passage on the west side is even shallower, having depths of only about 1 fathom. Maximum tidal currents of two knots in Deep Entrance and of 1 knot in Wide Passage have been observed.

The Eniwetok lagoon is nearly elliptical with its long axis trending northwestward. The deepest area is in the north central part of the lagoon, which is the area farthest from the main passes through the reef (Figures 1 and 2). If the numerous superimposed coral mounds were ignored, the bottom contours would show a smooth slope from depths of about 24 fathoms near FRED northwestward to the deepest point of the lagoon, about 35 fathoms. There appears to be no indication whatsoever of submerged terraces or cliffs on the deep portion of the lagoon floor. The mean depth of the lagoon is 26.2 fathoms, with depths between 24 and 32 fathoms most common. Bottom samples and underwater photographs show that the lagoon floor is chiefly covered with Foraminifera, shells, Halimeda debris, coral and other miscellaneous fine debris.

In the Marshalls, the atolls rise out of water about 15,000 feet in depth. The slopes of the atolls are steepest in the upper portions near the surface. At Eniwetok the contour gradient reaches a rate of about 4,000 feet per mile. Figure 3 shows the ocean bottom contours in the vicinity of Eniwetok Atoll.

The original native population of Eniwetok Atoll was Micronesian and in 1930 consisted of 121 inhabitants who raised chiefly pigs, chickens and coconuts, and caught the abundant fish available in the Eniwetok area. In 1947 Eniwetok Atoll was selected for an expansion of the permanent Pacific Proving Ground because of its isolated position, stable weather and the geography of its land masses. At this time the Eniwetok people were moved to Ujelang, where nearly 200 natives live today. Since that time Eniwetok has been populated exclusively with American personnel associated with atomic test operations. The number of persons present varies from tens of thousands during active operations to several hundreds during interim periods. The development of the atoll for test purposes has consisted principally of the construction of permanent base camps on FRED and ELMER Islets and of the utilization of the northern islets, extending from Runit to Bogallua, for shot-site and technical instrumentation purposes.

3. GENERAL WEATHER SETTING

Although detailed studies of the macroclimate of the Marshall Islands area and of Eniwetok in particular are available in the literature (Appendix III), it was thought desirable to include in this report a general description of the weather setting of Eniwetok. It is the purpose of this section to present a general description that will be especially useful to those not familiar with tropical meteorology.

Eniwetok is located on the south side of the Pacific high pressure belt, in what is commonly called the north-east trade wind zone, and to the north of the equatorial trough of low pressure.

Wind Structure. Eniwetok is overlain with three nearly independent wind systems. The lowest of these, extending from the surface up to about 20,000 feet, is the well known trade wind current. The Trades are deepest and strongest during the winter months, December through February, with an average strength at the surface of about 18 knots from an east-northeasterly direction. Maximum speeds occur at about the four to five thousand foot level, where speeds greater than 25 knots are not uncommon. The top of the current during this season may often extend to 30,000 feet or more. During the spring and summer the Trades become gradually weaker and more variable. At the same time their average or most typical direction veers from east-northeasterly to easterly. During August and September the average surface wind is 11 knots from the east. During these two months, frequent periods of very light winds, especially coming from the southeast, are often observed. During March, April and May the trade wind current becomes shallowest, often not extending above the 8,000 or 9,000-foot level. Figure 4, on which is plotted the zonal or east-west component of the wind as a function of height and of month, shows these different changes. Surface wind statistics by month are given in Table I.

Above the trades and extending up to the tropopause, which is generally located between 55,000 and 60,000 feet, are westerly winds which are usually called the Upper Westerlies. This wind stream may be thought of as the southward extension of the strong circumpolar jet stream of mid-latitudes. At the latitude of Eniwetok this southward extension of the polar westerlies overlies the trade wind current. The Upper Westerlies are quite variable due to the presence of numerous cyclonic and anticyclonic vortices which are typically carried along in the basic current. Such a vortex, in the proper position relative to Eniwetok, often produces east winds for periods of two to four days at these upper levels. The upper westerly current, whose core is normally located at about the 40,000-foot level, is strongest in the spring, from the month of March through May, at which time average velocities reach 25 knots. At the same time this current is deepest and most well developed. As the season progresses through summer into autumn, the thickness and strength of the current diminishes to average values of about 5 knots with extremely high variability. In mid-winter the Upper Westerlies often do not extend as far south aloft as Eniwetok.

Above the tropopause and situated in the lower stratosphere is the third wind stream, which is an easterly and very steady current. These winds are

TABLE I. CLIMATOLOGIC DATA SUMMARY, ENIWETOK[1]

	TEMPERATURE °F			PRECIPITATION[2]			SURFACE WIND[3] % OCCURRENCE									SKY COVER % OCCURRENCE				MEAN
	Mean Maximum	Mean Minimum	Mean Diurnal Range	Mean (inches)	Mean No. of Days with Meas. Precip.	Amount Occurring Most Frequently (inches)	NE	ENE	E	ESE	SE	4 - 12 (MPH)	13 - 24 (MPH)	25 - 31 (MPH)	Mean Speed (MPH)	0 - 2 (Tenths)	3 - 5 (Tenths)	6 - 9 (Tenths)	10 (Tenths)	(Tenths)
JAN	84.6	77.7	6.9	0.95	11.4	.02-.05	33	45	20	1	0	11	74	14	18.7	19	40	25	16	5.4
FEB	84.4	77.5	6.9	1.09	8.4	.02-.05	27	56	15	0	0	14	74	11	18.4	18	33	24	25	5.9
MAR	84.6	77.8	6.8	1.62	12.1	.02-.05	20	60	14	3	0	14	77	9	17.8	14	32	27	27	6.2
APR	85.6	78.7	6.9	1.13	9.6	.02-.05	21	63	15	1	0	8	85	7	18.4	15	27	24	34	6.5
MAY	85.5	78.7	6.8	4.80	15.0	.02-.05	13	59	24	3	1	15	78	6	17.5	10	27	28	35	7.0
JUN	85.9	78.9	7.0	3.88	15.4	.02-.05	12	59	24	3	1	16	79	4	16.9	11	33	41	25	6.3
JUL	86.1	78.9	7.2	6.01	19.1	.11-.25	8	38	35	10	4	38	59	1	13.7	9	34	37	20	6.6
AUG	86.3	79.1	7.2	6.93	20.9	.11-.25	9	27	35	9	8	48	45	1	11.9	6	29	41	24	7.0
SEPT	87.0	79.4	7.6	6.44	16.6	.26-.50	10	20	37	6	6	55	39	1	11.2	9	32	36	23	6.6
OCT	86.7	79.1	7.6	7.96	20.4	.11-.25	14	27	29	8	7	52	42	1	11.7	7	27	38	28	7.0
NOV	86.0	79.0	7.0	5.89	18.7	.02-.05	16	42	28	7	3	32	58	8	15.8	13	39	29	19	6.0
DEC	85.1	78.7	6.4	2.50	15.6	.02-.05	26	45	24	2	1	20	66	11	17.7	17	38	24	21	5.7
ANNUAL	85.7	78.6	7.1	49.20	183.2	.02-.05	17	45	25	5	3	27	65	6	15.8	12	33	30	25	6.3

1 Based on observations July 1945-March 1947; June 1949-July 1955, less May 1951.

2 Measurable precipitation is taken as being 0.01 inch or more. The intervals used for tabulating the frequency of rainfall amounts were 0.01, 0.02-.05; 0.06-.10; 0.11-.25; 0.26-.50; 0.51-1.00; and over 1.00.

3 Winds from directions other than those shown occurred less than 5% of the time on an annual basis; windspeeds above 31 m.p.h. occurred less than 1 percent of the time.

normally called the Krakatoa Easterlies. The Krakotoa Easterlies are weakest during the winter months of December through February and reach their maximum strength in the late summer or early autumn from August to October. Lack of observational data precludes any positive statement concerning their extent. However, they are generally observed above altitudes of 60,000 feet extending upward as high as balloon soundings have reached. These upper easterlies are the steadiest and most persistent winds known. Their steadiness exceeds that of the surface trades.

Temperature. The variation of surface air temperature at Eniwetok is extremely small -- a fact associated with its oceanic location and its latitude[4].

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[4]Length of the daylight period (sunrise to sunset) at Eniwetok ranges from 12 hours, 46 minutes to 11 hours, 29 minutes. Energy received at the outer atmosphere ranges from about 890 to about 600 cal./cm.^{2}/day. (After Robert J. List, Smithsonian Meteorological Tables, 6th edition). For times of sunrise and sunset see Table 2.

There is more temperature difference between night and day than there is between January and July. The greatest temperature changes are observed during rain showers, as a result of evaporative cooling. Mean-maximum and mean-minimum temperatures by month are given for Eniwetok in Table I.

Cloudiness. The dry season is normally considered to extend from mid-November through March and during this time total sky cover averages about 5 tenths. There is little if any observable diurnal variation in cloud amount. The dominant cloud form during this season is the typical trade wind cumulus with bases at about 1,800 feet and tops extending to the 4,000-5,000-foot level. Some middle cloudiness and cirrus may be observed in association with disturbed conditions in the more active convective areas located further south. As the season advances from April to late August or early September the cumuli typically present increase in vertical development so that by late summer cloud tops are normally found at the 8,000-9,000-foot level. At the same time, the amount of sky cover increases to an average of 6 or 7 tenths, due in part to more active cumulus development and in part to the more frequent appearance of middle cloud and cirrus. Average cloud amounts at Eniwetok are given in Table I.

Precipitation and Tropical Storms. During the dry season, precipitation is almost entirely the result of cumulus-produced showers. These showers are normally of short duration, but through their frequent occurrence may produce several inches of rainfall in a month. During the summer and early autumn months, periodic disturbances in the trade wind current, which are known as easterly waves, move across the Eniwetok area and produce greatly increased cloudiness and precipitation. These wavelike deformations of the general easterly flow are first observed in the trade wind current in the vicinity of 140° W longitude. They move westward and slowly deepen until in some cases cutoff cyclonic disturbances are produced. These cyclonic vortices or tropical storms continue their westerly movement in the basic current and under certain special circumstances may develop into typhoons. It is uncommon, however, for typhoons to become fully developed in the Eniwetok area; perhaps one every five years is typical. With the passage of an easterly wave over, or to the south of, Eniwetok a general increase in cloudiness at all levels is observed together with numerous moderate to heavy showers and in some cases with light to moderate continuous rainfall. As the wave passes on westward the cloud conditions slowly return (after a day or two) to a typical trade wind cumulus distribution and precipitation is again produced almost exclusively by individual cumulus activity. The intensity and frequency of easterly wave formation reaches its maximum in late summer or early autumn, and a corresponding maximum in precipitation values is observed at that time. Mean precipitation amounts by months for Eniwetok are given in Table I.

4. HYDROGRAPHY

The four aspects of the hydrography of Eniwetok Atoll that are pertinent to the interpretation of the observations presented in this study are the bathymetry of the lagoon and immediately surrounding ocean waters, tidal variations, current systems in the lagoon, and mean water temperature relationships with special reference to seasonal variations in surface water temperature and changes in vertical temperature structure within the lagoon. Each of these topics is considered below.

On the broadest scale, Eniwetok consists of a reef and superincumbent islets that enclose a large deep lagoon and that on the ocean side descend very steeply along the reef front into water that is hundreds of fathoms deep (Figure 3). The lagoon is generally deepest in its north central part, most of which lies below 32 fathoms, and it includes about 2300 coral knolls that rise to within a few fathoms of mean sea (lagoon) level as well as a 10-fathom terrace that borders the reef "along the east, north, and northwest side of the lagoon." Emery describes this terrace as follows:

> "The terrace is widest where the reef bends outward away from the lagoon and narrowest where the reef is indented toward the lagoon . . . . . . In the northwest part of the lagoon, where the terrace is widest it contains a depression which extends about 8 fathoms below the terrace surface . . . . ."[5]

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[5]K. O. Emery, "Submarine Geology of Bikini Atoll", Bull. GSA, LIX, 9, 855-59, 1948.

From the bathymetric chart that appears in Emery's article, it can be seen that this terrace is 1,000 to 5,000 feet wide. This same chart gives the bathymetric details for the entire lagoon floor. A more generalized chart of the floor appears in Figure 2; while Figure 1 shows sample soundings between ELMER and MACK and between BRUCE and KEITH, along the two lines that were followed in sampling lagoon water temperatures.

The mean tidal range at Eniwetok Atoll is 2.7 feet; the mean diurnal range, 3.9 feet. During the two periods of synoptic observation, in August, 1957, and in January-February, 1958, the high and low tides were as shown in Table 2, Appendix I.

The general pattern of current systems within the Eniwetok lagoon shifts continually with tidal variations and with changes in the speed and direction of the wind. However, some generalizations are warranted. With northeast to southeast winds, the surface currents probably form general patterns similar to those that have been observed at Bikini (Figure 5).

So far as surface water temperatures are concerned, the annual range over the nearby ocean is from a mean of 82° F. in late winter (February-March) to a mean of 83.5° in late summer (August-September) as shown in Figure 6. Vertical temperature structure within the first few fathoms of water is closely related to windspeed. With winds in excess of 10-15 knots there is vigorous mixing and the structure is isothermal. Otherwise, the temperature tends to be isothermal at night (with surface cooling) and to increase upward only very slightly by day, with the temperature difference between the surface and the 2-fathom depth being a small fraction of a degree Fahrenheit.

5. TOPOGRAPHY[6]

As indicated in the introduction, weather observations during the Eniwetok Microclimatic Project were made at seven different sites in the atoll. These sites were on the islets of FRED, ELMER, BRUCE, YVONNE, JANET, KEITH and also in the lagoon at MACK (Figure 1). It is the purpose of this section to describe the local topography of each of these observation points.

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[6]Most of the detailed reef descriptions given in this section were obtained from "Geology of Bikini and Nearby Atolls" by Emery, Tracy, Ladd et al, USGS Prof. Paper No. 260-A, Part I, 1954. The reader is referred to this publication for more detailed information.

FRED, one of the principal islets of the atoll, is located at its southernmost extremity, immediately adjacent to the east side of Wide Passage. This crescent-shaped islet is oriented approximately northeast-southwest and measures some 2.6 miles long by 0.4 miles wide. The islet comprises some 0.8 square miles of dry land. The development of FRED as the principal permanent operational base has removed essentially all of its natural topographic features. It now consists of an essentially flat, graded, table some 11 feet above mean sea level. Only in the extreme northeastern portion of the islet are remnants of original relief still observed. An aircraft runway, numerous taxiways, aircraft parking areas and buildings occupy more than 90% of the western two-thirds of the islet. The eastern one-third of the islet is principally used for housing facilities for personnel. (See Figure 7.)

The seaward reef along the southeastern face of the islet is composed of four principal parts: (1) An Algal Ridge made up of small moderately well developed buttresses with small relatively straight and regular surge channels.

The ridge is approximately 50 feet wide and appears to be dead as a result of wartime damage and numerous fuel oil immersions. (2) The Outer Reef Flat is covered by 3 inches to 1 foot of water at low tide and consists of a flat of algal limestone covered with a soft velvety algal veneer and pitted with small depressions from a few inches to a foot or more in diameter. The outer reef flat is about 130 feet wide. (3) The Inner Reef Flat is exposed at low tide, rising gradually to about a foot above water level, and is covered over on its shoreward end with loose scattered cobbles. In some areas large blocks of the outer reef have been torn loose and lifted up onto the inner flat by the action of severe storms. (4) A Boulder Rampart makes up the very steep beach of cobbles. This feature is probably in large part artificial as a result of construction work on the islet, but the islet outline appears to have been changed very little. The lagoon beach which stretches along the northwestern face of FRED is a gently sloping scalloped beach made up largely of gravel and loose sand. In some areas, however, exposed rock is evident.

The original vegetation of FRED Islet has been almost completely destroyed as a result of the combined action of wartime assault and the postwar development of the islet. Only a few (six or seven) widely scattered mature cocopalms remain along the lagoon side of the western half of the islet. Additionally some scattered clumps of native Scaevola and of Messerschmidia remain in the easternmost end of the islet. In recent years some artificial planting has been accomplished, but at the present time these plantings do not appreciably alter the appearance of an almost completely barren islet.

ELMER, which is a principal islet of the atoll, is situated on its southeastern edge some 4 miles northwest of FRED and immediately adjacent to the southwestern edge of the Deep Entrance. This oblong islet is approximately 1.4 miles long and 0.3 miles wide; it consists of about 0.3 square miles of dry land. As in the case of FRED, the development of extensive permanent base facilities on ELMER has largely removed all traces of its former natural topography. It now consists of an essentially flat table some 11 feet above sea level. Housing facilities, technical installations and uncovered material storage areas cover more than 80% of this islet. (See Figure 8.)

The seaward reef and lagoon beach characteristics of ELMER are similar in almost all respects to those described in the case of FRED. An exception is the large well developed rock flat which appears at the northernmost end of ELMER and forms the inner beach-face in that locality.

BRUCE, a smaller islet, is located at the extreme eastern edge of Eniwetok Atoll, about 5 miles north-northeast of ELMER. This islet has two principal parts: the larger part, roughly square in shape, comprises the entire northern end of the islet; the smaller part, an irregular narrow strip separated from the main islet by a water-filled depression in the reef, is situated at the southern end. BRUCE is approximately 0.4 miles long by 0.2 miles wide and contains less than 0.1 square statute miles of dry land. The erection of several measuring installations has not to any great extent affected the natural topography of the islet. As will be seen from Figure 9, the islet consists of an essentially flat table-land which occupies the entire central portion of the islet and is about 12 feet above sea level. Along the lagoon side of this table, which slopes gently downward from its seaward edge toward the lagoon, are several small dune-like mounds which reach elevations of 13 to 15 feet. Most of the observations taken on BRUCE, including the traverse observations, were obtained in the vicinity of an abandoned steel-mat airstrip which runs across the central part of the islet as shown in Figure 9. This airstrip has been abandoned for five or six years and is now covered with a growth of grass and weeds but as yet has not been over-grown by heavier brush.

The sea reef comprising the eastern edge of BRUCE is characterised by the extensive development of lines of groins or rock bars, transverse to the reef edge. The reef itself may be divided into five zones: (1) The Algal Ridge which slopes gently seaward with no buttresses apparent. This zone is approximately 80 feet wide with numerous surge channels in the form of widely spaced cracks 1 to 4 feet wide and 1 to 5 feet deep that extend 50 feet or more beyond the ridge crest. The channel walls are straight-sided and smooth; the floor is eroded algal limestone, its surface wavy and bare except for sparse gravel and boulder nodules in shallow potholes. The crest of the ridge is gently rounded and lies a foot or more above low water. (2) The Algal Pavement consists of a flat pavement of *Porolithon*, mostly yellow and dying, under one foot or more of water. The pavement is about 66 feet wide. (3) The Reef Flat is of orange-yellow algal limestone veneered by a thin film of Foraminiferal sand and marine algae. The flat surface is barren and covered with 2 to 6 inches of water.

It is steep on the seaward side and gently sloping on the shore side. Corals are rare or entirely absent except in small pools. (4) The Rock Bar or Groin, which is about 1300 feet wide, is a lithified conglomorate, modified by erosion and solution to form a rough platform about 3 inches above low water level. To landward the base of the bar is lithified and on it is piled a mass of loose boulders of coral and algal limestone. Further shoreward the rubble grows finer and the last 500 feet of the groin is a gravel and sand bar. (5) A narrow channel separates the groin from the islet beach and is gravel covered. The water here is one to one and one half feet deep at low tide and during early flood tide. The maximum current through this channel reaches 2 knots. The lagoonward side of BRUCE is composed of a number of scalloped gravel and sand beaches which slope gently out to a wide partially submerged rock flat.

BRUCE is covered almost completely with native vegetation. A more complete description of the vegetation is given in Section 6.

YVONNE, a medium-sized islet, is located along the northeast face of Eniwetok Atoll about 6 miles north-northwest of BRUCE. It is an elongated single islet measuring about 1.7 miles long and about 0.2 miles wide. Its dry land area comprises about 0.3 square miles (Figure 10). For many years this islet has been used as a shot site. As a result considerable modification of its natural topography has been produced. It is today a low-lying sand-covered flat with numerous deep and large depressions extending down into the reef structure below and with numerous dune-like hummocks which reach heights of 15 to 20 feet above sea level. The seaward and lagoon reef and beach characteristics are similar to those described in the case of BRUCE. As a result of numerous nuclear detonations, the islet is entirely devoid of vegetation.

JANET is a principal islet of the atoll and is situated at its northernmost extremity. It lies some 11 miles northwest of YVONNE and is roughly triangular in shape. JANET measures some 1.1 miles in a northwest-southeast direction and some 0.7 miles in a northeast-southwest direction. It contains about 0.6 square miles of dry land (Figure 10). This islet has also been used during previous years as a shot site and as a result is largely devoid of vegetation and has an appreciably altered topography. The islet consists of an essentially pyramidal table at some 15 feet above sea level with numerous large pits and depressions located along its seaward sides.

The seaward reef off JANET is comprised of four principal zones: (1) The Algal Ridge, which consists of a zone of buttresses and surge channels comparable in general form to those described for BRUCE. The ridge as a whole is dark brown with a few pink or light brown areas, but the darker parts of the ridge are almost black. Surge channels and pothole-like depressions are floored with sand and well-rounded coral pebbles and boulders. The ridge zone is about 60 feet wide. (2) The Coral Zone is a rough rock flat with a relief of one foot or more and a width of about 140 feet. Living corals are very numerous near the ends of the surge channels but over the zone as a whole they probably do not cover more than 15% of the surface. Near the landward edge of the zone are scattered remnants of an older algal limestone that rises from six inches to a foot above low tide level. (3) The Rock Flat, which is about 910 feet wide, is a barren surface with many pools in pits and irregular depressions. The surface is rough near its seaward edge becoming smoother lagoonward with thin patches of sand. (4) The Beach Zone is covered with a fine ripple-marked sand at the edge of the rock flat. At higher levels the covering becomes coarser with worn coral heads commonly exceeding a foot in diameter. The lagoon beach at JANET is a broad gravel and sand beach sloping gently lagoonward and extending out into relatively deep water.

KEITH, a minor islet of the atoll, is located on its southwestern edge about 12 miles almost due west of FRED Islet and some 2-3 miles southeastward from Southwest Passage. KEITH is nearly teardrop shaped and measures about 0.3 miles long by 0.1 miles wide. It is oriented approximately northwest by southeast and consists of less than 0.1 square miles of dry land. No large installations have been placed on this islet and as a result both its natural topography and vegetation have remained largely undisturbed. A relatively narrow ridge, lying along the central axis of the islet and reaching heights above 13 feet above sea level, is the most prominent feature on this islet. The land slopes gently both lagoonward and seaward from this narrow ridge (Figure 11). As one proceeds along the ridge in a southeasterly direction it terminates near the center of the islet, where the land surface slopes steeply down to a nearly flat table-like area located about 5 feet above sea level. This table area comprises the entire southeastern half of the islet.

The seaward reef along the southwestern edge of KEITH can be divided into four principal zones. (1) The Terrace slopes seaward for some 100 to 300 feet, where at an apparent depth of 10 or 15 fathoms it drops off quite steeply. At its outer edge it consists of irregular lobate algal spurs, separated by wide deep canyon-like channels which extend far down below sea level. These are about 30 feet deep at the reef edge and continue seaward to the edge of the terrace. (2) The Algal Ridge does not rise to a well defined crest; instead there are scattered hummocks or mounds about 20 to 60 feet across that rise to a maximum of 1 foot above low tide level. The zone is about 200 feet wide. (3) The Reef Flat, which at low tide is covered with about 1 foot of water, is a floor of algal limestone, irregular and hummocky with sandy patches in the hollows. This zone is about 50 feet wide. (4) The Beach Rock Zone, which is about 30 feet wide, consists of a rough rock platform on which lie boulders and the bedded sandstone of the islet shore. The lagoon beach side of KEITH is composed of a sharply sloping and narrow sand beach which extends down to about low water level and there meets a flat of coral limestone which gradually slopes downward as one proceeds toward deeper lagoon water.

Heavy vegetation on KEITH is located principally on its northwestern half. A heavy stand of mature coconut trees dominates this area. The southeastern half of the islet supports only secondary brush-type vegetation, principally *Scaevola*. (*See* Section 6.)

MACK is an artificial site built upon a very large coral head which is located in the northeastern quadrant of the lagoon. MACK is approximately 7 miles due west of YVONNE and 8 miles due south of JANET. This site consists of a large platform some 10 feet above sea level upon which has been built a steel tower some 85 feet in height (Figure 12). There are no exposed land areas at this site.

6. VEGETATION

Eniwetok Atoll is considered on the basis of the vegetation to be one of the drier of the Marshall Islands. This is evidenced by the lack of ferns such as *Polypodium* and *Asplenium*, and of shrubs such as *Pipturus*, which are present on many of the other atolls. The paucity of bryophytes and foliose lichens above a meter or a meter and a half above the ground is further indication of the comparative dryness.

Even so, the atoll received sufficient moisture to maintain vegetation on almost all portions which are continuously above high tide. The character of this vegetation is a result of human activity and the bio-physical factors such as soil and underlying rock, waterlevel, and tolerances of individual species. It has not been possible to make a careful study of all of these factors. However, observations and suggested correlations may be of some value.

As would be expected on a group of small islets composed almost exclusively of coral and coralline sand with many fragments of mollusc shells, the vegetation is a strand vegetation with Scaevola frutescens and Messerschmidia argentea the most frequent shrubs or small trees. Where the soil is somewhat richer in organic matter Pisonia grandis, Guettarda speciosa and, on some islets, Cordia subcordata become more frequent. Coconuts occur in regular rows, having been planted by the Japanese or Marshallese Islanders. Beneath the trees, which may reach 60-70 feet in height, there are hundreds of sprouted nuts as well as seedlings and small plants of the more common shrubs and plants. Vines are an important adjunct to the vegetation along the margins of the tall shrub thickets or forest.

Broadly speaking, the vegetation may be described as composed of three relatively distinct "zones". The first of these is low, with the plants and shrubs not, or barely exceeding, one meter in height. The factor which seems to determine the presence of this type of vegetation is shallow sand or isolated sand spits separated from the main water lens of the islet. It is here that Triumfetta procumbens and Ipomoea pes-caprae, both trailing or creeping vines, reach their maximum development. Low, stunted or dwarfed Scaevola also occurs with patches of Lepturus forming open grass-mats on the higher or deeper-sandy spots.

The "tall shrub" type of vegetation, consisting of shrubs to five or six meters tall, occupies the major part of each islet. Scaevola frutescens and Messerschmidia argentea compose the greater portion of this shrub. Ipomoea tuba is generally found at the "contact" of this vegetation with the low strand vegetation. Somewhat richer soils support Guettarda speciosa, Cordia subcordata, and Terminalia littoralis.

Rocky-sandy spits, even though separated from the main water-lens, are occupied by this type of vegetation, but with Pemphis acidula as the nearly exclusive member. The individuals form a "scrub" or "chaparral" with open bare substrate between them.

The "forest", if this designation may be used, is restricted to those areas of the islets where the depth of the soil or rock substrate is such that a distinct "water-lens" only of brackish water is formed. Pisonia grandis is the major species, although Ochrosia oppositifolia and Cordia subcordata may, formerly, have reached their maximum development in this type of vegetation.

The coconut plantations were planted in the forest area where they were underlain by soil and in the high shrub type of vegetation.

Since there were two areas intensively studied, one on the windward, and one on the leeward, side of the atoll, it may be useful to describe and discuss these areas separately. These descriptions should be read in conjunction with Figures 13 and 14.

KEITH. Underlying the entire islet appears to be a shelf of consolidated coral sand and shell rock which has its upper surface at about the high tide level. This shelf rock is soft and easily broken and begins on the ocean side approximately at the beach. On the lagoon side it extends 100-200 feet lagoonward of the high tide line.

The southeast half of the islet forms a shallow basin about 1-2 feet above high tide level, enclosed by a sandy ridge 3-8 feet above the floor of the basin. Within the basin the high scrub in the chaparral are generally only 1-2 meters high, though occasional larger shrubs occur. The individuals are generally 5-10 meters apart and numerous seedlings are present. Messerschmidia and Scaevola are the only shrubby species found. They are subglobose in shape, with the lateral branches touching the ground. Between the shrubs may be found clumps of Tricholaena repens and Fimbristylis atollensis. The rim on the lagoon side carries the low vegetation with a preponderance of Scaevola, Triumfetta and Lepturus. On the lagoon side of the rim are distinct rows of Messerschmidia seedlings corresponding to windrows of seaweed (a greater portion of which is Turbinaria) washed up by the sea and the Trades.

The rim on the ocean side is covered by the high shrub Messerschmidia and Scaevola. Triumfetta and I. tuba occur as scattered plants and Lepturus is almost entirely absent. The beach slope is nearly bare, with only scattered clumps of Triumfetta.

The northwest side of the basin area rises rapidly to the high portion of the islet. Guettarda enters the composition of the shrub here, and is found in reduced numbers throughout the rest of the islet. The ocean side of the islet is underlain by broken rock of irregular sizes, filled between with sand. This area was not planted to coconuts and here the Pisonia reaches its maximum development in an open forest, with Boerhaavia forming the major part of the ground cover. The lagoon half of the high part of the islet is covered with deeper soil and coconuts have been planted. The high shrub forms a definite understory, but Terminalia is found only along the lagoon-side margins. In disturbed soils of this area the ephemeral weeds Portulaca oleracea and Fleurya ruderalis may be found. Pemphis acidula and Suriana maritima occur as isolated individuals on the high shrub margins of the high portion of the islet.

BRUCE. The islet of BRUCE is apparently underlain by a coral sand rock which has been mainly broken up into irregularly sized rocks under the islet itself, but is mainly unbroken in the shallow waters surrounding the islet.

The southeast portion of the islet is a long sand spit with a short perpendicular spit extending oceanward. The long spit is covered by the low vegetation with extensive open patches of Lepturus. Along the highest portion the Messerschmidia and Scaevola take on the character of the high shrub. The perpendicular spit which is covered by high tides has the high shrub Pemphis.

The main part of the islet is covered by the high shrub, and except for a band on the ocean side 10-20 meters broad had been entirely planted to coconuts. This band is underlain by the broken coral-sand rock with little soil or sand between. The Scaevola is the dominant shrub in this region with almost no ground cover and no vines. In back of this band the Messerschmidia becomes dominant. Here too, vines and ground cover is lacking. On the lagoon side of the islet there is apparently a greater accumulation of organic matter in the soil. Pisonia and Cordia nearly exclude the other shrubs. I. tuba forms a nearly continuous blanket on the margin.

An airstrip that had been cut out of the vegetation just southeast of the center and a road connecting the strip with the landing on the lagoon side near the northwest end form openings in this vegetation. The strip, which is no longer in use, and the road are covered or bordered by Fimbristylis in the open. In the shadier portions of these clearings the weedy grass Eragrostis and

Portulaca (P. oleracea and P. samoensis) form the ground cover. Boerhaavia is the principal ground cover under Pisonia and Cordia.

7. THE OBSERVATIONS

Four aspects of the observational program require consideration: the plan of observation, instrumentation, instrument exposure (including site details), and observational procedures. In addition to make the data collected in this study most useful it is necessary to estimate how reliable the different kinds of observations were. Except for the observational plan, all of these aspects of the observations are considered specifically in the detailed notes that accompany the Tables in Appendix I.

Plan of Observation: The intensive observational periods extended from 1200 August 18th through 1100, September 1st, 1957 and from 1200 January 25th through 1100, February 8th, 1958 (180th meridian time). The plan of observation is summarized in Table II. This plan was, in fact, followed reasonably closely with three principal exceptions: because of various difficulties that will not be described, there were days on which cloud photographs were not obtained and on which radarscope pictures were not obtained; and hygrothermograph records were not obtained for every day at all locations. In addition, a few of the 3-hourly observations were missed at KEITH and BRUCE, while at the northern islet sites (YVONNE and JANET) a few daily rainfall observations were missed. The tabular data in Appendix I show precisely what these various omissions were.

During the actual intensive observational periods, special traverses were made on BRUCE and KEITH to determine micro-scale variations in the dry- and wet-bulb temperatures and in the temperature of the ocean and lagoon water at shallow depths upon the reef. Despite their relative paucity, these supplemental observational data may prove of interest to some investigators.

The extensive observational phase covered two periods: from September 1, 1957 through January 24, 1958 and from February 9, 1958 through August 17, 1958. Throughout almost all of this period semi-monthly rainfall totals were obtained at BRUCE and KEITH and daily totals were obtained at FRED and ELMER. In addition, some additional rainfall readings were made on YVONNE, JANET, and MACK.

Organization of Observational Data: The bulk of the observational data are presented in the Tables of Appendix I, which contains its own Table of Contents,

TABLE II. OBSERVATIONAL PROGRAM DURING INTENSIVE OBSERVATIONAL PERIODS
(August 18 - September 1, 1957: January 25 - February 8, 1958)

Abbreviations:
O: Occasional
D: Daily
12: 12-hourly
3: 3-hourly
3D: 3-hourly, daylight hours only
2: 2-hourly
H: Hourly
C: Continuous recording

SITE OR ZONE	Air pressure	Dry bulb temperature	Wet bulb temperature	Surface wind	Rainfall	Maximum temperature	Minimum temperature	Sky Cover	Clouds	Ceiling	Humidity	Present Weather	Cloud photograph	Radarscope photograph	Rawinsonde	Surface water temperature
FRED (USAF)	H	H	H	H	D	D	D	H	H	H	-	H	-	3	12	-
ELMER	-	D	D	D	D	D	D	D	D	-	-	O	-	-	-	-
BRUCE	-	3	3	3	3	12	12	3	3D	-	C	O	3	-	-	-
KEITH	-	3	3	3	3	12	12	3	3D	-	C	O	3	-	-	-
MACK	-	D C	D	D	D	D	D	D	D	-	C	D	-	-	-	-
JANET	-	-	-	-	D	-	-	-	-	-	-	-	-	-	-	-
YVONNE*	-	-	-	-	D	-	-	-	-	-	-	-	-	-	-	-
LAGOON	-	D	D	-	-	-	-	O	O	-	-	O	-	-	-	D
OCEAN	-	O	O	-	-	-	-	O	O	-	-	O	-	-	-	O
MSTS SHIP**	2	2	2	2	-	-	-	2	2	-	-	2	O	O	-	O

* Second intensive period only.

** First intensive period only.

List of Abbreviations, Code Names and Symbols, and Notes. In using the data appearing in Appendix I reference should be made to the General Notes at the beginning of the Appendix as well as to the detailed, specific notes for the individual tables that are being used. Appendix II provides two Indices, one to the Radarscope Pictures; the other, to the Cloud Pictures. This Appendix also contains specific notes and states how copies of these pictures can be obtained on loan. Supplemental data sources are listed in Appendix III. All Figures and Plates referred to in the Appendices, as well as in the text, appear at the back of this publication and are listed on page ix.

APPENDIX I.

TABULAR PRESENTATION OF OBSERVATIONAL DATA

N.B. It is recommended that the data in this Appendix be used in conjunction with the corresponding Notes. These Notes describe the observational sites and procedures, specify the instruments used, and provide estimates of the extreme limits of accuracy of the observations. The accuracy limits given can be applied to estimate the significance of comparative observations as well as of any particular observation. In this connection it is noted that even in instances in which the extreme limits of accuracy exceed the difference between two observations, the difference may have some significance. Significance is related to the nature of the statistical populations from which the observations are drawn, a subject discussed in some detail in the references cited in Appendix III.

CONTENTS OF APPENDIX I.

Part D. Observational Data for Extensive Phase

(September, 1957 -- August, 1958)

APPENDIX I.

GENERAL NOTES

N. B. These General Notes should be consulted before utilizing any of the observational data of this Appendix. The General Notes describe the observational sites and instrument exposures on the various islets and at MACK, state the types of instruments used, and give the procedures used in making shipboard observations. Thus these Notes supplement the far broader descriptions of the various islets given in the text. The Specific Notes for the individual tables, as listed in the Table of Contents, Appendix I (preceding pages), should also be consulted before utilizing the data. The Specific Notes describe departures from general observational practices as stated in the General Notes, give estimates of the reliability of the observations, and provide specific comments that will be useful in interpreting the observational data.

Observation Sites, Instrumentation, and Instrument Exposures at Land Stations and at MACK

FRED

Site Description: Figure 7 shows the location of buildings and of instruments on FRED. The shelter, raingages, special anemometer, and the tower on which the regular anemometer was located were all surrounded by barren ground composed of coral sand and gravel. The tower, however, was immediately adjacent to a surfaced taxi-way that was an apron of the main runway.

Instruments:

(a) Raingages: Standard 8-inch raingages were used at both locations 1 and 2. Raingage 2 was located about 15 yards SW of a 2-story building and it was this gage that was used for regular observations at the USAF weather station up until February 1, 1958. The gage appeared to be in too sheltered a location with reference to the tradewinds; and for this reason gage 1 was established at a distance of about 60 yards from the building. On February 1 this new location was adopted as the location of the official gage, and effective that date there were rainfall readings only from this one point.

(b) The shelter was of the standard Cotton Region type, with the door facing NNW.

(c) The direct reading dry-bulb thermometer was a mercury-in-glass instrument of the standard tropical type (USAF tropical thermometer). It was graduated in half-degrees Fahrenheit.

(d) The wet-bulb thermometer was a jacketed variety of the dry-bulb, mounted in the shelter on a standard hand-crank apparatus.

(e) Both anemometers were standard 3-cup instruments. Anemometer #1 was an instrument that showed total nautical miles of wind on a dial that was read directly. This anemometer was mounted on a special mast at a height of 11 feet above the ground (18-20 feet above mean sea level). Anemometer #2 was a recording (triple-register) instrument mounted on the tower at a height of 33 feet above the ground (41-43 feet above mean sea level).

(f) Barometry was based on a standard mercury instrument that was used to check daily the recording microbarograph from which the observational values were obtained. Values are given here in terms of station pressure, which represents a height of 19 feet above mean sea level.

(g) A GMD-1a was used for rawinsonde observations.

(h) The radarscope was a CPS/9.

BRUCE

Site Description: Figures 9 and 14 show the location of instruments on BRUCE and Plate I shows views of these instruments. These figures and the photographs in the Plate give detailed information as to the nature and distribution of ground cover and as to the topography (very minor relief) of the Islet. The ground was predominantly barren beneath the anemometer, the shelter, and the raingages and consisted of beach-rock covered by a veneer of coralline sand and gravel.

Instruments:

(a) Raingages: Standard 8-inch gages were used at both the Ocean and Lagoon sites.

(b) The shelter was of the standard Cotton Region type, with the door facing north.

(c) The anemometer was a 3-cup instrument with a totalizing dial (values given in nautical miles). It was mounted on a special mast at a height of 11 feet above the ground (18-20 feet above mean sea level).

(d) Maximum and minimum thermometers were mounted in the shelter in the standard manner (on the cross-beam, just forward of the back of the shelter, facing the door). These were standard Weather Bureau instruments: mercury-in-glass and alcohol-in-glass.

(e) A standard hygrothermograph was kept in the shelter. This was a Friez recording instrument, with a 7-day setting (7-day chart), and with a hair-and-lever mechanism for recording relative humidity.

(f) Direct dry-bulb and wet-bulb temperature readings were made using a Friez psychron (mercury-in-glass thermometers graduated in whole-degrees Fahrenheit and mounted in a unit with a battery-driven fan). The psychron was placed in the shelter and the reading was made at the time of lowest wet-bulb reading.

KEITH

Site Description: Figures 11 and 13 show the location of instruments on KEITH and Plate II shows views of these instruments. These figures and the photographs in the Plate give detailed information as to the nature and distribution of ground cover and as to topography. The ground was barren beneath the shelter, anemometer, and raingage, and consisted of beach-rock covered by a thin veneer of coralline sand and gravel.

Instruments:

The instruments used were identical with those for BRUCE (above). Figures 11 and 13 and Plate II provide information concerning instrument exposure.

ELMER

Site Description: Observations were made at two different sites. Through February 28, 1958, observations were made near the northeastern end of ELMER, with the raingage and the shelter in a large open area lying between a tank farm (to the NE) and quonset huts (to the SW). Effective March 1st, rainfall observations were taken near the dispatchers shack at the airstrip toward the SW side of ELMER. At both sites, the instruments were well out in the open and were underlain by barren ground consisting of coralline sand and gravel. Shelter and raingage locations with reference to buildings are shown in Figure 8.

Instruments:

(a) The shelter was mounted on a post at a medial height of $5\frac{1}{2}$ feet. It was 2X2X1 ft. with the 1 ft. length applying to the depth. The door, which faced NE, was full and hinged to swing upward. The shelter was made of light wood except for the back, which was masonite. The door was fully louvred, but the other five interior faces were solid.

(b) The maximum and minimum thermometer was of the U-type (mercury-in-glass) with a magnet for re-setting the rider. It was graduated in whole-degrees Fahrenheit. The thermometer was mounted on an upright post in the shelter.

(c) The raingage was a standard 8-inch one.

(d) Direct dry-bulb and wet-bulb readings were taken using a Friez psychron (mercury-in-glass thermometers graduated in whole-degrees Fahrenheit and mounted in a unit with a battery-driven fan). Psychron readings were made outside the shelter, in the shade, at a 5-foot height with the observer standing to leeward of the psychron.

(e) A standard recording hygrothermograph was maintained in the shelter (see description of this instrument under BRUCE instrumentation, above).

MACK

Site Description: This tower site is diagrammed in Figure 12. The raingage and shelter, whose location is also shown in this figure, were located on a side platform immediately to the south of the tower and at a height of 17½ feet above mean low lagoon water.

Instruments:

(a) The standard, 8-inch raingage was at the extreme SE edge of the platform. Because it was only four feet south of the standard shelter, the catch was probably biased due to eddies, especially when rainfall occurred with a north wind.

(b) The instrument shelter was of the standard Cotton Region type with the door on the west side.

(c) Maximum and minimum thermometers, the hygrothermograph, and the psychron for direct reading of dry-bulb and wet-bulb temperatures were of the same kinds that were used at KEITH and BRUCE (see above).

JANET AND YVONNE

Only standard 8-inch raingages were installed on these islets. In both instances they were placed on level terrain comprised of coralline sand and gravel with beach-rock beneath. Both were well exposed, with no obstruction of any kind within 100 yards. Their locations are shown in Figure 10.

Shipboard Observations

LAGOON TRAVERSES

Lagoon traverses were made on M-boats (LCMs). Water temperatures were measured through making hauls in a canvas bucket, the hauls being made on the windward side of the boat, 1-3 yards to the stern of mid-ship, well forward from the exhaust. Upon completing the haul, the bucket was placed in the shade of the steering-house and a thermometer was placed in the water with its bulb at a depth of 6-10 inches and held there until the mercury reached its lowest point. Except where otherwise noted in the Specific Table Notes that follow, the thermometer that was used was a special water thermometer, graduated in tenths of a degree Fahrenheit and mounted on a wooden backing with a perforated brass shield surrounding the thermometer bulb at a distance from the bulb of about 2/3 inch. Thus the bulb was shielded from the sun but was fully exposed to the water. Dry-bulb and wet-bulb air temperatures were obtained from the deck of the boat on the windward side well forward of the exhaust with the instrument shielded from the direct rays of the sun. Except where otherwise noted, observations were made with a psychron (see instrument description under BRUCE, above); and whether or not a psychron was used the observations were made at a height of about 5 feet above the deck or a total height of about 11 feet above the water.

OCEAN TRAVERSES

Ocean traverses were made on a crash-boat (AVP), with the observations being made forward, almost to the bow. As in the case of the lagoon observations (see above), water temperatures were obtained through bucket hauls and air temperatures (dry-bulb and wet-bulb) were obtained using a psychron. Air temperatures were taken at a height of about 5 feet above the forward (cockpit) deck, or about 7 feet above the water.

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Air temperature observations were from instruments in a louvred shelter on the port bridge wing, at a height of about 30 feet above the water. Thermometers were probably alcohol-in-glass, though this cannot be checked absolutely. Air pressure was from a Taylor aneroid located in the chart room. It was temperature-compensated in 1954 and corrections during 1954-1958 (inclusive) have not exceeded 0.05 inch. Water temperatures were standard intake temperatures.

Part A. General Tables

NOTES: TABLES 1-3

TABLE 1. ABBREVIATIONS, CODE NAMES, AND SYMBOLS.

This Table is self-explanatory. With one exception it lists all abbreviations, code names, and symbols used in the text and in the Tables. The exception is the code names for locations other than OSCAR, REX, and SAM. The remaining code names used herein are shown in Figure 1.

TABLE 2. ENIWETOK ATOLL: HIGH AND LOW TIDES, SUNRISE AND SUNSET.

All times given are 180th meridian. Tidal heights are correct to 0.1 foot at the northwest end of FRED, on the lagoon side, where the tide gage is located. Heights vary only by a few inches from one to another islet, not including the effect of piling up of water by wind. From the observations of surveyers at Eniwetok (personal communication), it is judged that with moderate to strong tradewinds blowing there is an increase in tide height of from 1 to 2 feet along the east coasts of the islets, this increase being above that observed at the tide gage. This increase occurs on the lagoon side of the western islets as well as on the ocean side of the eastern islets.

As for currents in the lagoon, according to H. O. Pub. No. 165A, Sailing Directions for the Pacific Islands (1952), "In Deep Entrance a maximum flood current of 2 knots, setting westward, occurs 2 hours after low tide. A maximum ebb of 1¼ knots, setting southeastward, occurs 50 minutes after high tide. Slack water occurs 40 minutes before low tide, and 20 minutes after high tide. . . . . In Wide Passage a maximum flood current of 1 knot, setting westward; occurs 1h. 10m. after high tide. A maximum ebb of 0.7 knot, setting 210°, occurs 2h. 27m. before low tide. Slack water occurs 2h. 48m. after high tide, and 1h. 28m. before low tide."

Sunrise and sunset are defined in the standard manner the times being given as those "at which the upper edge of the Sun's disk is actually seen on a regular and unobstructed horizon, under normal atmospheric conditions, by an observer at zero elevation above the Earth's surface in a level region." (Introduction to Tables of Sunrise, Sunset, and Twilight, U. S. Naval Observatory, Washington, D. C.)

TABLE 3. FRED: NAUTICAL MILES OF WIND (NOON TO NOON, 180TH MERIDIAN).

The low level anemometer was at the same height as those on BRUCE and KEITH. During the first Intensive Phase of the study (August-September, 1957) these three anemometers were compared both before and after the 2-week observational period. Comparisons were made through mounting each anemometer on a 6-foot pole and placing these along the beach on ELMER, with the anemometers aligned up-beach one from the other at successive distances of about 10 feet. The anemometers were rotated as to position and the total values were compared. 5-6 hours was allotted for each comparative run. Results of the inter-calibrations, before and after the observational period, were as follows (in percent of wind totals):

BEFORE: FRED and KEITH anemometers agreed consistently within 4%, with the FRED anemometer consistently the higher.

BRUCE anemometer consistently the lowest of the three, with the values ranging from 25-33% of the mean of FRED and KEITH.

AFTER: FRED consistently higher than BRUCE by 1-2%.

KEITH consistently 2-15% lower than the mean of FRED and BRUCE.

After the second calibration run, it was discovered that a nut had fallen into the housing of the KEITH anemometer. When this occurred is not known.

During the second Intensive Phase (January-February, 1958) there was no low-level anemometer at FRED, since it was found that one of the three totalizing anemometers was broken and it was decided to retain the wind measurements on BRUCE and KEITH, rather than FRED. Circumstances did not permit making calibration runs prior to this second observational period, but runs made afterward showed that the BRUCE and KEITH anemometers agreed within 10%. It is not known which, if either, anemometer was consistently higher.

NOTE: This comparative table for FRED may permit an estimate of low-level wind conditions during the second Intensive Phase through reducing the wind readings at the FRED tower (high level) by a factor of 22%. It should be noted, however, that Table 3 shows a general tendency for closer agreement between the high and low anemometers when winds are higher than when winds are lower; and since winds were decidedly higher during January-February than during August-September, this reduction coefficient should probably be decreased somewhat.

ABBREVIATIONS, CODE NAMES, AND SYMBOLS

TABLE 1

(For further details see NOTES for individual tables.)

Ac	Altocumulus
As	Altostratus
b	Cloud height determined by balloon.
C	Calm
Cb	Cumulonimbus (thunderstorm) cloud
Cc	Cirrocumulus
C_H	High cloud
Ci	Cirrus
C_L	Low cloud
C_{LMH}	Clouds: low, middle, high
C_M	Middle cloud
Cs	Cirrostratus
Cu	Cumulus
DD	Wind direction (to points of the compass or in tens of degrees)
DDFF	Wind direction (to points of the compass or tens of degrees) and windspeed (in knots unless otherwise specified)
e	Cloud height estimated
FF_3	Mean windspeed in knots over three hours ending at observation time.
m	Cloud height measured (with ceiling light or ceilometer)
M	Observation missing because of technical difficulty.
MB	Motor-boating. Humidity too low to be measured accurately. (Estimated value given in parentheses.)
N	Total sky cover (in tenths)
N_8	Total sky cover (in eighths)
N_O	Total opaque sky cover (in tenths)
OSCAR	Name of lagoon tower SE of MACK. (see map)
P	Surface air pressure, at station height
REX	Very small islet 3/4 mile NNW of ELMER (on northern edge of deep entrance).
RH	Relative humidity (in percent)
RR	Rainfall amount since last observation or for period shown.
RR_L	Rainfall at gage on lagoon side of BRUCE.
RR_O	Rainfall at gage on ocean side of BRUCE.
SAM	A very small islet on the eastern reef 1-7/8 miles NNW of BRUCE.
Sand Island	Small sand islet between ELMER and FRED.
Sc	Stratocumulus
SEA (code)	State of Sea is given in code according to the following scale: 0 - Calm sea, less than 1 foot 1 - Smooth sea, 1-2 feet 2 - Slight sea, 2-3 feet, occasional small whitecaps 3 - Moderate sea, 3-5 feet, sustained whitecaps 4 - Rough sea, 5-8 feet, large waves, large sustained whitecaps
St	Stratus
T	Trace of rainfall (less than 0.01 inch)
TT	Dry bulb temperature (in Fahrenheit unless °C specified, when in centigrade)
T_dT_d	Dewpoint temperature
T_nT_n	Minimum temperature since time of last observation of minimum.
TT_s	Surface sea water temperature
TT_w	Wet bulb temperature
T_xT_x	Maximum temperature since time of last observation of maximum.
WX	Present weather
ϑ	Bearing in degrees
( )	Approximate value, or when used with cloud type indicates less than one-tenth.
?	Approximate value, or (for cloud type) identification uncertain.

PLACE: ENIWETOK ATOLL HIGH AND LOW TIDES, SUNRISE AND SUNSET TABLE 2

TIDES

DATE	TIME	HEIGHT* (ft.)	DATE	TIME	HEIGHT* (ft.)
8/18/57	0200	1.8	1/25/58	0054	0.6
	0753	3.4		0701	3.8
	1407	1.7		1257	1.6
	2041	3.5		1904	4.9
8/19/57	0307	2.1	1/26/58	0122	1.1
	0852	3.0		0734	3.6
	1509	1.9		1329	1.5
	2210	3.4		1934	3.6
8/20/57	0518	2.2	1/27/58	0152	1.4
	1101	2.8		0812	3.5
	1710	2.1		1411	1.8
				2009	3.3
8/21/57	0010	3.5	1/28/58	0239	1.6
	0714	1.9		0905	3.3
	1308	3.0		1512	2.1
	1858	1.8		2102	2.9
8/22/57	0131	3.9	1/29/58	0329	1.8
	0812	1.5		1035	3.1
	1410	3.4		1719	2.2
	2002	1.5		2300	2.8
8/23/57	0224	4.3	1/30/58	0518	2.0
	0856	1.1		1231	3.3
	1455	3.8		1924	1.9
	2051	1.1			
8/24/57	0309	4.7	1/31/58	0111	2.1
	0934	0.7		0700	1.8
	1534	4.2		1343	3.7
	2134	0.7		2022	1.5
8/25/57	0349	5.0	2/1/58	0217	3.2
	1010	0.5		0803	1.5
	1612	4.5		1433	4.1
	2215	0.5		2103	1.2
8/26/57	0428	5.2	2/2/58	0302	3.5
	1045	0.3		0850	1.2
	1648	4.8		1513	4.5
	2254	0.4		2140	0.8
8/27/57	0505	5.1	2/3/58	0340	3.8
	1120	0.3		0931	0.8
	1724	4.8		1551	4.8
	2332	0.4		2215	0.5
8/28/57	0542	4.9	2/4/58	0415	4.2
	1153	0.5		1011	0.5
	1800	4.7		1628	5.0
				2250	0.3
8/29/57	0010	0.6	2/5/58	0451	4.4
	0617	4.5		1049	0.4
	1227	0.8		1705	5.1
	1837	4.5		2323	0.2

PLACE: ENIWETOK ATOLL HIGH AND LOW TIDES, SUNRISE AND SUNSET TABLE 2 (Concluded)

TIDES

DATE	TIME	HEIGHT* (ft.)	DATE	TIME	HEIGHT* (ft.)
8/30/57	0050	0.9	2/6/58	0527	4.5
	0654	4.2		1127	0.4
	1300	1.1		1741	5.0
	1916	4.2		2357	0.3
8/31/57	0132	1.4	2/7/58	0603	4.5
	0730	3.7		1205	0.5
	1334	1.5		1818	4.8
	1958	3.8			
9/1/57	0223	1.8	2/8/58	0033	0.5
	0812	3.2		0640	4.4
	1414	1.8		1245	0.7
	2058	3.5		1855	4.4

SUN

DATES	SUNRISE**	SUNSET**
8/18 - 9/1/57	0700	1930 - 1920
1/25 - 2/8/58	0735	1910 - 1915

* Tide height above ½ ft. below mean low water springs for Kwajalein. Source: U. S. Coast and Geodetic Survey, Tide Tables, Central and Western Pacific Ocean and Indian Ocean, 1958 (Wash. D. C., Gov't Prtg. Office).

** To nearest five minutes, 180th Meridian time.

PLACE: FRED

NAUTICAL MILES OF WIND (NOON TO NOON, 180th MERIDIAN)
- COMPARATIVE VALUES -

TABLE 3

DATE	ANEMOMETER #1 (On ground-based mast)	ANEMOMETER #2 (On tower)
18 - 19 August, 1957	92.2	176.0
19 - 20 August, 1957	217.5	283.0
20 - 21 August, 1957	235.4	254.0
21 - 22 August, 1957	181.9	218.0
22 - 23 August, 1957	180.5	259.0
23 - 24 August, 1957	288.5	262.0
24 - 25 August, 1957	131.8	219.0
25 - 26 August, 1957	51.0	110.0
26 - 27 August, 1957	187.5	212.0
27 - 28 August, 1957	208.5	218.0
28 - 29 August, 1957	154.0	210.0
29 - 30 August, 1957	143.1	251.0
30 August - 1 September, 1957*	417.7	526.0
	2489.6	3198.0

*To 0900, 1 September.

Part B. Observational Data, First Intensive Phase (August 18 -- September 1, 1957)

NOTES: TABLES 4-18

TABLE 4. FRED: HOURLY OBSERVATIONS AND DAILY SUMMARY.

These Notes apply both to Table 4 and Table 19, which presents similar observational data for the second Intensive Phase.

P represents station pressure and is given to thousandths of an inch, with the units and tens omitted. In Tables 4 and 19, all values are preceded by 29, except 000, which represents 30.000. The mercurial barometer (used daily to check the microbarograph) was calibrated January 30, 1958 and found to be 0.020 inch too low. This value should be added to those shown in the Tables. In addition, unreliability is introduced because the hourly values were read from the microbarograph and because of the lag in this instrument. Allowing for this factor, after 0.020 has been added to the values, the resulting values will all be correct within 0.020 (plus or minus) and half of the resulting values will be correct within 0.004.[1]

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[1]The extreme error of 0.020 represents the maximum 10-minute change that may be expected at Eniwetok, considering both the diurnal pressure curve and the changing synoptic situations. (More rapid change might accompany approach of a typhoon or an intense tropical storm, but such did not occur during these observational periods.) The ten minute period represents the maximum time-lag between the mercurial barometer and the microbarograph at times when the pressure is changing rapidly. (When it is changing very slowly the lag may be greater, but then the error amplitude is diminished very appreciably.) The value 0.004 is based on the assumption that rates of change of pressure over 5-10 minute periods are distributed normally about their mean. Finally, it should be noted that these error estimates allow for the fact that often in actual practice observers do not tap the microbarograph to permit the pen to adjust to the current pressure.

TT and TT_W were to be read to 0.1° F. according to standard instructions. It is evident, however, from the very high frequency of values ending in .0 or .5 that the observers usually read the temperature to the nearest graduated mark (.0 or .5). Allowing for this fact and for an extreme instrumental error of 0.3°, all values are correct within 0.5°.[2]

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[2]This assumes there is no consistent bias, either instrumental or human, and that in borderline cases the observer can discriminate to 0.1°.

RH is a calculated value based on TT and TT_w. (P is an insignificant factor for our purposes.) It follows that for the dry-bulb and wet-bulb temperatures experienced at Eniwetok all RH values are correct within 6%, and 9 out of 10 are correct within 4% (assuming normal error distribution and allowing for 1% error in conversion).

N is probably too high, especially at night, in all instances in which it largely depends on an observation of 10 Cs. An exception would be when 10 Cs was also observed at one of the other stations (BRUCE, KEITH, ELMER or MACK). It is noted that 10Cs was seldom reported at these other Eniwetok locations and that at several widely scattered stations in the tropical Pacific that take rawinsondes it has become customary to enter 10 Cs persistently on the primary basis of presence of a moist layer high aloft and on a secondary basis of real or imagined visual observations, including a slight diminution of starlight that can equally well be attributed to the high moisture content of the lower air.

Cloud observations involving 10 Cs are not always reliable, as noted above. Low cloud heights are probably correct within 200 feet during daylight because of the high frequency of local air traffic. At night they are probably correct within 400 feet. Estimated middle cloud heights are probably correct within 2000 feet. All cloud-height values are given in hundreds of feet. Thus the entry "18" represents 1800 feet. Direction of cloud movement is to four points of the compass.

DDFF is given to 16 points of the compass, with speed in knots for one-minute intervals. Assuming no persistent bias, speeds are correct within 10% and directions are correct within 1 point (plus or minus).

T_xT_x and T_nT_n were taken from the hourly values. For this reason, on afternoons with few clouds the true T_xT_x may have been as much as 1° higher than those shown; while during the nighttime and very early morning T_nT_n may have been as much as 1° lower than the values shown whenever there were showers. (Lowest temperatures on tropical atolls are apt to occur momentarily during showers, evidently because of overturning of the air combined with the effect of evaporation.) This source of unreliability is additive to that for TT (above).

RR is accurate within 0.01 inch, assuming care was taken in the observations. In any event, the representativeness of the catch is a factor that lowers the reliability decidedly more than do any inaccuracies in measurement. (See Table 34 and the notes therefor. These make it clear that RR values in Table 4 are decidedly too low.)

TIMES OF RAINFALL are biased by one to a few minutes in that there was no recording gage and the observer would seldom notice to the minute (especially at night) the exact time of inception or termination of rain.

TABLE 5. FRED: RAWINSONDE OBSERVATIONS.

These Notes apply also to Table 20.

Date and Time refer to the 180th meridian. Where the time given is precisely 0000 or 1200 it represents the scheduled release time and may be in error by as much as 15 minutes. Otherwise, it is almost certainly correct within 5 minutes.

Level is correct within 5 mb., except for the more accurate surface value, which is taken from the station barometer (see Notes for Table 4).

Height values are correct within 20 m. for levels between 850 and 600 mb. (inclusive); within 30 m. between 500 and 300; within 50 m. at 200; and within 100 m. at 150 and 100 mb. These inaccuracies are in addition to those associated solely with estimating the pressure level (see above).

TT is correct within 1° C. up to 300 mb. and within 2° above 300 mb., assuming no gross instrument failure and no major error on the part of the observer.

RH is correct within 10% and most values are correct within 5%, except when values are in parentheses, when RH may be in error by as much as 20%.

DD is given to the nearest 10° and about 95% of the values shown give the true value to the nearest 10° interval. The remaining 5% are in error by a full 10° step.[3]

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[3]The values by 10° intervals are based on more accurate readings half of which may be in error by 1° or more. The 5% figure is based on the assumption that the error distribution is normal.

FF values are correct within 10-15%, the accuracy being greatest at lowest heights and least at greatest heights.

NOTE: The above estimates of the reliability of the various observations are based on considering both instrumental and observer errors, not including any consistent bias. Thus such factors were considered as accuracy of elevation and azimuth angles (instrumental) and the fact that in plotting there were inaccuracies introduced by the thickness of pencil lines.

TABLE 6. BRUCE: THREE-HOURLY OBSERVATIONS.

These Notes apply also to Tables 8, 21, and 24.

Date and Time refer to 180th meridian, and times given are correct within 5 minutes.

TT, TT_w, T_xT_x, and T_nT_n were all checked, one against the others, and minor adjustments were made in some instances in accordance with the following rules. Direct reading dry-bulb and wet-bulb temperatures were taken as being correct except in two instances (for all Tables listed above), when a dry-bulb reading was obviously off by 5 degrees as indicated both by the recording hygrothermograph and the extreme thermometers. Where direct comparison immediately after re-setting showed consistently that a maximum or minimum thermometer differed from the direct-reading thermometer, the maximum or minimum value was corrected accordingly. Thus the minimum thermometer on KEITH during the first Intensive Phase was found to read 1° F. too low, and was consistently corrected by this amount. Except where otherwise noted in the Tables, all thermometers were read to the nearest half degree (values to the nearest .0 or .5). Since the psychron thermometers are designed and manufactured to be correct within 0.3° F. and since these were taken as being standard, the values are correct to within 0.5° F. (see Notes, Table 4).

RR values are correct within 0.01, not allowing for any sampling bias associated with exposure. The authors believe that the gages were well exposed and that there was no appreciable sampling bias due to exposure. The user of these data can judge from Figures 13 and 14 and from information in the text whether or not he agrees with this conclusion.

N is given in tenths, and except where the value is followed by "?" or is qualified by the Remarks, is correct within 0.1. Thus 0.5, representing the observer's best estimate, indicates a real value lying between 0.4 and 0.6, inclusive. It should be noted that N at these stations is often lower than N as observed at FRED because while FRED often reported 10Cs, BRUCE and KEITH seldom did so. Probably the FRED observation is in error in these instances (see Notes for Table 4).

C_{LMH} is a more or less accurate classification of cloud types and amounts, the accuracy varying with the observer. Some of the observers were inexperienced, having been trained in cloud observations only for a few hours prior to the start of the first observational period. Others were skilled observers, with many years of experience as well as thorough training. In general, the cloud identifications of the unskilled observers were nearly always correct with reference to recognition of cumulus and cirrus (undifferentiated); but probably they sometimes failed to recognize strato-cumulus, and particular types of cirrus and they probably sometimes confused altocumulus and cirro-cumulus or alto-stratus and cirro-stratus. Therefore in utilizing these observational data, reference should be made to the cloud photographs, to observations made simultaneously from other islets (including FRED), and to the following tabulation, which shows which observations in Table 6 were made by experienced observers.

Experienced observers made the observations at BRUCE during these intervals (all times are inclusive): 1200 Aug 24 -- 0900 Aug 25; 1200 Aug 26 -- 0900 Aug 27; 1200 Aug 28 -- 0900 Aug 29.

FF_3 gives mean windspeed in knots over the past three hours (since the time of last observation). The value shown was computed from the dial readings and was rounded off to the nearest whole knot. Fòr a discussion of anemometer calibrations, see Notes for Table 3.

DDFF gives wind direction to 8 points of the compass and windspeed in descriptive terms or in knots. Where descriptive terms or a range in knots is given, the windspeed was estimated by the observer. Where a single windspeed value is given it represents speed to the nearest knot as determined from the anemometer dial readings at the beginning and ending of one minute, unless some other time interval is specified in the Table. Descriptive terms follow the Beaufort phraseology. Estimated amounts (covering a range of speeds) are correct within 20% of the extremes shown where estimates were made by experienced observers (see above); otherwise, they are judged to be correct within 40%.

Times of beginning and end of rain are biased in the direction of giving too late a time in many instances. In this a distinction must be made between daytime and nighttime values. Daytime values are probably correct within 5 minutes. Nighttime values may be in error by as much as 30 minutes and there may well have been light showers that were not detected at night since the observer was often asleep. (On behalf of the observer it must be stated that these were 24- or 48-hour watches, with the observer alone on the islet.) Times of occurrence of phenomena other than beginning or end of rain are probably correct within 5 minutes. Here also, however, a distinction must be made between daytime and nighttime: There may well have been special phenomena that were not detected at night, not only because of poor visibility but also because the observer was in his tent asleep.

TABLE 7. BRUCE: SPECIAL OBSERVATIONS.

Date and Time refer to 180th meridian. Times are absolutely correct to within 5 minutes (allowing for error in setting of observer's watch) and are relatively correct (compared with one another) within 1 minute.

TT and TT_W were measured with a psychron, the instrument being held into the wind with the bulb shielded. Temperatures were estimated to the nearest tenth of a degree F. and are correct within 0.5° F.

Heights were estimated and are correct within 6 inches for the 5- and 3-foot heights and within 3 inches for the one-foot height.

TT_S was measured with an unshielded thermometer, graduated in half-degrees Centigrade. Readings were estimated to the nearest tenth degree C. and were converted to the nearest tenth degree F. The thermometer was held with the bulb continuously below the water surface, at a depth of 3-6 inches. It is difficult to estimate what the accuracy of these observations was, but assuming that the instrument was correct within 0.2° C., that the observer's readings were correct within 0.2° C., that neither of these possible sources of error was consistently biased, and that both errors were distributed normally then 9 values out of 10 are correct within 0.3° F. and all are correct within 0.7° F.

TABLE 8. KEITH: THREE-HOURLY OBSERVATIONS.

See Notes for Table 6.

Experienced observers made the cloud and other observations during the following intervals (times are inclusive): 1200 Aug 18 -- 0900 Aug 19; 1200 Aug 21 -- 0900 Aug 23; 1200 Aug 26 -- 0900 Aug 27; 1200 Aug 28 -- 0900 Aug 29; 1200 Aug 30 -- 0900 Aug 31.

TABLE 9. KEITH: HOURLY RELATIVE HUMIDITIES.

This Note applies also to Tables 22 and 25.

The three-hourly values (0300, 0600, etc.) are based on direct dry-bulb and wet-bulb readings (Table 8). The remaining values are taken from hygrothermograph charts, with adjustments in absolute trace readings being made to fit the three-hourly values. The three-hourly values are all correct within 6% and 9 out of 10 are correct within 4% (see Notes, Table 4). For intermediate hourly values, these errors increase to 8% and 5%. Further, at values in the 80s there is a small bias -- about 1% -- in the direction of giving values that are too low; while in the 90s there is similar bias of about 2%.

Since the hygrothermograph was checked regularly (usually daily and at least every other day) times are correct within 15 minutes.

TABLE 10. MACK: DAILY OBSERVATIONS.

This Note applies also to Table 26.

The Notes for Table 6 apply for all items except RR, DDFF, Sea, and Remarks. Cloud, wind, sea, and other observations were made by experienced observers on all dates except August 26th through 29th.

RR. Unavoidably, the raingage was not well exposed (see General Notes and Figure 7). Therefore readings may be in error by as much as 20%, with values probably tending to be too low when the wind at time of rainfall was between NNW and NNE and too high when it was between SSW and SSE.

DDFF gives wind direction to 8 points and windspeed in knots. These are estimates only. Where a range in knots is given, the values may be taken as being correct within 20% of the extremes when the observer was experienced or 40% when he was not. Where a single speed figure is given, the values may be taken as being correct within 30% when the observer was experienced or 60% when he was not.

SEA conditions are described in the Remarks in instances in which there was any doubt as to what standard code number to apply.

Remarks give dry-bulb and wet-bulb readings on Platforms #1, 2, and 3. Platform #1 is the small, low platform at the southwest corner of FRED. Platform #2 is the large middle platform on the northern side, which has upon it the small shelter house. Platform #3 is that on the south side, on which the shelter and raingage were mounted. (See Figure 7.) These platform temperature observations were taken with a psychron at a height of 5 feet (plus or minus 6 inches) above the platform itself. The values are correct within 0.5° F.

TABLE 11. MACK: BI-HOURLY TEMPERATURES AND RELATIVE HUMIDITIES.

This Note applies also to Table 27.

For humidity values, the direct once-a-day RH derived from direct dry-bulb and wet-bulb readings were taken as being correct and the trace curve of the hygrothermograph was where necessary adjusted accordingly. Similarly, the thermograph trace was adjusted where necessary to fit the direct dry-bulb reading and also the maximum and minimum thermometer readings. In both instances the necessary adjustments (both for the first and second Intensive Phase), amounted to not more than 4% for RH or 2° F. for dry-bulb temperature. Usually, they were less than 2% and 1°.

It is estimated that all RH values are correct within 8% and that 9 out of 10 are correct within 5%. There was no discernible bias in the RH chart values at MACK for values below 90%. Above 90%, however, there appears to have been a bias of 1-2%, with the values being too low by this amount and with the greater bias at the higher values.

It is estimated that bi-hourly temperatures are correct within 1.5° F., an estimate based on the closeness of agreement with direct reading temperatures and with maximum and minimum thermometer readings. There is no evidence of bias in the thermograph trace.

Since the hygrothermograph was checked regularly (usually daily and at least every other day), times are correct within 15 minutes.

TABLE 12. ELMER: DAILY OBSERVATIONS.

These Notes apply also to Table 28.

Time refers to 180th meridian and is correct within 5 minutes.

TT and TT_w are given to the nearest 0.5° F. (.0 or .5) and are correct within 0.5°.

T_xT_x and T_nT_n are correct within 1° F. They were read to the nearest 0.5° (.0 or .5).

RR is correct within 0.01 assuming a representative catch. For exposure see General Notes, text, and Figure 8.

The Notes for Table 4 apply to N, C_{LMH}, and DDFF. Observations were by experienced observers on all dates except August 27-29, inclusive.

TABLE 13. ELMER: BI-HOURLY TEMPERATURES.

Bi-hourly temperatures are taken from the hygrothermograph, with the trace adjusted to fit the direct-reading (psychron) and maximum and minimum values. Values shown in the Table are all correct within 2° F. and from the close agreement between direct readings and thermograph readings it is estimated that 9 out of 10 values are correct within 1° F. The footnotes to the Table give extreme values not obtainable within 1° by interpolation from the bi-hourly values.

Since the hygrothermograph chart was usually checked daily (and always at least every other day) times are correct within 15 minutes.

TABLE 14. JANET: DAILY RAINFALL.

RR is accurate to 0.01 inch. Time is 180th meridian and is accurate to within 5 minutes. Exposure excellent (see General Notes).

TABLE 15. ELMER-MACK: LAGOON TRAVERSES.

ZONES are defined as follows:

ZONE 1 -- Within 500 yards of ELMER

ZONE 2 -- Between 500 yards and 5 miles out from ELMER (or, in two instances, from BRUCE)

ZONE 3 -- Between 5 and 8 miles out from ELMER

ZONE 4 -- Between 8 and 11 miles out from ELMER

ZONE 5 -- Within 500 yards of MACK

Placement within zones is certain in every instance except the following: On August 26th, the 1030 observation was near the boundary between Zones 3 and 4, and may have been a few hundred yards within 3, rather than in 4 as given. The same is true with reference to the 1015 observation on August 28th. In all instances except when the traverse originated at BRUCE, the M-boat stayed within a zone bordered on the northeast by a line paralleling the direct ELMER-MACK track at a distance of 2 miles and bordered on the southwest by a line paralleling the direct track at a distance of 1 mile.

Time. Absolute times are correct within 10 minutes. Time intervals (between successive observations) are correct within 3 minutes, allowing for the fact that occasionally time was entered at the start of the observations although usually it was entered immediately upon their conclusion.

TT_s is correct within 0.2° F. in instances in which it was read to the nearest tenth of a degree and within 0.4 when read to the nearest half degree (.0 or .5). These estimates are based on the fact that the thermometer specifications call for an accuracy of within 0.1 and on the assumptions that this initial tolerance held and that the observer correctly read the thermometer within 0.1.

TT and TT_w were read to the nearest half-degree (.0 or .5) and are correct within 0.5° (see discussion under Notes, Table 4).

TABLE 16. BETWEEN BRUCE, KEITH, ELMER: LAGOON TRAVERSES.

Locations of the observations can be estimated by assuming straight-line courses between the islets and by spacing the observation points along these lines with distances proportional to elapsed times between observations. In most instances this will locate the observation point correctly to within 700 yards and in all instances it will locate the point correctly to within 1500 yards.

Times are absolutely correct within 10 minutes (180th meridian time) and differences between successive times are correct within 1 minute.

Temperatures were measured with different types of thermometers at different times, and the accuracy varied accordingly. Details are as follows:

August 20. Both air and water temperatures were measured with a mercury-in-glass thermometer, unjacketed, graduated in half-degrees C. and temperatures were estimated to 0.1° C. Values were later converted to the nearest 0.1° F. for water temperatures and the nearest 0.5° F. for air temperatures. Assuming no bias or instrumental error beyond the initial thermometer tolerance, TT_s values are accurate within 0.4° F. and TT values, within 0.6° F.

August 23. For all observations through that taken at 1420, the instrument, procedures, and accuracies were the same as for August 20 (above). From 1430 onward, a metal jacketed thermometer graduated in whole degrees F. was used. Using this thermometer, the observer estimated TT_s to the nearest 0.1° F. and TT to the nearest half-degree F. (.0 or .5). Since this was a less reliable instrument than the centigrade thermometer, $\underline{TT_s}$ is judged to be accurate only within 0.5° F. and $\underline{TT}$ to be accurate only within 0.7° F.

August 28. $\underline{TT_s}$, $\underline{TT}$, and $\underline{TT_w}$ were all measured to the nearest half-degree F. (.0 or .5). The Fahrenheit thermometer described immediately above was used to measure $\underline{TT_s}$, and the resulting observations are correct within 0.7° F. $\underline{TT}$ and $\underline{TT_w}$ are correct within 0.5° F. (see Notes, Table 4).

August 31. $\underline{TT_s}$, measured to tenths C. (see August 20, above), are accurate within 0.4° F. $\underline{TT}$ and $\underline{TT_w}$, measured with a psychron to the nearest half-degree F., are accurate within 0.5° F.

TABLE 17. LAGOON-OCEAN: LAGOON-OCEAN TRAVERSES.

August 18. $\underline{TT_s}$ was obtained by canvas bucket-haul from a helicopter using the Centigrade thermometer described in the Notes for Table 16, above. Readings were to the nearest 0.1° C. Values given are correct within 0.4° F.

August 23. $\underline{TT_s}$ was measured to the nearest half-degree F., using the F. thermometer described under date of August 23 in Notes, Table 16, above. All values are accurate within 0.7° F. $\underline{TT}$ and $\underline{TT_w}$ were measured to the closest half-degree F. (.0 or .5) using a psychron. Values are accurate within 0.5° F. Locations in the ocean (outside) were all taken 500 to 1000 yards off the reef.

TABLE 18. ENIWETOK-BIKINI: BI-HOURLY OBSERVATIONS, MSTS - T-LST 618.

Time is correct within 5 minutes.

Positions while underway, as given in the log, may be assumed to be accurate within 2 nautical miles.

$\underline{N_8}$ is correct within one-eighth. E.g.: In extreme instances, an entry of "4" may in fact have been 3/8 or 5/8.

DD is given to the nearest 10°, with the unit 0 omitted. Thus 11 represents 110°. With the ship underway, DD was estimated correctly to within 10°. With the ship docked, to within 8°. Thus in both instances a minority of the observations may fall in the wrong 10° category (plus or minus).

FF is given to the nearest knot. With the ship underway, FF was estimated correctly to within 5 knots (plus or minus). With the ship docked, to within 3 knots. Windspeeds (and directions) were estimated primarily on the basis of the effect of wind upon the water, following the Beaufort scale and then estimating knots within the Beaufort interval.

WX is given in code, following the U. S. Dept. of Commerce Weather Bureau Ship Code Card (TA 631-0-2), dtd. January 1, 1955. Quoting from this source, the code values given are to be interpreted as follows:

01: No hydrometeors except clouds. Clouds generally dissolving or becoming less developed during the past hour.

02: No hydrometeors except clouds. State of sky on the whole unchanged during the past hour.

03: No hydrometeors except clouds. Clouds generally forming or developing during the past hour.

15: Precipitation within sight, reaching sea, but distant ((i.e., estimated to be more than 5 km. (3 miles) from ship)).

16: Precipitation within sight, reaching sea, near to but not at the ship.

18: Squall(s).

60: Rain, not freezing, intermittent - slight at time of observation.

80: Rain shower(s), slight.

81: Rain shower(s), moderate or heavy.

P shows air pressure in tenths and hundredths of inches, so that the values given in the Table should be preceded by 29. Values given are correct within 0.05 inch.

TT and TT_w are correct within 1° F.

C_L amounts are correct within one-eighth. Height estimates are judged to be correct within 500 feet. Codes, as taken from the U. S. Dept. of Commerce Weather Bureau Ship Code Card (TA 631-0-2), dtd. January 1, 1955, have the following meanings:

2: Cumulus of moderate or strong vertical development generally with protuberances in the form of domes or towers, either accompanied or not by other cumulus or by stratocumulus; all having their bases at the same level.

3: Cumulonimbus the summits of which, at least partially, lack sharp outlines, but are neither clearly fibrous, neither cirriform nor in the form of an anvil; cumulus, stratocumulus or stratus may be present.

7: Fractostratus of bad weather or fractocumulus of bad weather or both; usually below altostratus or nimbostratus.

C_M and C_H code entries have meanings as follows (from the source cited immediately above):

C_M: 1: Altostratus, the greater part of which is semitransparent; through this part the sun or moon may be weakly visible as through ground glass.

C_M: 4: Patches of semitransparent altocumulus (often in the shape of almonds or fishes) at one or more levels; cloud elements continuously changing in aspect.

5: Semitransparent altocumulus in bands or altocumulus in one more or less continuous layer progressively invading the sky, generally thickening as a whole; the layer may be opaque or double with a second sheet.

6: Altocumulus formed by the spreading out of cumulus.

7: Any one of the following cases: (a) Altocumulus in two or more layers usually opaque in places and not progressively invading the sky; (b) Opaque layer of altocumulus not progressively invading the sky; (c) Altocumulus coexisting with altostratus or nimbostratus or both.

9: Altocumulus, generally at several layers in a chaotic sky; dense cirrus is usually present.

C_H: 1: Cirrus in the form of filaments, strands or hooks, not progressively invading the sky (often called "mares tails").

2: Dense cirrus in patches or entangled sheaves usually not increasing and possibly the remains of the upper parts of cumulonimbus; or cirrus with sproutings in the form of towers or battlements or having the aspect of cumuliform tufts.

3: Cirrus, often in the form of an anvil; either the remains of the upper parts of cumulonimbus, or parts of distant cumulonimbus, the cumuliform portions of which cannot be seen.

8: Cirrostratus not progressively invading the sky, and not completely covering it.

9: Cirrocumulus alone, or cirrocumulus accompanied by cirrus or cirrostratus or both, but cirrocumulus is the predominant cirriform cloud.

DD for waves is given to 10°, with the unit 0 omitted from the entries. Thus 08 represents 80°. Directions are correct to plus or minus 10°.

Period of waves is given in seconds and is correct within one second.

Height of waves is given in feet and is correct within 50% (plus or minus).

PLACE: FRED

HOURLY OBSERVATIONS AND DAILY SUMMARY AUGUST 18 - SEPTEMBER 1, 1957

TABLE 4

DATE	TIME	P	TT	TT_W	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
8/18	0056	770	81.3	77.0	82	10	1CuE18	10Cs	0	0	2	ESE4				
	0157	760	81.0	77.8	87	10	1CuE18	10Cs	0	0	2	ESE2				
	0255	735	81.0	78.0	88	10	1CuE18	10Cs	0	0	2	ESE4				
	0354	725	81.0	78.0	88	10	1CuE18	10Cs	0	0	2	ESE6				
	0456	720	81.9	78.2	85	10	2CuE18	10Cs	0	0	3	SSE6				
	0555	720	82.0	78.0	84	10	2CuE18	10Cs	0	0	3	SSE5				
	0655	725	82.0	78.0	84	10	2CuE18	10Cs	0	0	3	SSE6				
	0756	745	83.0	79.0	84	10	2CuE18	10Cs	0	0	3	SSE8				
	0855	775	84.0	79.0	80	10	2CuE18	10Cs	0	0	3	ESE6				
	0956	780	84.0	79.0	80	10	1CuE18	10Cs	0	0	2	SE8				
	1055	790	84.0	79.0	80	10	1CuE18	10Cs	0	0	2	SE8				
	1155	770	86.0	80.0	77	10	1CuE18	10Cs	0	0	2	SE9				
	1255	765	87.5	81.5	78	10	1CuE18	10Cs	0	0	2	SE8				
	1355	750	87.5	81.5	78	10	1CuE18	10Cs	0	0	2	SE7				
	1455	745	88.0	82.0	77	10	1CuE18	10Cs	0	0	2	SE6				
	1555	735	88.0	83.0	81	10	1CuE18	10Cs	0	0	2	SE7				
	1658	735	86.5	79.0	72	10	1CuE18	10Cs	0	0	2	S5				
	1755	745	86.0	78.0	73	10	1CuE18	10Cs	0	0	1	SSE4				
	1856	755	84.5	78.0	75	10	1CuE18	10Cs	0	0	1	SE4				
	1958	775	83.0	78.0	80	10	1CuE18	10Cs	0	0	1	SE2				
	2056	780	83.5	78.5	80	10	1CuE18	10Cs	0	0	1	ESE7				
	2158	800	83.0	78.0	80	10	1CuE18	10Cs	0	0	1	E7				
	2256	805	83.0	78.0	80	10	2CuE18	10Cs	0	0	3	E4				
	2357	805	82.8	78.0	81	10	2CuE18	10Cs	0	0	2	E6		88	81	0
8/19	0056	785	82.8	76.0	81	1	1CuE18	0	0	0	1	E8				
	0158	775	82.5	78.0	82	3	3CuE18	0	0	0	3	E6				
	0255	770	82.5	78.0	82	3	3CuE18	0	0	0	3	ENE7				
	0357	760	82.0	77.0	80	2	2CuE18	0	0	0	2	ENE7				
	0455	760	82.1	77.0	79	2	2CuE18	0	0	0	2	ENE7				
	0558	745	81.7	76.9	80	2	2CuE18	0	0	0	2	ENE8				
	0659	750	82.0	79.0	88	10	2CuE18	10Cs	0	0	2	ENE9				
	0755	760	85.0	80.0	81	10	2CuE18	10Cs	0	0	2	E8				
	0855	750	86.0	81.0	81	10	2CuE18	10Cs	0	0	2	E10				
	0955	795	86.0	81.0	81	10	2CuE18	10Cs	0	0	2	E8				
	1055	795	86.0	81.0	81	10	2CuE18	10Cs	0	0	2	E11				
	1155	800	86.0	81.0	81	10	2CuE18	10Cs	0	0	2	E11				
	1256	795	88.0	82.0	77	10	2CuE18	10Cs	0	0	2	E14				
	1355	790	88.0	82.0	77	10	2CuE18	10Cs	0	0	2	E12				
	1455	775	88.0	83.0	81	10	2CuE18	10Cs	0	0	2	E10				
	1556	765	87.0	81.0	77	10	2CuE18	10Cs	0	0	2	E11				
	1657	760	87.0	80.5	75	10	2CuE18	10Cs	0	0	2	E10				
	1756	745	87.0	79.0	70	10	2CuE18	10Cs	0	0	2	E11				

PLACE: FRED HOURLY OBSERVATIONS AND DAILY SUMMARY AUGUST 18 - SEPTEMBER 1, 1957 TABLE 4 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
8/19	1855	745	85.4	79.0	76	10	2CuE18	10Cs	0	0	2	E10				
	1959	755	84.0	78.0	77	10	2CuE18	10Cs	0	0	2	E10				
	2056	765	83.6	78.0	78	10	2CuE18	10Cs	0	0	2	E11				
	2157	780	82.8	77.8	80	10	2CuE18	10Cs	0	0	2	E10				
	2256	790	82.6	78.0	81	10	2CuE18	10Cs	0	0	2	E11				
	2358	810	83.0	78.3	81	10	2CuE18	10Cs	0	0	2	E13		88	82	0
8/20	0057	805	83.0	78.3	81	10	1CuE18	10Cs	0	0	1	E11				
	0156	785	82.5	78.0	82	10	1CuE18	10Cs	0	0	1	E15				
	0259	775	82.3	77.7	81	10	1CuE18	10Cs	0	0	1	E10				
	0357	760	82.1	77.5	81	10	2CuE18	10Cs	0	0	2	E10				
	0457	760	82.0	77.5	82	10	3CuE18	10Cs	0	0	3	E11				
	0559	750	81.6	77.0	81	10	3CuE18	10Cs	0	0	3	E11				
	0658	755	82.0	78.0	83	10	2CuE18	10Cs	0	0	3	E10				
	0758	770	83.0	77.5	78	10	3CuE18	10Cs	0	0	3	E16				
	0855	790	84.0	77.8	76	10	2CuE18	1Sc 45	10Cs	0	4	E16				
	0956	805	85.0	78.0	73	10	2CuE18	10Cs	0	0	3	E14				
	1058	805	86.5	78.5	70	10	2CuE18	10Cs	0	0	3	E16				
	1155	820	87.0	79.0	70	10	2CuE18	10Cs	0	0	3	E10				
	1256	810	86.5	79.0	72	10	2CuE18	10Cs	0	0	3	E14				
	1356	795	86.5	79.0	72	10	1CuE18	10Cs	0	0	2	E9				
	1455	775	87.0	80.0	74	10	1CuE18	10Cs	0	0	2	E8				
	1557	755	87.8	78.0	65	10	1CuE18	10Cs	0	0	2	E8				
	1656	755	87.0	79.0	70	10	1CuE18	10Cs	0	0	2	E6				
	1757	750	86.5	79.0	72	10	1CuE18	10Cs	0	0	2	E6				
	1856	760	85.5	78.5	73	10	1CuE18	10Cs	0	0	2	E9				
	1957	775	83.5	78.3	79	10	1CuE18	10Cs	0	0	2	E10				
	2055	795	83.2	78.0	79	10	1CuE18	10Cs	0	0	2	E8				
	2156	810	83.0	78.5	82	10	1CuE18	10Cs	0	0	2	E8				
	2256	820	83.2	78.5	81	10	1CuE18	10Cs	0	0	2	E8				
	2357	835	83.0	78.5	82	10	1CuE18	10Cs	0	0	2	E8		88	82	0
8/21	0056	830	82.5	77.5	80	10	5CuE18	10Cs	0	0	5	ESE8	0039-0049			
	0156	805	82.0	77.5	81	10	5CuE18	10Cs	0	0	5	ESE10				
	0256	790	79.0	77.5	93	10	7CuE18e	10Cs	0	0	8	S13	0200-0309			
	0355	780	80.0	77.8	91	10	5CuE18	10Cs	0	0	5	S10				
	0457	780	81.2	77.5	85	10	4CuE18	10Cs	0	0	5	S16				
	0559	790	81.8	77.6	83	10	4CuE18	10Cs	0	0	5	S12				
	0656	800	81.0	78.0	87	10	5CuE18	6AcE160e	10Cs	0	9	S9				
	0755	800	82.0	78.0	84	10	5CuE18	6AcE160e	10Cs	0	9	S16				
	0855	920	83.0	79.0	84	10	5CuE18	6AcE160e	10Cs	0	9	S15				
	0955	820	82.0	80.0	91	10	5CuE18	6AcE160e	10Cs	0	9	S16				
	1058	820	82.5	78.5	84	10	3CuE18	4ScE45b	10Cs	0	8	S16				

PLACE: FRED

HOURLY OBSERVATIONS AND DAILY SUMMARY AUGUST 18 - SEPTEMBER 1, 1957

TABLE 4
(Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
8/21	1158	795	83.0	79.5	86	10	3CuE18	4ScE45	2AcE160e	10Cs	7	S11				
	1255	800	83.0	79.5	86	10	2CuE18	4ScE45	2AcE160e	10Cs	7	S17				
	1355	785	84.0	80.0	84	10	2CuE18	4AcE160e	10Cs	0	9	S16				
	1458	775	84.5	78.5	77	10	2CuE18	4AcE160e	10Cs	0	8	SSW16				
	1559	770	84.1	78.3	77	10	2CuE18	3AcE160	10Cs	0	8	SSW13				
	1658	755	84.0	79.0	80	10	2CuE18	3AcE160	10Cs	0	8	S10				
	1755	740	84.0	78.8	80	10	1CuE18	3AcE160	10Cs	0	7	SSW12				
	1857	745	83.5	78.0	78	10	1CuE18	3AcE160	10Cs	0	6	S11				
	1958	780	83.2	78.0	79	10	1CuE18	3AcE160	10Cs	0	6	S15				
	2057	795	83.2	78.0	79	10	2CuE18	1AcE160	10Cs	0	5	S9				
	2155	820	83.1	77.8	79	10	2CuE18	1AcE160	10Cs	0	3	S7				
	2257	830	82.9	77.8	80	10	2CuE18	10Cs	0	0	3	S10				
	2355	835	82.3	78.0	83	10	1CuE18	10Cs	0	0	2	S6		85	79	0.15
8/22	0056	825	82.0	78.8	87	10	1CuE18	10Cs	0	0	2	SW4				
	0156	810	82.0	77.0	80	10	1CuE18	10Cs	0	0	2	W4				
	0255	800	81.8	77.5	82	10	1CuE18	10Cs	0	0	2	W2				
	0356	775	81.2	77.0	82	10	2CuE18	10Cs	0	0	3	W4				
	0456	745	80.5	77.0	85	10	2CuE18	10Cs	0	0	3	SW8				
	0555	730	81.0	77.0	83	10	3CuE18	10Cs	0	0	4	SW10				
	0656	740	81.0	77.0	83	10	3CuE18	10Cs	0	0	4	SW8				
	0756	760	82.0	78.0	84	10	3CuE18	10Cs	0	0	4	SW4				
	0855	775	84.0	80.0	84	10	3CuE18	10Cs	0	0	4	NW8				
	0955	795	86.0	80.0	77	10	3CuE18	10Cs	0	0	4	NNE4				
	1058	805	80.5	78.0	89	10	3CuE18	3ScE45e	2AsE160	10Cs	8	NNE12	1004-1128			
	1156	800	82.0	78.0	84	10	3CuE18	3ScE45b	2AsE160	10Cs	8	NE8				
	1255	785	82.0	78.0	84	10	3CuE18	3ScE45b	2AsE160	10Cs	8	NE10				
	1356	755	85.0	81.0	84	10	3CuE18	3ScE45b	2AsE160	10Cs	8	NE11				
	1455	745	88.0	78.5	66	10	3CuE18	3AcE140	10Cs	0	6	NE8				
	1556	730	87.8	79.0	68	10	2CuE18	3AcE140	2AsE160	10Cs	7	NE11				
	1657	720	86.7	78.5	70	10	2CuE18	2AcE140	10Cs	0	6	NE10				
	1756	725	84.8	78.5	75	10	2CuE18	3AcE140	10Cs	0	7	E10				
	1856	735	84.0	78.0	77	10	2CuE18	2AcE140	10Cs	0	7	ENE8				
	1958	740	83.5	77.0	74	10	2CuE18	2AcE140	1AsE160	10Cs	8	ENE12				
	2056	755	83.0	77.2	77	10	2CuE18	2AcE140	1AsE160	10Cs	7	NE11				
	2158	780	82.6	77.0	78	10	2CuE18	2AcE140	10Cs	0	6	NE10				
	2256	790	82.3	77.1	79	10	2CuE18	2AcE140	10Cs	0	6	NE11				
	2355	805	83.0	78.0	80	10	2CuE18	1AcE140	10Cs	0	6	ENE22		88	81	0.01
8/23	0054	785	82.0	79.0	88	10	2CuE18	1AcE140	10Cs	0	6	ENE12				
	0156	765	82.3	78.5	84	10	3CuE18	1AcE140	10Cs	0	7	E10				
	0255	760	82.0	78.0	84	10	3CuE18	2AcE140	10Cs	0	8	E6	0210-0229			
	0357	745	82.0	78.3	85	10	3CuE18	2AcE140	10Cs	0	9	E10	0315-0336			

PLACE: FRED HOURLY OBSERVATIONS AND DAILY SUMMARY AUGUST 18 - SEPTEMBER 1, 1957 TABLE 4 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_0	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
8/23	0458	740	79.8	77.3	90	10	3CuE18	2AcE140	10Cs	0	9	ENE10	0435-0507			
	0555	715	80.3	76.5	84	10	3CuE18	2AcE140	10Cs	0	8	ENE12				
	0655	715	80.3	76.5	84	10	3CuE18	2AcE140	10Cs	0	8	ENE10				
	0755	730	81.0	78.0	87	10	3CuE18	2AcE140	10Cs	0	8	ENE8				
	0855	735	82.0	79.0	88	10	3CuE18	2AcE140	10Cs	0	8	ENE8				
	0955	745	82.0	79.0	88	10	3CuE18	2AcE140	10Cs	0	8	ENE11	0954-0956			
	1058	745	83.5	80.0	86	10	2CuE18	3AcE140	10Cs	0	6	NE14				
	1155	740	84.5	80.0	82	10	2CuE18	3AcE140	10Cs	0	6	ENE14				
	1255	750	84.5	80.0	82	10	2CuE18	3AcE140	10Cs	0	6	ENE12				
	1355	715	86.0	83.0	88	10	2CuE18	3AcE140	10Cs	0	6	ENE13				
	1455	695	87.0	84.0	88	10	2CuE18	3AcE140	10Cs	0	6	ENE14				
	1556	675	85.5	81.0	82	10	2CuE18	1AsE160	10Cs	0	6	SE13				
	1657	675	84.0	80.0	84	10	2CuE18	1AsE160	10Cs	0	6	SSE13				
	1755	680	83.5	80.0	86	10	3CuE18	2ScE50	10Cs	0	8	SSE16				
	1857	685	81.8	79.2	89	10	5CuE18	4ScE50e	10Cs	0	8	SE14				
	1956	700	82.0	79.0	88	10	6CuE16m	6ScE50	10Cs	0	9	SE13				
	2058	720	82.0	79.0	88	10	6CuE16m	6ScE50	10Cs	0	8	SSE13				
	2159	760	81.8	79.2	89	10	6CuE16m	4ScE50	10Cs	0	8	SE12				
	2256	765	82.0	79.0	88	10	4CuE18	3ScE50e	10Cs	0	7	SE11				
	2355	795	83.0	81.0	84	10	3CuE18	2ScE50	10Cs	0	7	SE14		87	80	0.41
8/24	0055	785	83.0	79.0	84	10	3CuE18	2ScE50	10Cs	0	7	SE12				
	0156	775	82.5	78.3	83	10	3CuE18	2AcE140	10Cs	0	7	SE13				
	0255	760	82.3	78.0	83	10	3CuE18	2AcE140	10Cs	0	6	SE14				
	0355	755	82.0	78.3	85	10	3CuE18	2AcE140	10Cs	0	6	SE12				
	0456	750	81.5	77.0	81	10	2CuE18	2AcE140	10Cs	0	6	SE10				
	0555	740	81.3	78.0	86	10	2CuE18	2AcE140	10Cs	0	6	SE10				
	0658	760	81.0	78.5	89	10	3CuE18	2AcE140	10Cs	0	6	SSE10				
	0758	770	81.5	77.5	83	10	3CuE18	1AcE140	10Cs	0	6	SE6				
	0855	800	83.0	79.5	86	10	3CuE18	1AcE140	10Cs	0	6	SSE8				
	0955	815	83.0	80.5	90	10	6CuE18b	10Cs	0	0	8	S12	0928-0935			
	1055	820	84.5	80.5	84	10	6CuE18b	10Cs	0	0	6	S6	1009-1011			
	1155	815	85.5	80.0	79	10	4CuE18	10Cs	0	0	5	SE3				
	1256	805	87.0	80.0	74	10	2CuE18	10Cs	0	0	4	ESE5				
	1356	785	87.2	80.0	73	10	5CuE18	10Cs	0	0	6	ESE6				
	1458	770	87.0	81.0	77	10	5CuE18	10Cs	0	0	6	E6				
	1557	750	86.0	81.0	81	10	3CuE18	10Cs	0	0	5	E10				
	1658	740	86.1	81.0	80	10	3CuE18	10Cs	0	0	5	E10				
	1756	735	86.1	81.0	80	10	3CuE18	10Cs	0	0	5	E8				
	1857	745	84.2	79.5	81	10	3CuE18	10Cs	0	0	5	E8				
	1957	765	84.0	79.4	82	10	3CuE18	10Cs	0	0	5	E11				
	2059	775	83.7	79.0	81	10	3CuE18	10Cs	0	0	3	E15				
	2158	805	83.1	78.7	82	10	2CuE18	10Cs	0	0	3	E14				

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HOURLY OBSERVATIONS AND DAILY SUMMARY AUGUST 18 - SEPTEMBER 1, 1957

TABLE 4 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_0	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
8/24	2256	810	82.9	78.6	83	10	2CuE18	10Cs	0	0	3	E11				
	2357	815	82.9	78.6	83	10	2CuE18	10Cs	0	0	3	E10		87	81	0.05
8/25	0056	795	82.2	77.0	79	10	2CuE18	10Cs	0	0	2	E10				
	0156	790	82.0	77.1	80	10	2CuE18	10Cs	0	0	2	E12				
	0256	785	82.3	77.0	79	10	2CuE18	10Cs	0	0	2	E10				
	0356	780	82.2	77.0	79	10	2CuE18	10Cs	0	0	2	E11				
	0458	790	82.0	77.1	80	10	2CuE18	10Cs	0	0	2	E12				
	0556	795	82.3	77.0	79	10	2CuE18	10Cs	0	0	2	E10				
	0658	790	82.0	77.1	80	10	2CuE18	10Cs	0	0	5	E6				
	0755	795	82.0	77.1	80	10	2CuE18	10Cs	0	0	5	E6				
	0855	810	82.0	77.1	80	10	2CuE18	10Cs	0	0	5	E8				
	0958	825	86.0	79.0	73	10	2CuE18	10Cs	0	0	5	E6				
	1055	825	86.0	81.0	80	10	2CuE18	10Cs	0	0	5	E8				
	1155	805	86.0	81.0	80	10	2CuE18	10Cs	0	0	5	E6				
	1255	815	87.0	82.0	81	10	2CuE18	10Cs	0	0	4	E8				
	1355	795	88.0	79.0	67	10	2CuE18	10Cs	0	0	4	E5				
	1455	775	88.0	79.0	67	10	2CuE18	10Cs	0	0	4	E6				
	1555	765	88.3	79.0	67	10	2CuE18	10Cs	0	0	5	E4				
	1656	755	87.0	78.5	69	10	3CuE18	10Cs	0	0	6	E4				
	1755	725	86.5	78.3	69	10	3CuE18	10Cs	0	0	6	ESE2				
	1855	755	85.0	78.0	73	10	2CuE18	2AcE140	10Cs	0	6	C				
	1956	755	83.8	77.0	73	10	2CuE18	1AcE140	10Cs	0	5	C				
	2055	760	83.3	77.2	76	10	2CuE18	1AcE140	10Cs	0	4	C				
	2158	770	83.2	77.0	75	10	2CuE18	1AcE140	10Cs	0	4	N5				
	2256	775	82.8	77.5	79	10	2CuE18	10Cs	0	0	3	NNE4				
	2357	765	82.6	77.5	79	10	2CuE18	10Cs	0	0	2	N2		88	82	0
8/26	0057	755	82.6	77.5	79	10	2CuE18	10Cs	0	0	2	NNE2				
	0157	730	82.3	77.6	81	10	3CuE18	5As 160e	10Cs	0	8	E11	0139-0146			
	0257	710	82.2	77.4	80	10	3CuE18	5As 160e	10Cs	0	8	C				
	0356	705	82.0	77.1	80	10	2CuE18	5Cs	0	0	2	E5				
	0456	700	81.7	77.0	81	10	2CuE18	10Cs	0	0	2	E5				
	0559	690	81.3	76.6	80	10	2CuE18	10Cs	0	0	2	E6				
	0655	710	82.0	79.0	88	10	2CuE18	10Cs	0	0	2	E5				
	0755	710	82.0	79.0	88	10	2CuE18	10Cs	0	0	2	E4				
	0855	720	82.0	79.0	88	10	2CuE18	10Cs	0	0	2	E6				
	0958	735	83.5	79.0	82	10	6CuE18e	10Cs	0	0	6	E4	0945-0947			
	1058	745	86.5	80.5	77	10	2CuE18	10Cs	0	0	3	ESE5				
	1155	765	86.5	80.5	77	10	2CuE18	10Cs	0	0	6	S3	1129-1131			
	1255	760	86.5	80.5	77	10	2CuE18	10Cs	0	0	6	S5				
	1356	740	88.0	83.0	81	10	2CuE18	10Cs	0	0	6	S6				
	1456	720	86.5	80.0	75	10	4CuE18	10Cs	0	0	6	SE6				

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HOURLY OBSERVATIONS AND DAILY SUMMARY AUGUST 18 - SEPTEMBER 1, 1957

TABLE 4 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height)				N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY		
							1st Layer	2nd Layer	3rd Layer	4th Layer				T_xT_x	T_nT_n	RR
8/26	1557	710	86.7	80.0	75	10	3CuE18	10Cs	0	0	6	SE3				
	1658	705	86.5	80.0	75	10	3CuE18	10Cs	0	0	6	SE3				
	1756	700	85.0	79.0	77	10	3CuE18	10Cs	0	0	6	SE2				
	1856	705	84.3	78.2	76	10	3CuE18	10Cs	0	0	6	E4	1819-1824			
	1955	720	84.0	78.0	76	10	3CuE18	10Cs	0	0	6	E3				
	2058	735	83.4	78.1	79	10	3CuE18	10Cs	0	0	6	E16				
	2158	745	83.0	77.6	78	10	3CuE18	10Cs	0	0	6	E4				
	2256	755	83.1	77.7	78	10	3CuE18	10Cs	0	0	6	E4				
	2355	760	83.0	78.0	80	10	3CuE18	10Cs	0	0	4	E10		88	81	0.02
8/27	0054	755	83.0	78.0	80	10	3CuE18	10Cs	0	0	4	ESE10				
	0157	750	83.0	78.5	82	10	3CuE18	10Cs	0	0	4	ESE10				
	0255	730	82.0	78.0	84	10	3CuE18	10Cs	0	0	4	E10	0224-0232			
	0357	725	79.5	77.3	91	10	3CuE18	10Cs	0	0	4	E10	0328-0336			
	0456	720	81.0	78.0	83	10	3CuE18	10Cs	0	0	4	SE12				
	0555	710	80.3	77.9	90	10	3CuE18	10Cs	0	0	4	ESE12				
	0655	715	80.3	77.9	90	10	3CuE18	10Cs	0	0	4	ESE16				
	0755	730	82.0	79.0	88	10	3CuE18	10Cs	0	0	4	ESE15				
	0855	745	82.0	79.0	88	10	3CuE18	10Cs	0	0	4	ESE15	0829-0839			
	0955	755	83.0	80.0	88	10	3CuE18	10Cs	0	0	4	ESE15	0904-0909			
	1055	770	84.0	80.0	84	10	3CuE18	10Cs	0	0	4	ESE15	1009-1032			
	1155	755	83.8	80.0	85	10	4CuE18	10Cs	0	0	6	E16	1104-1134			
	1255	740	83.8	80.0	85	10	4CuE18	10Cs	0	0	6	E15	1223-1230			
	1355	725	86.0	82.0	84	10	4CuE18	10Cs	0	0	6	E14				
	1455	715	86.0	82.0	84	10	4CuE18	10Cs	0	0	6	E15				
	1557	700	87.0	78.3	68	10	2CuE18	10Cs	0	0	2	E12				
	1658	690	87.1	78.5	68	10	2CuE18	10Cs	0	0	2	E12				
	1756	700	87.0	78.3	68	10	2CuE18	10Cs	0	0	2	E11				
	1855	725	86.6	79.1	72	10	1CuE18	10Cs	0	0	1	E8				
	1957	755	86.5	79.0	72	10	3CuE18	10Cs	0	0	3	E10				
	2058	760	86.5	79.0	72	10	2CuE18	10Cs	0	0	2	ESE9				
	2157	785	85.3	78.2	73	10	2CuE18	10Cs	0	0	2	ESE10				
	2256	795	83.7	77.4	75	10	2CuE18	10Cs	0	0	2	ESE8				
	2359	800	83.1	76.9	75	10	2CuE18	10Cs	0	0	2	ESE10		87	80	0.50
8/28	0056	795	83.0	78.0	80	10	3CuE18	10Cs	0	0	3	SSE9				
	0158	775	83.0	78.5	82	10	3CuE18	10Cs	0	0	3	SE10				
	0256	765	82.0	78.0	84	10	3CuE18	10Cs	0	0	3	SSE8				
	0359	750	82.0	78.0	84	10	2CuE18	10Cs	0	0	2	SE6				
	0455	750	82.3	76.0	75	10	2CuE18	10Cs	0	0	2	SSE6				
	0557	750	82.2	78.1	83	10	2CuE18	10Cs	0	0	2	SSE8				
	0655	760	82.2	78.1	83	10	2CuE18	10Cs	0	0	2	SSE6				
	0755	770	83.5	80.0	86	10	2CuE18	10Cs	0	0	2	SSE7				

PLACE: FRED HOURLY OBSERVATIONS AND DAILY SUMMARY AUGUST 18 - SEPTEMBER 1, 1957 TABLE 4 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_0	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
8/28	0858	770	83.8	78.5	79	10	2CuE18	10Cs	0	0	6	S8				
	0955	805	83.8	78.5	79	10	2CuE18	10Cs	0	0	6	S6				
	1058	815	85.0	80.0	80	10	3CuE18	10Cs	0	0	5	S6				
	1155	920	85.0	80.0	80	10	3CuE18	2ScE45	10Cs	0	7	SSE4				
	1255	815	85.0	80.0	80	10	3CuE18	2ScE45	10Cs	0	7	SSE4				
	1355	810	87.0	82.0	81	10	3CuE18	2ScE45	10Cs	0	7	ESE5				
	1455	815	87.0	81.0	77	10	3CuE18	2ScE45	10Cs	0	7	ESE2				
	1554	790	85.0	79.3	78	10	2CuE18	3ScE45	10Cs	0	9	ENE6				
	1657	790	84.3	79.0	79	10	2CuE18	3ScE45	10Cs	0	9	ENE8				
	1757	765	84.1	79.0	80	10	2CuE18	3ScE45	10Cs	0	8	ENE7				
	1856	775	82.0	78.3	85	10	2CuE18	1ScE45	2As 140	10Cs	8	ENE10				
	1955	790	81.7	78.0	84	10	2CuE18	2As 140	10Cs	0	7	ENE12				
	2055	810	81.5	78.0	86	10	2CuE18	2As 140	10Cs	0	7	ENE14				
	2158	825	81.5	77.5	83	10	2CuE18	2As 140	10Cs	0	7	ENE12				
	2256	835	81.3	77.8	85	10	2CuE18	2As 140	10Cs	0	7	ENE10				
	2359	840	81.2	77.5	85	10	2CuE18	2As 140	10Cs	0	6	ENE11		87	81	0
8/29	0057	830	81.2	77.5	82	10	3CuE18	1As 140	10Cs	0	5	E10				
	0156	815	82.0	78.0	84	10	2CuE18	10Cs	0	0	4	E9				
	0255	805	81.7	77.5	83	10	2CuE18	10Cs	0	0	2	E11				
	0357	800	82.1	77.5	81	10	1CuE18	10Cs	0	0	1	E7				
	0457	795	81.8	77.3	81	10	1CuE18	1As 140	0	0	1	E11				
	0558	790	81.4	77.0	82	10	2CuE18	1As 140	10Cs	0	3	E10				
	0655	790	81.4	77.0	82	10	2CuE18	1As 140	10Cs	0	3	E9				
	0755	790	82.0	79.0	88	10	2CuE18	10Cs	10Cs	0	3	E10				
	0855	810	84.0	80.0	84	10	2CuE18	10Cs	0	0	2	E8				
	0955	815	84.0	80.0	84	10	2CuE18	10Cs	0	0	2	E8				
	1056	820	87.0	80.0	74	10	1CuE18	10Cs	0	0	1	ENE8				
	1156	815	87.0	81.0	77	10	2CuE18	10Cs	0	0	2	ENE6				
	1255	820	87.0	81.0	77	10	2CuE18	10Cs	0	0	2	ENE8				
	1356	800	88.0	82.0	78	10	2CuE18	10Cs	0	0	2	E14				
	1455	790	88.0	80.0	71	10	2CuE18	10Cs	0	0	2	ENE12				
	1556	775	89.5	80.0	66	10	2CuE18	10Cs	0	0	2	NE12				
	1655	760	86.0	79.0	73	10	6CuE16b	10Cs	0	0	6	ENE18				
	1756	750	84.0	80.0	84	10	5CuE18	10Cs	0	0	5	NNE15	1659-1710			
	1855	760	81.5	78.0	85	10	6CuE18e	2ScE45	10Cs	0	7	NE14	1842-1854			
	1956	775	83.5	77.0	74	10	5CuE18	2ScE45e	10Cs	0	8	NE11				
	2055	780	83.0	79.0	84	10	4CuE18	2ScE45e	10Cs	0	7	NE10				
	2158	790	83.0	79.0	84	10	3CuE18	1ScE45	10Cs	0	6	ENE16	2054-2100			
	2257	795	83.0	78.0	80	10	3CuE18	1ScE45	10Cs	0	6	NE12				
	2358	805	83.0	78.0	80	10	3CuE18	1ScE45	10Cs	0	6	NE10		90	81	0.01

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HOURLY OBSERVATIONS AND DAILY SUMMARY AUGUST 18 - SEPTEMBER 1, 1957

TABLE 4 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
8/30	0055	775	83.0	76.0	73	10	2CuE18	10Cs	0	0	2	E13				
	0157	780	82.0	78.0	84	10	2CuE18	10Cs	0	0	4	E10				
	0258	760	82.5	78.3	83	10	2CuE18	10Cs	0	0	3	E11				
	0356	750	82.1	77.7	82	10	2CuE18	10Cs	0	0	2	ENE10				
	0457	745	81.7	77.2	81	10	2CuE18	1As 160	10Cs	0	3	ENE10	0404-0413			
	0559	740	81.7	77.3	82	10	2CuE18	1As 160	10Cs	0	3	ENE15				
	0655	745	81.7	77.3	82	10	2CuE18	1As 160	10Cs	0	3	NE10				
	0755	750	82.0	80.0	91	10	2CuE18	1As 160	10Cs	0	3	NE9	0710-0715			
	0855	760	82.0	80.0	91	10	2CuE18	1As 160	10Cs	0	3	NE8				
	0956	770	84.0	80.0	84	10	2CuE18	3As 160	10Cs	0	6	N8				
	1055	775	84.0	81.0	88	10	2CuE18	3As 160	10Cs	0	6	NNE7				
	1155	765	81.1	78.0	88	10	1CuE18	2AcE140	10Cs	0	5	NNE6				
	1255	760	82.0	80.0	91	10	1CuE18	2AcE140	10Cs	0	5	E9				
	1355	745	83.0	79.0	84	10	1CuE18	2AcE140	10Cs	0	5	ESE8				
	1455	725	84.0	79.0	80	10	1CuE18	2AcE140	10Cs	0	5	E10				
	1559	710	88.0	80.0	71	10	2CuE18	10Cs	0	0	4	E10				
	1659	710	87.5	80.0	72	10	2CuE18	10Cs	0	0	4	E11				
	1756	700	87.0	77.0	64	10	2CuE18	10Cs	0	0	3	E3				
	1859	705	84.0	77.0	73	10	2CuE18	10Cs	0	0	3	ENE14				
	1956	720	83.0	78.0	80	10	2CuE18	10Cs	0	0	3	ENE13				
	2056	735	83.0	77.0	76	10	2CuE18	10Cs	0	0	3	ENE11				
	2158	750	82.5	78.3	83	10	2CuE18	10Cs	0	0	3	ENE10				
	2256	755	82.1	77.7	82	10	2CuE18	10Cs	0	0	3	NE10				
	2358	765	82.1	77.7	82	10	2CuE18	10Cs	0	0	3	ENE12		88	82	0.32
8/31	0055	755	82.1	77.7	82	10	3CuE18	10Cs	0	0	3	E14				
	0157	745	82.5	78.3	83	10	3CuE18	10Cs	0	0	3	E10				
	0257	730	81.7	77.3	82	10	2CuE18	10Cs	0	0	2	E9				
	0358	710	81.7	77.3	82	10	2CuE18	10Cs	0	0	2	E12				
	0455	710	81.5	77.3	83	10	2CuE18	10Cs	0	0	2	E13				
	0558	695	81.3	77.0	82	10	3CuE18	10Cs	0	0	3	E13				
	0659	700	83.0	77.0	76	10	3CuE18	10Cs	0	0	3	E18				
	0756	705	83.0	77.0	76	10	3CuE18	10Cs	0	0	3	E14				
	0856	720	84.0	80.0	84	10	2CuE18	10Cs	0	0	2	E15				
	0958	725	85.5	80.0	79	10	1CuE18	10Cs	0	0	2	E12				
	1056	725	87.0	80.5	75	10	1CuE18	2AcE160	10Cs	0	4	E14				
	1158	730	87.0	81.0	77	10	1CuE18	1AcE160	10Cs	0	3	E12				
	1259	730	87.0	80.8	76	10	3CuE18	1AcE160	10Cs	0	5	E16				
	1355	720	86.5	80.5	77	10	3CuE18	1AcE160	10Cs	0	4	E15				
	1458	675	87.0	80.5	75	10	4CuE18	10Cs	0	0	4	E14	1448-1457			
	1557	680	86.5	80.0	75	10	2CuE18	10Cs	0	0	3	E8				
	1658	680	86.3	80.0	76	10	1CuE18	10Cs	0	0	3	E10				
	1756	680	86.3	80.0	76	10	1CuE18	10Cs	0	0	3	E11				

PLACE: FRED HOURLY OBSERVATIONS AND DAILY SUMMARY AUGUST 18 - SEPTEMBER 1, 1957

TABLE 4 (Concluded)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
8/31	1859	675	84.8	77.0	70	10	1CuE18	10Cs	0	0	4	E10				
	1958	715	83.3	77.0	75	10	1CuE18	10Cs	0	0	3	E10				
	2055	735	83.3	78.5	81	10	1CuE18	10Cs	0	0	3	E10				
	2156	755	83.0	79.3	85	10	2CuE18	10Cs	0	0	3	E14	2123-2129			
	2255	770	83.0	80.0	88	10	2CuE18	10Cs	0	0	3	E14				
	2355	785	83.0	79.0	84	10	2CuE18	10Cs	0	0	3	E11	2318-2321	87	81	0.06
9/1	0058	780	82.2	77.6	81	10	4CuE18	10Cs	0	0	4	E12				
	0156	765	82.0	77.5	81	10	3CuE18	10Cs	0	0	5	SE11				
	0257	750	82.0	77.5	81	10	3CuE18	10Cs	0	0	3	SE15				
	0359	745	81.8	77.1	82	10	3CuE18	10Cs	0	0	3	S8				
	0457	745	81.5	77.5	83	10	3CuE18	10Cs	0	0	3	SE12	0409-0425			
	0559	755	81.5	77.5	83	10	3CuE18	10Cs	0	0	3	SE17				
	0656	765	81.8	77.1	82	10	3CuE18	10Cs	0	0	3	SE14				
	0759	775	82.5	78.4	84	10	1CuE18	4AsE120	10Cs	0	3	SE12				
	0856	790	83.9	78.4	78	10	2CuE18	5AsE120	10Cs	0	5	SE12				
	0955	810	84.5	80.0	82	10	3CuE18	5AsE120	10Cs	0	5	SE10				
	1056	815	85.9	80.6	79	10	0CuE18	10Cs	0	0	5	ESE10				
	1157	800	86.3	80.2	77	10	10Ci	0	0	0	3	SE10				
	1255	795	86.2	80.2	77	8	0CuE16	8Ci	0	0	6	ESE12				
	1355	760	87.6	80.3	74	8	8Ci	0	0	0	6	ESE11				
	1457	745	86.5	80.5	77	8	8Ci	0	0	0	6	ESE10				
	1559	735	89.0	80.6	70	5	1ScE50	4Ci	0	0	6	ESE9				
	1657	735	87.3	78.6	68	8	1ScE50	7Ci	0	0	3	E11				
	1758	740	87.1	79.5	72	7	1CuE18	1ScE50	0	0	6	E12				
	1857	755	84.0	78.1	76	10	2CuE18	1ScE50	5Ci	0	6	E10				
	1955	790	84.3	78.5	76	10	2CuE18	1AcE140	10Cs	0	3	E10				
	2058	795	84.3	78.8	78	10	2CuE18	1AcE140	10Cs	0	4	E11				
	2159	820	83.7	78.2	78	10	2CuE18	1AcE140	10Cs	0	4	E10				
	2257	820	82.9	77.7	80	10	2CuE18	1AcE140	10Cs	0	4	ESE11				
	2358	830	82.6	77.5	80	10	2CuE18	1AcE140	10Cs	0	3	ESE11		89	82	0.02

PLACE: FRED — RAWINSONDE OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957 — TABLE 5

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
8/18	0000	1008	Surface	28.5	23.4	74	60 - 2
		1000	75	28.1	M	M	60 - 2
		850	1492	17.6	15.6	88	100 - 2
		700	3137	10.4	-1.3	44	110 - 3
		600	4405	2.8	-1.6	79	100 - 7
		500	5860	-6.0	-9.8	74	110 - 8
		400	7576	-15.7	-25.2	44	110 - 5
		300	9680	-30.6	MB	(20)	210 - 6
		200	12414	-55.0	----	--	310 - 2
		150	14188	-67.9	----	--	240 - 3
		100	16554	-75.8	----	--	190 - 6
	1200	1009	Surface	27.5	26.1	92	130 - 5
		1000	85	27.3	25.8	92	130 - 5
		850	1506	18.8	13.0	69	130 - 6
		700	3147	10.0	2.6	60	110 - 6
		600	4413	2.9	-3.9	61	100 - 6
		500	5867	-5.3	-13.6	52	90 - 6
		400	7586	-16.4	-29.2	32	80 - 4
		300	9684	-31.6	MB	(20)	290 - 5
		200	12413	-53.3	----	--	220 - 7
		150	14206	-66.4	----	--	230 - 16
		100	16577	-78.2	----	--	260 - 10
8/19	0000	1010	Surface	28.0	21.8	69	80 - 2
		1000	94	27.2	21.7	72	90 - 3
		850	1510	17.8	13.6	76	100 - 5
		700	3150	9.4	3.8	68	90 - 9
		600	4412	1.9	-2.8	71	90 - 7
		500	5862	-6.5	-12.4	63	90 - 10
		400	7574	-16.5	-29.3	32	130 - 5
		300	9672	-31.8	MB	(20)	200 - 5
		200	12409	-57.2	----	--	250 - 11
		150	14196	-67.9	----	--	230 - 24
		100	16543	-79.3	----	--	260 - 11
	1200	1009	Surface	28.0	22.1	70	80 - 5
		1000	85	27.6	22.8	75	90 - 5
		850	1497	18.0	13.4	74	90 - 7
		700	3138	10.4	-8.2	26	90 - 10
		600	4406	3.3	-12.8	30	90 - 10
		500	5862	-6.0	-15.6	47	100 - 8
		400	7574	-16.8	-30.2	30	110 - 5
		300	9672	-31.3	MB	(20)	190 - 7
		200	12397	-55.0	----	--	210 - 6
		150	14177	-68.5	----	--	220 - 19
		100	16517	-79.3	----	--	270 - 8
8/20	0000	1009	Surface	27.4	22.6	75	80 - 5
		1000	85	27.1	22.8	77	80 - 6
		850	1499	17.7	7.7	52	70 - 8
		700	3138	10.2	-6.5	30	80 - 13
		600	4409	3.8	-14.9	24	100 - 10
		500	5863	-6.1	-16.7	43	80 - 7
		400	7582	-15.7	-22.5	32	110 - 5
		300	9685	-31.5	-42.2	34	180 - 5
		200	12414	-54.8	----	--	220 - 6
		150	14196	-66.9	----	--	250 - 16
		100	16542	-83.3	----	--	250 - 14

PLACE: FRED   RAWINSONDE OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957   TABLE 5 (Continued)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
8/20	1200	1010	Surface	27.5	22.5	74	90 - 8
		1000	94	26.8	M	M	90 - 8
		850	1507	17.8	14.1	79	100 - 7
		700	3153	10.9	-3.2	37	120 - 6
		600	4423	4.1	-11.9	30	130 - 6
		500	5884	-4.9	-18.7	33	130 - 7
		400	7609	-14.2	M	M	80 - 5
		300	9721	-30.2	M	M	120 - 9
		200	12467	-53.1	----	--	100 - 7
		150	14266	-66.1	----	--	60 - 8
		100	16630	-78.4	----	--	70 - 10
8/21	0000	1010	Surface	28.5	23.9	76	80 - 4
		1000	94	28.4	24.4	79	80 - 5
		850	1519	18.1	16.3	89	110 - 7
		700	3160	9.8	7.6	86	100 - 11
		600	4427	2.9	-1.0	75	100 - 11
		500	5884	-4.8	-11.6	59	100 - 10
		400	7603	-15.6	MB	(17)	80 - 7
		300	9707	-30.5	MB	(20)	90 - 2
		200	12447	-54.1	----	--	270 - 7
		150	14231	-67.9	----	--	280 - 12
		100	16575	-81.0	----	--	350 - 6
	1200	1010	Surface	27.5	22.3	73	120 - 8
		1000	93	26.5	M	M	170 - 6
		850	1510	19.0	14.1	73	160 - 3
		700	3158	11.0	3.1	58	120 - 3
		600	4427	3.1	-5.8	52	120 - 8
		500	5886	-4.9	-14.0	49	120 - 8
		400	7605	-16.2	-24.2	50	120 - 6
		300	9707	-31.4	-36.2	63	120 - 9
		200	12436	-54.7	----	--	290 - 6
		150	14215	-69.0	----	--	290 - 12
		100	16583	-75.1	----	--	80 - 7
8/22	0000	1010	Surface	27.0	22.9	78	180 - 5
		1000	94	26.9	22.7	78	185 - 4
		850	1510	17.9	14.6	81	140 - 3
		700	3149	8.6	5.1	79	105 - 6
		600	4409	0.8	-2.9	81	100 - 6
		500	5853	-7.5	-12.8	66	90 - 7
		400	7565	-16.7	-21.8	64	90 - 7
		300	9668	-30.9	MB	(20)	50 - 7
		200	12402	-54.7	----	--	50 - 7
		150	14191	-69.8	----	--	360 - 10
		100	16512	-77.3	----	--	260 - 11
	1200	1009	Surface	27.1	21.6	72	30 - 7
		1000	84	26.1	21.6	76	40 - 5
		850	1500	18.9	15.8	82	80 - 2
		700	3142	9.8	5.0	72	10 - 2
		600	4403	1.9	-0.9	90	340 - 3
		500	5856	-6.3	-9.0	81	30 - 9
		400	7575	-15.7	-20.3	68	10 - 7
		300	9677	-31.8	-40.5	42	90 - 6
		200	12409	-54.0	----	--	340 - 6
		150	14194	-67.0	----	--	350 - 17
		100	16565	-77.3	----	--	210 - 5

PLACE: FRED RAWINSONDE OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957 TABLE 5 (Continued)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
8/23	0000	1009	Surface	27.5	22.9	76	60 - 5
		1000	85	27.2	22.6	76	60 - 5
		850	1501	17.8	14.6	82	70 - 9
		700	3140	8.6	5.0	78	230 - 6
		600	4399	1.2	-0.6	88	190 - 4
		500	5851	-5.4	-7.4	86	130 - 3
		400	7570	-15.8	-21.4	62	120 - 3
		300	9668	-31.9	-39.9	45	180 - 4
		200	12399	-55.0	----	--	330 - 3
		150	14178	-68.3	----	--	300 - 5
		100	16534	-76.8	----	--	270 - 3
	1200	1007	Surface	28.5	23.0	72	70 - 7
		1000	68	27.9	M	M	70 - 7
		850	1484	19.2	13.4	69	100 - 11
		700	3131	10.7	5.4	69	100 - 5
		600	4401	3.6	-0.9	72	160 - 7
		500	5860	-4.9	-10.6	64	180 - 10
		400	7502	-15.6	-22.4	56	220 - 9
		300	9684	-30.4	-39.7	40	240 - 6
		200	12420	-53.7	----	--	230 - 9
		150	14207	-67.2	----	--	260 - 3
		100	16584	-77.1	----	--	100 - 4
8/24	0000	1009	Surface	29.0	24.8	78	140 - 6
		1000	85	28.6	24.6	79	140 - 6
		850	1503	17.0	13.2	79	160 - 10
		700	3139	9.1	3.8	69	140 - 10
		600	4398	1.7	-3.4	70	150 - 8
		500	5850	-5.2	-15.9	43	180 - 9
		400	7562	-16.1	-28.3	34	120 - 10
		300	9655	-31.9	-38.9	50	220 - 6
		200	12377	-56.0	----	--	240 - 4
		150	14139	-70.5	----	--	260 - 8
		100	16476	-81.5	----	--	200 - 10
	1200	1010	Surface	27.5	21.6	70	170 - 3
		1000	94	26.8	M	M	150 - 3
		850	1509	18.1	11.8	67	130 - 4
		700	3149	9.1	3.1	66	150 - 5
		600	4416	2.2	-2.9	69	120 - 8
		500	5869	-5.2	-17.0	39	130 - 8
		400	7589	-15.7	-25.2	44	130 - 10
		300	9693	-30.1	-40.5	36	140 - 4
		200	12444	-52.7	----	--	10 - 5
		150	14234	-68.2	----	--	340 - 6
		100	16608	-79.0	----	--	120 - 5
8/25	0000	1010	Surface	28.5	23.4	74	90 - 6
		1000	94	28.2	23.1	74	90 - 6
		850	1518	19.4	12.6	65	80 - 4
		700	3170	12.1	-5.0	30	90 - 7
		600	4442	3.3	-5.2	54	90 - 7
		500	5898	-5.7	-17.2	40	80 - 8
		400	7618	-15.5	-29.4	29	110 - 6
		300	9719	-30.8	MB	(20)	90 - 4
		200	12468	-53.4	----	--	90 - 2
		150	14253	-68.3	----	--	140 - 1
		100	16605	-80.6	----	--	270 - 5

PLACE: FRED RAWINSONDE OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957 TABLE 5 (Continued)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
8/25	1200	1010	Surface	28.0	20.5	64	100 - 3
		1000	94	27.8	20.0	64	100 - 3
		850	1514	18.4	9.4	56	100 - 5
		700	3154	9.7	5.1	73	110 - 9
		600	4419	2.8	-4.2	60	90 - 10
		500	5875	-5.0	-17.4	37	80 - 9
		400	7596	-14.1	MB	(16)	60 - 9
		300	9702	-31.0	MB	(20)	40 - 7
		200	12444	-52.8	----	--	20 - 6
		150	14235	-68.0	----	--	270 - 10
		100	16576	-78.0	----	--	40 - 12
8/26	0000	1009	Surface	28.0	22.0	72	30 - 2
		1000	85	27.0	22.0	74	30 - 3
		850	1502	19.0	17.0	88	90 - 3
		700	3153	12.0	6.1	67	90 - 4
		600	4425	3.5	-0.2	77	90 - 3
		500	5883	-5.0	-16.3	41	90 - 3
		400	7600	-16.6	-19.6	78	70 - 4
		300	9702	-30.1	-37.2	50	70 - 8
		200	12445	-53.7	----	--	10 - 8
		150	14226	-68.9	----	--	340 - 9
		100	16574	-77.6	----	--	70 - 8
	1200	1008	Surface	27.0	19.0	62	110 - 3
		1000	75	26.7	19.3	69	90 - 3
		850	1490	17.6	13.9	79	110 - 6
		700	3128	2.7	-2.8	66	100 - 5
		600	4387	0.9	-3.5	72	120 - 7
		500	5833	-6.5	-7.3	M	M - M
		400	7545	-16.2	-32.0	24	M - M
		300	9646	-31.5	MB	(20)	M - M
		200	12384	-53.7	----	--	M - M
		150	14167	-69.0	----	--	M - M
		100	16493	-78.5	----	--	M - M
8/27	0000	1009	Surface	27.0	21.6	72	100 - 5
		1000	84	26.5	21.7	75	100 - 5
		850	1497	17.4	13.9	80	100 - 8
		700	3132	8.9	3.6	69	100 - 6
		600	4392	1.3	-3.3	72	90 - 7
		500	5843	-5.1	-19.6	31	140 - 4
		400	7558	-16.2	-25.6	44	90 - 2
		300	9653	-31.5	-40.0	43	30 - 4
		200	12378	-54.1	----	--	360 - 12
		150	14154	-69.3	----	--	350 - 14
		100	16473	-79.5	----	--	10 - 7
	1200	1008	Surface	27.0	25.6	92	110 - 7
		1000	76	26.6	M	M	110 - 8
		850	1486	19.3	M	M	140 - 2
		700	3124	9.0	M	M	130 - 7
		600	4384	2.1	M	M	130 - 7
		500	5837	-7.3	M	M	110 - 2
		400	7540	-17.3	M	M	30 - 5
		300	9637	-31.1	M	M	10 - 5
		200	12379	-54.2	----	--	330 - 15
		150	14161	-68.9	----	--	10 - 9
		100	16513	-76.3	----	--	30 - 7

PLACE: FRED RAWINSONDE OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957

TABLE 5 (Continued)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
8/28	0000	1009	Surface	28.7	22.8	70	120 - 5
		1000	85	27.9	23.1	75	120 - 5
		850	1501	17.9	14.9	83	150 - 4
		700	3141	8.8	-1.3	49	160 - 5
		600	4400	1.1	-3.3	72	160 - 6
		500	5848	-6.2	-14.2	53	130 - 7
		400	7563	-16.9	-26.8	42	80 - 8
		300	9656	-32.6	-37.6	61	30 - 8
		200	12380	-55.2	----	--	10 - 8
		150	14154	-69.0	----	--	360 - 21
		100	16504	-74.0	----	--	20 - 2
	1200	1010	Surface	28.0	22.1	70	180 - 3
		1000	94	27.2	22.1	74	170 - 3
		850	1517	18.8	15.0	78	170 - 3
		700	3761	9.7	2.8	62	150 - 5
		600	4424	1.8	-2.4	73	160 - 6
		500	5875	-6.2	-20.2	32	150 - 7
		400	7589	-16.5	-22.6	59	120 - 6
		300	9686	-31.3	-37.2	56	100 - 11
		200	12425	-54.0	----	--	40 - 16
		150	14204	-69.4	----	--	30 - 18
		100	16566	-74.1	----	--	30 - 5
8/29	0000	1010	Surface	27.5	21.8	71	70 - 6
		1000	94	27.0	22.5	76	70 - 6
		850	1510	18.8	13.9	73	70 - 5
		700	3155	10.0	4.7	69	100 - 2
		600	4423	2.9	-5.7	53	110 - 2
		500	5876	-6.2	-11.8	64	180 - 2
		400	7587	-17.0	-23.4	57	200 - 5
		300	9686	-30.8	-35.3	65	110 - 11
		200	12424	-55.4	----	--	60 - 14
		150	14192	-70.1	----	--	20 - 14
		100	16555	-76.8	----	--	90 - 9
	1200	1010	Surface	28.5	23.0	72	100 - 4
		1000	94	27.8	22.8	74	90 - 5
		850	1516	19.3	13.5	69	80 - 5
		700	3166	10.6	2.5	57	70 - 4
		600	4430	2.1	-3.8	65	90 - 2
		500	5898	-6.2	-11.9	64	50 - 2
		400	7593	-15.4	-28.1	33	360 - 3
		300	9699	-30.4	-41.0	35	90 - 4
		200	12447	-53.2	----	--	60 - 8
		150	14236	-67.5	----	--	110 - 6
		100	16605	-76.0	----	--	340 - 4
8/30	0000	1009	Surface	28.0	23.6	77	60 - 8
		1000	85	27.6	23.7	79	60 - 8
		850	1509	18.8	14.7	77	60 - 10
		700	3153	9.3	6.6	83	60 - 7
		600	4421	2.9	-1.3	74	50 - 2
		500	5874	-6.0	-10.9	68	350 - 2
		400	7593	-15.5	-23.7	52	20 - 5
		300	9696	-31.1	MB	(20)	20 - 2
		200	12428	-54.3	----	--	40 - 3
		150	14210	-68.6	----	--	200 - 9
		100	16567	-78.4	----	--	80 - 8

PLACE: FRED   RAWINSONDE OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957   TABLE 5 (Concluded)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
8/30	1200	1008	Surface	27.5	23.7	80	100 - 4
		1000	76	27.1	23.8	82	100 - 4
		850	1498	18.3	12.5	70	110 - 6
		700	3140	10.2	2.7	60	110 - 9
		600	4406	2.4	-5.9	54	100 - 8
		500	5859	-4.8	-12.6	54	160 - 2
		400	7582	-15.4	-20.3	65	310 - 3
		300	9690	-31.0	MB	(20)	290 - 7
		200	12423	-53.5	----	--	220 - 10
		150	14216	-66.1	----	--	240 - 6
		100	16593	-79.5	----	--	70 - 5
8/31	0000	1008	Surface	28.0	23.4	76	60 - 6
		1000	76	27.2	22.8	77	70 - 6
		850	1496	18.6	16.2	86	80 - 3
		700	3142	10.7	3.4	61	80 - 3
		600	4413	2.9	-2.0	70	80 - 8
		500	5870	-5.8	-10.3	70	90 - 3
		400	7584	-16.5	-22.5	60	150 - 3
		300	9679	-31.9	-41.5	38	90 - 7
		200	12409	-53.8	----	--	190 - 11
		150	14192	-68.0	----	--	190 - 14
		100	16565	-77.4	----	--	30 - 3
	1200	1007	Surface	28.6	23.1	72	80 - 6
		1000	68	28.0	22.8	73	90 - 7
		850	1494	19.6	15.6	78	90 - 7
		700	3146	11.1	2.4	59	90 - 7
		600	4417	3.1	-1.8	72	110 - 6
		500	5873	-5.8	-9.2	77	120 - 6
		400	7594	-15.6	-21.9	58	180 - 6
		300	9698	-31.6	-38.2	52	180 - 10
		200	12434	-53.8	----	--	180 - 15
		150	14231	-66.1	----	--	190 - 15
		100	16608	-75.0	----	--	110 - 10
9/1	0000	1008	Surface	26.5	21.9	76	100 - 7
		1000	75	25.8	21.6	78	110 - 7
		850	1500	19.1	17.6	91	120 - 9
		700	3148	10.6	4.7	67	90 - 9
		600	4415	2.8	-5.2	56	100 - 10
		500	5817	-5.2	-13.9	50	100 - 8
		400	7592	-14.8	-28.4	30	110 - 8
		300	9691	-31.3	MB	(20)	130 - 9
		200	12426	-52.7	----	--	180 - 12
		150	14215	-67.7	----	--	180 - 12
		100	16568	-82.4	----	--	130 - 6
	1300	1009	Surface	27.6	22.4	73	130 - 5
		1000	85	27.6	22.6	74	130 - 6
		850	1510	19.4	15.5	78	150 - 6
		700	3157	10.1	4.7	69	120 - 10
		600	4426	3.8	-4.7	54	110 - 10
		500	5889	-3.9	-10.7	59	100 - 13
		400	7620	-14.9	-20.7	61	110 - 9
		300	9731	-29.8	-36.5	52	170 - 5
		200	12485	-52.3	----	--	110 - 5
		150	14294	-66.3	----	--	90 - 6
		100	16635	-81.3	----	--	90 - 11

PLACE: BRUCE THREE-HOURLY OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957 TABLE 6

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR_L	RR_O	N	C_{LMH}	FF_3	DDFF	REMARKS
8/18	1200	89.0	--	----	----	0	0	6	Cu,Sc,Ci...	--	SE	
	1500	--	--	----	----	0	0	8	Cu,Sc,Ac,Ci	4	SE	1500 few drops of rain fell.
	1800	--	--	----	----	T	T	8	Thick Cu;Sc	2	SE	1700-1710 light shwr, also heavy squalls 3-5
	2100	--	--	----	----	0	0	1	....	1	E	miles N and E.
8/19	0000	82.0	--	94.0	80.0	0	0	1	....	4	NE	0000 clear overhead - clouds on horizon.
	0300	--	--	----	----	0	0	1	Cu.........	4	NE	
	0600	--	--	----	----	0	0	4	Cu.........	4	E	
	0900	--	--	----	----	0	0	4	Cu.........	5	E	
	1200	88.5	80.5	88.5	80.0	0	0	2	Cu.........	6	E gentle	
	1500	--	--	----	----	0	0	4	Cu.........	8	E gentle	
	1800	--	--	----	----	0	0	4	Cu,Cb......	8	E gentle	
	2100	--	---	----	----	0	0	-	....	8	E	
8/20	0000	82.5	77.0	90.5	82.5	0	0	Clear?	....	10	E	
	0300	--	--	----	----	0	0	-	....	11	E	
	0600	--	--	----	----	0	0	-	....	6	E	
	0900	85.0	77.5	----	----	0	0	-	Cu.........	9	E	
	1200	89.0	80.0	89.0	80.0	0	0	4	Cu,Ci......	9	NE moderate	1200 towering Cu on horizon.
	1500	91.0	81.0	----	----	0	0	2	Cu,Ac,Ci...	8	NE	
	1800	86.0	79.0	----	----	0	0	3	Sc,Ac......	6	NE light	
	2100	83.0	78.0	----	----	0	0	2	....	5	NE light	2300 fresh SE wind. 2315 light shwrs.
8/21	0000	80.0	77.0	91.0	80.0	0.02	0.03	5	....	5	NE	0000 dark clouds to SE.
	0300	79.0	77.0	----	----	0.02	0.01	10	....	8	S moderate	0300 steady light shwrs.
	0600	79.0	76.0	----	----	0.07	0.09	10	....	4	SE light	
	0900	82.0	77.0	----	----	0	0	10	Ac,Ci......	4	S moderate	
	1200	89.5	80.5	89.5	77.5	0	0	4	Cu,Sc,As, Ac,Ci	8	S fresh	
	1500	--	---	----	----	0	0	7	Cu,Ci......	6	S	
	1800	--	--	----	----	0	0	4	Cu,Ci......	4	S	
	2100	--	--	----	----	0	0	-	....	3	S gentle	
8/22	0000	81.0	77.0	93.0	79.5	0	0	-	....	2	Calm	0200 rain began.
	0300	--	--	----	----	0.04	0.04	-	....	1	---	0300 light rain at time of obs.
	0600	--	---	----	----	0.01	0.02	-	Cu,Sc,Ci...	2	S	
	0900	--	--	----	----	0	0	9	Cu,Sc......	2	SE	
	1200	83.0	77.5	83.0	77.5	0.25	0.28	10	Cu,Sc......	5	Calm	1100 rain ended.
	1500	--	--	----	----	T	T	10	Cu,Cb,Ac...	7	NE	
	1800	--	--	----	----	0	0	10	Cu,Sc......	8	E	
	2100	--	--	----	----	0	0	10	....	10	NE light	
8/23	0000	81.5	78.0	86.0	81.5	0	0	10	....	11	E moderate	0000 few drops of rain.
	0300	--	--	----	----	0	0	10	....	8	E light	
	0600	--	--	----	----	0.19	0.19	10	....	9	SE	0430-0545 light rain. 0600 light shwrs.
	0900	--	--	----	----	T	0.01	9	Sc,Ac,Ci...	9	NE	0830 light shower.
	1200	85.5	80.5	85.5	78.0	0	T	7	2Cu;5Ci.....	11	E 5-10	
	1500	--	--	----	----	0.01	0.01	9	4Cu;2Cb;3Ci.	9	E 5-10	1500-1505 rain with ESE wind 10-15 kts.
	1800	--	--	----	----	0	0	10	8Cu;2Ac&Ci..	11	SE 10-15	followed by E 0-5 kts. 1800 overcast.
	2100	--	--	----	----	0	0	-	....	11	SE 10-15	

PLACE: BRUCE THREE-HOURLY OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957

TABLE 6
(Continued)

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR_L	RR_O	N	C_{LMH}	FF_3	DDFF	REMARKS
8/24	0000	82.5	77.5	91.5	82.5	0	0	-	....	10	SE 10-15	
	0300	--	--	----	----	0.04	0.04	-	....	10	SE 0-5	
	0600	--	--	----	----	0	0	4	2Cu;2Ci.....	10	SE 5-10	
	0900	--	--	----	----	0	0	7	5Cu;2Ci.....	8	SE 5-10	
	1200	93.0	82.0	93.0	79.0	0	0	7	4Cu;4Ci.....	4	E 8-10	
	1500	91.0	81.5	----	----	0	0	7	3Cu;2Ac;7Ci.	5	SE 4-6	1500 towering Cu to the East.
	1800	87.0	80.0	----	----	0	0	8	2Cu;8Ci.....	5	E light and variable	
	2100	82.0	77.5	----	----	0	0	5	5Ci.........	5	E 8-10	
8/25	0000	81.5	77.5	93.0	81.5	0	0	3	3Ci.........	7	E 8-10	
	0300	81.5	76.5	----	----	0	0	3	3Ci.........	8	E 10-15	
	0600	81.0	76.5	----	----	0	0	3	1Cu;2Ci.....	6	SE 6-8	
	0900	85.5	79.0	----	----	0	0	10	2Cu;2Ac;10Cs	5	SE 8-10	
	1200	93.0	81.5	93.0	81.0	0	0	9	2Cu;7Sc.....	5	E 5-10	
	1500	88.5	79.0	----	----	0	0	9	2Cu;1Ac;6Ci.	3	E 0-2	
	1800	88.5	77.5	----	----	0	0	9	2Cu;3Ac;4Ci.	3	Calm	1730 calm began.
	2100	83.0	77.0	----	----	0	0	-	....	1	Calm	2120-2125 light shwr.
8/26	0000	82.0	77.5	93.0	82.0	T	T	-	....	1	Calm	
	0300	80.0	77.0	----	----	0	0	-	....	3	Calm	
	0600	81.0	78.0	----	----	0	0	5	.Cu.........	3	SE 0-2	0645-0700 rain shwr.
	0900	82.5	79.5	----	----	0.03	0.04	9	.Cu&Sc......	4	SE 0-2	0900 shwr over Elmer and lagoon, partial
	1200	88.0	81.5	88.0	80.0	0.01	T	6	4Cu;2Ac;3Ci.	5	SE 10-12	rainbow to west. 0918 shwr began. 0923
	1500	94.0	82.0	----	----	T	0.01	6	3Cu;6Ci.....	6	SE 8-10	shwr stopped. 1155 rain shwr began. 1205
	1800	85.0	79.5	----	----	0.04	0.01	9	4Cu;4Ac;2Ci.	4	E 4-6	stopped. 1200 towering Cu all Quads. 1700
	2100	82.0	78.5	----	----	0	0	-	....	5	E 8-10	rain shwr began. 1710 stopped. 1730 rain
8/27	0000	82.0	77.5	94.0	82.0	0	0	-	....	9	SE 10-15	shwr began. 1740 stopped. 1800 towering
	0300	81.0	78.0	----	----	0.02	T	-	....	9	E 10-15	Cu all Quads. 0250 rain shwr began. 0255
	0600	81.5	78.0	----	----	0	T	5	3Cu;3Ci.....	10	E 10-15	stopped. 0300 towering Cu all Quads. 0600
	0900	84.0	79.5	----	----	0	0	6	4Cu;2Ac;2Ci.	6	SE 8-12	towering Cu NE. 0900 towering Cu all Quads
	1200	90.0	81.0	90.0	81.0	0	0	3	2Cu;1Sc.....	13	E 15	and rain shwrs to S.
	1500	93.5	82.0	----	----	0	0	5	4Cu;1Sc.....	11	E 20	
	1800	87.0	80.0	----	----	0	0	8	4Cu;4Ci.....	10	E 15	
	2100	82.5	78.0	----	----	0	0	-	....	8	SE 12	
8/28	0000	82.0	78.0	94.0	82.0	0	0	-	....	8	E 10	
	0300	81.5	77.5	----	----	T	T	-	....	7	SE 20	
	0600	81.1	77.5	----	----	0	0	2	....	6	SE 10	
	0900	86.0	79.0	----	----	0	0	8	....	4	S 10	0900 hazy sun.
	1200	89.0	80.0	89.0	81.0	0	0	10	2Cu;6Ac;6Ci.	3	Calm	1200 very dark horizon to east.
	1500	85.5	78.5	----	----	0	0	10	3Cu;10Ac....	.2	E 1-2	1500 very dark horizon to SE.
	1800	82.0	78.5	----	----	0	0	10	2Cu;10Ac....	6	E 6-8	
	2100	81.0	77.0	----	----	0	0	-	....	9	E 8-10	
8/29	0000	80.5	77.0	90.5	80.5	0	0	-	....	10	E 6-8	
	0300	81.0	77.5	----	----	0	0	-	....	8	E 6-8	
	0600	81.5	78.0	----	----	0	0	7	5Cu;5Ci.....	10	E 4-6	0600 shwrs in sight in all quadrants. 0803
	0900	86.0	79.5	----	----	T	T	5	2Cu;4Ci.....	8	E 3-5	light shwr began. 0807 stopped. 0900
	1200	88.5	80.0	88.5	80.5	0	0	3	.Cu.........	6	E 0-5	cirrus very thin. 1200 wind variable in spd.

PLACE: BRUCE

THREE-HOURLY OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957

TABLE 6
(Concluded)

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR_L	RR_O	N	C_{LMH}	FF_3	DDFF	REMARKS
8/29	1500	89.0	79.5	----	----	0	0	4	2Cu&Cb;2Ci..	9	E 3-8	1500 wind speed variable; towering Cu to W.
	1800	82.5	78.0	----	----	0.03	0.03	10	8Cu;2Ci.....	11	E 5-8	1632 few drops rain. 1720-1728 light shwr.
	2100	82.5	78.5	----	----	0.01	0.01	5	Cu.........	11	E 5-10	1800 wind speed variable; towering Cu to W.
8/30	0000	82.5	78.5	89.0	82.5	0	0	-	....	12	E 8-10	S half of lagoon covered with shwrs; shwrs
	0300	82.0	78.0	----	----	0	0	-	....	8	E 5	to seaward SSE and E of Bruce. 1828-1853
	0600	82.0	77.5	----	----	0	0	2	Cu.........	8	E 2-5	very light shwr. 1912-1919 very light shwr.
	0900	84.0	79.0	----	----	T	T	9	Cu.........	6	Calm	2100 gusty winds. 0851-0854 light shwr.
	1200	86.0	80.0	86.0	82.0	0.36	0.39	4	2Cu;2Ci.....	3	SE 0-2	0900 rain shwr. Rain seaward in SE quadrant;
	1500	91.0	82.0	----	----	0	0	3	2Cu;1Ci.....	4	E 3-5	rainbow to W. 0935 9/10 sky cover -5Sc;3Cu;
	1800	86.5	80.0	----	----	0	0	7	7Cu........	6	E 0-5	1Ac. 0950-1023 rain shwr. 1830-1845 rain
	2100	81.5	78.0	----	----	0.27	0.28	-	....	8	E 5-10	shwr. Wind E 15-20.
8/31	0000	81.5	78.0	91.0	81.5	0	0	-	....	9	E 8-12	
	0300	82.0	78.0	----	----	0	0	-	....	9	E 8-12	
	0600	82.0	77.0	----	----	0	0	3	2Cu;1Ci.....	11	E 8-12	
	0900	84.5	79.5	----	----	0	0	6	5Cu;1Ci.....	10	E 8-12	
	1200	89.0	81.0	89.0	80.5	0	0	6	3Cu;2Ac;1Ci.	10	E 15	
	1500	91.0	83.0	----	----	0	0	6	2Cu;3Sc;1Ac.	11	E 15	
	1800	87.0	80.0	----	----	0	0	8	6Cu;2Ci.....	11	E 15	
	2100	83.0	79.0	----	----	0	0	-	....	8	E 12	2100 thin high cirrus. Halo around moon.
9/1	0000	81.0	78.0	91.0	81.0	T	T	-	....	6	E 15	2345-0045 rain shwr. 0000 showery.
	0300	80.0	78.0	----	----	0.04	0.04	-	....	11	SE 12	0345 light shwr.
	0600	81.0	78.0	----	----	0.01	0.01	6	....	10	SE 20	
	0900	85.0	79.0	----	----	0	0	9	2Cu;7Ci&Cs..	11	SE 15	0900 hazy.

PLACE: BRUCE | SPECIAL OBSERVATIONS, AUGUST, 1957 | TABLE 7

DATE	LOCATION	TIME	HT. (ft.)	TT	TT_w	TT_s	REMARKS
28th	Ocean water line	1530	5	83.0	78.0		This set of observations on August 28th represents readings on a cross-BRUCE traverse along a line past the shelter and parallel to the line of wells (on old airstrip). Wind throughout was ENE, 2-3 knots.
	Edge of vegetation,ocean	1533	5	83.5	78.0		
	Opposite Well #5	1536	5	84.2	78.6		
	Opposite instrument shelter	1539	5	83.8	78.0		
	Opposite Well #4	1542	5	83.8	78.4		
	Opposite Well #4, but about 75 feet into vegetation	1546	5	84.5	78.9		
	Opposite Well #3	1550	5	83.9	77.9		
	Opposite Well #2	1553	5	83.8	77.6		
	Edge of vegetation, lagoon	1557	5	83.7	77.7		
	Lagoon water line	1600	5	83.8	77.5		
30th	Edge of water, lagoon	1208		86.0	80.0	84.6	The 1208-1241 observations are from a lagoon-ocean traverse on a line passing the shelter and parallel to the line of wells.
	Edge of water, lagoon	1210	5	86.0	79.5		
	Edge of vegetation, lagoon	1212	5	87.0	80.0		
	Edge of vegetation, lagoon	1213	1	87.0	82.0		
	Opposite Well #1	1215	5	85.5	79.5		
	Opposite Well #1	1216	1	87.0	82.0		
	Opposite Well #2	1217	5	87.5	81.0		
	Opposite Well #2	1218	1	91.0	84.0		
	Opposite Well #3	1221	5	87.0	80.5		
	Opposite Well #3	1222	1	92.5	86.5		
	Opposite Well #4	1224	5	81.0	80.5		
	Opposite Well #4	1225	1	87.5	82.0		
	Opposite instrument shelter	1227	5	86.0	80.0		
	Opposite instrument shelter	1228	1	91.0	84.0		
	Opposite Well #5	1229	5	87.5	81.0		
	Opposite Well #5	1230	1	89.5	83.5		
	Edge of vegetation, ocean	1232	5	86.0	80.0		
	Edge of vegetation, ocean	1234	1	88.0	83.5		
	Edge of water (on reef)	1241	5	85.5	82.0		
	Edge of water (on reef)	1241	1	84.0	78.5	84.6	
	15 yards to edge of ocean reef	1510	3	85.0	79.5	85.1	The 1510-1540 observations are along the same line, but from ocean to lagoon.
	Halfway in on ocean reef	1515	5	84.5	78.5		
	Edge of vegetation, ocean	1519	5	86.5	80.0		
	Edge of vegetation, ocean	1520	1	90.5	83.5		
	Opposite Well #5	1523	5	90.0	82.5		
	Opposite Well #5	1524	1	91.0	83.0		
	Opposite instrument shelter	1525	5	90.5	82.5		
	Opposite instrument shelter	1526	1	91.5	82.5		
	Opposite Well #4	1527	5	90.5	82.0		
	Opposite Well #4	1529	1	90.5	82.5		

PLACE: BRUCE

SPECIAL OBSERVATIONS, AUGUST, 1957

TABLE 7
(Concluded)

DATE	LOCATION	TIME	HT. (ft.)	TT	TT_w	TT_s	REMARKS
30th	Opposite Well #3	1530	5	89.5	81.0		
	Opposite Well #3	1531	1	91.0	82.0		
	Opposite Well #2	1532	5	90.5	81.5		
	Opposite Well #2	1533	1	91.5	82.0		
	Opposite Well #1	1534	5	89.5	81.0		
	Opposite Well #1	1535	1	90.0	82.0		
	Edge of vegetation, lagoon	1536	5	88.5	80.0		
	Edge of vegetation, lagoon	1537	1	91.0	82.0		
	Edge of lagoon	1539	5	90.5	81.5	86.0	
	Edge of lagoon	1540	1	90.5	82.5		
	Edge of lagoon	1540	5	89.0	81.0	85.3	
	Edge of water, ocean	2109	5	83.0	78.5	83.5	The 2109-2131 observations are the same traverse as above, ocean to lagoon.
	Edge of water, ocean	2110	1	83.0	79.0		
	Edge of vegetation, ocean	2112	5	83.0	78.5		
	Edge of vegetation, ocean	2113	1	82.0	79.0		
	Opposite Well #5	2115	5	84.0	82.5		
	Opposite Well #5	2115	1	84.0	82.0		
	Opposite instrument shelter	2116	5	84.0	82.0		
	Opposite instrument shelter	2117	1	83.5	82.0		
	Opposite Well #4	2120	5	82.0	79.0		
	Opposite Well #4	2121	1	82.0	79.0		
	Opposite Well #3	2122	5	82.0	78.5		
	Opposite Well #3	2123	1	81.5	78.5		
	Opposite Well #2	2124	5	82.0	78.5		
	Opposite Well #2	2125	1	81.5	79.0		
	Opposite Well #1	2126	5	82.0	78.5		
	Opposite Well #1	2127	1	81.5	78.5		
	Edge of vegetation, lagoon	2129	5	82.0	78.5		
	Edge of vegetation, lagoon	2129	1	81.5	78.5		
	Edge of lagoon water	2131	5	82.0	79.0	84.2	

PLACE: KEITH THREE-HOURLY OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957 TABLE 8

Date	Time	TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	FF_3	DDFF	REMARKS
8/18	1200	87.5	78.5	89.0	80.0	0	4	4Cu..........	--	NE	
	1500	89.0	79.0	----	----	0	7	7Cu..........	4	E	
	1800	88.5	78.0	----	----	0	4	4Cu..........	4	NE	1700 Partial rainbow, NE
	2100	82.5	75.5	----	----	0	1	1Cu..........	2	NE	
8/19	0000	82.5	77.0	90.5	82.5	0	1	1Cu..........	4	E	
	0300	82.0	76.0	----	----	0	3	2Cu;1Ac.....	5	NE	
	0600	81.5	77.5	----	----	0	8	7Cu;1Ac.....	5	NE	
	0900	86.0	79.0	----	----	0	5	5Cu..........	3	NE	
	1200	91.0	81.0	91.0	75.5	0	4	4Cu..........	7	E	
	1500	92.5	81.0	----	----	0	3	3Cu..........	11	E	
	1800	86.5	79.5	----	----	0	4	4Cu..........	11	E	
	2100	83.0	77.0	----	----	0	1	1Cu..........	12	E	
8/20	0000	82.0	77.0	92.5	82.0	0	1	1Cu..........	12	E	
	0300	81.5	77.0	----	----	0	3	2Cu;1Ci.....	11	E	
	0600	81.5	75.0	----	----	0	8	2Cu;6Ci.....	10	E	0645-0730 calm. 0800-0830 Rainbow to W. Line of
	0900	85.5	77.0	----	----	0	7	2Cu;1Ac;4Ci.	12	E	shwrs. 5-10 mi. S, moving W. 0900 Cu in SE,SW
	1200	91.0	79.0	91.0	81.0	0	6	3Cu;3Ci.....	12	E	1200 Cu well developed S to W
	1500	90.5	79.0	----	----	0	3	2Cu;1Ci.....	13	E	1500 Cu well developed in N. 1700-1900 very light
	1800	88.5	79.0	----	----	0	2	Cu..........	4	E	winds. 1800 few Ci in NW
	2100	83.0	77.0	----	----	0	2	Cu..........	8	E	
8/21	0000	82.5	77.0	91.0	82.5	0	8	Cu..........	8	E	0000 Few drops of rain
	0300	78.5	77.0	----	----	0.05	10	Sc..........	9	W	0255-0310 light shwrs. 0340-0347 light shwrs.
	0600	81.0	77.0	----	----	0.01	10	Sc..........	8	S	
	0900	83.0	77.0	----	----	T	10	6Cu;4Ci.....	7	SE	
	1200	83.0	78.0	83.0	78.0	0	9	1Cu;7Ac,As; 1Ci	10	S	
	1500	85.0	78.0	----	----	0	9	5Cu;8Ci.....	12	S	
	1800	84.0	78.0	----	----	0	8	3Cu;5Ac.....	9	SW	
	2100	82.0	77.5	----	----	0	5	1Cu;4Ci.....	8	S	
8/22	0000	82.0	78.0	85.5	82.0	0	2?	Cu..........	4	S	
	0300	80.0	76.0	----	----	0	3?	Cu..........	1	Calm	
	0600	81.0	77.5	----	----	0	9	1Cu;8As.....	2	W	0600 halo observed 45°
	0900	84.5	79.0	----	----	0	10	4Cu;4Cs; 2Ac,As	4	N to Calm	0915 beginning light shwr.
	1200	83.5	78.5	84.5	80.0	0.01	10	9Cu;Sc,Ac,Ci	6	NE under 4	9:12 from chopper en route to Keith, observed 4 shwrs. northward over lagoon. One, 5-10 miles
	1500	88.5	78.0	----	----	0	10	Ac,Ci,Cu...	7	E 8-10	across, may have extended over Janet. Other 3
	1800	83.5	78.0	----	----	0	10	6Cu;3Ac,Ci..	11	E 12-14	were much smaller -- 1 mile or so across.
	2100	83.5	77.5	----	----	0	--	....	13	E 12-15	10:18 light rain begins from edge of low cloud that
8/23	0000	81.5	78.0	88.5	81.5	0	--	....	13	E 12-14	has drifted in from east. Cloud extends northward
	0300	82.0	78.5	----	----	T	--	....	12	E 4-6	from Keith. Rain ended 1100. 0003-0030 Lt.rain.
	0600	80.0	77.0	----	----	0.10	10	Cu,Sc,Ac...	11	E 5-8	0255-0610 light to moderate rain,changing to very
	0900	82.5	79.0	----	----	T	9	Cu,As,Ci...	12	E 8-10	light rain 0610 to 0735,when rain ended.
	1200	87.0	80.0	87.0	80.0	T	9	8Cu,Sc;1Ac, Ci	16	NE 10-15	1004-1008 light shwrs. 1200 gusts to 20 knots.

PLACE: KEITH THREE-HOURLY OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957 TABLE 8 (Continued)

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	FF_3	DDFF	REMARKS
8/23	1500	87.0	79.0	----	----	0	10	4Cu;5Ci;1Ac..	11	E 5-10	1700-1800 Squall line about 10 miles southwest of
	1800	83.0	79.0	----	----	0	10	2Cu;8Sc.......	10	SE 10	Keith. 1800 rain in lagoon between Bruce and
	2100	81.5	77.0	----	----	0.02	10	8Cu;2Ci.......	9	SE 10-15	Keith. 1803 few drops of rain. 1950 few drops of rain. 2008-2017 rain. 2100 light shwr.
8/24	0000	83.0	78.0	87.5	80.0	0	10	Sc..........	10	SE 10-15	0040 few drops of rain.
	0300	82.0	77.5	----	----	T	10	4Cu;6Ci.......	9	E 5-15	0300 winds variable. 0440 rain started - stopped
	0600	81.0	77.5	----	----	0.03	10	4Cu;6Ci.......	9	SE 5-10	sometime before 0600. 0745 partial rainbow
	0900	83.0	78.0	----	----	0	10	3Cu;7Ci.......	9	SW 5-10	southwest of Keith. 0900 rain in lagoon N of
	1200	83.0	77.0	85.0	79.5	0.21	7	3Cu;3Sc;1Ac..	5	SE 5	Bruce-Keith line. 1040 started raining. 1100 rain
	1500	89.5	81.0	----	----	T	7	6Cu;1Sc,Ac...	4	E 5-10	slackened to light shwr. 1115-1300 intermittent
	1800	85.5	78.0	----	----	0	8	2Cu;3Ac;3Ci..	7	E 5-10	light shwrs. 1800 halo around hazy sun.
	2100	82.0	77.0	----	----	0	3	....	6	E 12	
8/25	0000	82.0	77.0	90.0	82.0	0	3	....	8	E 15	
	0300	81.5	77.0	----	----	0	3	....	9	E 15	
	0600	81.0	75.0	----	----	0	7	....	9	NE 18	
	0900	83.0	76.5	----	----	0	9	1Cu;8Ci,Cs,Ac	6	SE 10	0900 high thin Ci,Cs.
	1200	88.0	78.0	88.0	81.0	0	8	1St;7Ci.......	4	E 0-5	
	1500	89.0	77.0	----	----	0	8	1Cu;1St;6Ci..	1	E 0-5	
	1800	89.0	77.5	----	----	0	8	4Cu;4Ci.......	1	Calm	
	2100	81.0	76.0	----	----	0	--	....	0	Calm	2100 rain started. 2115 rain stopped.
8/26	0000	79.0	75.5	91.0	79.0	T	--	....	0	Calm	0215 wind E 15-20 kts. 0225-0235 rain. 0240 wind
	0300	81.0	75.5	----	----	T	--	....	4	E 5-10	dropped.
	0600	81.0	76.5	----	----	T	--	....	1	E 0-5	0655 sky cover 3/10;2/10 Cu 1/10 Ci. 0830 -0835
	0900	86.0	79.0	----	----	0	6	4Cu;2Ci.......	3	E 0-5	rain. 0940 large Cb over lagoon to E. 1013 few
	1200	87.0	78.8	87.0	78.5	0.07	6	4Cu&Cb;2Ac; 6Ci	3	E 3-4	drops of rain. 1016 shwr commenced. 1035 shwr stopped. 1200 rain shwr over lagoon to NE.
	1500	86.5	77.5	----	----	0	6	4Cu&Cb;1Ac; 6Ci	3	E 2-3	1500 rain shwr to W over ocean.
	1800	85.0	77.0	----	----	0	9	4Cu&Cb;3Ac; 8Ci	1	Calm	1800 many shwrs in sight in all quadrants. 1910 few drops of rain.
	2100	81.0	77.0	----	----	0	--	....	2	SE 3-5	2100 heavy rain shwr commencing -- gusty wind.
8/27	0000	81.5	77.5	88.5	79.0	0.10	--	....	9	SE 6-8	2115 shwr stopped.
	0300	81.5	76.0	----	----	0	--	....	10	E 8-10	
	0600	80.5	77.0	----	----	0	3	2Cu;3Ci.......	10	E 6-8	0720 shwr commenced. 0732 shwr stopped. 0750 few
	0900	82.5	78.5	----	----	0.08	7	4Cu;(Ac);6Ci.	9	E 4-6	drops of rain. 0845 very light shwr. 0910 few
	1200	86.5	80.5	86.5	78.0	0.01	8	8Cu..........	10	SE 5-10	drops of rain. 0900 many shwrs over lagoon. 1040
	1500	88.5	80.0	----	----	0	5	5Cu..........	12	SE 10-12	-1130 light shwr.
	1800	87.0	78.0	----	----	0	8	2Cu;6Ci.......	11	SE 10-12	
	2100	82.5	78.0	----	----	0	--	....	8	SE 8-12	
8/28	0000	81.5	77.5	88.5	81.5	0	--	....	8	SE 8-12	
	0300	82.0	77.5	----	----	0	--	....	7	SE 5-10	
	0600	82.0	77.0	----	----	0	3	2Cu;1Ci......	5	SE 5-10	

PLACE: KEITH THREE-HOURLY OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957 TABLE 8 (Concluded)

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	FF_3	DDFF	REMARKS
8/28	0900	84.5	78.0	----	----	0	8	3Cu;5Ci......	5	S 5-10	
	1200	87.0	79.5	87.0	81.0	0	10	2Cu;10Cs.....	4	SE 3-5	
	1500	87.5	78.5	----	----	0	10	2Cu;2Ac;10Cs.	1	Calm	
	1800	83.5	77.5	----	----	0	10	3Cu;10Cs.....	6	E 8-10	
	2100	82.0	78.5	----	----	0	--	....	11	E 10-12	
8/29	0000	81.5	77.0	87.5	81.5	0	--	....	13	E 10-15	
	0300	81.0	77.0	----	----	0	--	....	10	E 8-10	
	0600	81.5	77.5	----	----	0	4	4Cu;2Ci......	12	E 8-10	
	0900	85.0	79.0	----	----	0	6	6Cu..........	7	E 4-6	
	1200	88.0	80.5	88.0	79.5	0	4	4Cu..........	9	NE 12	
	1500	89.0	80.0	----	----	0	4	2Cu;1Cb;1Cs..	15	NE 20	1705 light shwr began. 1730 rain began. 1745 rain
	1800	84.5	79.5	----	----	0.02	7	3Cu;4Sc......	12	NE 20	ended. 1815 rain began (wind gusty). 1830 rain
	2100	82.5	77.5	----	----	0.08	--	....	14	NE 20	ended. 1920 rain began. 1930 rain ended. 2030
8/30	0000	83.0	78.5	90.0	80.0	0	--	....	14	NE 20	lightning to west. 2300 lightning to north.
	0300	82.5	78.0	----	----	T	--	....	10	NE 15	
	0600	82.5	77.5	----	----	0	--	....	11	NE 12	
	0900	85.5	78.0	----	----	0	3	1Cu;1Sc;1Ci,Ac	8	NE 10	1000 rain shwr began. 1015 stopped. 1020 rain shwr
	1200	85.5	79.0	85.5	82.0	0.29	6	4Cu;2Ac;4Ci..	4	E 5-8	began. 1045 stopped. 1200 towering Cu all Quads.
	1500	87.5	80.0	----	----	0	4	2Cu;3Ci......	3	NE 5-10	1500 towering Cu all Quads.
	1800	88.5	80.0	----	----	0	4	4Cu;2Ci......	8	E 5-8	1800 towering Cu all Quads. Rain shwr NE in lagoon.
	2100	81.5	78.5	----	----	0.16	7	4Cu;4Ci......	9	E 5-10	1900 rain shwr began. 1910 stopped. 1920 rain shwr
8/31	0000	81.5	78.0	88.5	78.0	0.02	--	....	13	E 10-15	began. 1945 stopped. 2000 rain shwr began. 2010
	0300	82.5	77.5	----	----	0	--	....	12	E 10-15	stopped. 2100 towering Cu all Quads. Moonlight.
	0600	81.5	77.5	----	----	T	8	3Cu;3Ac;5Ci..	15	E 10-15	
	0900	84.5	79.0	----	----	0	7	3Cu;2Ac;5Ci..	13	E 10-12	1000-1100 calm wind.
	1200	90.0	82.0	90.0	81.5	0	8	2Cu;1Ac;5Ci..	11	E 5-8	1332-1338 light shwr.
	1500	88.0	80.0	----	----	T	7	5Cu;2Ac......	13	E 8	1517-1528 heavy shwr.
	1800	86.0	79.0	----	----	0.02	10	2Cu;8Ci,Cs...	12	E 5-8	1800 Cb in NW quadrant. 1850 heavy rain shwr E over
	2100	83.0	77.5	----	----	0	--	....	11	E 5-8	lagoon. 1905-1915 gusty winds at 15-20 kts. 2000
9/1	0000	79.0	76.5	91.0	79.0	0.35	--	....	11	E 3-5	halo around moon. 2325-0008 rain.
	0300	81.5	77.5	----	----	0.10	--	....	9	E 5	0420 rain started. 0545-0550 rain.
	0600	80.0	77.0	----	----	0.16	3	3Cu..........	9	SE 8-10	
	0900	83.0	78.5	83.0	78.0	T	10	4Cu;6Cs......	8	E 3-5	

PLACE: KEITH

HOURLY RELATIVE HUMIDITIES, AUGUST 18 - SEPTEMBER 1, 1957*

TABLE 9

HOUR: DATE	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
8/18												67	66	65	64	64	63	62	65	71	72	74	75	78
8/19	78	78	76	74	75	83	83	79	73	68	66	65	63	65	61	65	71	74	75	75	76	77	78	80
8/20	80	80	80	78	79	74	76	71	68	66	63	59	59	59	60	61	64	66	67	73	76	76	76	78
8/21	80	82	93	83	85	83	79	79	77	78	79	80	79	76	73	74	76	76	80	81	82	83	81	84
8/22	82	82	84	86	87	81	81	81	79	74	78	80	70	66	63	67	72	78	77	77	76	81	85	86
8/23	86	84	86	86	86	87	88	84	86	85	82	74	76	73	70	76	80	84	83	82	82	80	80	80
8/24	86	86	82	84	84	85	85	81	80	80	84	82	68	67	69	67	74	72	76	80	80	80	78	80
8/25	80	81	82	79	76	76	77	76	74	72	70	76	68	66	58	59	60	60	66	72	80	84	85	85
8/26	82	83	78	74	78	82	82	80	74	80	74	70	70	72	67	62	67	70	75	82	83	84	82	82
8/27	--	--	78	--	--	86	--	--	84	--	--	77	--	--	69	--	--	66	--	--	82	--	--	84
8/28	--	--	82	--	--	80	--	--	75	--	--	72	--	--	67	--	--	77	--	--	86	--	--	82
8/29	--	--	82	--	--	83	--	--	77	--	--	71	--	--	68	--	--	81	--	--	80	--	--	82
8/30	--	--	82	--	--	80	--	--	72	--	--	75	--	--	72	--	--	69	--	--	86	--	--	86
8/31	--	--	80	--	--	83	--	--	79	--	--	71	--	--	71	--	--	73	--	--	78	--	--	89
9/1	--	--	83	--	--	87	--	--	82															

* Because of malfunctioning of the hygrothermograph only 3-hourly values are given 8/27 - 9/1.

PLACE: MACK DAILY OBSERVATIONS, AUGUST 18 - 31, 1957 TABLE 10

DATE	TIME	TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	DDFF	SEA (Code)
8/18	1240	85.0	76.5	86.0	79.0	0.02	3	3Cu.........	S Light	---
8/19	1225	84.5	78.0	----	81.5	0	4	4Cu.........	E 6-8	---
8/20	1200	83.5	76.0	86.0	82.0	0	4	4Cu;Ci......	E 6-8	---
8/21	1200	82.5	77.5	85.0	77.5	0.11	8	2Cu;Ac;Ci...	SE 12-15	2
8/22	1200	83.0	75.5	84.0	79.0	0.13	9	2Cu;Ac;Ci...	NE 8-10	0
8/23	1200	83.0	78.5	85.0	80.5	0.21	8	2Sc;3Ac;7Ci.	NE 10-13	1
8/24	1200	81.5	76.0	85.0	77.0	0.27	7	4Cu;2Ac;6Ci.	E 6-8	0
8/25	1155	84.0	76.0	86.0	82.0	0	8	2Cu;4Ac;8Ci.	E 3-4	0
8/26	1200	85.0	78.5	88.0	78.0	0.09	7	4Cu;3Ac.....	SE 4	0
8/27	1200	84.0	78.0	85.0	78.5	0.24	6	5Cu;1Ac.....	SE 15	2
8/28	1130	85.0	79.0	84.0	82.0	0	10	3Cu;10As....	----	---
8/29	1200	85.5	79.0	85.0	81.5	0	4	4Cu.........	NE 10-12	1
8/30	1150	84.0	78.0	85.0	78.0	0.05	4	3Cu;2Ac;3Ci.	NE 3-4	0
8/31	1145	84.5	78.5	87.0	77.5	0.04	7	3Cu;3Ac;4Ci.	E 10-12	1

REMARKS AND TOWER READINGS

8/22 Towering Cu to S.

8/23 Cb to SW.

8/24 Light rain shwr. Several shwrs. in sight over lagoon and islets; heavy shwr. ½ mile N of MACK. TOWER: Platform #1 1220: TT-82.0; TT_w-77.0. Platform #2 1225: TT-81.0; TT_w-76.5. Platform #3 (on ladder at level of top) 1230: TT-81.0; TT_w-76.5.

8/25 Swelling cumulus on horizon along NE quadrant. TOWER: Platform #1 1207: TT-84.0; TT_w-76.0. Platform #2 1210: TT-83.0; TT_w-75.0. Platform #3 1215: TT-82.5; TT_w-75.5. Top 1213: TT-82.5; TT_w-75.5. (Platform #3 and Top are at same level; #3 was read on ladder at level of top; Top was read standing on top platform facing windward.)

8/26 Gentle swells, surface wind ripples. Heavy rain shwr. N of MACK; commenced 1230 and observed until after 1300. TOWER: Platform #1: TT-83.0; TT_w-78.0. Platform #2: TT-82.0; TT_w-77.0. Platform #3: TT-82.0; TT_w-77.0.

8/27 Moderate swells with white caps. Cloud conditions changed rapidly to following by 1230: N 10; 3Cu;7Ci. TOWER: Platform #1: TT-82.0; TT_w-78.0. Platform #2: TT-81.5; TT_w-77.5. Platform #3: TT-81.5; TT_w-76.5. At Shelter 1132: TT83.0; TT_w-77.5.

8/28 Hazy sun. TOWER: Platform #1 1115: TT-85.0; TT_w-78.0. Platform #2 1120: TT-84.0; TT_w-77.5. Platform #3 1125: TT-83.5; TT_w-77.0.

8/29 TOWER: Platform #1: TT-85.5; TT_w-79.0. Platform #2: TT-85.0; TT_w-79.0. Platform #3: (missing).

8/30 TOWER: Platform #1 1157: TT-83.0; TT_w-77.5. Platform #2 1200: TT-82.5; TT_w-77.5. Platform #3 1203: TT-82.2; TT_w-77.5. Top (Windward side) 1204: TT-82.0; TT_w-77.5.

8/31 Sea: code "1" plus. TOWER: Platform #1 1201: TT-84.0; TT_w-78.0. Platform #2 1203: TT-83.5; TT_w-78.0. Platform #3 1205: TT-84.0; TT_w-78.5. (poor exposure top shelter obstructing wind flow). Top (Windward side) 1208: TT-83.0; TT_w-79.0.

PLACE: MACK

BI-HOURLY TEMPERATURES AND RELATIVE HUMIDITIES, AUGUST 18 - 31, 1957

TABLE 11

HOUR:	0200		0400		0600		0800		1000		1200		1400		1600		1800		2000		2200		2400	
DATE	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH
8/18													85	78	85	76	84	74	82	80	82	75	82	78
8/19	82	74	82	75	82	80	83	76	83	78	84	74	85	75	84	75	83	80	83	72	83	78	83	76
8/20	82	78	82	75	82	72	83	70	83	70	84	72	84	74	84	74	84	74	84	78	83	82	82	84
8/21	81	88	79	91	79	80	81	75	82	70	82	79	83	75	84	74	84	75	83	75	82	76	79	82
8/22	79	80	79	91	80	80	81	75	82	75	83	74	83	72	84	66	85	65	84	70	82	78	81	87
8/23	83	80	82	80	81	82	80	88	79	87	83	85	83	82	84	82	83	82	83	83	83	82	83	78
8/24	83	80	80	82	82	78	83	78	82	80	84	76	86	70	83	72	83	77	83	76	83	77	83	76
8/25	82	80	82	75	82	72	83	75	84	69	84	68	84	68	86	68	85	69	84	70	83	82	83	84
8/26	83	85	81	88	82	82	80	80	80	80	84	76	84	72	84	75	81	81	83	80	83	80	82	80
8/27	81	84	80	84	79	84	82	82	81	82	83	81	83	82	83	82	83	85	83	85	83	80	82	82
8/28	82	84	82	86	82	87	83	74	83	74	84	76	83	74	82	79	81	90	81	86	81	85	81	83
8/29	81	86	81	86	81	85	82	84	83	79	83	80	81	75	82	80	80*	82	80	82	81	83	80	86
8/30	80	85	80	85	80	80	81	82	81	85	83	74	82	76	82	80	81	86	80	87	77	89	80	90
8/31	80	86	80	82	80	80	81	82	81	87	84	78												

* 1900, 8/29, temperature 76°.

PLACE: ELMER DAILY OBSERVATIONS, AUGUST 18 - SEPTEMBER 1, 1957 TABLE 12

DATE	TIME	TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	DDFF
8/18	0900	85.5	78.5	91.0	78.0	0	3	2Cu;1Ci........	E 5-10
8/19	0915	85.5	79.0	93.0	84.0	0.02	2	2Cu............	E 5-10
8/20	0900	84.5	76.0	90.0	81.5	0	3	1Cu;2Ci........	E 8-10
8/21	0900	83.0	77.0	89.0	76.5	0.52	10	3Cu;Ac;Cs......	S 4-6
8/22	0900	81.5	77.5	88.0	80.0	0.14	10	9Cu,Sc;(Ac);(Ci)	N Very Lt.
8/23	0900	81.0	78.5	88.0	77.0	0.19	8	5Cu;3Ac;4Ci....	NE 8-10
8/24	0900	85.5	80.0	89.0	76.5	0.09	8	4Cu;2Ac;8Ci....	SE 4-6
8/25	0908	85.0	78.0	89.0	81.0	0	9	2Cu;1Ac;9Ci&Cs.	E 3-5
8/26	0900	82.0	78.5	90.0	82.0	0.18	9	6Cu;2Ac;2Ci....	Lt. Variable
8/27	0900	80.5	77.5	90.0	76.0	0.08	10	6Sc;4Cu........	E 10-12
8/28	0850	85.0	77.5	88.5	80.0	T	10	2Cu;8Cs&Ci.....	SE 2-4
8/29	0905	86.0	84.5	87.5	83.5	0.01	2	2Cu............	NE 0-5
8/30	0905	82.5	78.0	90.5	80.0	0.13	8	5Cu;2Ac;5Ci....	NE 3-6
8/31	0910	84.0	79.0	----	----	0.13	6	3Cu;4Ac;4Ci....	E 8-10
9/1	1015	84.0	81.0	88.0	77.5	0.20	8	3Cu;4Ac;7Ci....	E 6-8

REMARKS

8/22	0900	Rain.
8/23	0900	Shwrs. to the north.
8/24	0900	Shwrs. in sight. Swelling cumulus over the lagoon to the NW.
8/25	0908	Swelling cumulus far distant to the NE.
8/26	0900	Towering cumulus in all quadrants. Shwr. from 0852 to 0905.
8/27	0900	Shwr. from 0904 to 0912.
8/30	0905	Shwrs. in sight in all quadrants.
9/1	1015	Towering cumulus in the north quadrant.

PLACE: ELMER

BI-HOURLY TEMPERATURES AUGUST 20 - SEPTEMBER 1, 1957

TABLE 13

HOUR:	0200	0400	0600	0800	1000	1200	1400	1600	1800	2000	2200	2400
DATE												
8/20					84	87	88	88	86	82	82	80
8/21	78*	77	78	79	82	85	86	86	85	81	80	80
8/22	79	77	79	81	78	80	86	84	82	82	81	78
8/23	80	78	79	80	80**	84	87	85	83	81	81	82
8/24	81	81	81	81	86	87	87***	86	85	82	82	81
8/25	81	81	80	82	87	88	89	89	86	84	81	81
8/26	78	79	80	82	80	84	87	88	84	81	81	81
8/27	78	79****	80	81	81	84	86	86	83	81	80	80
8/28	80	80	79	81	85	84	84	83	80	80	79	79
8/29	79	80	80	81	85	88*****	88	87	79	80	81	81
8/30	80	80	80	82	78	85	86	86	85	80	80	80
8/31	80	80	80	81	83	84	85	86	85	82	81	77
9/1	79	79	79	80	83	86						

* Just before 0300, 8/21, temperature drops to 76°.
** 0900, 8/23, temperature 81°.
*** 1300, 8/24, temperature 88°.
**** 0500, 8/27, temperature 77°.
***** 1300, 8/29, temperature 89°.

PLACE: JANET

TABLE 14

DAILY RAINFALL, AUGUST 19 - 31, 1957

DATE	TIME	RR	REMARKS
8/19	0915	0.50	Total since 0915, 8/17/57.
8/20	0915	0	
8/21	0915	0.22	
8/22	0915	0.13	
8/23	0915	0.10	
8/24	0945	0.19	
8/25	----	*	
8/26	0945	0.11	
8/27	0945	0.81	
8/28	0915	0	
8/29	0915	0	
8/30	0915	0.15	
8/31	0915	0.01	

* Amount included in total for next day.

PLACE: EIMER-MACK LAGOON TRAVERSES, AUGUST 18 - 31, 1957 TABLE 15

DATE	ZONE	TIME	TT_s	TIME	TT	TT_w	REMARKS
8/18		1128					Departed EIMER.
	1	1132	84.0*	1137	87.0	78.5	300 yards off EIMER.
	2	1150	84.5*	1155	88.0	79.5	Off buoy.
	3	1210	84.5*	1215	88.0	79.0	
	4	1230	85.0*	1233	87.0	79.0	
	5	1243	84.5*				100 feet off MACK.
		1247					Arrived MACK.
		1410					Departed MACK.
	5	1415	85.5*	1420	84.0	78.0	100 feet west of MACK.
	4	1435	84.5*	1442	83.5	78.0	
	2	1455	84.5*	1502	83.0	77.5	
	1	1525	84.0*				300 yards off EIMER.
		1530					Arrived EIMER.
8/19		1057					Departed EIMER.
	1	1101	84.0*	1105	84.0	79.0	300 yards off EIMER.
	2	1121	84.0*	1125	83.5	78.5	Off buoy.
	3	1141	84.5*	1145	83.5	79.0	
	4	1201	84.5*	1205	83.5	78.5	
	5	1218	84.5*				150 feet off MACK.
		1222					Arrived MACK.
		1300					Departed MACK.
	5	1303	84.5*	1308	85.5	78.5	45 feet west of MACK.
	4	1325	84.5*	1328	84.5	79.0	
	3	1345	84.5*	1350	84.5	78.5	
	2	1405	84.0*	1410	84.5	78.5	
	1	1432	84.0*				300 yards off EIMER.
		1440					Arrived EIMER.
8/20		1016					Departed EIMER.
	1	1019	83.5*	1024	83.5	77.5	300 yards off EIMER.
	2	1039	83.5*	1044	83.5	77.0	Buoy to starboard.
	3	1059	84.0*	1104	85.0	77.0	
	4	1119	84.0*	1123	84.5	77.5	
	5	1135	84.0*				300 feet off MACK.
		1142					Arrived MACK.
		1220					Departed MACK
	5	1225	84.5*				50 feet west of MACK.
	4	1245	84.0*	1250	84.5	78.0	
	3	1305	84.0*	1310	84.5	78.0	
	2	1325	84.0*	1330	84.5	77.5	Off buoy.
	1	1347	83.5*				300 yards off EIMER.
		1350					Arrived EIMER.
8/21		1019					Departed EIMER.
	1	1021	83.5*	1025	84.5	79.0	At green water.
	2	1041	83.5*	1043	83.5	78.0	Obstruction buoy "A" to port.
	3	1059	84.0*	1102	83.5	78.5	Black buoy "11" nearby.
	4	1117	84.0*	1118	83.5	78.5	OSCAR off starboard bow.
	5	1133	84.0*	1134	83.0	78.5	300 yards off MACK.
	5	1136	84.0*				200 feet off MACK.
		1148					Arrived MACK. M-boat had to lay off tower because of sea condition.
		1220					Departed MACK.
	5	1225	84.0*	1226	83.5	78.5	200 feet off MACK.
	4	1241	84.0*	1244	83.5	77.5	OSCAR off port bow.
	3	1305	84.0*	1306	82.5	77.5	Black buoy to starboard.
	2	1337	84.0*	1338	82.0	77.0	
	2	1350	84.0*	1352	82.5	78.0	Red lighted buoy to starboard.

DATE	ZONE	TIME	TT_s	TIME	TT	TT_w	REMARKS
8/21	1	1406	83.5*				At green water.
		1410					Arrived EIMER.
8/22		1005					Departed EIMER.
	1	1007	83.5	1009	81.5	78.0	Rain shwrs between 1015 and 1100.
	2	1025	83.7	1027	80.5	78.0	"A" buoy to port.
	3	1043	83.7	1046	80.0	77.5	Buoy to port.
	4	1100	83.8	1102	80.5	77.5	
	4	1118	84.0	1121	81.0	77.5	1,500 yards off MACK.
	5	1123	84.0				150 feet off MACK.
		1125					Arrived MACK.
		1245					Departed MACK.
	5	1246	84.5	1248	83.0	77.5	50 feet off MACK.
	4	1304	84.3	1307	84.0	78.5	
	3	1323	84.2	1325	84.0	78.5	Black buoy to port.
	2	1342	84.3	1344	84.0	78.5	
	2	1356	84.0	1359	83.5	77.5	
	1	1404	84.0				At green water.
		1406					Arrived EIMER.
8/23		1020					Departed EIMER.
	1	1023	83.5	1025	82.0	78.5	At green water.
	2	1040	83.8	1044	82.0	78.5	Buoy "A" to port.
	3	1058	83.7	1101	82.5	79.0	Black buoy "11" to port.
	4	1116	84.0	1119	83.0	78.5	OSCAR off the starboard bow.
	4	1131	84.0	1134	83.0	79.5	OSCAR off the starboard quarter.
	5	1138	84.0				150 feet off MACK.
		1140					Arrived MACK.
		1240					Departed MACK.
	5	1240	84.3	1242	83.5	78.5	50 feet off MACK.
	4	1258	84.0	1300	83.5	78.5	OSCAR off the port quarter.
	3	1317	84.0	1319	83.5	78.5	Between a black and a red buoy.
	2	1335	84.0	1338	83.0	79.0	Buoy "A" to port.
	2	1350	83.5	1353	84.5	79.0	Buoy "8" to starboard.
	1	1400	83.8				At green water
		1405					Arrived EIMER.
8/24		1020					Departed EIMER.
	1	1025	84.0	1030	84.5	78.5	500 yards off EIMER.
	2	1043	84.0	1050	86.5	78.5	Black buoy on starboard beam.
	3	1104	84.0	1109	83.0	78.5	Red lighted buoy on starboard quarter.
	4	1125	84.0	1130	83.0	78.5	OSCAR on starboard beam.
	5	1136	84.0				300 feet off MACK.
		1138					Arrived MACK.
		1235					Departed MACK.
	5	1236	84.8	1045	83.5	77.5	150 feet off MACK.
	4	1256	85.2	1303	83.0	78.0	OSCAR on the port quarter.
	3	1316	84.8	1320	84.0	78.5	Black buoy "11" off starboard beam.
	2	1338	84.7	1342	84.5	77.5	BRUCE on port beam.
	2	1348	83.9	1354	84.5	78.0	Black channel (inside) buoy on port beam.
	1	1355	84.0				Inside green water.
		1356					Arrived EIMER.
8/25		1020					Departed EIMER.
	1	1022	84.0	1025	83.5	76.5	At edge of green water.
	2	1040	84.0	1045	83.0	76.8	Obstruction buoy "A" off starboard bow.
	3	1100	84.5	1103	83.5	77.0	Black buoy "11" off starboard beam.
	4	1121	84.5	1125	83.0	76.5	OSCAR on starboard bow.
	5	1140	84.5				
		1142					Arrived MACK.

DATE	ZONE	TIME	TT_s	TIME	TT	TT_w	REMARKS
8/25		1220					Departed MACK.
	5	1222	84.8	1228	85.5	76.5	150 feet off MACK.
	4	1242	84.8	1248	85.5	77.0	OSCAR on port quarter.
	3	1301	85.0	1305	84.5	76.5	Black buoy "11" off port beam.
	2	1321	85.0	1325	85.2	75.6	Obstruction buoy "A" off port beam.
	2	1335	83.9	1340	84.5	77.0	At red buoy "6". Current (about 6 knots) running into lagoon at red buoy "6".
	1	1342	84.4				At edge of the green water.
		1344					Arrived ELMER.
8/26		0945					Boat departed BRUCE rather than ELMER.
	2	0950	83.5	1000	84.0	79.5	100 yards from shore.
	3	1010	83.8	1020	84.0	79.0	Intermittent shwrs. 1015-1100.
	4	1030	83.5	1035	84.0	79.5	Buoy 400 yards to port.
	5	1050	83.2	1055	82.5	78.5	300 yards off MACK. All readings taken by holding bulb-end into wind.
		1100					Arrived MACK.
		1230					Departed MACK.
	5	1235	84.2	1240	83.5	78.5	200 yards off MACK.
	4	1255	84.7	1300	84.5	78.0	
	3	1315	85.0	1320	84.0	78.0	Heavy rain shwr. N of MACK still visible at 1330.
	2	1335	84.0	1340	84.0	78.0	300 yards south of red buoy "A".
	1	1353	84.0	1357	85.0	78.5	300 yards off ELMER. All readings taken by holding bulb-end into wind.
		1400					Arrived ELMER.
8/27		1007					Departed ELMER.
	1	1010	83.7	1013	83.5	79.0	300 yards off shore.
	2	1030	83.7	1032	84.5	79.0	Red buoy 400 yards to starboard.
	3	1050	84.1	1052	84.5	79.5	
	4	1110	84.4	1113	85.0	79.5	
		1120					Arrived MACK.
		1255					Departed MACK.
	5	1300	84.5	1302	83.5	79.0	300 yards off MACK.
	4	1320	84.3	1323	84.0	79.0	
	3	1340	84.3	1342	85.0	79.0	Black buoy 300 yards to port.
	2	1400	84.3	1402	85.0	79.0	Obstruction buoy 200 yards to port.
	1	1418	84.0	1420	86.0	79.0	300 yards off ELMER.
		1423					Arrived ELMER.
8/28		0950					Boat departed BRUCE rather than ELMER.
	2	0955	83.9	0957	84.5	78.0	At blue water-heading 300°.
	3	1015	84.0	1016	84.0	78.5	Heading 300°.
	4	1036	84.1	1035	84.5	78.0	Heading 300°.
	5	1051	84.1	1050	85.0	78.5	Off MACK.
		1053					Arrived MACK.
		1220					Departed MACK.
	5	1220	84.4	1225	86.0	79.0	Few yards off MACK.
	4	1240	84.0	1242	85.0	79.0	
	3	1300	84.2	1303	85.0	78.0	Buoy "11".
	2	1320	83.9	1324	84.0	78.5	
	1	1335	83.5	1334	84.5	78.0	At edge of blue water.
		1339					Arrived ELMER.
8/29		1010					Departed ELMER.
	1	1018	83.5*	1020	84.5	78.5	Buoy and REX in line.
	2	1035	84.0*	1038	84.5	78.5	
	3	1055	85.0*	1057	84.5	79.0	
	4	1115	84.5*	1118	84.0	79.0	

PLACE: EIMER-MACK LAGOON TRAVERSES, AUGUST 18 - 31, 1957 TABLE 15 (Concluded)

DATE	ZONE	TIME	TT_s	TIME	TT	TT_w	REMARKS
8/29	5	1130	84.5*	1128	85.5	80.0	
		1130					Arrived MACK.
		1222					Departed MACK.
	5	1222	85.0	1224	87.5	80.0	Few yards off MACK.
	4	1240	84.5	1243	87.0	80.5	
	3	1300	84.5	1302	86.0	80.0	
	2	1320	84.0	1322	85.5	79.0	
	1	1335	84.5	1338	86.0	79.5	
		1340					Arrived EIMER.
8/30		1013					Departed EIMER.
	1	1015	83.3	1020	80.5	77.0	150 yards off EIMER. Rain shwr. 300 yards ahead.
	2	1033	83.3	1037	80.5	77.0	Obstruction buoy "A" on starboard beam. Rain shwr. 1000 yards off port bow.
	3	1055	83.8	1100	81.0	76.5	OSCAR on starboard bow.
	4	1115	84.4	1119	83.0	79.0	OSCAR on starboard beam.
	5	1133	84.4				200 feet off MACK. Many shwrs. over lagoon at start of traverse; all dissipated by noon.
		1135					Arrived MACK.
		1211					Departed MACK.
	5	1213	85.4				150 feet off MACK.
	4	1225	85.2	1229	83.5	77.0	OSCAR on port beam.
	3	1245	85.2	1248	83.5	78.5	Black buoy "11" 500 yards ahead.
	2	1306	84.8	1310	83.0	79.0	Obstruction buoy "A" off port beam.
	2	1320	84.5	1323	83.5	79.0	Cement barge off port beam.
	1	1325	84.5				At blue water's edge.
		1327					Arrived EIMER.
8/31		1023					Departed EIMER.
	1	1025	83.9	1027	84.0	79.0	At edge of blue water.
	2	1045	83.8	1048	84.0	78.5	Obstruction buoy "A" on port quarter.
	3	1105	84.2	1108	84.0	79.0	Black buoy "11" astern 1000 yards.
	4	1125	84.4	1127	84.5	79.0	OSCAR off starboard beam.
	5	1135	84.5				300 feet off MACK.
		1138					Arrived MACK.
		1245					Departed MACK.
	5	1250	84.5	1252	86.0	79.0	1000 yards off MACK.
	4	1315	84.5	1317	85.5	78.0	OSCAR on port quarter.
	3	1338	84.4	1340	85.0	80.0	Black buoy "11" on port quarter.
	2	1401	83.9	1408	85.5	79.5	Red lighted buoy "12" off port beam.
	1	1420	83.8				At edge of blue water.
		1422					Arrived EIMER.

* Temperatures read to nearest 0.5° F. only.

PLACE: BETWEEN BRUCE, KEITH, ELMER

TABLE 16

LAGOON TRAVERSES, AUGUST, 1957

Traverse No. 1, BRUCE-KEITH

DATE	TIME	TT_s	TIME	TT	REMARKS
20th	0945	83.7	0945	88.0	In shallow water by BRUCE departing for KEITH.
	0950	83.8	0950	86.0	
			0955	85.0	
	1000	84.2	1000	85.0	
			1005	85.0	
	1010	84.2	1010	86.0	Near obstruction buoy "A".
			1015	85.0	
	1020	84.0	1020	85.0	
			1025	85.0	
	1030	84.2	1030	84.5	
	1040	84.2	1040	84.5	
			1045	85.0	
	1050	84.0	1050	84.5	
			1055	85.0	
	1100	84.0	1100	85.0	
			1105	85.0	
	1110	84.2	1110	85.5	
	1115	84.4	1115	85.0	
	1120	84.6	1120	87.0	Water shoaling.
	1125	84.6	1125	86.0	100 yards from shore.
	1128	84.2	1128	89.0	At shore - KEITH.
	1203	83.8	1203	87.0	About 50 yards from shore.
	1205	84.6	1205	86.0	50 yards to blue water. Course 110°.
	1210	84.6	1210	85.5	Deep water. Course 115°.
	1220				Thermometer broke, observations discontinued.

Traverse No. 2, ELMER-KEITH-BRUCE

DATE	TIME	TT_s	TIME	TT	REMARKS
23rd	1030				Departed ELMER.
	1025	84.0	1025	84.0	ELMER landing.
	1030	83.8	1030	87.0	Heading 245-250°. Hazy sun.
			1035	84.0	
	1040	84.0	1040	84.0	Heading 245°.
			1045	84.5	
	1050	84.0	1050	84.5	Heading 250°.
			1055	84.5	Passing buoy.
	1100	84.2	1100	85.0	Heading 250°. 1104 passing buoy.
			1105	85.0	
	1110	84.2	1110	85.0	Heading 250°.
			1115	85.0	
	1120	84.2	1120	85.0	Heading 250°.
			1125	85.0	
	1130	84.6	1130	85.0	
			1135	85.0	
	1140	84.4	1140	85.5	
			1145	85.0	
	1150	84.4	1150	85.0	
	1155	84.4			At edge of blue water.
	1200	83.3			At buoy.
	1205	84.0			Halfway from buoy to shore on KEITH.
	1210	85.1			At KEITH, but still in water (at edge of shore).
	1220	84.0			Halfway from shore to buoy (starting now for BRUCE).
	1225	83.8			At buoy.
	1320				Departed KEITH.
	1325	84.4	1325	86.0	At edge of blue water.

PLACE: BETWEEN BRUCE, KEITH, ELMER

TABLE 16
(Continued)

LAGOON TRAVERSES, AUGUST, 1957

Traverse No. 2, ELMER-KEITH-BRUCE

DATE	TIME	TT_s	TIME	TT	REMARKS
23rd	1330	84.4	1330	84.0	Heading 70° true.
			1335	84.0	
	1340	84.2	1340	84.0	Heading 70° true.
			1345	84.5	
	1350	84.4	1350	84.5	Heading 75° true.
			1355	84.5	
	1400	84.4	1400	84.0	Heading 75° true.
			1405	84.5	
	1410	84.4	1410	84.0	
			1415	84.5	
	1420	84.4	1420	84.5	
			1425	84.5	
	1430	84.3	1430	84.0	
			1435	83.0	
	1440	84.1	1440	84.0	Cloudy with light shwrs.
			1445	83.0	
	1450	84.2	1450	84.0	100 yards S of buoy "A".
			1455	83.0	
	1500	84.2	1500	83.0	
			1505	82.0	Heavy rain on BRUCE.
	1510	84.1	1510	83.0	
	1515	84.1	1515	82.0	At edge of blue water.
	1518	84.8	1518	86.0	200 yards off shore.
	1521	84.9	1521	85.0	100 yards off shore.
	1525	85.3	1525	85.5	Along shoreline at BRUCE.
			1527	84.8	Inshore.

Traverse No. 3, KEITH-BRUCE

DATE	TIME	TT_s	TIME	TT	TT_w	REMARKS
28th	1045					Departed KEITH.
			1043	88.0	81.0	Edge of vegetation on shore at KEITH.
	1045	85.0*	1045	86.5	79.0	Edge of water.
	1050	84.0*	1052	85.0	79.0	5 yards from KEITH.
	1055	84.0*	1057	84.5	80.0	100 yards from buoys at KEITH.
	1100	84.0*	1102	84.0	80.0	
	1110	84.5*				
	1120	84.5*	1122	85.5	79.5	
	1130	84.5*	1132	85.0	79.0	
	1140	84.5*	1142	85.0	79.0	
	1150	84.5*	1152	84.5	78.5	
	1200	84.0*	1202	85.0	79.0	
	1210	84.0*	1212	85.0	78.5	
	1215					Buoy "A".
	1220	84.0*	1222	85.0	79.0	
	1230	84.0*	1232	84.5	78.0	
	1235	84.0*	1237	85.0	78.0	
	1240	84.0*	1241	85.0	78.0	
	1242	84.5*	1242	85.0	78.0	100 yards from BRUCE.
	1244	84.5*	1244	85.0	77.5	25 yards from BRUCE.
	1245	85.0*	1245	85.0	78.5	Edge of water.
			1247	85.5	78.5	Edge of vegetation on BRUCE.

PLACE: BETWEEN BRUCE, KEITH, ELMER

TABLE 16
(Concluded)

LAGOON TRAVERSES, AUGUST, 1957

Traverse No. 4, BRUCE-KEITH-ELMER

DATE	TIME	TT_s	TIME	TT	TT_w	REMARKS
31st	0930					Departed BRUCE.
			0927	86.0	79.5	Edge of vegetation on BRUCE.
	0929	84.2	0929	85.0	79.0	Edge of water.
	0951	84.2	0951	86.5	80.0	50 yards from water's edge.
	0954	84.0	0954	86.0	79.5	Edge of blue water.
	1000	84.0	1000	86.5	80.0	Course 250°.
	1015	84.2	1015	86.5	79.0	Course 250°.
	1030	84.2	1030	86.0	79.5	Course 250°.
	1045	84.6	1045	86.0	79.5	Course 240°.
	1100	84.6	1100	87.0	80.5	Course 240°. 1103 passed red buoy (50 gallon drum on coral head.
	1115	84.7	1115	87.0	80.0	Course 240°.
	1125	84.7	1125	87.0	80.0	Course 240°.
	1130	84.7	1130	86.5	80.0	
	1132	84.6	1132	86.5	80.5	Between KEITH buoys.
	1134	85.3	1134	86.5	80.5	10 yards from water's edge.
	1136	86.4	1136	85.5	80.0	Edge of water.
			1138	86.0	79.5	Edge of vegetation on KEITH.
	1200					Departed KEITH.
			1155	88.0	80.5	Edge of vegetation.
	1157	86.9	1157	86.5	80.0	Edge of water.
	1158	85.6	1158	87.0	81.0	15 yards from water's edge.
	1203	84.7	1203	85.0	79.5	Passed buoy.
	1208	84.7	1208	87.0	80.5	Course 080°.
	1225	85.1	1225	86.0	79.5	Course changed to 070°.
	1240	84.9	1240	86.0	80.0	Course from 070 to 065°.
	1255	84.7	1255	85.5	79.5	Course 060°.
	1310	84.6	1310	86.0	80.0	Passed obstruction buoy; Course 060°. 1318 - 1321 rain shwr.
	1325	84.6	1325	85.5	79.5	Passed lighted buoy; Course 065°.
	1340	84.4	1340	85.5	79.5	Course 065°.
	1350	84.2	1350	86.0	79.0	Passed buoy "B-1".
	1356					Arrived ELMER.

PLACE: LAGOON-OCEAN TABLE 17

LAGOON-OCEAN TRAVERSES, AUGUST, 1957

DATE	TIME	TT_s	REMARKS
18th	1025	83.5	From helicopter. About 500 yards off ELMER reef, in ocean.
	1042	83.7	From helicopter. About 500 yards off KEITH reef, in ocean.

DATE	TIME	TT_s	TIME	TT	TT_w	REMARKS
23rd	1150					Departed ELMER
	1156	83.0*	1158	85.0	80.0	In deep channel entrance.
	1203	83.0*	1206	84.5	79.5	Off entrance buoy "2".
	1217	83.0*	1219	85.0	80.0	Outside E of BRUCE.
	1232	83.0*	1235	86.0	80.0	Outside NE of SAM.
	1248	83.0*	1250	85.0	80.0	Outside E of BRUCE.
	1304	83.5*	1306	85.5	80.0	Outside E of ELMER.
	1320	83.5*	1322	85.0	79.5	Outside E of FRED.
	1333	83.0*	1335	84.5	79.0	Off black "1" buoy, SW of FRED.
	1342	84.0*	1350	85.0	79.5	In lagoon W of Sand Island.
	1400					Arrived ELMER.

PLACE: ENIWETOK-BIKINI — BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957 — TABLE 18

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/18	0200	Bikini	2	Lt.Airs	03	72	82	78		2	2	20					
	0400	Bikini	2	Lt.Airs	02	70	81	78		2	2	20					
	0600	Bikini	2	Lt.Airs	02	72	80	78		2	2	20					
	0800	Bikini	2	Lt.Airs	02	72	83	78		2	2	20					
	1000	Bikini	2	09-05	02	86	87	80		2	2	20					
	1200	Bikini						N O	R E P O R T S								
	1400	Bikini						N O	R E P O R T S								
	1600	Bikini						N O	R E P O R T S								
	1800	Bikini	4	11-08	03	76	86	80		3	2	20	--	1			
	2000	Bikini	6	11-05	02	92	82	78		6	2	20	--	--			
	2200	Bikini	2	11-05	01	90	82	78		2	2	20	--	--			
	2400	Bikini	0	11-05	02	90	82	78		-	-	--	--	--			

LOG ENTRIES:

0000-0200 LST Cargo Pier, Enyu Is., Bikini Atoll: Lat 11°30.7'N-Long 165°33.5'E. Light airs, sky mostly clear with scattered cumulus clouds, visibility unlimited. Barometer steady. Bright moonlight.

0200-0400 Position as before. No change in weather.

0400-0600 Position as before. No change in weather.

0600-0800 Position as before. No change in weather in past 8 hours. Barometer steady. Light variable airs.

0800-1000 Position as before. Visibility unlimited. Slight easterly breeze. Low SW swell.

1000-1200 Position as before. Visibility unlimited. Low SW swell.

1200-1400 Position as before. Cloud cover increasing. Shower in sight to NW. East to south breeze strengthening.

1400-1600 Position as before. Clear overhead. Banks of cumulus cloud all around horizon, heaviest to eastward.

1600-1800 Position as before. Cumulus clouds all around horizon. Filaments or strands of cirrus clouds overhead. Visibility unlimited. Barometer rising.

1800-2000 Position as before. Barometer came up .16 in past 2 hours. Clouds becoming more developed. No change in wind.

2000-2200 Position as before. Clouds dissolving. Visibility unlimited.

2200-2400 Position as before. No clouds. Barometer steady. Visibility unlimited.

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/19	0200	Bikini	6	10-05	18	85	81	78		5	2	20	--	1			
	0400	Bikini	6	11-05	18	87	81	78		5	2	20		1			
	0600	Bikini	3	08-10	01	86	82	77		3	2	20	--	1			
	0800	Bikini						N O	R E P O R T S								
	1000	Bikini	3	08-10	01	80	87	80		3	2	20	--	--			
	1200	Bikini	3	08-10	02	80	86	79		3	2	20	--	--			
	1400	Bikini	3	09-10	02	74	87	79		3	2	20					
	1600	Bikini	2	07-08	01	72	86	79		2	2	20					
	1800	Bikini	2	06-10	02	77	84	78		2	2	20	0	1			
	2000	Bikini	2	08-10	02	80	83	77		2	2	20	0	1			
	2200	Bikini	0	05-10	02	80	82	76		-	-	--	--	--			
	2400	Bikini	0	05-10	02	80	82	77		-	-	--	--	--			

DATE	TIME	POSITION	COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/19																		

LOG ENTRIES:

0000-0200 LST Cargo Pier, Enyu Is., Bikini Atoll: Lat 11°30.7'N-Long 165°35.5'E. Rain squalls to northeasterly around horizon. Light southeasterly breeze. Barometer dropping slowly. Low southwesterly swells. Excellent visibility except toward rain squalls. Sky mostly cloudy.
0200-0400 Position as before. Occasional light rain squalls. Barometer rising slowly. Slight east-southeasterly breeze. Excellent visibility except in rain squalls.
0400-0600 Position as before. Visibility excellent. Sky clearing. Low swell from southwest.
0600-0800 Position as before. Visibility excellent. Low southwest swell.
0800-1000 Position as before. Cumulus clouds all around horizon. Clear overhead. Barometer dropped .80 in past 2 hours. Visibility unlimited.
1000-1200 Position as before. No change in weather conditions.
1200-1400 Position as before. Towering cumulus clouds around horizon. Clear overhead. Barometer dropping slowly. Variable light wind from east to east-northeasterly. Unlimited visibility.
1400-1600 Position as before. No change in weather.
1600-1800 Position as before. Visibility excellent.
1800-2000 Position as before. Visibility excellent. Low confused swell.
2000-2200 Position as before. No clouds. Barometer steady. Visibility unlimited.
2200-2400 Position as before. No change in weather. Barometer steady. Visibility unlimited.

DATE	TIME	POSITION	COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT.	C_L TYPE	C_L HT.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT.
8/20	0200	Bikini		2	05-10	03	78	82	77	--	2	2	20					
	0400	Bikini		2	05-10	02	76	82	78	--	2	2	20					
	0600	Bikini		2	10-03	02	76	82	77		2	2	20					
	0800	Bikini		2	08-05	02	79	83	77		2	2	20					
	1000	Bikini		3	08-08	02	93	86	79		2	2	20	--	1			
	1200	11°27.5'N 165°25'E	253	3	08-05	02	91	88	80		2	2	20	--	1	08	4	2
	1400	11°26'N 165°05'E	269	2	08-10	01	86	88	79	86	T	2	20	--	1	08	4	2
	1600	11°26'N 164°46'E	269	2	08-08	02	82	88	79	86	1	2	20	--	1	08	4	2
	1800	11°27'N 164°26'E	265	2	04-08	02	82	88	79		2	2	20	0	9	04	-	1
	2000	11°27'N 164°07'E	265	2	05-08	02	82	84	78		2	2	20	0	9	04	-	1
	2200	11°25'N 163°50.0'E	265	5	08-05	03	92	84	78		5	2	20	--	--	08	5	2
	2400	11°24.0'N 163°32'E	270	2	08-05	16	92	83	78		2	2	20	--	--	08	5	2

LOG ENTRIES:

0000-0200 LST Cargo Pier, Enyu Is., Bikini Atoll: Lat 11°30.7'N-Long 165°35.5'E. Sky mostly clear with scattered cumulus clouds around horizon. Light northeasterly breeze. Bright moonlight with unlimited visibility. Barometer steady.

PLACE: ENIWETOK-BIKINI — BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957 — TABLE 18 (Continued)

8/20

LOG ENTRIES:

0200-0400 Position as before. No change in weather for past 4 hours. Barometer dropping slowly.
0400-0600 Position as before. Visibility excellent. Low SW swell.
0600-0800 Position as before. Visibility excellent. Low SW swell.
0800-1000 Position as before. Cumulus clouds all around horizon. Strands of cirrus overhead. Barometer rising. Visibility unlimited.
1000-1200 En route Bikini to Parry Is*: Lat 11°27.5'N-Long 165°25'E. No change in weather. Visibility unlimited.
1200-1400 (1400 Position: 11°26'N-Long 165°05'E) Sky mostly clear with towering cumulus clouds around horizon. Thin strands of cirrus overhead. Bright sunshine. Visibility unlimited. Light northeasterly breeze and sea. Barometer dropping slightly in past 2 hours.
1400-1600 (1600 Position: 11°26'N-Long 164°46'E) No change in weather for past 4 hours.
1600-1800 (1800 Position: 11°27'N-Long 164°26'E) Visibility excellent. Low short easterly swell. Long low NW swell.
1800-2000 (2000 Position: 11°27'N-Long 164°07'E) Visibility excellent. Low short easterly swell. Long low NW swell.
2000-2200 (2200 Position: 11°25'N-Long 163°50.0'E) Clouds forming. Barometer jumped .10 in past 2 hours. Visibility unlimited. 2210: rain squalls on radar scope @ 315°T 24.0 mi. off port bow. 2253: lightning observed in NE.
2200-2400 (2400 Position: 11°24.0'N-Long 163°32'E) Rain squalls on radar scope. Visibility unlimited. Lightning north and northeast. Barometer steady.

DATE	TIME	POSITION	COURSE	N_s	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/21	0200	11°25'N 163°17'E	270	4	18-12	18	88	81	78	85	4	2	20			18	3	2
	0400	11°25'N 162°59'E	265	8	19-10	18	86	80	77	85	7	2	20	--	1	18	3	2
	0600	11°26'N 162°43'E	258	4	21-05	80	84	82	78		4	2	20			21	-	1
	0800	11°25'N 162°25'E	VAR	7	21-05	03	86	83	78		7	7	20			21	-	1
	1000	Eniwetok		6	17-08	01	86	83	77		5	7	20	--	1	17	-	1
	1200	Eniwetok		5	18-10	01	80	83	77		4	7	20	--	1	18	-	1
	1400	Eniwetok		5	19-12	16	76	84	78		4	7	20	--	1	19	-	1
	1600	Eniwetok							NO REPORTS									
	1800	Eniwetok							NO REPORTS									
	2000	Eniwetok							NO REPORTS									
	2200	Eniwetok		1	19-08	01	82	83	78		1	2	20	--	--	19	-	1
	2400	Eniwetok							NO REPORTS									

LOG ENTRIES:

0000-0200 En route Bikini to Parry Is.*: (0200 Position: Lat 11°25'N-Long 163°17'E). 0020: wind shifted from ESE to south. Moderate southerly wind 10 to 12 knots. Numerous small rain squalls noted on radar. Flashes of lightning observed to NW. Unlimited visibility. Barometer dropped .04 in past 2 hours. Light southerly sea and low southeasterly swell.
0200-0400 (0400 Position: Lat 11°25'N-Long 162°59'E) Numerous light rain squalls. Good visibility except in squalls. Lightning observed to westerly. Sky mostly overcast. Light southwesterly wind and sea.
0400-0600 (0600 Position: Lat 11°26'N-Long 162°43'E) Visibility unlimited. Low NE swell. Sighted loom of Eniwetok aero-beacon light 25 miles.

*Parry is the native name for Elmer Islet, Eniwetok.

PLACE: ENIWETOK-BIKINI

BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957

TABLE 18 (Continued)

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_W	TT_S	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/21																	

LOG ENTRIES:

0600-0800 (0800 Position: Lat 11°25'N-Long 162°25'E) Visibility excellent. 0615: ship commenced to roll heavily, moderate average southerly swell.

0800-1000 (1000 Position: Anchored off Parry (Elmer) Is. - Anchorage "Cl") Moderate southeasterly wind. Sky mostly overcast. Visibility 12-15 miles. Rain squalls around horizon. Barometer steady. Light southerly sea inside Eniwetok lagoon.

1000-1200 Anchored as before. Weather as before except sky clearing slightly. Barometer dropped .06 during past 2 hours.

1200-1400 Position as before. Visibility unlimited. Barometer falling. Southerly winds.

1400-1600 Position as before. Moderate southerly winds. Excellent visibility.

1600-1800 Position as before. Visibility unlimited. Low short SW swell.

1800-2000 Position as before. Visibility excellent. Low SW swell.

2000-2200 Position as before. No change in wind or weather conditions. Visibility unlimited.

2200-2400 Position as before. Southerly breeze. Visibility excellent. Barometer rising.

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_W	TT_S	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/22	0200	Eniwetok	7	18-05	18	82	83	78		7	7	20			19	--	1
	0400	Eniwetok	7	09-05	18	80	83	78		7	7	20			18	--	1
	0600	Eniwetok	8	24-08	18	79	83	78		8	7	20			20	--	1
	0800	Eniwetok	7	24-05	01	80	83	78		7	7	20			--	--	-
	1000	Eniwetok	8	04-10	81	86	81	79		8	7	20	--	--	--	--	-
	1200	Eniwetok	6	05-08	81	90	82	79		8	7	20	--	--	--	--	-
	1400	Eniwetok	6	05-08	01	84	86	80		3	2	20	5	1	--	--	-
	1600	Eniwetok	7	05-08	03	82	84	78		7	7	20	--	--	--	--	-
	1800	Eniwetok	7	05-08	02	80	82	78		7	7	20					
	2000	Eniwetok	6	05-10	02	82	81	78		6	7	20					
	2200	Eniwetok	6	07-15	15	86	83	78		6	2	20	--	--	--	--	-
	2400	Eniwetok	6	08-15	15	86	82	78		6	2	20	--	--			

LOG ENTRIES:

0000-0200 Anchored off Parry (Elmer) Is. in Anchorage "Cl". Light southerly wind. Moderate southerly swell with slight southerly sea. Excellent visibility with rain squalls to south. Barometer steady.

0200-0400 Position as before. Light rain squalls. Long, low, choppy southerly swell. Light southerly sea. 0340: wind suddenly shifted to easterly. Rain squalls moving from easterly direction.

0400-0600 Position as before. Occasional light rain squalls. 0500-0600: noted frequent shifting of wind from E to W through S. Barometer dropping slowly. Excellent visibility.

0600-0800 Position as before. Light NW breeze. Barometer steady. Sky mostly overcast.

0800-1000 Parry (Elmer) Is., deep water pier. Sky overcast. Moderate rain. Northeasterly breeze.

1000-1200 Position as before. Wind diminishing. Barometer rising. Visibility about 6 mile due to rain.

1200-1400 Position as before. Visibility unlimited. Barometer falling. Thunderheads forming in S. Clearing in NE.

1400-1600 Position as before. Thunderheads remain in southerly direction. Clouds forming all over. Barometer falling.

1600-1800 Position as before. No change in weather.

1800-2000 Position as before. Thunderheads all around horizon. Visibility unlimited.

2000-2200 Position as before. Swells decreasing.

2200-2400 Position as before. Swells increasing.

PLACE: ENIWETOK-BIKINI BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957

TABLE 18 (Continued)

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/23	0200	Eniwetok	7	08-10	15	82	82	78		7	2	20					
	0400	Eniwetok	8	08-12	60	82	82	78		7	7	20	--	1			
	0600	Eniwetok	8	07-12	60	80	81	78		8	7	20					
	0800	Eniwetok	7	07-12	18	80	82	78		6	7	20	--	1			
	1000	Eniwetok	7	06-12	15	84	82	78		7	7	20	--	1			
	1200	Eniwetok	6	11-10	15	88	87	80		6	7	20	--	1			
	1400	Eniwetok	6	12-15	02	68	87	82		6	2	20	--	9			
	1600	Eniwetok	6	12-15	02	67	87	82		6	2	20	--	9			
	1800	Eniwetok	8	13-15	02	68	84	80		8	7	20	--	--			
	2000	Eniwetok	8	13-12	80	72	84	78		8	7	20	--	--			
	2200	Eniwetok						NO REPORTS									
	2400	Eniwetok						NO REPORTS									

LOG ENTRIES:

0000-0200 Moored, deep water cargo pier, Parry (Elmer) Is. Light rain squalls. Sky mostly overcast. Unlimited visibility except in squalls. Northeasterly breeze 10-12 knots. Barometer dropping slowly.
0200-0400 Moored as before. Light rain. Barometer steady. 10 to 12 miles visibility. Sky overcast.
0400-0600 Position as before. Frequent light rain squalls.
0600-0800 Vessel maneuvering off Parry (Elmer) Is. awaiting instructions to beach. Rain squalls to NE. Barometer steady. Excellent visibility.
0800-1000 Beached, old cargo pier, Parry (Elmer) Is. Heavy rain falling to northeastward approximately 12 miles away.
1000-1200 Position as before. Dark cumulonimbus clouds to northeastward. Occasional light rain falling.
1200-1400 Position as before. Barometer falling rapidly. Winds veering.
1400-1600 Position as before. Dark clouds to NE as before.
1600-1800 Position as before. Winds SE 15 knots. Visibility 10.0 miles. Barometer steady.
1800-2000 Position as before. Winds same as above. Barometer rising. Slight showers of rain.
2000-2200 Position as before. Occasional sprinkles of rain.
2200-2400 Position as before. Wind veering to south. Sky overcast.

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/24	0200	Eniwetok	6	16-12	01	77	83	78		6	2	20					
	0400	Eniwetok	2	14-08	01	76	83	78		2	2	20					
	0600	Eniwetok	1	14-05	01	75	82	78		1	2	20					
	0800	Eniwetok	7	14-05	05	80	83	79		5	2	20	4				
	1000	Eniwetok	6	11-05	15	84	86	80		5	2	20	4	1	11	--	--
	1200	Eniwetok						NO REPORTS									
	1400	Eniwetok						NO REPORTS									
	1600	Eniwetok						NO REPORTS									
	1800	Eniwetok	7	10-05	03	84	85	80		4	2	20	-	1			
	2000	Eniwetok	7	10-05	02	86	83	79		4	2	20	-	1			
	2200	Eniwetok	1	10-05	01	88	83	78		1	2	20	-	-			
	2400	Eniwetok						NO REPORTS									

LOG ENTRIES:

0000-0200 Moored and beached port side to, old cargo pier, Parry (Elmer) Is. Light south-southeasterly wind. Sky mostly overcast. Unlimited visibility. Barometer steady.

PLACE: ENIWETOK-BIKINI   BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957   TABLE 18 (Continued)

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/24																	

LOG ENTRIES:
0200-0400 Position as before. Sky clearing. Barometer steady.
0400-0600 Position as before. Sky mostly clear with cumulus clouds on horizon to easterly. Excellent visibility. Barometer steady.
0600-0800 Position as before. Sky becoming overcast with cumulus and thin altocumulus at various levels. Barometer rising. Unlimited visibility. Light southeasterly breeze.
0800-1000 At anchor: Lat 11°24.5'N-Long 162°22'E. Visibility excellent. Occasional light sprinkles of rain.
1000-1200 Position as before. Visibility excellent. 1000: heavy rain squall of about 10 minute duration. 1130: vessel commenced to roll in low NE swell.
1200-1400 Position as before. Visibility excellent. Low southerly swell. Low, short NE swell.
1400-1600 No entry
1600-1800 At Parry (Elmer) Is. Visibility unlimited. Barometer rising. Clear in E. Thunderheads in N.
1800-2000 Position as before. Weather same as above.
2000-2200 Position as before. Clouds diminishing. Visibility unlimited. Thunderheads in N.
2200-2400 Position as before. No change in weather.

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT.	C_L TYPE	C_L HT.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT.
8/25	0200	Eniwetok	3	10-05	03	86	82	78		3	2	20					
	0400	Eniwetok	2	10-08	01	82	82	78		2	2	20					
	0600	Eniwetok	3	10-05	03	86	83	78		3	2	20					
	0800	Eniwetok	6	09-05	03	86	84	79		4	2	20	7	--			
	1000	Eniwetok	4	09-03	01	86	86	80		4	2	20					
	1200	Eniwetok	4	09-Airs	02	86	88	80		4	2	20					
	1400	Eniwetok						N O R E P O R T S									
	1600	Eniwetok						N O R E P O R T S									
	1800	Eniwetok	6	Lt.Airs	03	75	87	79		4	2	20	9	2			
	2000	Eniwetok	6	Airs	16	78	83	78		6	7	20	--	--			
	2200	Eniwetok	6	Airs	80	78	83	78		6	7	20	--	--			
	2400	Eniwetok	4	Airs	01	78	--	78		4	2	20	--	--			

LOG ENTRIES:
0000-0200 Moored at old cargo pier, Parry (Elmer) Is., Eniwetok Atoll. Light southeasterly breeze. Visibility unlimited. Scattered cumulus clouds. Barometer dropping slowly.
0200-0400 Position as before. Weather unchanged in past 4 hours.
0400-0600 Position as before. Clouds becoming more developed. Unlimited visibility.
0600-0800 Position as before. Clouds becoming more developed. Barometer steady. Light easterly breeze.
0800-1000 Position as before. Cumulus clouds around horizon. Light breeze. Calm sea in lagoon. Barometer steady. Unlimited visibility.
1000-1200 Position as before. Weather unchanged.
1200-1400 Position as before. Visibility unlimited.
1400-1600 Position as before. Visibility unlimited. Calm, no swell.
1600-1800 Position as before. Visibility unlimited. No wind. Barometer steady. Thunderheads gathering all over.
1800-2000 Position as before. Heavy rain shower approaching from ENE direction.
2000-2200 Position as before. Slight rain shower.
2200-2400 Position as before. Barometer steady. Visibility unlimited. No wind.

PLACE: ENIWETOK-BIKINI | BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957 | TABLE 18 (Continued)

DATE	TIME	POSITION/COURSE	N_s	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/26	0200	Eniwetok	7	08-05	60	78	81	79		7	2	20					
	0400	Eniwetok	5	Lt.Airs	18	74	81	78		5	2	20					
	0600	Eniwetok	5	14-03	18	73	81	78		5	2	20					
	0800	Eniwetok	6	14-03	02	74	82	78		6	2	20					
	1000	Eniwetok	6	14-05	81	79	85	80		6	2	20					
	1200	Eniwetok	4	14-03		75	88	81		4	2	20					
	1400	Eniwetok	4	14-08	02	72	87	80		4	2	20					
	1600	Eniwetok	6	12-08	03	68	87	80		6	2	20					
	1800	Eniwetok	5	12-05	15	70	85	79		5	2	20					
	2000	Eniwetok	5	12-05	02	73	84	78		5	2	20					
	2200	Eniwetok	5	11-05	02	76	83	78		5	2	20					
	2400	Eniwetok						N O	R E	P O	R T	S					

LOG ENTRIES: 0000-0200 Moored and beached at old cargo pier, Parry (Elmer) Is. Sky mostly overcast with frequent rain squalls. Visibility 10-12 miles except in squalls. Barometer falling slowly. Light easterly airs.
0200-0400 Position as before. Sky clearing. Rain squalls around horizon. Light easterly airs.
0400-0600 Position as before. Visibility excellent.
0600-0800 Position as before. Visibility excellent. Calm, no swell.
0800-1000 Position as before. Visibility excellent.
1000-1200 Position as before. Sky clearing. Visibility excellent.
1200-1400 Position as before. Visibility excellent.
1400-1600 Position as before. Visibility excellent.
1600-1800 Position as before. Visibility excellent. Showers to northward.
1800-2000 Position as before. Visibility excellent.
2000-2200 Position as before. Visibility excellent.
2200-2400 Position as before. No change in weather conditions.

DATE	TIME	POSITION/COURSE	N_s	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/27	0200	Eniwetok	8	10-08	60	74	81	78		7	2	20	1				
	0400	Eniwetok	6	09-05	18	74	82	78		6	2	20					
	0600	Eniwetok	4	09-05	01	74	82	78		4	2	20					
	0800	Eniwetok	3	10-08	01	74	83	78		3	2	20					
	1000	Eniwetok	4	13-10	80	78	82	79		4	2	20					
	1200	Eniwetok	4	12-10	02	76	86	80		4	2	20					
	1400	Eniwetok						N O	R E	P O	R T	S					
	1600	Eniwetok						N O	R E	P O	R T	S					
	1800	Eniwetok						N O	R E	P O	R T	S					
	2000	Eniwetok	2	12-10	01	78	83	80		2	2	20	--	--			
	2200	Eniwetok	2	12-10	02	78	83	80		2	2	20	--	--			
	2400	Eniwetok	2	12-10	02	78	83	80		2	2	20	--	--			

LOG ENTRIES: 0000-0200 Beached and moored, old cargo pier, Parry (Elmer) Is. Sky overcast. Light rain squalls. Gentle easterly breeze. Barometer steady. Excellent visibility except in rain squalls.

PLACE: ENIWETOK-BIKINI BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957 TABLE 18 (Continued)

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/27																	

LOG ENTRIES:
0200-0400 Position as before. Squalls on horizon to N and W. Barometer steady. Sky clearing.
0400-0600 Position as before. Weather as before. Sky clearing. Barometer steady.
0600-0800 Position as before. Weather as before.
0800-1000 Position as before. Visibility reduced in showers.
1000-1200 Position as before. Visibility excellent.
1200-1400 Position as before. Visibility excellent.
1400-1600 Position as before. Visibility excellent.
1600-1800 Position as before. Visibility excellent.
1800-2000 Position as before. Visibility excellent.
2000-2200 Position as before. Visibility unlimited. Clouds diminishing. Barometer steady.
2200-2400 Position as before. No change in weather.

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/28	0200	Eniwetok	4	10-10	03	76	82	79		4	2	20					
	0400	Eniwetok	2	10-08	01	76	82	79		2	2	20					
	0600	Eniwetok	2	13-08	02	76	82	79		2	2	20					
	0800	Eniwetok	4	13-08	03	78	83	79		4	2	20					
	1000	Eniwetok	7	13-08	02	78	87	80		6	2	20	--	1			
	1200	Eniwetok	8	16-04	16	77	85	80		8	2	20	--	--			
	1400	Eniwetok	7	Airs	60	78	86	81		7	2	20	--	1			
	1600	Eniwetok	8	09-05	03	76	83	79		7	2	20	--	1			
	1800	11°24'N 162°39'E	8	07-15	02	80	81	78		8	2	20			07	5	3
	2000	11°23'N 162°56'E						N O		R E P O R T S							
	2200	11°25.0'N 163°13.0'E	8	07-15	80	90	82	78		8	7	20	--	--	07	5	3
	2400	11°25.0'N 163°32.0'E 090	1	07-15	01	90	82	78		1	2	20	--	--	07	5	3

LOG ENTRIES:
0000-0200 Beached and moored, old cargo pier, Parry (Elmer) Is. Moderate southeasterly wind 10-12 knots. Barometer steady. Partly overcast. Unlimited visibility.
0200-0400 Position as before. Sky clearing.
0400-0600 Position as before. Visibility unlimited. Low westerly swell.
0600-0800 Position as before. Visibility unlimited. Low westerly swell.
0800-1000 Position as before. Visibility unlimited. Thunderheads forming in the ENE.
1000-1200 Position as before. No change in weather.
1200-1400 Moored and beached as before. Light rain squalls. Good visibility. Barometer steady. Rain squalls on horizon to easterly and southerly.
1400-1600 Departing via deep entrance from Parry (Elmer) Is. Sky overcast. Thunderheads around horizon. Barometer steady. Light easterly breeze.
1600-1800 (1800 Position: Lat 11°24'N-Long 162°39'E) Visibility excellent. Low short NE swell.

PLACE: ENIWETOK-BIKINI — BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957 — TABLE 18 (Continued)

DATE	TIME	POSITION/COURSE		N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/28																		

LOG ENTRIES:

1800-2000 (2000 Position: Lat 11°23'N-Long 162°56'E) Visibility excellent. Medium average NE swell. Slight NE sea.

2000-2200 (2200 Position: Lat 11°25.0'N-Long 163°13.0'E) En route Parry (Elmer) Is. to Bikini. Slight showers of rain. Visibility about 10.0 miles. Easterly sea (slight). Sky overcast. Barometer rising. 2310: lightning in the east. Long bright flashes.

2200-2400 (2400 Position: Lat 11°25.0'N-Long 163°32.0'E - on course 090° true) Thunderheads and lightning in the E. Visibility unlimited. Barometer steady.

DATE	TIME	POSITION/COURSE		N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/29	0200	11°25'N 163°49'E	090	3	10-10	01	86	82	78	85	3	2	20			10	5	3
	0400	11°25.5'N 164°07'E	090	4	10-12	03	86	82	78	85	4	2	20			10	5	3
	0600	11°25'N 164°25'E	090	2	06-10	01	83	83	79		2	2	20			06	4	3
	0800	11°25'N 164°43'E							N O		R E P O R T S							
	1000	11°24.0'N 165°00'E	087	4	07-10	03	86	84	80		3	2	20	--	1	07	4	3
	*1200	Bikini	085	4	07-10	02	87	85	79		3	2	20	--	1	07	4	3
	1400	Bikini		4	06-12	02	86	85	79		3	2	20	--	1	--	--	-
	1600	Bikini		5	05-12	03	85	86	80		5	2	20	--	--	--	--	-
	1800	Bikini		5	07-12	02	83	84	79		5	2	20					
	2000	Bikini		2	06	01	85	83	78		2	2	20					
	2200	Bikini		2	06-12	02	86	83	79		2	2	20	--	--	--	--	-
	2400	Bikini							N O		R E P O R T S							

LOG ENTRIES:

0000-0200 (0200 Position: Lat 11°25'N-Long 163°49'E) Sky clearing. Cumulus clouds to S. Barometer dropping slowly. Unlimited visibility. Light southeasterly wind and sea.

0200-0400 (0400 Position: Lat 11°25.5'N-Long 164°07'E) No change in weather for past 4 hours.

0400-0600 (0600 Position: Lat 11°25'N-Long 164°25'E) Visibility excellent. Slight ENE sea. Moderate average NE swell.

0600-0800 (0800 Position: Lat 11°25'N-Long 164°43'E) Visibility excellent. Slight northeasterly sea. Moderate average NE swell.

0800-1000 (1000 Position: Lat 11°24.0'N-Long 165°00'E) Visibility unlimited. Thunderheads all around horizon. Cirrus clouds overhead.

*1000-1200 (1200 Position: Approaching Bikini Atoll) No change in weather.

1200-1400 Moored at Enyu Is., Bikini Atoll. Moderate NE wind 12-15 knots. Unlimited visibility. Rain squalls in distance around horizon. Barometer steady.

1400-1600 Position as before. Weather as before. Rain squalls to easterly.

1600-1800 Position as before. Visibility excellent.

1800-2000 Position as before. Visibility excellent.

2000-2200 Position as before. Visibility unlimited. Barometer rising. Thunderheads around horizon. Northeasterly breeze.

PLACE: ENIWETOK-BIKINI   BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957   TABLE 18 (Continued)

DATE	TIME	POSITION	COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/29																		

LOG ENTRIES: 2200-2400 Position as before. No change in weather.

DATE	TIME	POSITION	COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/30	0200	Bikini		4	06-10	03	84	82	79		4	2	20					
	0400	Bikini		6	06-10	03	82	82	79		6	2	20					
	0600	Bikini		4	06-10	01	78	82	78		4	2	20					
	0800	Bikini		4	06-10	02	75	83	79		4	2	20					
	1000	Bikini		3	10-10	02	73	85	80		2	2	20	--	1			
	1200	Bikini		3	07-10	81	73	86	80		2	2	20	--	1			
	*1400	Bikini	253	3	08-10	02	78	87	81		2	2	20	--	1			
	1600	11°26'N 165°09'E	270	4	08-10	03	80	87	81		4	2	20					
	1800	11°25'N 164°51'E	270	4	07-10	02	72	91	83		4	2	20	--	1	07	3	2
	2000	11°25'N 164°34'E							N O		R E P O R T S							
	2200	11°26.0'N 164°16.5'E	270	3	07-10	16	85	85	80		3	2	20	--	-	07	3	2
	2400	11°26.0'N 164°00.0'E	270	3	07-10	16	85	85	80		3	2	20	--	-	07	3	2

LOG ENTRIES:
0000-0200 Moored to LST cargo pier, Bikini Atoll. Sky partly overcast. Excellent visibility. Barometer dropping slowly. Light east-northeasterly wind.
0200-0400 Position as before. No change in weather past 4 hours except sky becoming more overcast.
0400-0600 Position as before. Visibility excellent.
0600-0800 Position as before. Visibility excellent.
0800-1000 Position as before. Visibility unlimited. Barometer falling. Thunderheads all around horizon. Cirrus clouds overhead. 1100: moderate rain shower from ENE direction.
1000-1200 Position as before. Visibility unlimited. Moderate rain showers.
*1200-1400 (1400 Position: Departing Bikini) Moderate easterly wind and sea. Unlimited visibility. Thunderheads around horizon. Sky overhead clear. Barometer rising slowly.
1400-1600 (1600 Position: Lat 11°26'N-Long 165°09'E) No change in weather past 4 hours.
1600-1800 (1800 Position: Lat 11°25'N-Long 164°51'E) Visibility excellent.
1800-2000 (2000 Position: Lat 11°25'N-Long 164°34'E) Visibility excellent. Low NE swells.
2000-2200 (2200 Position: Lat 11°26.0'N-Long 164°16.5'E - course 270° true - 8.85 fon speed) Visibility unlimited. Cumulus clouds all around horizon. Barometer rising. Lightning (Moderate) in S.
2200-2400 (2400 Position: Lat 11°26.0'N-Long 164°00.0'E) No change in weather.

DATE	TIME	POSITION	COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/31	0200	11°26'N 163°42'E	270	4	08-12	03	82	84	80		4	2	20			08	4	2
	0400	11°26'N 163°24'E	270	4	07-12	02	80	85	80		4	2	20			07	4	2

PLACE: ENIWETOK-BIKINI — BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957 — TABLE 18 (Continued)

DATE	TIME	POSITION	COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
8/31	0600	11°27'N 163°06'E	270	4	07-15	02	78	83	79		4	2	20			07	4	2
	0800	11°25'N 162°51'E	267	4	07-15	15	78	83	79		4	2	20			07	4	2
	*1000	Eniwetok	267	6	09-10	03	80	90	82		3	2	20	--	1	09	4	2
	1200	Eniwetok		6	10-10	02	84	87	80		3	2	20	--	1			
	1400	Eniwetok		4	09-10	01	78	88	80		4	2	20					
	1600	Eniwetok		4	09-10	02	74	88	81		4	2	20					
	1800	Eniwetok		4	10-10	02	75	86	80		4	2	20					
	2000	Eniwetok		4	10-10	02	80	84	78		4	2	20					
	2200	Eniwetok		3	10-10	02	82	83	78		3	2	20					
	2400	Eniwetok		4	10-10	81	84	82	79		4	7	20	--	--			

LOG ENTRIES:

0000-0200 (0200 Position: Lat 11°26'N-Long 163°42'E - Bikini to Parry (Elmer) Is.) Sky cloudy around horizon. Unlimited visibility. Light northeasterly wind and sea. Light rain squalls noted passing to S of vessel. Lightning flashes to W.

0200-0400 (0400 Position: Lat 11°26'N-Long 163°24'E) Bright lightning flashes to NW. Barometer dropping slowly. No change in weather for past 4 hours.

0400-0600 (0600 Position: Lat 11°27'N-Long 163°06'E) Visibility excellent. Moderate NE swell.

0600-0800 (0800 Position: Lat 11°25'N-Long 162°51'E) Visibility excellent. Low NE swell.

*0800-1000 (1000 Position: Approaching Parry (Elmer) Is.) Visibility unlimited. Easterly breeze. High cirrus clouds blown in streaks. Thunderheads all around horizon.

1000-1200 Position: Parry (Elmer) Is. No change in weather.

1200-1400 Beached and moored at Parry (Elmer) Is. Cumulus clouds around horizon. Light easterly breeze. Unlimited visibility. Barometer dropping slowly.

1400-1600 Position as before. No change in weather.

1600-1800 Position as before. Visibility excellent.

1800-2000 Position as before. Visibility excellent.

2000-2200 Position as before. Visibility unlimited. Barometer rising. Light easterly breeze. Cumulus clouds around horizon.

2200-2400 Position as before. Rain showers. Visibility about 8 miles in the E. Unlimited elsewhere. Barometer rising.

DATE	TIME	POSITION	COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
9/1	0200	Eniwetok		3	10-08	02	82	81	79		3	2	20					
	0400	Eniwetok		4	10-08	03	80	82	79		4	2	20					
	0600	Eniwetok		4	10-10	02	82	81	78		4	2	20					
	0800	Eniwetok		6	11-10	03	84	82	79		6	2	20					
	1000	Eniwetok		4	15-10	01	86	85	81		4	2	20	6	1			
	1200	Eniwetok		4	15-10	02	88	86	80		4	2	20	6	1			
	1400	Eniwetok		4	11-10	02	80	87	80		4	2	20	6	1			
	1600	Eniwetok							N O	R E	P O	R T	S					
	1800	Eniwetok		6	10-10	03	84	84	80		3	2	20	6	1			
	2000	Eniwetok		3	10-10	01	86	83	79		3	2	20	--	--			

PLACE: ENIWETOK-BIKINI BI-HOURLY OBSERVATIONS, MSTS - T-LST 618, AUGUST 18 - SEPTEMBER 1, 1957

TABLE 18 (Concluded)

DATE	TIME	POSITION/COURSE	N_8	DDFF	WX	P	TT	TT_w	TT_s	C_L AMT. 8ths	C_L TYPE	C_L HT. 00 ft.	C_M	C_H	WAVES DD	WAVES PERIOD	WAVES HT. ft.
9/1	2200	Eniwetok	3	10-10	02	90	83	79		3	2	20	--	--			
	2400	Eniwetok	2	10-10	02	90	83	79		2	2	20	--	--			

LOG ENTRIES:
0000-0200 Beached and moored at Parry (Elmer) Is. Towering cumulus clouds around horizon. Light southeasterly breeze. Excellent visibility. Barometer steady.
0200-0400 Position as before. No change in weather.
0400-0600 Position as before. Sky partly overcast with cumulus clouds. Unlimited visibility. Light southeasterly wind. Barometer steady.
0600-0800 Position as before. No change in weather for past 8 hours with exception of sky becoming more overcast.
0800-1000 Position as before. Visibility excellent.
1000-1200 Position as before. Visibility excellent. Low SW swell.
1200-1400 Position as before. Visibility excellent.
1400-1600 Position as before. Visibility excellent.
1600-2000 Position as before. No change in weather.
2000-2200 Position as before. No change in weather.
2200-2400 Position as before. No change.

Part C. Observational Data, Second Intensive Phase (January 25 -- February 8, 1958)

NOTES: TABLES 19-32

TABLE 19. FRED: HOURLY OBSERVATIONS AND DAILY SUMMARY.

See Notes for Table 4, pp. 39f.

TABLE 20. FRED: RAWINSONDE OBSERVATIONS.

See Notes for Table 5, p. 41.

TABLE 21. BRUCE: THREE-HOURLY OBSERVATIONS.

See Notes for Table 6, pp. 41-43, as well as the note below.

Experienced observers made the observations at BRUCE during the following interval (times are inclusive): 1200 Jan 25 -- 0900 Jan 27.

TABLE 22. BRUCE: HOURLY RELATIVE HUMIDITIES.

See Notes for Table 9, p. 44.

TABLE 23. BRUCE AND KEITH: SPECIAL OBSERVATIONS.

TT_s BRUCE. These measurements were made with an unshielded mercury-in-glass thermometer graduated to half-degrees C. Readings were taken with the thermometer bulb at a depth of 1 to 6 inches beneath the surface of the water, with the reading being made to the nearest tenth of a degree C. at that time when the mercury column had become steady at a minimum value. Mean values of the several observations were converted to °F. in each instance and are estimated to be correct within 0.2°F. in 9 out of 10 instances and within 0.5°F. in all instances (see Notes for Table 7, pp. 43-44, and note that the mean based on several observations will be somewhat more accurate than any single observation).

TT_s KEITH values were read with the same type of thermometer described immediately above, with the bulb at depths of 3-6 inches. Values were, however, read only to the nearest half-degree. Values given represent a mean of several readings as shown and are accurate within 0.3° C.

TT and TT_w were measured with an Asmann psychrometer (graduated in whole degrees F.), were read to the nearest 0.5°F., and are correct within 0.4°F. Heights are correct within 6 inches.

TABLE 24. KEITH: THREE-HOURLY OBSERVATIONS.

See Notes for Table 6, pp. 41-43, as well as the note below.

Experienced observers made the observations at KEITH during the following interval (times are inclusive): 1200 Jan 25 -- 0900 Feb 4.

TABLE 25. KEITH: HOURLY RELATIVE HUMIDITIES.

See Notes for Table 9, p. 44.

TABLE 26. MACK: DAILY OBSERVATIONS.

See Notes for Table 10, pp. 44-45, as well as note below.

Experienced observers made the observations at MACK on the following dates: Jan 26-30 (inclusive); Feb 3, 6, 7.

TT on Jan 25-29 (inclusive) was obtained from max and min thermometers after re-setting. Values are correct within 0.5° F.

TABLE 27. MACK: BI-HOURLY TEMPERATURES AND RELATIVE HUMIDITIES.

See Notes for Table 11, p. 45.

TABLE 28. ELMER: DAILY OBSERVATIONS.

See Notes for Table 12, p. 46, as well as note below.

Experienced observers made the observations at ELMER on the following dates: Jan 26 - Feb 2 (inclusive); Feb 4, 5.

TABLE 29. JANET AND YVONNE: DAILY RAINFALL.

RR is accurate to 0.01 inch.

Time is accurate to within 5 minutes.

TABLE 30. ELMER-MACK: LAGOON TRAVERSES.

See Notes for Table 15, pp. 46-47, as well as notes below.

LOCATIONS by Zones are in doubt as follows: 1330, Jan 25 observation is near Zone 3, and may be a few hundred yards within that zone; 1345, Jan 27 observation may also be just within Zone 3; 1338, Jan 29, may also be just within Zone 3; 1344, Feb 6, may be up to a few hundred yards within Zone 2.

TT from Jan 25 through Jan 29 was obtained from same thermometer used for TT_s (Fahrenheit thermometer graduated in tenths of a degree F.) and are correct within 0.2° F. where read to the nearest tenth and within 0.4° F. where read to the nearest 0.5° F.

TABLE 31. BETWEEN BRUCE, KEITH, ELMER: LAGOON TRAVERSES.

See Notes for Table 16, pp. 47-48.

TABLE 32. LAGOON-OCEAN: LAGOON-OCEAN TRAVERSES.

See Notes for Table 17, p. 48.

PLACE: FRED HOURLY OBSERVATIONS AND DAILY SUMMARY JANUARY 25 - FEBRUARY 8, 1958 TABLE 19

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_0	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
1/25	0058	965	80.0	75.0	79	1	1CuE25	0	0	0	1	ENE14				
	0157	960	79.7	74.2	77	0	0	0	0	0	0	ENE12				
	0259	960	79.7	74.2	77	0	0	0	0	0	0	ENE13				
	0358	955	79.7	74.2	77	0	0	0	0	0	0	ENE16				
	0457	950	80.0	74.2	76	0	0	0	0	0	0	NE18				
	0559	950	80.0	74.2	76	0	0	0	0	0	0	NE14				
	0656	960	78.4	74.0	81	7	7ScE25e	0	0	0	7	NE14	0644-0655			
	0759	970	77.3	74.8	89	5	1ScE15	4CuE25	0	0	5	NE15	0725-0732			
	0858	980	79.9	75.3	81	3	3CuE25	0	0	0	3	ENE16				
	0957	995	81.7	76.1	77	4	2CuE25	2Ac 80	0	0	4	ENE18				
	1059	000	82.3	76.6	77	3	3CuE25	0	0	0	3	ENE18				
	1158	995	82.0	75.8	75	3	3CuE25	0	0	0	3	ENE18				
	1257	980	85.1	77.0	69	4	4CuE25	0	0	0	4	ENE17				
	1358	960	83.3	76.2	72	3	3CuE25	0	0	0	3	ENE15				
	1456	940	83.8	76.4	71	1	1CuE20	0	0	0	1	ENE16				
	1559	920	83.6	76.3	72	2	1CuE20	1Ac 80	0	0	2	ENE16				
	1659	920	81.5	77.0	82	3	3CuE20	0	0	0	3	ENE16				
	1755	920	82.3	75.4	73	3	3CuE20	0	0	0	3	ENE16				
	1859	920	81.3	75.6	82	2	2CuE20	0	0	0	2	ENE16				
	1958	945	80.2	75.2	79	2	2CuE21	0	0	0	2	ENE15				
	2058	950	79.8	74.6	79	7	7CuE22e	0	0	0	7	ENE15				
	2157	960	79.8	74.8	80	4	4CuE22	0	0	0	4	ENE16				
	2255	960	79.4	74.1	78	3	3CuE21	0	0	0	3	ENE17				
	2355	960	79.4	74.3	79	2	2CuE21	0	0	0	2	NE17		85	77	T
1/26	0058	960	79.7	74.3	83	2	2CuE21	0	0	0	2	ENE18				
	0159	950	79.3	74.4	80	0	0	0	0	0	0	ENE16				
	0256	940	79.0	74.5	81	0	0	0	0	0	0	ENE16				
	0356	935	78.9	74.5	81	0	0	0	0	0	0	ENE16				
	0459	930	78.4	75.0	85	0	0	0	0	0	0	ENE15				
	0556	940	78.4	75.0	85	0	0	0	0	0	0	ENE18				
	0656	950	78.2	75.1	87	3	3CuE25	0	0	0	3	ENE19				
	0759	960	78.6	72.9	76	8	2CuE25	6Cs	0	0	3	NE17				
	0858	970	80.0	72.8	72	8	2CuE25	6Cs	0	0	3	NE16				
	0957	990	82.8	73.0	63	8	2CuE25	6Cs	0	0	3	NE17				
	1059	000	83.3	74.3	66	8	2CuE25	6Cs	0	0	3	NE17				
	1158	990	83.1	74.4	66	8	2CuE25	6Cs	0	0	3	NE15				
	1257	970	84.9	74.8	62	5	3CuE25	2Cs	0	0	5	NE15				
	1359	940	84.4	74.2	62	5	3CuE25	2Cs	0	0	5	NE16				
	1458	925	84.7	74.1	61	8	1CuE25	7Cs	0	0	4	NE15				
	1557	910	82.9	75.2	70	7	1CuE25	6Cs	0	0	2	NNE15				
	1658	900	82.2	75.0	72	6	2CuE25	5Cs	0	0	3	NNE14				
	1755	885	82.0	74.2	70	6	2CuE25	6Cs	0	0	3	NNE15				

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HOURLY OBSERVATIONS AND DAILY SUMMARY JANUARY 25 - FEBRUARY 8, 1958

TABLE 19
(Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
1/26	1856	885	80.2	74.0	75	4	4CuE21	0	0	0	4	NE14				
	1958	890	80.0	74.0	75	3	3CuE21	0	0	0	3	NE16				
	2055	900	79.8	73.6	75	2	2CuE21	0	0	0	2	NE16				
	2155	910	79.6	73.0	73	0	0	0	0	0	0	NE19				
	2256	910	79.4	72.5	72	0	0	0	0	0	0	NE20				
	2355	920	79.1	73.1	73	0	0	0	0	0	0	NE21		85	78	0
1/27	0059	915	79.1	73.1	75	0	0	0	0	0	0	NE21				
	0158	905	79.0	73.0	75	0	0	0	0	0	0	NE22				
	0256	895	78.8	73.8	79	0	0	0	0	0	0	NE22				
	0359	885	78.8	73.8	79	0	0	0	0	0	0	NE20				
	0458	885	78.6	73.7	79	0	0	0	0	0	0	NE22				
	0556	870	78.8	73.8	79	0	1CuE25	0	0	0	0	NE22				
	0656	870	79.0	73.0	75	1	1CuE25	0	0	0	1	NE24				
	0757	870	79.0	72.0	71	1	1CuE25	0	0	0	1	ENE16				
	0859	875	80.0	72.0	68	1	1CuE25	0	0	0	1	ENE22				
	0958	890	81.8	72.4	64	1	1CuE25	0	0	0	1	ENE18				
	1058	895	83.3	74.2	65	1	1CuE25	0	0	0	1	ENE18				
	1159	905	84.4	74.0	61	1	1CuE25	0	0	0	1	ENE22				
	1257	880	83.4	73.4	62	1	1AcE80	0	0	0	1	ENE18				
	1358	855	83.4	73.4	62	1	1CuE25	0	0	0	1	E18				
	1459	840	83.1	74.1	63	3	1CuE25	2AcE80	0	0	3	E18				
	1557	825	83.4	73.4	62	3	3CuE25	0	0	0	3	E20				
	1658	825	82.9	72.9	63	8	1CuE25	7Cs	0	0	3	ENE16				
	1756	845	83.1	73.0	62	8	1CuE25	7Cs	0	0	3	ENE18				
	1859	850	80.1	71.9	67	8	1CuE25	7Cs	0	0	3	ENE14				
	1958	870	79.8	71.7	68	7	1CuE25	6Cs	0	0	3	ENE16				
	2058	885	79.9	71.4	66	1	1CuE25	0	0	0	1	ENE16				
	2157	890	79.6	71.5	67	1	1CuE25	0	0	0	1	ENE18				
	2259	900	79.7	72.6	71	3	3CuE25	0	0	0	3	ENE16				
	2359	910	79.6	72.6	71	5	5CuE25	0	0	0	5	ENE16		84	79	0
1/28	0058	905	79.1	71.9	71	0	0	0	0	0	0	NNE16				
	0157	905	78.9	71.9	71	0	0	0	0	0	0	NNE16				
	0255	890	78.9	71.5	70	0	0	0	0	0	0	NNE16				
	0357	875	78.9	71.5	70	0	0	0	0	0	0	NE18				
	0458	870	78.0	71.7	73	2	2CuE21	0	0	0	2	NNE15	0438-0442			
	0555	865	78.0	71.6	73	2	2CuE21	0	0	0	2	NNE16				
	0657	870	78.0	71.6	73	1	1CuE25	0	0	0	1	NNE16				
	0758	880	78.6	71.0	69	4	1CuE25	3Ci	0	0	1	NNE14				
	0859	890	79.7	72.2	70	4	1CuE25	3Ci	0	0	1	NNE16				
	0958	905	82.1	72.1	62	4	1CuE25	3Ci	0	0	1	E14				
	1057	910	82.2	73.0	65	4	1CuE25	3Ci	0	0	1	E14				

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HOURLY OBSERVATIONS AND DAILY SUMMARY JANUARY 25 - FEBRUARY 8, 1958

TABLE 19 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
1/28	1159	895	83.2	73.2	62	4	1CuE25	3Ci	0	0	1	E12				
	1258	865	84.2	72.2	56	4	1CuE25	3Ci	0	0	1	ENE17				
	1357	835	85.0	73.5	58	3	1CuE25	2Ci	0	0	1	E14				
	1459	820	84.1	73.2	60	3	1CuE25	2Ci	0	0	1	E16				
	1557	800	84.1	73.2	60	3	1CuE25	2Ci	0	0	1	E16				
	1658	795	82.0	72.8	65	1	1CuE25	0	0	0	1	ENE14				
	1759	800	82.4	73.6	66	0	0	0	0	0	0	E13				
	1856	810	80.5	72.7	69	0	0AcNE100	0	0	0	0	E13				
	1959	830	80.4	72.6	69	0	0	0	0	0	0	E14				
	2058	850	80.0	73.1	72	0	0	0	0	0	0	E15				
	2159	860	80.1	71.0	64	0	0	0	0	0	0	E16				
	2257	870	79.8	72.4	70	1	1CuE25	0	0	0	1	ENE15				
	2359	870	79.4	72.6	72	3	3CuE25	0	0	0	3	ENE13		85	78	T
1/29	0056	855	79.1	72.5	73	2	2CuE21	0	0	0	2	ENE15				
	0158	850	79.2	73.1	75	2	2CuE21	0	0	0	2	E16				
	0255	850	79.1	72.8	74	2	2CuE21	0	0	0	2	E16				
	0355	845	78.8	74.8	83	3	3CuE21	0	0	0	3	E15				
	0458	845	78.8	74.6	82	2	2CuE21	0	0	0	2	E15				
	0555	845	78.8	74.8	82	2	2CuE21	0	0	0	2	E14				
	0659	845	79.0	74.5	81	3	2CuE21	6Cs	0	0	2	E16				
	0758	850	79.3	74.8	81	3	3CuE21	0	0	0	3	E18				
	0857	865	80.3	75.0	78	3	3CuE21	0	0	0	3	E19				
	0958	880	82.2	75.5	73	2	2CuE21	0	0	0	2	E15				
	1056	885	82.1	75.5	73	2	2CuE21	0	0	0	2	E16				
	1156	865	82.8	75.0	70	2	2CuE21	0	0	0	2	E13				
	1258	845	83.0	75.1	69	2	2CuE21	0	0	0	2	E14				
	1359	815	85.1	77.0	70	2	1CuE21	1Ci	0	0	1	E14				
	1456	795	84.8	77.1	73	2	1CuE21	1Ci	0	0	1	E12				
	1559	770	84.3	77.6	74	3	3CuE21	0	0	0	3	E13				
	1657	765	84.0	76.0	69	3	3CuE25	0	0	0	3	E16				
	1759	790	84.0	76.0	69	3	3CuE25	0	0	0	3	ENE14				
	1858	800	81.3	75.2	75	3	2CuE25	1Ac 80	0	0	3	ENE15				
	1957	810	80.5	75.0	81	3	3CuE25	0	0	0	3	E14				
	2059	820	80.5	75.0	81	2	2CuE25	0	0	0	2	ENE14				
	2158	840	80.2	75.0	79	2	2CuE25	0	0	0	2	ENE16				
	2257	840	80.2	75.0	79	2	2CuE25	0	0	0	2	ENE16				
	2359	840	80.2	75.0	79	2	2CuE25	0	0	0	2	ENE17		85	79	0
1/30	0058	840	78.3	73.0	77	4	4CuE25	0	0	0	4	NE12				
	0159	840	77.4	73.2	83	4	4CuE25	0	0	0	4	NNE12				
	0257	830	77.1	73.0	83	2	2CuNE25	0	0	0	2	NNE18				
	0358	820	77.2	73.1	83	2	2CuNE25	0	0	0	2	NNE11				

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HOURLY OBSERVATIONS AND DAILY SUMMARY JANUARY 25 - FEBRUARY 8, 1958

TABLE 19
(Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
1/30	0456	810	77.2	73.4	85	1	1CuNE25	0	0	0	1	NNE10				
	0559	800	76.8	74.7	90	1	1CuNE25	0	0	0	1	NNE11				
	0659	800	76.9	74.7	90	8	2CuNE25	6Ac 80e	0	0	8	ENE10				
	0759	810	78.0	69.8	67	8	2CuE25	6Ac 80e	0	0	5	NNE8				
	0856	825	79.1	75.0	83	8	2CuE25	6Ac 80e	0	0	5	ENE9				
	0957	840	81.2	76.0	80	3	1CuE25	2Ac 80	0	0	2	E9				
	1056	850	83.1	76.8	75	2	2Cs	0	0	0	1	E10				
	1158	845	84.2	78.6	78	5	2CuE25	1Ac 100	2Cs	0	4	E12				
	1259	825	85.0	78.8	74	5	2CuE25	3Cs	0	0	2	E8				
	1359	805	84.6	78.6	76	5	2CuE25	3Cs	0	0	2	E8				
	1456	785	86.0	78.0	70	8	2CuE25	6Cs	0	0	3	E10				
	1558	765	85.8	78.1	70	5	2CuE25	3Cs	0	0	2	E8				
	1658	765	85.3	78.2	73	2	2CuE25	0	0	0	2	E8				
	1759	780	84.0	78.0	76	2	2CuE25	0	0	0	2	E12				
	1857	800	81.0	76.5	81	2	2CuE25	0	0	0	2	E10				
	1958	810	80.8	76.0	79	2	2CuE25	0	0	0	2	E14				
	2059	815	80.8	76.0	79	2	2CuE25	0	0	0	2	E12				
	2157	830	80.0	75.0	79	2	2CuE25	0	0	0	2	E14				
	2258	840	80.2	76.5	84	6	6AcE80e	0	0	0	6	E14				
	2359	855	80.2	76.5	84	8	8AcE80e	0	0	0	8	E15		86	77	0
1/31	0058	855	80.3	76.2	84	8	8Ac 80e	0	0	0	8	E16				
	0159	855	80.1	76.1	83	8	8Ac 80e	0	0	0	8	E16				
	0258	850	79.6	75.8	84	8	2CuE25	6Ac 80e	0	0	8	E14				
	0356	840	79.5	75.6	83	4	2CuE25	2Ac 80	0	0	4	E13				
	0457	830	79.4	75.3	83	2	1CuE25	1Ac 80	0	0	2	E14				
	0559	800	78.4	75.6	88	2	2CuE25	0	0	0	2	E12				
	0658	805	79.2	75.2	83	2	2CuE21	0	0	0	2	E13				
	0757	810	79.8	75.0	80	2	2CuE21	0	0	0	2	E14				
	0855	825	80.2	75.2	79	2	2CuE21	0	0	0	2	E14				
	0959	845	82.2	76.2	76	2	2CuE21	0	0	0	2	E14				
	1058	855	83.5	76.2	71	2	2CuE20	0	0	0	2	E14				
	1159	845	83.9	77.8	76	4	4CuE21	0	0	0	4	E14				
	1258	835	83.5	78.4	80	5	5CuE21	0	0	0	5	E15	1245-1250			
	1358	825	84.3	77.8	75	4	4CuE21	0	0	0	4	E14	1315-1321			
	1455	795	82.6	76.9	78	10	3CuE21	10Cs	0	0	3	E11				
	1558	780	84.1	76.8	72	10	3CuE21	10Cs	0	0	3	E14				
	1656	780	83.9	77.0	73	3	3CuE21	0	0	0	3	ENE17				
	1756	790	83.6	76.9	74	3	3CuE21	0	0	0	3	E16				
	1859	810	81.0	76.0	80	3	3CuE21	0	0	0	3	E18				
	1958	825	80.4	75.3	80	1	1CuE21	0	0	0	1	E18				
	2056	830	80.0	76.0	83	3	3CuE21	0	0	0	3	E16				
	2159	840	80.1	76.1	83	3	3CuE21	0	0	0	3	E15				

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HOURLY OBSERVATIONS AND DAILY SUMMARY JANUARY 25 - FEBRUARY 8, 1958

TABLE 19 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_0	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
1/31	2256	850	80.0	76.0	83	4	4CuE21	0	0	0	4	E16				
	2356	845	79.9	76.2	84	4	4CuE21	0	0	0	4	E20		84	78	T
2/1	0058	845	79.9	76.2	84	3	3CuE25	0	0	0	3	E20				
	0157	830	79.8	75.2	82	2	2CuE25	0	0	0	2	E20				
	0259	815	79.8	75.2	82	1	1CuE25	0	0	0	1	E18				
	0357	795	79.8	75.2	82	1	1CuE25	0	0	0	1	E18				
	0458	775	79.8	75.5	82	0	0	0	0	0	0	E20				
	0559	810	79.8	75.5	82	0	0	0	0	0	0	E20				
	0659	810	79.8	75.2	81	2	2CuE25	0	0	0	2	E16				
	0758	830	80.0	75.0	79	6	6CuE21e	0	0	0	6	E18				
	0856	850	80.2	76.0	82	6	3CuE21	3AsE100e	0	0	6	E16	0814-0819			
	0956	870	82.0	75.8	75	6	3CuE21	3AsE100e	0	0	6	E20				
	1058	885	81.6	76.8	81	7	3CuE21	1ScE25	3As 100e	0	7	E20				
	1158	885	83.0	76.0	73	3	3CuE21	0	0	0	3	E22				
	1259	860	84.2	76.0	68	0	0	0	0	0	0	E16				
	1356	840	84.3	76.2	68	1	1AcE100	0	0	0	1	E16				
	1457	820	84.2	76.1	68	0	0	0	0	0	0	E15				
	1558	805	84.6	77.6	73	1	1CuE20	0	0	0	1	ENE16				
	1657	800	84.7	77.7	73	1	1CuE20	0	0	0	1	ENE18				
	1756	805	84.4	77.5	73	1	1CuE20	0	0	0	1	ENE16				
	1856	825	82.2	76.0	75	2	2CuE20	0	0	0	2	ENE18				
	1958	840	80.3	75.0	78	2	2CuE20	0	0	0	2	ENE16				
	2056	855	80.4	75.0	77	4	4CuE20	0	0	0	4	ENE15				
	2159	865	80.0	75.0	79	3	3CuE20	0	0	0	3	ENE18				
	2259	870	78.3	75.8	89	10	10ScE21e	Unknown	Unknown	Unknown	10	E15	2245-2253			
	2358	870	78.3	75.8	89	7	2ScE21e	0	0	0	7	ENE21	2258-2325	85	78	0.04
2/2	0057	870	78.3	75.8	89	2	2CuE25	0	0	0	2	E15				
	0158	860	79.1	76.1	87	8	8CuE25e	0	0	0	8	E16	0157-0304			
	0259	855	78.0	75.5	89	8	8CuE25e	0	0	0	8	ENE18				
	0356	845	78.0	75.5	89	10	10CuE25e	Unknown	Unknown	Unknown	10	ENE20	0355-0403			
	0458	840	78.8	75.4	85	8	8CuE25e	0	0	0	8	ENE19				
	0557	845	79.4	75.4	81	8	8CuE25e	0	0	0	8	ENE16				
	0658	845	79.4	75.4	81	8	8CuE25e	0	0	0	8	ENE20				
	0759	850	79.7	75.5	83	5	3CuE25	2Ac 80	0	0	5	NE20				
	0858	870	80.3	75.7	81	5	3CuE25	2Ac 80	0	0	5	NE20				
	0957	900	78.1	75.8	89	9	1ScE15	2CuE25	6Ac 80e	0	9	ENE22	0927-0956			
	1059	905	80.2	77.1	87	9	1ScE15	2CuE25	6Ac 80e	0	9	ENE22	1025-1034			
	1158	905	80.1	76.3	84	9	1ScE15	2CuE25	6Ac 80e	0	9	ENE20				
	1259	885	80.1	76.2	84	9	1ScE15	2CuE25	6Ac 80e	0	9	ENE20				
	1358	870	80.3	76.4	83	8	2CuE25	6Ac 80e	0	0	8	E18				
	1458	840	81.7	76.6	80	8	2CuE25	6Ac 80e	0	0	8	ENE17				

PLACE: FRED

HOURLY OBSERVATIONS AND DAILY SUMMARY JANUARY 25 - FEBRUARY 8, 1958

TABLE 19 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
2/2	1559	825	82.9	75.6	72	8	2CuE25	6Ac 80e	0	0	8	NE22				
	1658	820	82.6	75.0	71	8	3CuE22	7AsE70e	0	0	8	NE24				
	1755	825	82.0	75.0	72	8	3CuE22	7AsE70e	0	0	8	NE25				
	1859	830	81.2	74.5	73	6	2CuE22	6AcE70e	0	0	6	NE24				
	1958	825	80.0	73.2	72	2	2CuE22	0	0	0	2	NE24				
	2056	835	79.9	74.0	75	2	2CuE22	0	0	0	2	ENE26				
	2157	845	79.9	73.5	74	2	2CuE22	0	0	0	2	ENE24				
	2258	850	79.5	73.5	75	2	2CuE21	0	0	0	2	ENE24				
	2355	845	79.4	73.5	75	2	2CuE21	0	0	0	2	ENE23		83	78	0.05
2/3	0059	845	79.3	74.0	78	5	5CuE25	0	0	0	5	ENE22				
	0159	840	79.2	74.0	78	5	5CuE25	0	0	0	5	ENE24				
	0256	830	79.0	73.9	78	2	2CuE25	0	0	0	2	ENE24				
	0359	830	78.8	73.8	79	2	2CuE25	0	0	0	2	ENE24				
	0459	815	78.8	73.9	80	2	2CuE25	0	0	0	2	ENE21				
	0556	810	78.8	73.9	80	2	2CuE25	0	0	0	2	ENE18				
	0659	810	79.2	74.1	79	5	5CuE25	0	0	0	5	NE18				
	0759	825	79.4	74.6	80	8	2CuE25	6Ac 80e	0	0	8	ENE20				
	0858	850	79.9	74.8	79	3	3CuE25	0	0	0	3	ENE19	0818-0829			
	0959	860	80.4	75.0	78	8	6CuE25e	2Ac 80	0	0	8	ENE16	0942-0949			
	1058	870	82.3	76.6	77	8	6CuE25e	2Cs	0	0	8	NE18				
	1158	865	82.1	75.0	72	8	2CuE25	6Cs	0	0	3	ENE17				
	1256	850	80.4	73.6	73	9	2CuE25	6Cs	0	0	9	ENE14				
	1358	825	84.1	75.4	67	4	2CuE25	2Cs	0	0	4	NE16				
	1459	800	85.0	75.6	65	4	2CuE25	2Cs	0	0	4	NE16				
	1557	790	85.1	75.8	65	3	2CuE25	1Cs	0	0	3	NE16				
	1658	785	83.0	75.3	70	8	4CuE25	6AcE70e	0	0	8	ENE16				
	1755	800	83.0	75.0	69	8	3CuE15	4ScE25e	2AcE70	0	8	ENE16				
	1858	810	81.0	74.5	74	3	3CuE22	0	0	0	3	ENE18				
	1958	825	80.2	74.2	76	2	2CuE22	0	0	0	2	ENE20				
	2056	835	80.0	74.0	75	3	2CuE22	1AsE100	0	0	3	ENE19				
	2156	845	79.6	75.0	81	3	2CuE22	1AcE100	0	0	3	ENE18				
	2258	840	79.4	74.0	78	3	3CuE22	0	0	0	3	E18				
	2355	850	79.4	74.0	78	3	3CuE22	0	0	0	3	E16		85	79	T
2/4	0059	855	79.4	74.0	78	3	3CuE25	0	0	0	3	E18				
	0159	855	79.3	73.9	78	2	2CuE25	0	0	0	2	E16				
	0256	845	79.2	73.9	78	5	5CuE25	0	0	0	5	E16				
	0355	840	79.0	73.7	78	10	5CuE25	10Cs	0	0	8	ENE14				
	0459	840	78.8	73.7	79	10	3CuE25	10AsE80e	Unknown	Unknown	10	ENE13				
	0556	830	78.8	73.7	79	10	10ScE25e	Unknown	Unknown	Unknown	10	E10	0542-0642			
	0657	840	76.5	72.4	82	9	9AsE80e	0	0	0	9	ENE8				
	0758	850	76.1	72.1	82	10	5CuE25	5AsE80e	Unknown	Unknown	10	ENE21				

PLACE: FRED

HOURLY OBSERVATIONS AND DAILY SUMMARY JANUARY 25 - FEBRUARY 8, 1958

TABLE 19 (Continued)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
2/4	0859	860	76.0	74.0	91	10	8CuE25e	2AsE80	Unknown	Unknown	10	ENE15	0814-0901			
	0957	880	79.4	75.0	82	5	3CuE25	2AsE100	0	0	5	E16				
	1058	885	79.4	75.0	82	10	3CuE25	7AsE80e	Unknown	Unknown	10	ENE14				
	1159	875	78.5	75.5	87	9	5CuE25	4AsE80e	0	0	9	ENE16				
	1258	850	81.9	76.9	80	8	6CuE25e	2AsE80	0	0	8	ENE16	1235-1241			
	1356	815	84.1	77.1	73	8	6CuE25e	2AsE80	0	0	8	ENE18				
	1459	805	83.0	76.0	73	4	2CuE25	2AsE80	0	0	4	ENE14				
	1557	775	83.4	75.4	69	4	2CuE25	2AsE80	0	0	4	ENE15				
	1656	770	81.1	75.0	75	10	10ScE15e	Unknown	Unknown	Unknown	10	ENE20	1609-1614			
	1759	775	80.6	76.1	81	9	2CuE25	7AcE80e	0	0	9	NE18	1642-1645			
	1857	775	80.3	76.1	82	4	4CuE25	0	0	0	4	NE18	1655-1709			
	1958	790	80.0	75.2	80	4	4CuE25	0	0	0	4	ENE18				
	2059	800	80.1	75.1	79	2	2CuE25	0	0	0	2	NE18				
	2156	810	79.9	74.8	79	2	2CuE25	0	0	0	2	ENE17				
	2257	815	79.8	75.1	81	5	5CuE25	0	0	0	5	ENE16				
	2358	835	79.7	75.8	83	7	7CuE25e	0	0	0	7	NE16		84	76	0.03
2/5	0057	835	79.8	75.2	81	6	2CuE25	6AcE100e	0	0	6	ENE16				
	0158	830	80.0	75.0	79	8	2CuE22	8AcE100e	0	0	8	ENE18				
	0256	820	79.8	74.8	79	10	2CuE21	10AcE100e	Unknown	Unknown	10	ENE16				
	0358	810	78.6	75.0	85	3	3CuE22	0	0	0	3	E13	0321-0326			
	0459	805	79.5	74.9	81	3	3CuE22	0	0	0	3	ENE20				
	0555	780	79.8	75.2	81	3	3CuE22	0	0	0	3	ENE20				
	0658	780	79.5	75.2	82	2	2CuE22	0	0	0	2	E18				
	0757	780	79.9	75.0	80	3	3CuE22	0	0	0	3	E16				
	0859	790	80.3	75.0	78	3	3CuE22	0	0	0	3	E16				
	0957	815	82.1	75.0	72	3	3CuE22	0	0	0	3	E16				
	1058	820	82.1	75.0	72	3	3CuE22	0	0	0	3	E17				
	1159	830	83.2	75.2	69	1	1CuE22	0	0	0	1	E14				
	1257	815	84.0	74.0	63	1	1CuE22	0	0	0	1	E14				
	1358	790	84.0	76.0	69	1	1CuE22	0	0	0	1	E20				
	1459	790	84.2	75.2	66	1	1CuE22	0	0	0	1	E14				
	1558	790	84.2	74.0	62	1	1CuE22	0	0	0	1	E19				
	1657	790	84.1	74.6	64	1	1CuE22	0	0	0	1	ENE16				
	1758	775	82.3	74.7	70	1	1CuE25	0	0	0	1	ENE16				
	1856	790	80.4	73.6	72	2	2CuE25	0	0	0	2	ENE16				
	1957	800	79.9	72.6	71	1	1CuE25	0	0	0	1	ENE17				
	2057	810	80.0	72.9	71	1	1CuE25	0	0	0	1	ENE15				
	2158	820	79.8	72.1	69	1	1CuE25	0	0	0	1	ENE15				
	2256	825	79.5	71.9	69	5	5CuE25	0	0	0	5	ENE14				
	2357	825	79.1	70.3	65	2	2CuE25	0	0	0	2	ENE16		84	79	T

PLACE: FRED HOURLY OBSERVATIONS AND DAILY SUMMARY JANUARY 25 - FEBRUARY 8, 1958 TABLE 19 (Continued)

DATE	TIME	P	TT	TT_W	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
2/6	0056	830	78.9	70.1	65	2	2CuE22	0	0	0	2	ENE15				
	0159	830	78.6	70.1	66	2	2CuE22	0	0	0	2	ENE14				
	0256	825	78.2	70.3	68	0	0	0	0	0	0	NE12				
	0358	820	78.8	71.6	70	7	2CuE22	7AcE100e	0	0	7	NE12				
	0459	820	77.0	72.0	79	10	3CuE22	10ScE55a	Unknown	Unknown	10	NE15				
	0555	815	77.8	72.4	77	8	3CuE22	8ScE50e	0	0	8	NE15				
	0659	820	77.9	73.0	79	10	2CuE22	4ScE50e	4AcE80	Unknown	10	NE14				
	0759	830	79.8	72.4	70	10	2CuE22	6ScE50e	2Ac 80	0	9	ENE12				
	0856	850	80.0	72.4	70	10	6ScE50e	4AcE80	Unknown	Unknown	10	NE15				
	0956	865	81.3	73.1	68	10	10ScE50e	Unknown	Unknown	Unknown	10	ENE16				
	1057	880	83.8	72.4	58	3	1CuE25	2Ac 80	0	0	3	NE12				
	1156	850	84.9	72.8	56	9	2CuE25	7AcE120e	0	0	9	NE16				
	1258	830	83.3	73.5	63	10	6CuE25e	4AcE120	0	0	9	ENE16				
	1358	800	84.9	73.7	59	3	1CuE25	2AcE120	0	0	3	ENE16	1309-1313			
	1456	770	85.0	73.0	57	1	1CuE25	0	0	0	1	NE16				
	1559	760	84.2	72.5	57	1	1CuE25	0	0	0	1	NE16				
	1658	760	83.2	72.2	59	1	1CuE25	0	0	0	1	E12				
	1759	785	83.2	71.0	55	1	1CuE25	0	0	0	1	ENE16				
	1859	785	81.2	70.2	58	1	1AcE80	0Ci	0	0	1	ENE12				
	1958	795	80.0	71.0	64	1	1AcE100	0	0	0	1	ENE14				
	2059	795	79.8	71.8	68	0	0	0	0	0	0	ENE13				
	2158	795	79.0	71.7	73	0	0	0	0	0	0	ENE13				
	2257	800	79.0	71.7	73	2	1CuE25	1Ci	0	0	2	ENE14				
	2359	795	79.0	71.7	73	4	4CuE25	0	0	0	4	ENE14		85	77	T
2/7	0057	795	79.1	71.8	70	5	5CuE25	0	0	0	5	NE14				
	0156	790	78.7	71.0	69	5	5CuE25	0	0	0	5	NE15				
	0258	780	78.4	71.3	71	5	5CuE25	0	0	0	5	NE14				
	0359	775	78.5	71.4	71	3	3CuE25	0	0	0	3	ENE12				
	0456	775	78.2	71.8	73	5	5CuE25	0	0	0	5	NE16				
	0558	780	78.3	71.6	72	3	3CuE25	0	0	0	3	NE15				
	0659	790	78.5	71.6	72	5	3CuE25	2AcE80	0	0	5	ENE20	0620-0628			
	0757	800	79.0	71.0	68	2	2CuE20	0	0	0	2	ENE16				
	0856	810	81.5	72.0	63	2	1CuE20	1Ci	0	0	2	ENE16				
	0956	825	81.8	71.8	62	3	2CuE20	1AcE80	0	0	3	ENE18				
	1056	830	82.8	72.8	62	3	2CuE20	1AcE80	0	0	3	ENE12				
	1156	820	82.8	72.8	62	4	4CuE20	0	0	0	4	ENE16				
	1259	810	84.9	73.8	59	4	4CuE20	0	0	0	4	ENE16				
	1358	790	85.0	74.7	62	3	3CuE20	0	0	0	3	ENE16				
	1456	775	84.8	73.6	59	4	4CuE20	0	0	0	4	ENE14				
	1556	755	85.0	74.0	59	3	3CuE20	0	0	0	3	ENE16				
	1657	760	83.6	73.6	62	3	2CuE20	1AcE120	0	0	3	ENE14				
	1759	775	82.2	74.2	65	3	2CuE20	1AcE120	0	0	3	ENE16				

PLACE: FRED

HOURLY OBSERVATIONS AND DAILY SUMMARY JANUARY 25 - FEBRUARY 8, 1958

TABLE 19 (Concluded)

DATE	TIME	P	TT	TT_w	RH	N	CLOUDS AND OBSCURING PHENOMENA (Amount-type-direction-height) 1st Layer	2nd Layer	3rd Layer	4th Layer	N_O	DDFF	TIMES OF RAINFALL	DAILY SUMMARY T_xT_x	T_nT_n	RR
2/7	1858	780	79.4	74.0	78	2	2CuE25	0	0	0	2	E12				
	1957	780	79.6	73.0	73	3	1CuE25	2Ci	0	0	1	ENE14				
	2059	785	79.4	74.0	78	0	0	0	0	0	0	ENE15				
	2158	790	79.2	72.8	74	0	0	0	0	0	0	ENE13				
	2257	795	79.2	72.8	74	3	3Ci	0	0	0	0	E12				
	2359	795	79.2	72.8	74	2	2CuE25	0	0	0	2	E10		85	78	T
2/8	0058	800	78.8	71.9	72	3	3CuE25	0	0	0	3	ENE14				
	0156	790	78.6	72.0	73	5	5CuE25	0	0	0	5	ENE14				
	0257	780	78.8	72.1	73	5	5CuE25	0	0	0	5	E14				
	0356	770	78.2	71.6	73	5	5CuE25	0	0	0	5	ENE12				
	0458	770	78.4	71.9	73	3	3CuE25	0	0	0	3	ENE13				
	0559	770	78.3	71.2	71	3	3CuE25	0	0	0	3	ENE14				
	0659	775	78.0	71.6	74	5	2CuE25	3CsE	0	0	3	ENE15				
	0758	785	78.9	69.9	64	8	2CuE25	8CsE	0	0	2	ENE15				
	0856	800	80.2	71.8	67	10	2CuE25	10CsE	0	0	3	ENE15				
	0958	815	82.5	72.5	62	10	2CuE22	10CsE	0	0	3	ENE14				
	1057	820	83.2	73.0	62	10	2CuE22	10CsE	0	0	3	ENE16				
	1155	805	83.0	74.2	66	10	3CuE22	10CsE	0	0	4	E12				
	1256	785	84.5	74.9	64	10	1CuE22	10Cs	0	0	2	ENE14				
	1356	760	84.0	74.9	66	10	1CuE22	10Cs	0	0	2	E16				
	1456	740	84.0	74.2	63	7	1CuE22	7Cs	0	0	2	E15				
	1559	725	83.7	73.5	62	4	1CuE22	4Cs	0	0	1	E14				
	1658	725	83.2	74.0	65	4	1CuE22	4CiE	0	0	1	E14				
	1756	745	83.0	74.0	66	4	1CuE22	3Ci	0	0	3	E16				
	1857	750	81.3	72.3	67	2	2CuE22	0	0	0	2	ENE15				
	1959	750	80.2	71.5	64	1	1CuE22	0	0	0	1	ENE14				
	2056	760	80.0	71.5	65	0	0	0	0	0	0	E16				
	2159	765	79.3	73.4	76	0	0	0	0	0	0	ENE18				
	2259	770	79.0	73.5	77	0	0	0	0	0	0	E16				
	2356	770	79.0	73.5	77	0	0	0	0	0	0	E18		85	78	0

PLACE: FRED   RAWINSONDE OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958   TABLE 20

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
1/25	0200	1015	Surface	27.0	22.6	77	50 - 7
		1000	137	25.6	22.0	80	60 - 9
		850	1549	19.0	11.1	60	90 - 11
		700	3194	10.8	MB	(13)	100 - 10
		600	4459	2.2	MB	(14)	100 - 10
		500	5913	-5.0	MB	(15)	110 - 9
		400	7633	-16.9	MB	(14)	100 - 8
		300	9732	-31.0	MB	(20)	90 - 7
		200	12465	-54.2	----	--	110 - 5
		150	14252	-67.8	----	--	110 - 9
		100	16614	-74.2	----	--	90 - 8
	1130	1016	Surface	27.9	22.9	74	60 - 9
		1000	146	26.7	22.6	78	70 - 10
		850	1561	17.8	14.3	80	150 - 6
		700	3207	12.0	MB	(12)	60 - 7
		600	4476	4.3	MB	(13)	80 - 8
		500	5935	-3.5	MB	(14)	90 - 12
		400	7659	-14.7	MB	(16)	110 - 10
		300	9767	-29.9	MB	(20)	100 - 9
		200	12525	-52.0	----	--	100 - 11
		150	14329	-65.6	----	--	110 - 9
		100	16710	-76.8	----	--	120 - 9
	2330	1015	Surface	26.9	22.1	75	60 - 8
		1000	137	25.9	21.3	76	60 - 8
		850	1550	16.5	13.1	80	60 - 6
		700	3189	12.0	MB	(12)	80 - 5
		600	4461	4.1	MB	(13)	90 - 8
		500	5918	-4.9	MB	(15)	90 - 13
		400	7644	-15.6	MB	(17)	80 - 14
		300	9739	-32.3	MB	(20)	120 - 5
		200	12473	-53.2	----	--	90 - 13
		150	14261	-66.9	----	--	120 - 9
		100	16636	-75.9	----	--	110 - 5
1/26	1200	1016	Surface	25.4	19.1	67	40 - 9
		1000	145	24.6	18.5	69	40 - 8
		850	1546	14.2	8.7	70	40 - 9
		700	3183	11.0	MB	(13)	60 - 4
		600	4456	4.1	MB	(13)	50 - 4
		500	5912	-5.6	MB	(15)	110 - 8
		400	7638	-15.0	MB	(16)	160 - 11
		300	9744	-32.0	MB	(20)	90 - 9
		200	12470	-53.9	----	--	120 - 12
		150	14258	-67.4	----	--	110 - 7
		100	16622	-77.5	----	--	80 - 5
	2335	1013	Surface	27.3	22.3	74	50 - 8
		1000	119	26.1	21.6	76	50 - 9
		850	1528	16.8	10.9	68	76 - 11
		700	3171	10.8	MB	(13)	60 - 5
		600	4445	5.1	MB	(13)	50 - 13
		500	5911	-3.1	MB	(14)	120 - 12
		400	7646	-14.6	MB	(16)	70 - 10
		300	9750	-31.5	MB	(20)	110 - 8
		200	12493	-53.5	----	--	140 - 7
		150	14281	-67.6	----	--	130 - 9
		100	16636	-81.1	----	--	120 - 8

PLACE: FRED RAWINSONDE OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958

TABLE 20 (Continued)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
1/27	1210	1012	Surface	27.0	21.1	70	50 - 9
		1000	111	26.0	20.9	73	50 - 9
		850	1522	15.1	11.9	81	60 - 11
		700	3161	12.0	MB	(12)	80 - 10
		600	4441	6.7	MB	(13)	100 - 11
		500	5918	-1.5	MB	(14)	90 - 6
		400	7654	-14.5	MB	(16)	50 - 5
		300	9763	-30.5	MB	(20)	90 - 9
		200	12510	-52.3	----	--	160 - 9
		150	14306	-67.1	----	--	210 - 7
		100	16666	-79.1	----	--	190 - 7
	2340	1012	Surface	26.8	20.5	68	60 - 8
		1000	111	25.8	20.0	70	70 - 11
		850	1515	16.4	-0.7	31	100 - 10
		700	3155	10.7	MB	(13)	60 - 13
		600	4424	4.5	MB	(13)	80 - 8
		500	5890	-2.6	MB	(14)	70 - 11
		400	7617	-15.4	MB	(16)	40 - 13
		300	9720	-31.1	MB	(20)	60 - 8
		200	12470	-52.8	----	--	160 - 4
		150	14262	-66.1	----	--	170 - 9
		100	16632	-77.4	----	--	70 - 7
1/28	1137	1013	Surface	26.7	18.9	62	80 - 7
		1000	119	25.9	18.6	64	80 - 7
		850	1526	14.4	9.5	72	60 - 6
		700	3163	13.4	MB	(12)	60 - 9
		600	4444	7.2	MB	(13)	90 - 6
		500	5919	-2.0	MB	(14)	90 - 6
		400	7649	-15.0	MB	(16)	90 - 5
		300	9756	-31.0	MB	(20)	70 - 7
		200	12508	-52.3	----	--	270 - 7
		150	14307	-66.5	----	--	270 - 5
		100	16683	-76.6	----	--	90 - 3
	2332	1011	Surface	25.7	19.4	68	70 - 8
		1000	101	24.9	19.4	71	60 - 9
		850	1506	14.4	12.3	87	90 - 12
		700	3139	11.4	MB	(13)	110 - 4
		600	4414	6.7	MB	(13)	60 - 11
		500	5881	-3.9	MB	(14)	60 - 8
		400	7663	-16.0	MB	(17)	100 - 11
		300	9705	-31.3	MB	(20)	80 - 6
		200	12445	-53.1	----	--	310 - 6
		150	14238	-66.4	----	--	350 - 6
		100	16607	-73.2	----	--	140 - 9
1/29	1135	1012	Surface	26.7	20.6	69	90 - 10
		1000	111	25.7	20.1	71	90 - 10
		850	1515	15.4	8.0	61	90 - 8
		700	3149	10.7	MB	(13)	70 - 3
		600	4423	5.9	MB	(13)	30 - 9
		500	5895	-4.2	MB	(14)	20 - 11
		400	7625	-13.9	MB	(16)	60 - 9
		300	9728	-32.5	MB	(20)	50 - 5
		200	12448	-55.0	----	--	40 - 3
		150	14228	-67.6	----	--	20 - 9
		100	16596	-76.0	----	--	260 - 5

PLACE: FRED RAWINSONDE OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958 TABLE 20 (Continued)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
1/29	2359	1011	Surface	26.4	23.5	84	60 - 8
		1000	102	25.9	23.2	85	60 - 8
		850	1513	16.9	6.4	50	70 - 4
		700	3152	13.9	MB	(12)	140 - 3
		600	4433	6.0	MB	(13)	20 - 7
		500	5900	-3.5	MB	(14)	90 - 3
		400	7631	-13.6	MB	(16)	60 - 2
		300	9742	-31.3	MB	(20)	350 - 7
		200	12474	-52.6	----	--	240 - 7
		150	14268	-66.2	----	--	260 - 13
		100	16638	-79.9	----	--	350 - 11
1/30	1350	1011	Surface	25.3	21.7	80	100 - 5
		1000	101	24.8	21.2	80	100 - 5
		850	1514	17.9	4.2	40	130 - 2
		700	3147	12.7	-9.0	21	30 - 2
		600	4422	4.9	MB	(13)	30 - 3
		500	5895	-2.1	MB	(14)	20 - 6
		400	7627	-14.7	MB	(16)	80 - 6
		300	9724	-32.9	MB	(20)	310 - 3
		200	12456	-58.0	----	--	280 - 11
		150	14250	-66.3	----	--	360 - 4
		100	16623	-77.0	----	--	350 - 3
	2342	1010	Surface	26.9	23.0	79	70 - 7
		1000	94	26.2	22.5	80	70 - 7
		850	1507	18.4	13.1	71	110 - 3
		700	3141	6.4	5.2	92	60 - 2
		600	4413	4.4	MB	(13)	60 - 3
		500	5877	-3.9	MB	(14)	40 - 6
		400	7601	-15.5	MB	(17)	10 - 5
		300	9700	-32.5	MB	(20)	320 - 5
		200	12435	-53.0	----	--	260 - 13
		150	14227	-69.3	----	--	230 - 10
		100	16593	-78.9	----	--	280 - 3
1/31	1140	1011	Surface	24.3	18.5	70	80 - 7
		1000	101	23.3	18.7	75	80 - 7
		850	1495	14.1	8.8	70	90 - 6
		700	3112	11.0	MB	(13)	50 - 6
		600	4378	3.4	MB	(13)	110 - 3
		500	5831	-6.3	MB	(15)	40 - 7
		400	7536	-17.7	MB	(17)	360 - 7
		300	9615	-34.0	MB	(21)	330 - 6
		200	12323	-54.9	----	--	260 - 7
		150	14106	-67.5	----	--	240 - 13
		100	16468	-79.3	----	--	230 - 6
2/1	0100	1011	Surface	27.2	22.9	77	90 - 8
		1000	102	26.5	22.4	78	80 - 9
		850	1515	16.2	13.5	84	80 - 11
		700	3158	13.0	MB	(12)	60 - 4
		600	4438	7.0	MB	(13)	40 - 4
		500	5910	-3.4	MB	(14)	30 - 8
		400	7630	-16.9	MB	(17)	20 - 8
		300	9717	-32.5	MB	(20)	310 - 4
		200	12442	-53.5	----	--	290 - 8
		150	14229	-67.3	----	--	280 - 10
		100	16593	-78.4	----	--	270 - 12

PLACE: FRED RAWINSONDE OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958 TABLE 20 (Continued)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
2/1	1200	1012	Surface	27.0	20.1	66	90 - 9
		1000	111	26.2	20.4	70	90 - 9
		850	1518	15.2	8.7	65	80 - 10
		700	3155	12.6	MB	(12)	80 - 5
		600	4431	6.0	MB	(13)	50 - 10
		500	5894	-4.2	MB	(14)	70 - 6
		400	7616	-15.6	MB	(17)	20 - 11
		300	9719	-31.2	MB	(20)	310 - 5
		200	12446	-53.9	----	--	360 - 5
		150	14230	-66.8	----	--	230 - 14
		100	16600	-77.9	----	--	60 - 3
	2337	1012	Surface	25.9	23.0	84	60 - 9
		1000	111	25.0	22.6	86	70 - 9
		850	1520	16.3	16.2	99	80 - 11
		700	3142	7.0	MB	(13)	90 - 11
		600	4409	4.7	MB	(13)	90 - 14
		500	5870	-2.7	MB	(14)	50 - 11
		400	7596	-15.3	MB	(16)	20 - 16
		300	9691	-32.5	MB	(20)	310 - 10
		200	12411	-53.7	----	--	290 - 18
		150	14201	-66.0	----	--	300 - 15
		100	16574	-79.6	----	--	240 - 12
2/2	1200	1013	Surface	26.1	20.9	73	50 - 10
		1000	118	25.3	20.6	75	50 - 11
		850	1527	16.8	14.8	88	80 - 14
		700	3167	12.5	3.5	54	100 - 11
		600	4445	5.2	MB	(13)	80 - 12
		500	5902	-4.8	MB	(15)	40 - 15
		400	7618	-15.7	MB	(17)	20 - 13
		300	9713	-32.7	MB	(20)	10 - 15
		200	12440	-52.0	----	--	290 - 26
		150	14243	-65.4	----	--	320 - 15
		100	16624	-78.9	----	--	360 - 6
	2340	1011	Surface	26.5	20.4	69	50 - 12
		1000	102	25.5	19.9	71	60 - 12
		850	1509	17.0	11.9	72	70 - 11
		700	3149	12.0	MB	(12)	70 - 10
		600	4426	5.0	MB	(13)	80 - 12
		500	5886	-4.8	MB	(15)	60 - 10
		400	7601	-17.7	MB	(17)	10 - 12
		300	9678	-34.2	MB	(21)	340 - 13
		200	12387	-54.2	----	--	300 - 17
		150	14176	-65.8	----	--	310 - 14
		100	16549	-78.5	----	--	360 - 5
2/3	1200	1011	Surface	27.2	22.0	73	60 - 8
		1000	102	26.2	21.4	75	60 - 8
		850	1507	15.2	10.8	75	70 - 12
		700	3145	12.0	MB	(12)	70 - 14
		600	4419	5.6	MB	(13)	60 - 12
		500	5880	-5.7	MB	(15)	40 - 11
		400	7585	-19.6	MB	(17)	360 - 11
		300	9652	-32.0	MB	(20)	360 - 12
		200	12404	-52.1	----	--	360 - 15
		150	14208	-65.9	----	--	320 - 17
		100	16691	-77.7	----	--	270 - 15

PLACE: FRED RAWINSONDE OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958 TABLE 20 (Continued)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
2/3	2335	1011	Surface	26.3	21.6	75	70 - 9
		1000	102	25.6	21.3	77	70 - 9
		850	1507	16.9	-0.3	31	100 - 13
		700	3149	13.2	MB	(12)	70 - 13
		600	4424	3.9	MB	(13)	60 - 14
		500	5880	-6.0	MB	(15)	60 - 11
		400	7585	-18.9	MB	(17)	40 - 19
		300	9679	-30.1	MB	(20)	50 - 30
		200	12427	-53.9	----	--	40 - 28
		150	14214	-67.3	----	--	350 - 16
		100	16572	-77.5	----	--	340 - 14
2/4	1144	1012	Surface	26.2	21.0	73	80 - 8
		1000	111	25.4	20.9	76	70 - 13
		850	1519	16.0	14.5	91	90 - 8
		700	3155	8.8	7.2	89	100 - 11
		600	4423	3.0	MB	(13)	100 - 12
		500	5875	-5.2	MB	(15)	70 - 13
		400	7585	-19.0	MB	(17)	60 - 17
		300	9690	-29.9	MB	(20)	40 - 16
		200	12442	-52.0	----	--	10 - 11
		150	14242	-65.6	----	--	10 - 14
		100	16616	-75.6	----	--	40 - 9
	2337	1009	Surface	26.3	22.2	78	40 - 9
		1000	84	25.9	22.0	79	50 - 9
		850	1496	15.9	13.9	88	70 - 11
		700	3135	12.4	MB	(12)	80 - 11
		600	4407	3.0	MB	(13)	130 - 5
		500	5864	-4.6	MB	(15)	110 - 15
		400	7574	-18.0	MB	(17)	90 - 13
		300	9682	-30.5	MB	(20)	50 - 15
		200	12428	-53.5	----	--	340 - 7
		150	14219	-66.9	----	--	20 - 9
		100	16577	-79.9	----	--	60 - 10
2/5	1140	1009	Surface	25.0	19.0	69	70 - 8
		1000	84	24.5	18.9	71	60 - 8
		850	1492	16.9	10.9	68	50 - 8
		700	3139	12.8	MB	(12)	100 - 8
		600	4409	2.5	MB	(13)	60 - 7
		500	5869	-3.2	MB	(14)	50 - 9
		400	7600	-11.9	MB	(16)	40 - 9
		300	9725	-29.4	MB	(19)	70 - 5
		200	12477	-52.1	----	--	30 - 9
		150	14280	-65.2	----	--	50 - 4
		100	16661	-79.5	----	--	120 - 6
2/6	0200	1010	Surface	25.6	18.4	64	50 - 8
		1000	93	25.0	18.8	68	60 - 8
		850	1497	14.9	12.6	83	110 - 8
		700	3141	10.3	MB	(13)	50 - 6
		600	4406	3.9	MB	(13)	50 - 6
		500	5866	-5.0	MB	(15)	70 - 2
		400	7587	-15.9	MB	(17)	60 - 6
		300	9692	-31.1	MB	(20)	150 - 2
		200	12445	-52.7	----	--	150 - 4
		150	14238	-66.5	----	--	270 - 1
		100	16605	-80.0	----	--	350 - 5

PLACE: FRED RAWINSONDE OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958

TABLE 20 (Concluded)

DATE	TIME	LEVEL (mb.)	HEIGHT (m.)	TT (°C)	T_dT_d (°C)	RH	DDFF (m/s)
2/6	1138	1012	Surface	27.4	19.2	61	60 - 8
		1000	111	26.4	19.3	65	60 - 7
		850	1517	14.1	10.7	80	80 - 7
		700	3154	11.8	MB	(12)	80 - 5
		600	4427	4.9	MB	(13)	80 - 4
		500	5890	-5.0	MB	(15)	50 - 7
		400	7608	-17.3	MB	(17)	80 - 5
		300	9710	-30.0	MB	(20)	260 - 2
		200	12463	-52.5	----	--	260 - 5
		150	14259	-67.1	----	--	240 - 5
		100	16628	-80.1	----	--	330 - 3
	2343	1009	Surface	25.9	19.8	69	60 - 7
		1000	84	25.2	19.4	70	60 - 8
		850	1487	17.0	3.0	39	80 - 9
		700	3125	10.4	MB	(13)	60 - 8
		600	4394	5.2	MB	(13)	60 - 8
		500	5851	-5.7	MB	(15)	80 - 4
		400	7570	-15.2	MB	(16)	180 - 1
		300	9670	-32.3	MB	(20)	270 - 5
		200	12400	-54.6	----	--	250 - 8
		150	14181	-68.7	----	--	310 - 5
		100	16530	-79.7	----	--	330 - 4
2/7	1131	1010	Surface	26.5	20.1	68	60 - 8
		1000	94	25.7	19.7	69	60 - 8
		850	1501	15.2	7.5	60	70 - 11
		700	3135	11.3	MB	(13)	60 - 11
		600	4407	5.7	MB	(13)	30 - 4
		500	5870	-4.4	MB	(14)	40 - 4
		400	7595	-14.4	MB	(16)	100 - 2
		300	9702	-31.7	MB	(20)	280 - 8
		200	12444	-52.9	----	--	270 - 9
		150	14242	-66.8	----	--	330 - 7
		100	16612	-79.3	----	--	340 - 4
	2345	1009	Surface	25.8	20.5	72	70 - 7
		1000	84	25.1	20.2	74	70 - 7
		850	1490	15.6	8.4	62	70 - 11
		700	3130	10.5	MB	(13)	40 - 12
		600	4393	3.1	MB	(13)	30 - 6
		500	5849	-5.0	MB	(15)	360 - 2
		400	7569	-14.9	MB	(16)	310 - 3
		300	9671	-31.0	MB	(20)	290 - 13
		200	12414	-53.5	----	--	310 - 12
		150	14204	-67.8	----	--	300 - 10
		100	16565	-80.0	----	--	300 - 6
2/8	1132	1010	Surface	26.0	18.8	64	60 - 8
		1000	93	25.2	18.7	67	60 - 8
		850	1496	15.0	11.0	77	90 - 8
		700	3132	11.7	MB	(12)	60 - 8
		600	4404	4.0	MB	(13)	40 - 6
		500	5863	-4.5	MB	(15)	350 - 1
		400	7586	-15.5	MB	(17)	300 - 3
		300	9704	-29.8	MB	(20)	360 - 5
		200	12463	-53.5	----	--	270 - 12
		150	14258	-67.1	----	--	290 - 10
		100	16621	-88.2	----	--	320 - 6

PLACE: BRUCE THREE-HOURLY OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958 TABLE 21

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR_L	RR_O	N	C_{LMH}	FF_3	DDFF	REMARKS
1/25	1200	84.5	77.5	----	----	0	0	1	1Cu.........	--	NE 10-12	
	1500	85.0	78.0	----	----	0	0	3	3Cu.........	12	NE 8-10	
	1800	82.0	77.0	----	----	0	0	2	1Cu;1Ci....	13	NE 8-10	
	2100	80.0	76.0	----	----	0	0	7	3Cu;5Ac;1Ci	12	NE 2-4	2100 rain in sight, E to S.
1/26	0000	79.0	74.0	86.0	79.0	0	0	0	(Cu).......	14	NE 12-15	
	0300	79.5	74.5	----	----	0	0	0	(Cu).......	13	NE 9-12	
	0600	79.0	73.5	----	----	0	0	0	(Cu).......	15	NE 12-15	
	0900	80.5	74.5	----	----	0	0	6	6Cu;2Ci....	16	NE 6-8	
	1200	83.5	74.0	83.5	78.5	0	0	4	4Cu;1Ci....	13	NE 8-10	
	1500	82.0	76.0	----	----	0	0	7	6Cu;2Ac;1Ci	13	NE 9-12	Between 1500 and 1800 7/10 Ci.
	1800	82.0	75.5	----	----	0	0	4	3Cu;1Ci....	10	NE 6-8	Between 1800 and 2100 5/10 Ac.
	2100	79.0	74.5	----	----	0	0	4	4Cu.........	12	E 10-12	
1/27	0000	79.0	73.0	85.5	79.0	0	0	2	2Cu.........	18	E 12-16	
	0300	78.5	72.5	----	-----	0	0	2	2Cu.........	16	E 12-16	
	0600	78.5	73.0	----	----	0	0	1	1Cu.........	19	E 17-20	
	0900	80.5	73.0	----	----	0	0	0	(Cu).......	18	E 17-20	0900 heavy swelling Cu NW.
	1200	84.0	76.0	84.0	78.0	0	0	4	1Cu;3Ac....	17	NE 10-15	
	1500	84.0	76.0	----	----	0	0	3	2Cu;1Ci....	13	NE 10-15	
	1735	81.5	73.5	----	----	0	0	6	1Cu;5Ci....	13	NE 10-15	
	2035	79.0	73.5	----	----	0	0	-	....	13	NE 10-15	
	2335	79.0	72.5	----	----	0	0	4	3Cu;1Ci....	14	NE 12-15	
1/28	0235	78.0	73.5	----	----	0	0	-	....	14	NE 10-12	
	0535	78.0	73.5	----	----	0	0	-	....	13	NE 8-12	
	0900	80.0	71.5	----	----	0	0	3	2Cu;1Ci....	14	NE 8-12	
	1200	87.0	75.0	87.0	78.0	0	0	4	3Cu;1Ci....	12	NE 10-15	
	1500	87.0	75.0	----	----	0	0	2	2Cu.........	12	NE 8-12	
	1800	82.0	73.5	----	----	0	0	under 1	Ci........	12	NE 8-12	
	2100	79.0	72.0	----	----	0	0	0	....	12	NE 8-12	
1/29	0000	78.0	72.5	87.5	78.0	0	0	-	....	13	NE 8-12	
	0300	78.0	73.5	----	----	0	0	-	....	10	NE 8-12	
	0600	78.0	73.5	----	----	0	0	-	....	12	NE 8-12	
	0900	80.5	75.0	----	----	0	0	5	5Cu.........	11	NE 8-12	
	1200	86.0	79.0	86.0	77.0	0	0	1	1Cu.........	10	NE 10	
	1500	86.5	78.5	----	----	0	0	2	2Cu.........	10	NE 10-15	
	1800	82.5	76.0	----	----	0	0	3	3Cu.........	10	NE 10	
	2100	80.0	75.0	----	----	0	0	3	3Cu.........	8	NE 10-12	
1/30	0000	78.5	75.0	87.5	78.5	0	0	3	3Cu.........	14	NE 15	
	0300	78.0	75.0	----	----	0	0	-	....	12	NE 10	0300 cloudy, rain.
	0600	75.5	71.0	----	----	0	0	-	....	7	NE 5-10	0600 cloudy, rain.
	0900	82.0	76.5	----	----	0	0	4	2Cu;2Ac....	3	NE 3-5	
	1200	86.0	79.0	86.0	75.5	0	0	7	5Cu;2Ci....	5	NE 5	
	1500	88.0	80.0	----	----	0	0	5	4Cu;1Ci....	6	NE 5	
	1800	84.0	77.5	----	----	0	0	4	4Cu.........	5	NE 5	
	2100	80.0	77.0	----	----	0	0	4	4Cu.........	8	NE 5-10	

PLACE: BRUCE

THREE-HOURLY OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958

TABLE 21
(Continued)

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR_L	RR_O	N	C_{LMH}	FF_3	DDFF	REMARKS
1/31	0000	80.0	75.0	90.0	80.0	0	0	-	....	10	NE 10	0000 cloudy, Cu visible.
	0300	79.0	75.0	----	----	0	0	-	....	10	NE 10	0300 cloudy.
	0600	79.0	75.0	----	----	0	0	-	....	10	NE 10	0600 some clouds visible.
	0900	81.0	75.5	----	----	0	0	2	2Cu........	10	NE 15	
	1200	86.5	79.0	86.5	78.5	0	0	7	7Cu;1Ac....	10	NE 9**	1406-1416 rain.
	1500	85.0	79.0	----	----	0.05	0.03	5	5Cu;1Ac....	10	NE 9**	
	1800	82.5	76.0	----	----	0	0	3	3Cu........	11	NE 9**	
	2100	79.0	76.0	----	----	0	0	3	....	13	NE 11**	
2/1	0000	79.0	74.5	87.0	79.0	0	0	3	....	13	NE 11**	
	0300	79.0	75.0	----	----	0	0	3	....	14	NE 11**	
	0600	78.5	74.5	----	----	0	0	-	....	14	NE 12**	0800-0900 intermittent rain.
	0900	79.0	75.0	----	----	0.07	0.06	9	2Cu;7Sc....	13	NE 12**	0907 sun appeared. 0941-0945 and 0950-0953
	1200	84.0	75.0	84.0	76.0	0.01	0.02	1	1Cu........	13	NE 12**	rain.
	1500	85.0	77.5	----	----	0	0	1	1Cu........	12	NE 11**	
	1800	81.0	75.0	----	----	0	0	1	1Cu........	12	NE 11**	
	2100	79.0	73.5	----	----	0	0	1	....	12	NE 12**	
2/2	0000	78.0	75.0	86.0	76.5	T	T	2	....	14	NE 12**	0230-0245 heavy rain with high winds.
	0300	76.0	74.5	----	----	0.16	0.13	10	....	15	NE 17**	
	0600	79.0	75.0	----	----	0.01	0.02	7?	....	18	NE 18**	
	0900	80.0	75.0	----	----	0	0	8	6Sc;4Ac....	19	NE 18**	0916-0940 rain. 0940-1015 intermittent shwr.
	1200	81.0	77.0	81.0	76.0	0.10	0.10	10	9Cu;(Ci)...	18	NE 19*	1120-1125 rain. 1200 light shwr. 1240-1250
	1500	82.0	75.5	----	----	0.01	0.01	10	10Cu;1Ci...	18	NE 15*	light rain and gusty.
	1800	80.5	75.0	----	----	0	0	10	10Cu;1Ci...	20	NE 19*	
	2100	79.0	73.0	----	----	0	0	1	1Cu........	20	NE 17*	2100 moonlight.
2/3	0000	78.5	73.0	82.5	78.5	0	0	6	6Cu........	19	NE 19*	0000 moonlight.
	0300	78.5	74.0	----	----	0	T	8	8Cu........	19	NE 17*	0300 moonlight. 0555-0600 rain.
	0600	76.5	73.0	----	----	0.01	0.02	10?	....	16	NE 12*	0650-0700 rain.
	0900	78.5	73.0	----	----	0.02	0.01	3	3Cu........	14	NE 11*	0940-0950 rain.
	1200	80.0	75.0	80.0	75.5	0.01	0.02	8	8Cu........	14	NE 17*	1200 light shwr. 1205-1210 light shwr.
	1500	81.5	75.0	----	----	0	0	0	(Cu).......	15	NE 14*	
	1800	80.5	75.0	----	----	0	0	6	6Cu;(Ci)...	15	NE 14*	2045-2048 light shwr.
	2100	76.5	73.0	----	----	T	0	9	6Cu;3Ci....	14	NE 9*	2100 moonlight.
2/4	0000	78.0	73.5	82.0	76.0	0	0	2	2Cu........	13	NE 10*	0000 moonlight.
	0300	78.0	74.0	----	----	0	0	3	3Cu;1Ci....	11	NE 8*	0300 moonlight.
	0600	79.0	74.5	----	----	0	0	10	....	11	NE 10*	0600 cloudy, light shwr. 0620-0630 rain.
	0900	76.5	74.5	----	----	0.14	0.13	10	10Cu;3Ci...	11	NE 12*	0708-0715 rain. 0740-0845 intermittent shwrs.
	1200	80.0	77.0	80.0	76.5	T	T	6	5Sc;2Ac....	12	NE 10	0900 hazy sun. 1111-1117 rain.
	1500	80.0	76.0	----	----	T	T	7	6Sc;2Ac....	13	NE 14	
	1800	79.0	76.0	----	----	0	0	6	5Sc;2Ac....	13	NE 15	1800 shwrs over lagoon SW to W.
	2100	79.0	74.5	----	----	0	0	1	....	16	NE 12	Much of the day shwrs were apparently passing
2/5	0000	79.0	75.0	81.5	79.0	0	0	8	....	13	NE 10	N of Bruce as evidenced by clouds and short
	0300	79.0	75.0	----	----	0	0	9	....	14	NE 12	period when a few drops were felt.
	0600	79.0	74.5	----	----	0	0	5	....	15	NE 14	
	0900	80.0	74.0	----	----	0	0	4	2Cu;3Ac....	14	NE 14	
	1200	85.0	76.0	85.0	78.0	0	0	3	3Cu........	14	NE 12	

PLACE: BRUCE THREE-HOURLY OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958 TABLE 21 (Concluded)

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR_L	RR_O	N	C_{LMH}	FF_3	DDFF	REMARKS
2/5	1500	85.0	75.0	----	----	0	0	2	2Ac.........	12	NE 12	
	1800	82.0	74.5	----	----	0	0	3	3Cu.........	15	NE 12	
	2100	78.5	73.0	----	----	0	0	3	....	12	NE 9	
2/6	0000	78.0	72.0	85.5	78.0	0	0	3	....	13	NE 10	
	0300	77.5	72.5	----	----	0	0	3	....	11	NE 10	
	0600	78.0	72.5	----	----	0	0	10	....	12	NE 10	
	0900	79.0	72.0	----	----	T	T	10	10Cu........	12	NE 8	
	1200	84.5	75.0	84.5	76.5	0	0	9	9Cu.........	12	NE 10	
	1500	84.0	74.5	----	----	0	0	0	(Cu).......	15	NE 10*	
	1800	83.0	78.0	----	----	0	0	0	(Cu).......	12	NE 10	
	2100	79.0	73.5	----	----	0	0	1	....	12	NE 10*	
2/7	0000	77.5	72.5	84.5	77.5	0	0	10	2Cu;8Ci....	11	NE 12*	0000 moonlight.
	0300	78.0	72.0	----	----	0	0	2	2Cu.........	14	NE 10*	0300 moonlight. 0430-0435 light rain.
	0600	78.0	72.5	----	----	0.01	0.01	4	4Cu.........	13	NE 14*	0600 moonlight. 0630-0632 light rain.
	0900	78.5	71.5	----	----	0	T	1	1Cu.........	11	NE 8*	
	1200	83.0	74.0	83.0	76.0	0	0	5	5Cu.........	14	NE 10	1230 well developed Cb to NW.
	1500	85.0	75.0	----	----	0	0	5	5Cu.........	11	NE 10	
	1800	81.5	75.0	----	----	0	0	2	2Cu.........	12	NE 10	1800 shwr line E to SE. 1830-1835 light shwr.
	2100	78.5	73.0	----	----	T	T	2	2Cu.........	12	NE 12	
2/8	0000	78.0	72.5	85.5	78.0	0	0	7	7Cu.........	11	NE 9	
	0300	77.5	72.5	----	----	0	0	8	8Cu.........	10	NE 10	
	0600	78.0	72.0	----	----	0	0	5	5Cu.........	11	NE 10	
	0900	80.0-	73.0	80.0	77.5	0	0	9	4Cu;5Ci....	12	NE 12	

PLACE: BRUCE

HOURLY RELATIVE HUMIDITIES, JANUARY 25 - FEBRUARY 8, 1958*

TABLE 22

HOUR:	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
DATE																								
1/25												71	--	--	74	--	--	80	--	--	84	--	--	79
1/26	--	--	79	--	--	77	--	--	76	--	--	64	--	--	76	--	--	74	--	--	81	--	--	75
1/27	--	--	75	--	--	77	--	--	72	--	--	69	--	--	69	--	--	--	--	--	--	--	--	--
1/28	--	--	--	--	--	--	--	--	67	--	--	57	--	--	57	--	--	73	--	--	71	--	--	77
1/29	--	--	82	--	--	82	--	--	78	--	--	75	--	--	68	--	--	74	--	--	79	--	--	82
1/30	--	--	84	--	--	82	--	--	78	--	--	74	--	--	71	--	--	75	--	--	87	--	--	79
1/31	--	--	83	--	--	83	--	--	78	71	72	72	66	98	77	72	74	74	82	84	87	85	82	81
2/1	85	84	83	84	83	83	80	81	83	83	80	66	65	66	72	73	74	76	77	77	77	81	84	87
2/2	88	95	93	93	90	83	82	81	80	81	82	84	--	--	74	--	--	78	--	--	76	--	--	77
2/3	--	--	81	--	--	85	--	--	77	--	--	80	--	--	74	--	--	78	--	--	85	--	--	81
2/4	--	--	83	--	--	81	--	--	91	--	--	87	90	88	83	84	86	87	82	84	81	84	85	83
2/5	82	82	83	86	84	81	80	79	76	70	66	67	62	64	63	66	69	70	76	77	77	77	76	75
2/6	76	77	79	81	76	77	77	75	71	72	62	64	54	62	64	65	70	80	82	81	77	82	83	79
2/7	81	81	75	80	82	77	79	74	71	70	68	66	65	64	63	69	72	74	76	76	77	77	77	77
2/8	77	78	79	77	76	75	74	74	72															

* Because of delay in receipt of hygrothermograph and malfunctioning for a brief period, the hourly record is incomplete as shown.

PLACE: BRUCE AND KEITH SPECIAL OBSERVATIONS, JANUARY 28, 1958 TABLE 23

BRUCE 0730-0815

LOCATION	WATER DEPTH	NO. OF MEASUREMENTS	TT_s* (°C)	TT_s (mean in °F.)
Lagoon, ½ ft. from shore	2 in.	5	4 - 26.2; 26.1	79.1
Lagoon, 5 ft. from shore	1 ft.	6	5 - 26.2; 26.3	79.2
Lagoon, 8 ft. from shore	2 ft.	5	3 - 26.2; 2 - 26.3	79.2
Lagoon, 5 yds. from shore	3 ft.	5	4 - 26.3; 26.2	79.3
Lagoon, 6 yds. from shore	4 ft.	5	5 - 26.3	79.3
Lagoon, 8 yds. from shore	5 ft.	5	3 - 26.4; 2 - 26.3	79.4
Ocean, ½ ft. from shore	2 in.	5	3 - 24.0; 23.9; 24.1	75.2
Ocean, 3-4 yds. from shore	6 in.	5	3 - 25.5; 25.6; 25.7	78.0
Ocean, 25 yds. from shore	1 in.	5	26.4; 3 - 26.5; 26.6	79.7
Ocean, 50 yds. from shore	2 in.	5	5 - 26.7	80.1
Ocean, 75-100 yds. from shore; 20 yds. from edge of reef	3 in.	5	5 - 26.7	80.1

BRUCE 1400-1515

LOCATION	WATER DEPTH	NO. OF MEASUREMENTS	TT_s* (°C)	TT_s (mean in °F.)
Lagoon, ½ ft. from shore	2 in.	5	2 - 27.4; 3 - 27.5	81.4
Lagoon, 5 ft. from shore	1 ft.	5	4 - 27.3; 27.4	81.2
Lagoon, 7 ft. from shore	2 ft.	5	5 - 27.3	81.1
Lagoon, 10 ft. from shore	3 ft.	5	4 - 27.2; 27.1	80.9
Lagoon, 3 yds. from shore	4 ft.	5	2 - 27.1; 3 - 27.2	80.9
Lagoon, 7-8 yds. from shore	5 ft.	5	2 - 27.0; 3 - 27.1	80.7
Ocean, in tidal pool at shore	1-2 in.	5	3 - 32.3; 32.4; 32.5	90.2
Ocean, in tidal pool at shore	3 in.	5	31.4; 2 - 31.5; 2 - 31.6	88.7
Ocean, 10 yds. from shore	6 in.	5	28.0; 2 - 28.1; 2 - 28.3	82.8
Ocean, 25 yds. from shore	6 in.	5	3 - 27.7; 2 - 27.8	81.9
Ocean, 50 yds. from shore	6 in.	5	3 - 27.5; 27.6; 27.7	81.6

PLACE: BRUCE AND KEITH SPECIAL OBSERVATIONS, JANUARY 28, 1958

TABLE 23
(Concluded)

BRUCE 1400-1515

LOCATION	WATER DEPTH	NO. OF MEASUREMENTS	TT_s* (°C)	TT_s (mean in °F.)
Ocean, about 100 yds. from shore; 10 yds. from edge of reef	1 ft.	5	27.0; 2 - 27.1; 2 - 27.2	80.8

KEITH 1520-1550

LOCATION	HEIGHT	TT	TT_w
Lagoon side, on open ridge at upper end of beach, about 20 yds. from water	5 ft.	83.0	74.0
Among coconut trees, 50 yds. NW of tent, 10 yds. from open lagoon beach	5 ft.	81.5	72.0
Among Pisonia, ocean side of path, 150 yds. WNW of tent, halfway between ocean beach and path	5 ft.	87.0	75.0
At upper edge of ocean beach, about 10 yds. from water	5 ft.	84.0	75.0

* Underlined values show number of observations at same temperature reading. Thus: 3 - 26.4 indicates 3 readings of 26.4°C.

KEITH, JANUARY 27

TIME	LOCATION	WATER DEPTH	NO. OF MEASUREMENTS	TT_s** (°C)
0730	Lagoon surface water	1-2 ft.	3	25.0
1420	Ocean side of reef, surface water	1 ft.	3	30.0

KEITH, JANUARY 28

TIME	LOCATION	WATER DEPTH	NO. OF MEASUREMENTS	TT_s** (°C)
1415	Lagoon, successive surface water readings out to 50 yards from shore	1-1½ ft.	6	28.5

** Readings constant within 0.5°C.

PLACE: KEITH

THREE-HOURLY OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958

TABLE 24

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	FF_3	DDFF	REMARKS
1/25	1200	--	--	----	----	--	2	2Cu........	--	E 8-10	
	1500	85.0	77.5	----	----	0	3	3Cu........	16	E 10-12	
	1800	82.0	76.5	----	----	0	4	4Cu;1Ci....	16	E 8-10	
	2100	80.0	76.0	----	----	0	6	3Cu;3Ac....	16	E 10-15	2100 moonlight.
1/26	0000	79.5	75.0	86.0	79.5	0	-	....	18	E 10-15	
	0300	79.0	74.0	----	----	0	-	....	14	E 10-15	
	0600	79.0	73.5	----	----	0	3	3Cu........	18	E 10-15	
	0900	80.0	73.0	----	----	0	8	4Cu;7Ci....	16	E 10-15	
	1200	83.5	75.0	83.5	78.5	0	4	4Cu;1Ci....	17	E 10-15	
	1500	83.0	74.5	----	----	0	8	4Cu;3Ac;4Ci	15	E 10-15	
	1800	80.5	74.0	----	----	0	4	3Cu;2Ci....	14	E 10-15	
	2100	80.0	73.5	----	----	0	4	4Cu........	14	E 10-12	2100 moonlight.
1/27	0000	79.0	73.5	84.0	79.0	0	-	....	18	E 10-15	
	0300	77.5	73.5	----	----	T	-	....	16	E 10-15	0255-0305 light shwr.
	0600	79.0	73.0	----	----	T	5	5Cu........	19	E 10-15	
	0900	80.0	73.5	----	----	0	3	2Cu;1Ci....	20	E 10-15	0900 towering Cu NE.
	1200	82.0	73.5	82.0	76.5	0	1	Cu,Sc,Ci..	25	NE 17*	
	1500	84.0	74.5	----	----	0	1	Cu,Ci.....	18	NE 17*	
	1800	81.0	73.0	----	----	0	8	(Cu);8Cs...	17	NE 17*	
	2100	79.0	72.0	----	----	0	2	....	17	NE 12	
1/28	0000	79.0	72.0	84.0	79.0	0	2	2Cu........	18	NE 15	
	0300	78.0	73.0	----	----	0	2	2Cu........	17	NE 15	
	0600	78.0	72.0	----	----	0	2	....	17	NE 10-12	
	0900	80.0	72.0	----	----	0	4	(Cu);4Cs...	16	NE 16*	
	1200	84.0	75.0	84.0	78.0	0	1	1Cu,Ci.....	15	NE 10*	
	1500	84.0	74.5	----	----	0	under 1	(Cu,Ci)....	17	NE 15*	
	1800	81.5	73.0	----	----	0	0	....	14	NE 12*	1800 two thin streaks Ci to N.
	2100	79.5	71.5	----	----	0	under 2	....	13	NE 8*	2100 sky at least .8 clear.
1/29	0000	79.0	73.5	85.5	79.0	0	2-4	Cu,Ci?....	14	NE 10	
	0300	78.5	73.5	----	----	0	-	....	15	NE 10	0300 some Cu.
	0600	78.0	74.0	----	----	0	-	....	13	NE 8-10	0600 some Cu.
	0900	80.0	74.5	----	----	0	3	3Cu........	13	NE 12*	
	1200	85.5	76.0	85.5	78.0	0	5	4Cu;2Ci....	11	E 8-10	
	1500	87.0	76.5	----	----	0	2	2Cu........	12	E 8-10	
	1800	83.0	76.0	----	----	0	4	4Cu;1Ci....	12	NE 6-8	
	2100	80.0	75.0	----	----	0	3	3Cu........	14	NE 10-12	2100 moonlight.
1/30	0000	80.0	75.0	87.0	80.0	0	6	6Cu........	16	NE 8-10	0000 moonlight.
	0300	77.5	74.5	----	----	0	-	....	11	NE 8-10	
	0600	78.0	75.0	----	----	0	-	....	14	NE 8-10	
	0900	80.0	73.5	----	----	0	7	2Cu;7Cs....	7	NE 8-10	
	1200	87.5	79.0	87.5	77.0	0	5	2Cu;4Ci....	7	NE 6-8	
	1500	88.5	78.0	----	----	0	4	1Cu;2Ac;2Ci	7	NE 6-8	
	1800	84.0	77.0	----	----	0	4	4Cu........	9	NE 8-10	

PLACE: KEITH

THREE-HOURLY OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958

TABLE 24
(Continued)

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	FF_3	DDFF	REMARKS
1/30	2100	81.0	76.5	----	----	0	5	3Cu;3Ci....	11	NE 10-12	2100 moonlight.
1/31	0000	80.5	76.5	89.0	80.5	0	-	....	13	E 10-15	0000 cloudy.
	0300	79.0	76.0	----	----	0	-	....	13	NE 8-10	0300 cloudy.
	0600	79.0	75.5	----	----	0	3	3Cu;1Ci....	11	NE 8-10	
	0900	81.0	76.5	----	----	0	3	3Cu........	12	E 8-10	
	1200	86.5	79.0	86.5	78.5	0	5	5Cu........	14	NE 11*	1200 Cu moving from NE. 1202-1204 shwrs. 1355-1356
	1500	87.5	80.5	----	----	T	8	8Cu........	12	NE 11*	shwrs. 1411-1414 shwrs. 1500 Cu moving from NE.
	1800	82.0	77.5	----	----	T	3	3Cu........	13	NE 10*	Rain to NW. 1506-1509 shwrs. 1800 cloud moving
	2100	79.5	75.5	----	----	0	3	3Cu........	15	NE 12*	from NE. 2100 cloud moving from NE.
2/1	0000	79.0	74.5	87.5	79.0	0	3	3Cu........	17	NE 14	0205-0210 shwrs.
	0300	78.0	75.5	----	----	0.06	0	(Cu).......	15	E 14	0300 rain to N.
	0600	77.5	75.0	----	----	T	3	3Cu........	15	E 10*	0600 cloud moving from NE. 0830-0840 shwrs.
	0900	78.0	76.5	----	----	T	8	3Cu;6Ac....	18	NE 11*	0900 rain to W. 0938-0944 shwr. 1011-1014 shwr.
	1200	84.0	75.5	84.0	75.5	0.04	3	2Cu;1Ac....	16	N 11*	1121-1126 rain.
	1500	85.0	75.5	----	----	0	0	0..........	14	NE 12*	
	1800	81.0	76.0	----	----	0	0	(Cu).......	17	NE 13*	
	2100	79.0	76.0	----	----	0	2	2Cu........	15	NE 13	2300-0800 intermittent shwrs.
2/2	0000	77.0	76.0	86.5	77.0	T	10	6Cu;2Ci;4Ac	17	NE 14	
	0300	75.0	72.5	----	----	0.04	10	10Cu.......	18	E 16	
	0600	79.0	75.0	----	----	0.08	10	10Cu.......	22	E 18*	0600 raining.
	0900	79.5	75.0	----	----	T	6	3Cu;2Ci;3Ac	23	E 21*	1155-1206 rain.
	1200	78.0	75.0	80.0	75.0	0.02	9	4Cu;5Ci;4Ac	22	NE 24*	1200 raining. 1235-1245 rain. 1315-1320 rain.
	1500	82.0	75.5	----	----	0.01	10	4Cu;10Cs...	20	NE 21*	
	1800	81.0	75.5	----	----	0	9	3Cu;5Ci;6Ac	23	NE 22*	
	2100	79.5	74.0	----	----	0	3	3Cu........	25	NE 19*	2100 moonlight.
2/3	0000	79.0	73.0	82.5	76.0	0	2	2Cu........	24	NE 20*	0000 moonlight.
	0300	79.0	73.0	----	----	0	3	3Cu........	19	NE 20*	0300 moonlight.
	0600	78.5	73.0	----	----	0	4	4Cu........	22	NE 20*	0630-0635 rain. 0655-0700 rain. 0725-0735 rain.
	0900	79.5	74.0	----	----	T	5	3Cu;3Ac....	18	NE 19*	0900 towering Cu to N. 1025-1038 rain.
	1200	82.0	75.5	82.0	77.0	0.02	5	3Cu;3Ci....	19	NE 16*	
	1500	82.5	75.0	----	----	0	2	1Cu;2Ac....	16	NE 14*	
	1800	81.0	75.0	----	----	0	8	3Cu;8Ac....	16	NE 14*	
	2100	79.5	74.0	----	----	0	4	1Cu;4Ci....	19	NE 10-15	2100 moonlight.
2/4	0000	79.0	74.0	83.5	79.0	0	3	3Cu........	17	NE 10-15	0000 moonlight.
	0300	79.0	74.5	----	----	0	-	....	13	NE 8-10	0300 cloudy. 0555-0615 rain.
	0600	79.5	74.0	----	----	T	10	3Cu;10Ac....	16	NE 15*	0600 light rain.
	0900	76.5	74.5	----	----	0.04	10	4Cu;2Ac;6Cs	13	NE 14*	0905-0910 shwr. 1150-1155 shwr.
	1200	79.0	76.0	80.5	79.0	T	10	2Cu;8As....	16	NE 12*	1417-1425 shwr.
	1500	81.5	77.0	----	----	T	6	2Cu;4As....	15	NE 14*	
	1800	80.5	77.5	----	----	0	10	Cu,Sc.....	14	NE 17*	1730-1800 rain SE moving toSW; Cu 5 mile distant.
	2100	79.5	75.5	----	----	T	4	4Cu........	18	NE 15*	1821-1828 shwr. 2100 bright moon.
2/5	0000	79.5	75.5	81.5	79.0	0	8	Cu,Sc.....	17	NE 17*	0000 somewhat gusty.
	0300	79.5	74.5	----	----	0	9	Cu,Sc.....	18	NE 15*	0300 somewhat gusty.
	0600	79.0	75.0	----	----	0	8	8Cu........	18	NE 15*	0600 gusty.
	0900	80.0	74.5	----	----	0	6	6Cu........	18	NE 15*	0900 gusty.

PLACE: KEITH   THREE-HOURLY OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958   TABLE 24 (Concluded)

Date and Time		TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	FF_3	DDFF	REMARKS
2/5	1200	83.5	74.0	83.5	78.5	0	1	1Cu.........	17	NE 15*	
	1500	85.0	75.0	----	----	0	2	2Cu.........	19	NE 15*	
	1800	82.0	74.0	----	----	0	3	3Cu.........	17	NE 13*	
	2100	79.0	72.5	----	----	0	3	3Cu.........	17	NE 15*	
2/6	0000	78.0	72.0	85.0	78.0	0	2	2Cu.........	15	NE 14*	
	0300	78.0	70.0	----	----	0	0	....	16	NE 10*	0300 bright moonlight. 0450 rain. 0540-0612
	0600	75.0	72.5	----	----	0.04	10	10Sc........	13	NE 9*	intermittent rain. 0625 rain began.
	0900	79.0	72.5	----	----	0.01	10	Cu,Sc......	13	NE 15*	
	1200	82.5	74.0	82.5	75.0	0	5	3Cu;3Ac.....	14	NE 10*	
	1500	81.5	72.0	----	----	0	0	0..........	16	NE 15*	
	1800	81.0	72.5	----	----	0	0	0..........	14	NE 12*	
	2100	79.0	72.0	----	----	0	0	0..........	14	NE 14*	
2/7	0000	78.5	72.5	82.5	78.5	0	5	5Cu;4Ci.....	16	NE 19*	
	0300	78.0	72.0	----	----	0	5	5Cu.........	16	NE 17*	0510 brief shwr.
	0600	78.0	72.5	----	----	T	8	8Cu.........	16	NE 14*	0510-0530 gusty.
	0900	78.0	72.0	----	----	0	0	(Cu)........	18	NE 14*	
	1200	83.0	75.0	83.0	77.5	0	3	3Cu.........	15	NE 14*	
	1500	84.0	75.0	----	----	0	3	3Cu.........	17	NE 14*	
	1800	81.0	74.0	----	----	0	3	3Cu.........	13	NE 14*	
	2100	78.5	74.0	----	----	0	0	0..........	14	NE 10*	
2/8	0000	78.5	73.0	86.0	78.5	0	5	5Cu.........	15	NE 12*	
	0300	78.0	72.0	----	----	0	5	5Cu.........	14	NE 10*	
	0600	78.0	72.0	----	----	0	9	7Cu;4Ci.....	17	NE 12*	
	0900	82.0	74.0	----	----	0	5	1Cu;5Ci.....	13	NE 14*	

PLACE: KEITH HOURLY RELATIVE HUMIDITIES, JANUARY 25 - FEBRUARY 8, 1958* TABLE 25

HOUR:	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
DATE																								
1/25															72	--	--	78	--	--	83	--	--	81
1/26	--	--	80	--	--	77	--	--	72	--	--	68	--	--	67	--	--	74	--	--	74	--	--	77
1/27	--	--	83	--	--	75	--	--	74	--	--	67	--	--	64	--	--	68	--	--	71	--	--	71
1/28	--	--	79	--	--	75	--	--	68	--	--	66	--	--	64	--	--	67	--	--	68	--	--	77
1/29	--	--	79	--	--	83	--	--	78	--	--	65	--	--	62	--	--	73	--	--	79	--	--	79
1/30	--	--	87	--	--	87	--	--	74	--	--	69	--	--	63	--	--	73	--	--	82	--	--	84
1/31	--	--	87	--	--	85	--	--	82	--	--	72	71	70	74	70	74	82	85	84	83	85	86	81
2/1	85	92	90	89	89	89	85	86	94	90	86	68	62	64	65	70	76	80	84	86	87	90	91	96
2/2	90	90	88	92	90	83	83	82	82	84	92	87	88	80	74	74	81	78	85	86	78	79	76	75
2/3	75	75	75	76	76	77	79	78	78	76	82	74	77	77	71	75	75	76	79	78	78	80	80	79
2/4	80	80	82	80	79	78	98	92	91	92	90	87	86	82	81	86	86	87	91	88	89	89	89	89
2/5	90	91	80	81	82	83	82	81	77	74	70	64	64	64	63	64	66	69	74	73	73	72	76	75
2/6	77	70	67	74	86	88	86	80	74	73	72	67	68	68	63	--	--	67	--	--	71	--	--	75
2/7	--	--	75	--	--	77	--	--	75	--	--	69	--	--	66	--	--	72	--	--	81	--	--	77
2/8	--	--	75	--	--	75	--	--	69															

* Because of malfunctioning of the hygrothermograph, the hourly record is incomplete as shown.

PLACE: MACK DAILY OBSERVATIONS, JANUARY 25 - FEBRUARY 8, 1958 TABLE 26

DATE	TIME	TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	DDFF	SEA (Code)
1/25	1200	81.0	---	----	----	0	3	1Cu;2Ci.....	E 18-22	1
1/26	1200	80.0	---	81.0	78.5	0	1	1Cu;(Ci)....	NE 14-16	2
1/27	1200	79.5	---	80.5	76.0	0	1	1Cu;(Ac)....	NE 17-20	2
1/28	1200	80.5	---	80.5	78.0	T	7	6Cu;2Ci.....	NE 16	2
1/29	1150	80.0	---	81.0	78.0	0	5	5Cu;1Ci.....	NE 13-16	1
1/30	1200	79.5	---	80.5	74.0	0	4	(Cu);4CsCc..	E 5-7	1
1/31	1210	83.5	76.5	83.5	79.0	T	-	------------	----	---
2/1	1200	81.0	73.5	81.5	78.0	0.09	1	1Cu.........	NE 18-20	3
2/2	1200	81.0	74.5	81.0	75.5	0.75	10	10Cu,Sc.....	NE 20-25	4
2/3	1200	80.5	74.5	80.5	74.5	0.01	4	3Cu;2Ac.....	NE 18	3
2/4	1200	78.5	75.0	80.0	73.5	0.09	10	10Cu;(Ci)...	NE 12	2
2/5	1200	80.5	76.0	80.5	80.0?	0.01	2	2Cu.........	NE 18	2
2/6	1200	80.5	73.0	81.0	77.0	0	3	1Cu;3Ac.....	NE 14	2
2/7	1200	80.5	72.5	80.5	77.0	0	1	1Cu;1Ci.....	NE 13	2
2/8	0930	80.0	---	80.0	78.0	0	5	4Cu;1Ac;4Ci.	NE 12-15	1

REMARKS

1/25 Rainfall value covers period since 1400, 1/2/58.

1/26 Sea: Almost 2. Whitecaps barely forming.

1/27 Sea slight with whitecaps and with swells 4 feet.

1/28 Whitecaps barely forming.

1/29 Sea gentle, no whitecaps.

1/30 Banded Cc about 50° above SE horizon.

2/2 Wind seems to be increasing.

2/5 Sunny.

PLACE: MACK

BI-HOURLY TEMPERATURES AND RELATIVE HUMIDITIES, FEBRUARY 1 - 8, 1958

TABLE 27

HOUR:	0200		0400		0600		0800		1000		1200		1400		1600		1800		2000		2200		2400	
	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH	TT	RH
DATE																								
2/1											81	68	81	75	81	76	81	75	80	76	80	80	78	82
2/2	79*	83	78	83	80	75	80	75	80**	76	81	72	80	78	80	78	80	75	80	76	79	76	79	77
2/3	79	75	79	76	79	79	77***	78	79	78	79	80	80	75	80	75	80	78	80	78	79	80	79	78
2/4	79	77	79	79	79	81	74	88	76	82	78	83	79	83	76	85	80	82	80	79	80	81	80	83
2/5	80	80	79	81	79	76	79	78	80	77	80	72	80	75	80	75	80	78	79	75	79	75	79	72
2/6	78	70	78	78	77	78	79	76	79	71	79	75	79	70	79	74	80	65	79	74	79	76	78	77
2/7	78	80	78	80	78	79	79	70	80	75	80	72	79	78	79	82	79	79	79	81	79	80	79	79
2/8	79	78	79	77	78	76	79	76	80	76														

* Immediately after 0200, 2/2, temperature dropped sharply to 76°.

** Just before 1100, 2/2, temperature dropped sharply to 75°.

*** Just after 0700, 2/3, temperature was 76°.

PLACE: ELMER DAILY OBSERVATIONS, JANUARY 26 - FEBRUARY 7, 1958 <u>TABLE 28</u>

DATE	TIME	TT	TT_w	T_xT_x	T_nT_n	RR	N	C_{LMH}	DDFF
1/26	0900	81.0	74.0	85.0	69.0?	0	1	1Cu;(Ci).......	NE 10-12
1/27	1200	----	----	----	----	0	-	2Cu;4Ac.........	NE 8-10
1/28	1200	----	----	83.5	79.0	0	4	3Cu;1Ci.........	NE 8-10
1/29	1330	86.0	----	86.0	78.0	0	0	(Cu);(Ci)......	E 6-8
1/30	1200	86.5	----	87.5	76.0	0	4	2Cu;2Ac;1Ci....	NE 6
1/31	1200	85.0	----	90.5	78.0	0	5	5Cu............	NE 8-10
2/1	1200	85.0	75.0	88.0	76.0	0.09	0	(Cu)...........	E 12-15
2/2	1200	81.0	76.0	86.5	74.0	0.26	10	10Cu...........	E 15-18
2/3	1200	82.0	75.0	82.5	73.0	0.01	5	5Cu;1Ac.........	NE 8-12
2/4	1200	82.0	76.0	83.0	74.5	0.03	5	2Cu;3Ac;3Cc,Ci.	NE 8-10
2/5	1200	86.0	76.5	84.5	78.0	0.04	2	2Cu............	E 12
2/6	1215	82.0	73.0	86.5	77.0	T	8	3Cu;5Sc.........	NE 10
2/7	1320	84.5	74.5	85.0	75.0	0	3	3Cu............	NE 12

REMARKS

1/29	1330	Clear.
2/1	1200	Some cumulus on horizon. Towering cumulus on western horizon. Shwrs. from 0830-0840; 0915-0925. Brief intense shwr. about 0045.
2/2	1200	Rain at the following times: 2/1 2130-2145; 2330-2340. 2/2 0115-0200; 0245-0305; 0925-0945; 1130-1135; 1235-1245.
2/6	1215	Cloudy and bright. W-N horizon cloudless.

PLACE: JANET AND YVONNE

TABLE 29

DAILY RAINFALL, JANUARY 25 - FEBRUARY 8, 1958

DATE	TIME	RR JANET	TIME	RR YVONNE	REMARKS
1/25	0730	0*	1600	0*	* JANET total since 0730, 1/24; YVONNE total since 1652, 1/24/58.
1/26	1000	0	----	0	
1/27	0930	0	1600	0	
1/28	0730	0	1650	0	
1/29	0730	0	1640	0	
1/30	0730	0.36	1630	0	
1/31	0730	0.01	1650	T	
2/1	0730	0.05	1630	0.05	
2/2	----	**	***	0.20	** Amount included in next total.
2/3	0730	0.17	***	0.15	
2/4	0730	0	***	0.17	
2/5	0730	0.13	***	0.05	
2/6	0700	0	***	T	
2/7	0730	0	***	0	
2/8	0730	0	***	0	

*** About 1630

PLACE: EIMER-MACK LAGOON TRAVERSES, JANUARY 25 - FEBRUARY 7, 1958 TABLE 30

DATE	ZONE	TIME	TT_s	TIME	TT	TT_w	REMARKS
1/25		1031					Departed EIMER.
	1	1035	80.5*				Edge of deep water.
	2	1040	80.5*				Near stern of grounded barge.
	2	1056	80.5*				Off buoy "A".
	3	1115	80.5*				
	4	1135	80.5*				
	5	1150	81.0*				On outward trip, boat bore westerly, then northeasterly toward MACK; on return trip, it bore easterly and approached EIMER from NE.
		1155					Arrived MACK.
		1237					Departed MACK.
	5	1240	81.0*				
	4	1300	80.5*				
	3	1320	81.0*				
	2	1330	81.0*				Buoy "B".
	2	1350	80.5*				
	1	1402	80.5*				Edge of deep water.
		1405					Arrived EIMER.
1/26		1015					Departed EIMER.
	1	1017	80.5*				Edge of deep water.
	2	1038	80.5*				Off buoy "A".
	3	1057	80.5*				Near black unmarked buoy.
	4	1117	80.5*				
	5	1137	80.5*				300 yards from MACK.
		1142					Arrived MACK.
		1225					Departed MACK.
	5	1245	80.5*				
	4	1305	80.5*				
	3	1320	80.5*				
	2	1340	80.5*				300 yards from cement barge, near buoy "6".
	1	1347	80.5*				Edge of shallow water.
		1350					Arrived EIMER.
1/27		1024					Departed EIMER.
	1	1026	81.0*				Edge of deep water.
	2	1046	81.0*	1045	76.0		Buoy "A" 300 yards leeward and rear.
	3	1106	81.0*	1105	78.0		Buoy "11" 300 yards windward and rear.
	4	1126	81.0*	1125	77.0		OSCAR tower one mile windward.
	5	1146	81.0*	1145	79.0		MACK dead ahead 300 yards.
		1152					Arrived MACK.
		1243					Departed MACK.
	5	1245	81.0*	1244	77.0		200 yards off MACK.
	4	1305	81.0*	1304	79.0		OSCAR tower one mile.
	3	1325	81.0*	1324	79.5		
	2	1345	81.0*	1344	80.5		
	2	1405	81.0*	1404	80.5		
	1	1420	81.0*	1419	77.0		Edge of deep water.
		1425					Arrived EIMER.
1/28		1020					Departed EIMER.
	1	1024	81.0*	1023	81.0		Edge of deep water.
	2	1045	81.0*	1044	80.5		
	3	1104	81.0*	1103	80.0		Off buoy "11".
	4	1125	81.0*	1124	81.0		One mile W OSCAR tower.
	5	1142	81.0*	1141	80.0		200 yards off MACK.
		1148					Arrived MACK.
		1246					Departed MACK.
	5	1248	81.0*	1247	82.0		200 yards off MACK.

PLACE: ELMER-MACK LAGOON TRAVERSES, JANUARY 25 - FEBRUARY 7, 1958 TABLE 30 (Continued)

DATE	ZONE	TIME	TT_s	TIME	TT	TT_w	REMARKS
1/28	4	1312	81.0*	1311	81.5		One mile W OSCAR tower.
	3	1333	80.5*	1332	80.5		Buoy "11".
	2	1353	80.5*	1352	80.0		Buoy "A".
	1	1415	81.0*	1414	81.5		Edge of deep water.
		1420					Arrived ELMER.
1/29		1017					Departed ELMER.
	1	1020	81.7	1019	84.0		Edge of deep water.
	2	1042	81.3	1041	80.5		Four minutes past red buoy.
	3	1104	81.1	1103	81.0		
	4	1124	80.8	1123	81.0		
	5	1136	81.1	1135	80.5		200 yards off MACK.
		1140					Arrived MACK.
		1235					Departed MACK.
	5	1237	81.3	1236	82.0		200 yards off MACK.
	4	1258	81.3	1257	82.0		
	3	1317	81.1	1316	81.0		
	2	1338	81.1	1337	81.0		
	2	1400	81.1	1359	82.0		Buoy "8".
	1	1411	81.3	1410	82.0		Edge of shallow water.
		1415					Arrived ELMER.
1/30		1017					Departed ELMER.
	1	1020	81.5	1019	81.5	77.0	Edge of deep water.
	2	1040	81.5	1039	80.5	77.0	200 yards east of buoy.
	3	1100	80.6	1059	81.5	78.0	
	4	1120	80.6	1119	81.5	77.0	
		1137					Arrived MACK.
		1236					Departed MACK.
	5	1238	82.4	1237	81.5	78.0	200 yards off MACK.
	4	1300	81.5	1259	80.5	78.0	It was noted upon leaving MACK at 1236 that a mass of low cumulus had appeared and was moving in from SE. This Cu was not visible at 1200 from MACK. This Cu passed overhead and disappeared to NW by 1330.
	3	1320	81.5	1319	80.5	77.0	
	2	1340	81.5	1339	80.5	78.0	
	1	1357	81.5	1356	81.5	76.0	Edge of shallow water.
		1401					Arrived ELMER.
1/31		1002					Departed ELMER.
	1	1002	81.0*	1005	84.0	76.0	Edge of deep water.
	2	1021	81.0*	1024	82.5	76.0	Buoy "A".
	3	1040	81.0*	1044	82.0	76.0	Buoy "11".
	4	1059	81.0*	1102	82.5	76.0	1000 yards SE of OSCAR.
	5	1118	81.0*	1120	84.0	77.5	MACK.
				1120	83.5	76.5	MACK.
		1120					Arrived MACK.
		1215					Departed MACK.
	5	1218	81.0*	1220	82.5	77.0	200 yards off MACK.
	4	1238	81.0*	1240	83.5	77.5	2500 yards SE OSCAR.
	3	1257	81.0*	1300	82.5	77.0	700 yards S of buoy "11".
	2	1317	81.0*	1320	82.5	77.0	400 yards S of buoy "A".
	1	1340	81.5*	1342	83.5	77.0	Edge of deep water.
		1345					Arrived ELMER.
2/1		1017					Departed ELMER.
	1	1020	81.0*	1024	81.5	74.5	Edge of deep water. Light rain from 1020 to 1050. Sun out at 1055. During rain period 9Cu; state of sea 2.
	2	1040	81.0*	1043	80.0	75.5	150 yards N buoy "A".
	3	1058	80.0*	1103	79.0	75.0	Buoy "11".

PLACE: ELMER-MACK LAGOON TRAVERSES, JANUARY 25 - FEBRUARY 7, 1958 TABLE 30 (Continued)

DATE	ZONE	TIME	TT_s	TIME	TT	TT_w	REMARKS
2/1	4	1119	80.0*	1123	80.0	75.0	2000 yards S of OSCAR.
	5	1134	80.0*	1135	80.0	75.5	200 yards off MACK.
		1140					Arrived MACK.
		1248					Departed MACK.
	5	1250	80.5*	1254	81.0	74.0	200 yards off MACK.
	4	1310	80.0*	1312	81.0	74.0	2500 yards S of OSCAR.
	3	1333	80.5*	1335	81.0	74.0	Buoy "11".
	2	1355	81.0*	1358	80.5	74.0	Buoy "A".
	2	1413	81.0*	1415	80.5	73.5	Cement barge.
	1	1420	81.0*	1420	81.5	73.0	Edge of shallow water.
		1425					Arrived ELMER.
2/2		1014					Departed ELMER.
	1	1015	80.0*	1016	78.0	75.5	Edge of deep water.
	2	1030	80.0*	1029	79.0	76.0	Black buoy "7".
	3	1050	80.0*	1049	80.0	76.0	
	4	1110	80.0*	1109	79.5	75.0	
	5	1130	80.0*	1129	80.5	75.0	
		1140					Arrived MACK.
		1225					Departed MACK.
	5	1225	80.5*	1226	84.0	76.0	At MACK.
	4	1245	80.5*	1244	82.0	76.0	
	4	1305	80.0*	1304	81.0	75.5	
	3	1325	80.0*	1324	81.0	75.5	
	2	1345	80.0*	1344	80.0	76.5	
	1	1357	80.5*	1356	81.0	76.0	Edge of shallow water.
		1400					Arrived ELMER.
2/3		1016					Departed ELMER.
	1	1019	80.0*	1018	80.0	73.5	Edge of deep water.
	2	1040	80.0*	1039	79.5	75.5	Eleven minutes beyond buoy "8".
	3	1100	80.0*	1059	78.5	75.5	
	4	1119	80.0*	1118	78.0	73.5	
	5	1141	80.0*	1140	78.5	74.0	200 yards from MACK.
		1145					Arrived MACK.
		1240					Departed MACK.
	5	1243	80.0*	1242	80.0	75.5	200 yards from MACK.
	4	1305	80.0*	1304	80.5	75.0	
	3	1325	80.0*	1324	80.5	75.5	
	2	1347	80.0*	1346	80.5	75.0	
	2	1405	80.5*	1404	81.0	75.0	
	1	1418	80.0*	1417	81.0	75.0	Edge of deep water.
		1421					Arrived ELMER.
2/4		1023					Departed ELMER.
	1	1025	80.0*	1026	79.0	75.5	Edge of blue water.
	2	1045	80.0*	1047	79.0	75.5	200 yards N of buoy "A".
	3	1103	80.0*	1105	79.0	75.5	300 yards N of buoy "11".
	4	1125	80.0*	1128	79.0	75.5	1500 yards S of OSCAR.
	5	1138	80.0*	1140	80.0	75.5	200 yards off MACK. Rain shwr. at MACK from 1140 to 1150.
		1145					Arrived MACK.
		1245					Departed MACK.
	5	1248	81.0*	1250	80.0	76.0	100 yards off MACK. Rain shwr. from 1240 to 1250.
	4	1309	81.0*	1310	80.5	76.5	2500 yards SW of OSCAR.
	3	1326	81.0*	1328	80.5	76.0	500 yards NE of buoy "11".
	2	1345	80.0*	1346	79.5	76.0	300 yards NE of buoy "A".
	1	1405	80.0*	1405	79.0	75.0	Edge of blue water.
		1408					Arrived ELMER.

PLACE: ELMER-MACK LAGOON TRAVERSES, JANUARY 25 - FEBRUARY 7, 1958

TABLE 30
(Concluded)

DATE	ZONE	TIME	TT_S	TIME	TT	TT_W	REMARKS
2/5		1010					Departed ELMER.
	1	1014	80.0*	1014	82.0	75.0	Edge blue water.
	2	1031	80.0*	1033	81.0	75.0	Buoy "A".
	3	1048	80.0*	1049	81.0	75.0	Buoy "11".
	4	1105	80.0*	1106	80.5	75.0	2000 yards S. of OSCAR.
	5	1120	80.0*	1121	81.0	74.0	150 yards S. of MACK.
		1130					Arrived MACK.
		1228					Departed MACK.
	5	1230	80.0*	1231	80.5	74.5	150 yards S. of MACK.
	4	1248	80.0*	1250	80.0	74.5	3 Miles S. of OSCAR.
	3	1305	80.0*	1307	80.0	74.0	Buoy "11".
	2	1323	80.0*	1325	80.0	74.5	Buoy "A".
	1	1342	80.0*	1342	82.0	74.0	Edge of blue water.
		1344					Arrived ELMER.
2/6		1014					Departed ELMER.
	1	1016	80.0*	1016	80.0	72.5	Edge of deep water.
	3	1036	80.0*	1036	80.5	73.0	Off buoy "11".
	4	1056	80.0*	1056	80.0	71.5	
	4	1115	80.0*	1115	80.0	72.5	7 minutes SW of OSCAR.
	5	1140	80.0*	1140	79.5	72.5	200 yards off MACK.
		1145					Arrived MACK.
		1241					Departed MACK.
	5	1244	81.0*	1244	83.0	74.5	200 yards off MACK. Rain 1259-1301.
	4	1303	80.5*	1303	82.5	74.5	1 mile WSW of OSCAR.
	3	1323	80.5*	1323	82.5	73.5	
	3	1344	80.0*	1344	83.0	72.0	Off buoy "11".
	1	1410	80.0*	1410	83.0	73.5	Edge of deep water.
		1412					Arrived ELMER.
2/7		1016					Departed ELMER.
	1	1019	80.0*	1019	81.0	73.0	Edge deep water.
	2	1038	80.0*	1038	81.0	73.5	Off buoy "8".
	3	1059	80.0*	1059	80.5	73.0	
	4	1120	80.0*	1120	80.5	73.0	1 mile W of OSCAR.
	5	1136	80.0*	1136	80.5	73.5	200 yards off MACK.
		1139					Arrived MACK.
		1225					Departed MACK.
	5	1227	81.0*	1227	81.5	74.0	200 yards off MACK.
	4	1247	80.5*	1247	82.0	74.0	1 mile off OSCAR.
	3	1307	80.5*	1307	82.5	74.0	
	2	1328	80.5*	1328	82.0	74.5	100 yards N of buoy "10".
	1	1345	80.0*	1345	83.0	74.5	Edge of deep water.
		1348					Arrived ELMER.

PLACE: BETWEEN BRUCE, KEITH, ELMER

TABLE 31

LAGOON TRAVERSES, FEBRUARY, 1958

Traverse No. 1, BRUCE-KEITH

DATE	TIME	TT_s	TIME	TT	TT_w	REMARKS
1st	1010					Departed BRUCE.
	1012	80.0*	1014	80.5	75.0	Edge of deep water at BRUCE.
	1030	80.5*	1035	80.5	75.0	
	1040	80.5*	1042	80.0	75.0	10 yards off buoy "B".
	1100	80.5*	1103	79.0	75.0	Immediately after light rain shwr.
	1120	80.5*	1123	81.0	75.5	
	1139	80.5*	1141	81.5	76.0	
	1155	80.5*	1157	83.0	75.5	
	1202	80.5*	1204	80.5	74.5	Edge of deep water at KEITH.

Traverse No. 2, BRUCE-KEITH-ELMER

DATE	TIME	TT_s	TIME	TT	TT_w	REMARKS
7th	0934	79.0*	0934	80.5	73.0	15 yards off BRUCE. Departing for KEITH.
	0937	79.5*	0937	80.5	73.0	Edge of deep water.
	0957	80.0*	0957	81.5	74.5	
	1017	80.0*	1017	80.5	73.0	
	1037	80.0*	1037	80.5	73.5	
	1057	80.0*	1057	80.0	72.5	
	1114	80.0*	1114	81.0	74.0	Edge of deep water.
	1116	79.5*	1116	81.0	73.0	Between buoys.
	1117					At KEITH departing for ELMER.
	1137	80.0*	1137	81.0	73.5	
	1157	80.0*	1157	81.0	73.5	
	1217	80.0*	1217	81.5	74.0	
	1237	80.0*	1237	81.0	74.0	
	1258	80.5*	1258	81.5	74.0	Edge deep water off ELMER.
	1300					Arrived ELMER.

PLACE: LAGOON-OCEAN

TABLE 32

LAGOON-OCEAN TRAVERSE, FEBRUARY, 1958

DATE	TIME	TT_s	TIME	TT	TT_w	REMARKS
6th	0850					Departed FRED.
	0854	80.0*		80.5	74.5	Edge of deep water.
	0908	80.0*		80.0	73.5	Between channel marker buoys in the South Channel.
	0915	80.0*		80.0	74.0	Outside, end of five minute run on Course 190° magnetic.
	0926	80.0*		80.0	74.0	Outside, end of ten minute run around west side of the reef.
	0938	80.0*		80.0	74.5	Outside, off KEITH.
	0950	80.0*		80.5	74.5	Outside, NW of KEITH.
	1004	80.0*		80.0	74.5	Outside, off KEITH.
	1016	80.0*		79.5	74.0	Outside, between KEITH and South Channel.
	1039	80.0*		81.0	74.5	Between channel marker buoys in the South Channel.
	1058	80.0*		80.0	72.0	Off FRED (northern end) approximately one mile in lagoon.
	1108	80.0*		81.0	73.0	Edge of deep water off ELMER by the personnel pier.
	1115					Arrived ELMER. Water temperatures outside the lagoon were a little over 80.0 and inside were a little under 80.0°F.

Part D. Observational Data for Extensive Phase

(September, 1957 -- August, 1958)

NOTES: TABLES 33-38

For comments regarding raingage locations and relative accuracy of Gages 1 and 2 on FRED, see General Notes, p. 28. For comments regarding bias of raingage readings on MACK, see Notes for Table 10, p. 44.

In general, all rainfall observations in these Tables are correct to 0.01 inch. Times are correct within 10 minutes, except that the 0000 time for rainfall observations at FRED is correct within 3 minutes.

PLACE: FRED

TABLE 33

DAILY RAINFALL ENIWETOK

	1957					1958							
	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST
1	0.06	0.02	0.02	0.15	0.01	0.22	0.04	T	T	1.57	0.01	0.01	T
2	0.01	0.04	T	0.21	0.05	0.36	0.05	1.03	0.28	0.14	0.02	0.01	T
3	0.05	0.08	T	0.12	T	0.03	T	0.01	0.05	T	T	0.30	T
4	0	0.54	0.28	0.01	0.01	0.03	T	T	T	0.07	0.05	0.45	0
5	0.14	0.12	0.16	2.37	0.96	0	T	0.08	0.07	T	0.13	0.30	T
6	T	0	0	0.15	0	0.05	T	T	T	0	0.02	0.01	0.06
7	0.05	T	0.08	0.02	0.02	T	T	T	T	0	0.06	T	T
8	0.19	1.30	0	0.26	0.03	0.05	0	0.08	0.01	T	0	0.02	0.45
9	0	T	T	0.02	1.04	0.06	0.02	0.11	T	T	T	0.09	0.19
10	0	0.30	0.89	0.08	0	0.19	0	0.05	0.57	T	T	0.11	0.68
11	0.01	T	T	0.18	T	0	0.02	T	0.12	0.10	T	0.23	1.32
12	0	0.15	3.04	1.78	T	0	0.01	0.03	T	0	1.21	T	0.29
13	0.14	T	0.02	5.28	T	0.01	0	T	0	0.06	0.05	1.16	0.02
14	0.35	0.08	0.30	T	T	0.12	0	0.06	0.06	0	T	0.44	T
15	1.50	0.11	0.54	0.06	0.01	T	0.31	0	0.39	0	0.24	1.09	1.06
16	0.02	0.01	0.02	0	0.06	T	0	0	0.02	0	0.01	2.52	0.67
17	0.15	0	0.03	0	T	0.02	T	0	T	0.27	0	T	0.27
18	0	0.03	0.14	0.90	T	T	0	T	0.05	T	T	2.61	0.08
19	0	T	0.15	T	0.05	0	T	0.05	0.08	0.18	T	0.13	0.14
20	0	0.25	0	0.01	0.25	T	0	T	0.01	T	T	T	0.61
21	0.15	T	0.02	0	0	0.63	T	0.13	0.01	T	T	0.81	0.41
22	0.01	T	0	0.02	0	0.10	0	0	0.07	0	T	4.43	T
23	0.41	0	0.79	0.08	0	0	0	0	0.23	T	T	0.31	0.94
24	0.05	0.15	0.11	0.14	0	0	T	0	T	0.01	0.26	T	0.09
25	0	T	0.13	0.12	0	T	0.01	T	T	0	0.09	0.01	0.02
26	0.02	0.01	0.79	0.08	0.01	0	0	0	0	0	0.05	0.21	0.12
27	0.50	0.01	0.31	0.06	0	0	0	T	T	T	T	0	0.01
28	0	0.32	0	0.01	0.04	T	0	0	0	T	0.23	T	0.13
29	0.01	0.10	0.34	0.01	T	0		0.01	0	0.02	0.06	0	0.12
30	0.32	0.10	0.06	0.20	0.05	0		T	0.03	0.22	0.05	0.10	0.02
31	0.06		T		0.04	T		0.08		0.75		T	0.12
MONTHLY TOTAL	4.28	3.72	8.22	12.32	2.63	1.87	0.46	1.72	2.05	3.39	2.54	15.35	7.82

PLACE: FRED

COMPARATIVE RAINFALL OBSERVATIONS, AUGUST, 1957 - JANUARY, 1958

TABLE 34

DATE OF READING	TIME OF GAGE #1 READING	GAGE #1	GAGE #2**
8/18/57	1215	0	0
8/19	1200	0	0
8/20	1200	0	0
8/21	1200	0.15	0.15
8/22	1200	0.15	0.01
8/23	1200	0.05	0.41
8/24	1200	0.50	0.05
8/25	1200	0	0
8/26	1200	0.01	0.02
8/27	1200	0.52	0.50
8/28	1200	0.55	0
8/29	1200	0.01	0.01
8/30	1200	0.35	0.32
8/31	----	0.35	0.06
9/1	0904	0***	0.02
9/2	0900	0	T
9/3	0900	0	T
9/4	0900	0.69	0.54
9/5	0900	0.60	0.12
9/6	0855	0.80	0
9/7	0900	0	T
9/8	0900	1.00	1.30
9/9	0900	0.50	T
9/10	0900	0.23	0.30
9/11	0850	T	T
9/12	0900	0.17	0.15
9/13	0900	T	T
9/14	0900	T	0.08
9/15	0900	0.20	0.11
9/16	0910	0.11	0.01
9/17	1000	T	0
9/18	0915	0	0.03
9/19	0910	0.81	T
9/20	0900	0.30	0.25
9/21	0900	0.01	T
9/22	0920	0.01	T
9/23	0905	T	0
9/24	0915	0.15	0.15
9/25	0900	0.01	T
9/26	1300	0.01	0.01
9/27	0900	0	0.01
9/28	0900	0.03	0.32
9/29	0905	0.41	0.10
9/30	1040	0.12	0.10
10/1	0905	0.06	0.02
10/2	0900	0	T
10/3	0900	T	T
10/4	0900	0.12	0.28
10/5	Break in record, Gage #1		
11/1	1300	0.03	0.15
11/2	0900	0.20	0.21
11/3	1030	0.15	0.12
11/4	0855	0.10	0.01
11/5	0855	0.37	2.37
11/6	----	*	0.15
11/7	0900	1.97	0.02
11/8	0855	0.25	0.26
11/9	----	*	0.02
11/10	0925	0.05	0.08
11/11	0930	0.10	0.18

DATE OF READING	TIME OF GAGE #1 READING	GAGE #1	GAGE #2**
11/12/57	0900	1.80	1.78
11/13	0855	0.16	5.28
11/14	0925	1.96	T
11/15	0900	0.05	0.06
11/16	0905	T	0
11/17	----	*	0
11/18	----	*	0.90
11/19	0906	3.68	T
11/20	0900	0.02	0.01
11/21	0900	0	0
11/22	0900	0	0.02
11/23	1600	0.03	0.08
11/24	1600	0.25	0.14
11/25	0900	1.04	0.12
11/26	0900	0.06	0.08
11/27	0900	0.30	0.06
11/28	0900	T	0.01
11/29	0855	0.02	0.01
11/30	1800	0.25	0.20
12/1	0930	0.01	0.01
12/2	0855	0.06	0.05
12/3	0905	T	T
12/4	0858	T	0.01
12/5	0930	0.73	0.96
12/6	----	*	0
12/7	1100	0.02	0.02
12/8	----	*	0.03
12/9	0900	0.81	1.04
12/10	0900	0.23	0
12/11	----	*	T
12/12	0900	T	T
12/13	0900	0	T
12/14	0900	T	T
12/15	----	*	0.01
12/16	0900	T	0.06
12/17	0900	0.06	T
12/18	0900	T	T
12/19	0900	0.05	0.05
12/20	0900	T	0.25
12/21	0855	0	0
12/22	Break in record, Gage #1		
1/1/58	0900	0.26	0.22
1/2	0900	0.15	0.36
1/3	0900	0.21	0.03
1/4	0900	0.06	0.03
1/5	0900	0	0
1/6	0900	0	0.05
1/7	0900	0.05	T
1/8	0900	T	0.05
1/9	0900	0.03	0.06
1/10	0900	0.06	0.19
1/11	0900	0.19	0
1/12	0900	0	0
1/13	0900	0	0.01
1/14	0900	0.04	0.12
1/15	0900	0.09	T
1/16	0900	T	T
1/17	0900	0.02	0.02
1/18	0900	T	T

PLACE: FRED

COMPARATIVE RAINFALL OBSERVATIONS,
AUGUST, 1957 - JANUARY, 1958

TABLE 34
(Concluded)

DATE OF READING	TIME OF GAGE #1 READING	GAGE #1	GAGE #2**
1/19/58	0900	0	0
1/20	0900	T	T
1/21	0900	0.01	0.63
1/22	0900	0.64	0.10
1/23	0900	0.06	0
1/24	0900	0	0
1/25	0900	T	T
1/26	0900	0	0
1/27	0900	0	0
1/28	0900	0.01	T
1/29	0900	0	0
1/30	0900	0	0
1/31	0900	0	T

* Amount included in next total.

** 24 hour rainfall ending 2400 (180th meridian) on the date shown.

*** Not measured but believed to be zero.

PLACE: BRUCE, KEITH, MACK

OCCASIONAL RAINFALL OBSERVATIONS,
SEPTEMBER, 1957 - AUGUST, 1958

TABLE 35

BRUCE				KEITH			MACK		
DATE	TIME	RR_L*	RR_O*	DATE	TIME	RR*	DATE	TIME	RR*
9/16/57	0845	---	3.15(1)	9/15/57	1000	2.30(1)	9/14/57	1000	1.71(4)
10/1/57	0900	---	2.14	9/30/57	1130	2.14	10/1/57	1045	1.54
10/15/57	1100	---	3.37	2/28/58	1030	0.16(3)	10/15/57	0920	3.41
10/31/57	1100	3.30(2)	3.27	3/15/58	0930	0.87	10/31/57	0930	3.35
11/16/57	1200	3.92	4.11	4/15/58	0930	2.00	11/16/57	1000	3.48
11/27/57	1140	0.31	0.28	4/30/58	----	0.42	12/3/57	1400	1.80
12/16/57	0840	0.11	0.11	5/31/58	----	0.34	12/16/57	1000	0.10
1/2/58	1530	0.10	0.09	7/15/58	----	3.10	1/2/58	1402	0.08
1/15/58	1010	1.24	1.32	7/30/58	----	9.39	1/15/58	0850	1.30
2/18/58	0850	0.24(3)	0.26(3)	8/15/58	----	4.85	2/18/58	0900	0.35(5)
3/7/58	1305	0.24	0.25	8/30/58	----	4.00	3/6/58	1230	0.15
3/21/58	0935	0.50	0.50				3/17/58	1130	1.20
3/31/58	1040	0.10	0.12				3/31/58	1335	0.06
4/21/58	1000	2.60	2.65				4/16/58	----	1.60
6/2/58	1000	4.02	4.10						
6/30/58	0950	2.43	2.35						
8/1/58	1000	9.92	10.80						
8/30/58	1300	5.95	5.98						

FOOTNOTES

(1) Total rainfall since 0900, 9/1.
(2) Total rainfall since 1100, 10/15.
(3) Total rainfall since 0900, 2/8.
(4) Total rainfall since 1145, 8/31.
(5) Total rainfall since 0930, 2/8.
* Rainfall total since last observation.

PLACE: ELMER

TABLE 36

DAILY RAINFALL**

				1957		1958						
	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST
1	*	0.13	0.24	*	0.30	0.09	0	*	1.85	*	0	0.10
2	*	0	0.10	*	0.20	0.26	*	*	0.04	0.75	0.06	*
3	0.84	0.21	*	0	0.18	0.01	0.05	0.13	0	0.02	0	*
4	0.04	0	0.10	0.05	0.10	0.03	0	0	*	0.01	*	0.18
5	0.10	0.16	1.40	0.21	*	0.04	0	0.03	0	0.18	0.99	0
6	0.27	0.10	0.45	0.01	0.06	T	0.02	*	0.01	0	*	0.01
7	0.11	0.15	0.40	0.01	0.09	0	0	0.05	0	0	0.05	*
8	0.48	0	0.04	0.06	0.15	*	0	0.01	0	*	0	1.58
9	0.51	0	0.01	0.04	0.25	*	*	0	0	0	0.23	0.42
10	0.52	0.06	*	*	0.26	*	0.15	0.37	0.01	0	0.27	*
11	0.04	0.13	0.12	0.07	0.24	0.01	0.01	0.63	*	0	0.15	1.07
12	0.02	0.02	2.75	0.07	*	0.01	0.01	0.07	0.04	0.73	0.02	0.60
13	0	*	0.08	0.07	0.23	0	0.04	*	0	0.01	*	0
14	0	2.25	0.14	0	0.32	0	0	0.01	0.05	0.01	1.28	*
15	0.11	1.05	0.10	*	0.32	0	0	0.36	0	*	0.59	0.21
16	0.07	0.01	*	0.06	0.20	*	*	0.05	0	0.60	3.63	0.38
17	0	0.29	0	0.04	0.18	0.20	0	0	0	*	0.10	*
18	0.01	0.01	0	0.06	0.10	0	0.01	0	*	0	0.83	0.45
19	0.01	0.04	***	0.16	*	0	0.01	0.09	0.15	0	0	0.07
20	0.07	*	***	0.09	0.05	0	0	*	0	0.01	*	0.19
21	0.01	0.03	***	0.06	0.40	0	0	0.12	0	0	0.10	*
22	0.03	0	***	*	0.40	0	0	0.04	0	*	2.61	0.97
23	0.15	1.57	***	0.01	0.35	*	*	0.21	*	0.01	0.13	0.62
24	0.12	0.09	***	0	0.30	0	0	0.03	0	0.20	0.34	*
25	0	0.02	***	*	0	0	0	0.02	*	0.04	*	0.25
26	0.16	0.98	***	0	0	0.01	0	0	*	*	0.02	0.03
27	0.17	*	***	0	0	0	0.01	*	*	0.04	*	0.05
28	0.64	1.00	***	0.05	0	0	0	0	0	0	0	0
29	0.17	1.07	0.64	*	0		0.01	0	0.02	*	*	0
30	0.43	0.80	0.02	0.10	0		*	0	*	0.52	0.01	0.34
31		0.01		0.06	0		0		*		0.26	0.19

* Amount included in next total.
** For times of observations, <u>see</u> NOTES.
*** Installation damaged by typhoon. Placed back in operation 11/28/57.

PLACE: JANET DAILY RAINFALL, AUGUST 30, 1957 - APRIL 29, 1958 <u>TABLE 37</u>

DATE	TIME	RR	DATE	TIME	RR	DATE	TIME	RR	DATE	TIME	RR
8/30/57	0915	0.15**	11/5/57	0800	0.41	1/8/58	0730	0	3/13/58	0730	0.09
8/31	0915	0.01	11/6	0730	3.03	1/9	0730	0.08	3/14	----	*
9/1	----	*	11/7	0730	0.31	1/10	0730	0.05	3/15	0730	0.23
9/2	----	*	11/8	0730	0.34	1/11	0730	0	3/16	1000	0
9/3	0915	0.63	11/9	0730	0.03	1/12	0930	0	3/17	0730	0
9/4	0915	0.05	11/10	0930	0.02	1/13	0730	0	3/18	0730	0.06
9/5	0915	0.01	11/11	0730	0.02	1/14	0730	0.19	3/19	0730	0.06
9/6	0915	0.00	11/12	0730	1.45	1/15	0730	0.06	3/20	0730	0.03
9/7	0915	0.01	11/13	0730	0.06***	1/16	0730	0.01	3/21	0730	0
9/8	----	*	11/14	0730	0.88	1/17	0730	0.08	3/22	0730	0
9/9	0915	0.39	11/15	0730	0.04	1/18	0730	0.08	3/23	1100	0
9/10	0915	0.01	11/16	0730	0.12	1/19	0930	0	3/24	0730	0
9/11	0915	0.11	11/17	0930	0	1/20	0730	0	3/25	0730	0.03
9/12	0915	0.05	11/18	0730	0	1/21	0730	0.12	3/26	----	*
9/13	0915	0	11/19	0730	1.53	1/22	0730	0.07	3/27	0730	0
9/14	0915	0	11/20	0730	0.04	1/23	0730	0.04	3/28	0730	0
9/15	----	*	11/21	0730	0	1/24	0730	0	3/29	0730	0
9/16	0915	0.01	11/22	0730	0	1/25	0730	0	3/30	----	*
9/17	0915	0	11/23	0730	0.07	1/26	1000	0	3/31	0730	0
9/18	0915	0.01	11/24	0730	0.56	1/27	0930	0	4/1	0730	0.07
9/19	0915	0	11/25	0730	0.13	1/28	0730	0	4/2	0730	0.01
9/20	0915	0.03	11/26	0730	0.01	1/29	0730	0	4/3	0730	1.12
9/21	0915	0.31	11/27	0730	0.06	1/30	0730	0.36	4/4	0730	0.08
9/22	----	*	11/28	0730	0.34	1/31	0730	0.01	4/5	0730	0
9/23	0915	0.33	11/29	0730	0.26	2/1	0730	0.05	4/6	----	*
9/24	0915	0.22	11/30	0730	0.29	2/2	----	*	4/7	0730	0.24
9/25	0915	0.25	12/1	0930	0	2/3	0730	0.17	4/8	0730	0.12
9/26	0915	0.02	12/2	0730	0.01	2/4	0730	0	4/9	0730	0
9/27	0915	0.20	12/3	0730	0	2/5	0730	0.13	4/10	0730	0
9/28	1615	0.14	12/4	0730	0.14	2/6	0700	0	4/11	0730	0.12
Break in record.			12/5	0730	0.26	2/7	0730	0	4/12	0730	0.37
Rainfall unknown.			12/6	0730	0.22	2/8	0730	0	4/13	0730	0
10/4	0730	0.13**	12/7	0730	0	2/9	1000	0	4/14	0730	0
10/5	0730	0.01	12/8	0930	0.16	2/10	0730	0	4/15	0730	0.17
10/6	----	*	12/9	0730	0.14	2/11	0730	0.23	4/16	0730	0.11
10/7	0730	1.45	12/10	0730	0.16	2/12	0730	0.08	4/17	0730	0.02
10/8	0730	0	12/11	0730	0	2/13	0730	0	4/18	0730	0
10/9	0730	0	12/12	0730	0.08	2/14	0730	0.07	4/19	0730	0.12
10/10	0730	0.18	12/13	0730	0	2/15	0730	0	4/20	----	*
10/11	0730	0.06	12/14	0730	0	2/16	0930	0	4/21	0730	0.11
10/12	0730	0	12/15	0930	0	2/17	0730	0.07	4/22	0730	0
10/13	0930	1.09	12/16	0730	0.03	2/18	0730	0	4/23	0730	0.18
10/14	0730	0.17	12/17	0730	0	2/19	0730	0	4/24	0730	0.01
10/15	0730	2.42	12/18	0730	0.02	2/20	0730	0	4/25	0730	0.01
10/16	0730	0.01	12/19	0730	0.36	2/21	0730	0	4/26	0730	0.06
10/17	0730	0.11	12/20	0730	0	2/22	0730	0	4/27	0730	0
10/18	0730	0.12	12/21	0730	0.08	2/23	0930	0	4/28	0730	0
10/19	0730	0.03	12/22	0930	0	2/24	0730	0	4/29	0730	0
10/20	0900	0.15	12/23	0730	0	2/25	0730	0			
10/21	0730	0	12/24	0730	0	2/26	0730	0.08			
10/22	0730	0	12/25	1100	0	2/27	0730	0			
10/23	0730	0.44	12/26	0730	0.03	2/28	0730	0			
10/24	0730	0.25	12/27	0730	0.02	3/1	0730	0			
10/25	0730	0.46	12/28	0730	0.01	3/2	----	*			
10/26	0730	0.17	12/29	0930	0.14	3/3	0700	0.29			
10/27	0930	0.12	12/30	0730	0	3/4	0730	0.02			
10/28	0730	0.01	12/31	0730	0.02	3/5	0730	0.05			
10/29	0730	0.09	1/1/58	0730	0.40	3/6	0730	0.02			
10/30	0730	0.16	1/2	0730	0.02	3/7	0730	0.11			
10/31	0730	0.03	1/3	0730	0.07	3/8	----	*			
11/1	0730	0.05	1/4	0730	0.01	3/9	1000	0			
11/2	0730	0.25	1/5	0930	0.06	3/10	0730	0.01			
11/3	0930	0.01	1/6	0730	0	3/11	0730	0			
11/4	0730	0.01	1/7	0730	0.12	3/12	0730	0.29			

* Amount included in next total.

** Amount in last 24 hours.

*** Gauge was covered when checked. Doubtful value.

PLACE: YVONNE

DAILY RAINFALL, FEBRUARY 8 - APRIL 21, 1958

TABLE 38

FEBRUARY	TIME	RR	MARCH	TIME	RR	APRIL	TIME	RR
			1	1650	0	1	1700	0
			2	1600	T	2	1700	0
			3	1600	0.02	3	1700	0.02
			4	1650	0.06	4	1700	0.03
			5	1600	0	5	1700	0.12
			6	1650	0.02	6	1700	0.22
			7	1600	0	7	1700	0.07
8	**	0	8	1630	0.07	8	1700	0
9	----	*	9	----	*	9	1700	0.10
10	1640	0	10	1620	0.04	10	1700	0.50
11	1500	0.07	11	1650	0.05	11	1700	1.45
12	1655	0.08	12	1630	0.03	12	1700	0
13	1655	0	13	----	*	13	1700	0
14	1655	T	14	1630	0.07	14	1700	0.34
15	1650	0	15	1630	0	15	1700	0.30
16	----	*	16	1650	0.01	16	1700	0.03
17	1640	0	17	1750	0.07	17	1700	0
18	1650	0	18	1700	0	18	1700	0.02
19	1640	0	19	1715	0.20	19	1700	0.18
20	1650	0	20	1640	0	20	1700	0.10
21	1640	0	21	1700	0	21	1700	0
22	1650	T	22	1710	0			
23	----	*	23	1700	0			
24	1630	T	24	1715	0			
25	1600	0.07	25	1710	0			
26	1650	0.03	26	1700	0			
27	1600	0	27	1700	0			
28	1610	T	28	1720	T			
			29	1700	0			
			30	1640	0.01			
			31	1700	0			

** Time of observation about 1630.

* Amount included in next reading.

APPENDIX II.

INDICES FOR PHOTOGRAPHS

CONTENTS

NOTES: TABLES A THROUGH F

GENERAL: Photographs listed in this Appendix can be borrowed for scientific use for a period that will be expected not to exceed 30 days. Requests for photographs on loan should be addressed to the U. S. Weather Bureau, Washington 25, D. C., Attention: Public Information Coordinator. In ordering photographs refer specifically to MICROCLIMATIC OBSERVATIONS AT ENIWETOK, distinguish specifically between Radarscope and Cloud photos, and list the photos required both by dates and by index numbers.

TABLES A AND B. On these photos, true north is directly at the top. The range is 75 miles. Times are correct within 5 minutes.

TABLES C THROUGH F. The camera was hand-held, with orientation usually determined by markers that had been established using a Brunton compass. Directions given are true and are estimated to be correct within 10° (plus or minus). It will be noted that the standard directions were so selected that one of the pairs of photographs from BRUCE was taken facing KEITH and the other was taken 90° clockwise from this direction. Similarly, one of the photographs from KEITH was normally taken facing BRUCE, and the other was taken 90° clockwise from this direction. Directions other than these standard ones were used primarily to avoid having to take a photograph directly into the sun. Quality of the photographs varies. All photos indexed are sufficiently clear to show the general form of the clouds (if any) and the general amount of cloud within the view of the camera (not including high, thin cirrus). However, the photos whose quality is only fair are not sufficiently sharp to discriminate between cloud types that sometimes closely resemble one another, as between cumulus and marginal forms of strato-cumulus (cumulus with some stratification). Times given refer to 180th meridian and are correct within 5 minutes.

PLACE: FRED INDEX NUMBERS OF RADARSCOPE PHOTOS, AUGUST 18 - SEPTEMBER 1, 1957* TABLE A
(Eniwetok dates and times - 180th meridian)

TIME	DATE														
	18th	19th	20th	21st	22nd	23rd	24th	25th	26th	27th	28th	29th	30th	31st	1st
0000				16		32				71	76	98	122		
0015				17		33	42				77	99	123		
0245				18		34	43				78	100	124		
0300				19		35	44				79	101	125		
0315				20		36	45				80	102	126		
0545				21		37	46					103	127	135	
0600				22		38	47					104	128	136	
0615				23		39	48				81	105	129	137	
0845			6	24		40	49				82	106	130	138	
0900			7	25		41	50				83	107	131	139	153
0915			8	26			51				84	108	132	140	154
1145			9	27			52				85	109	133	141	
1200				28			53				86	110		142	
1215			10	29			54		60	72	87	111		143	
1445		1					55		61	73	88	112		144	
1500		2					56		62	74	89	113	134	145	
1515		3					57		63	75	90	114		146	
1745							58		64		91	115		147	
1800		4					59		65		92	116		148	
1815		5	11						66		93	117			
2045			12						67		94	118		149	
2100			13		30				68		95	119		150	
2115			14		31				69		96	120		151	
2345			15						70		97	121		152	

* Blanks indicate no photograph was obtained.

PLACE: FRED INDEX NUMBERS OF RADARSCOPE PHOTOS, JANUARY 25 - FEBRUARY 8, 1958* TABLE B

(Eniwetok dates and times - 180th meridian)

TIME	DATE														
	25th	26th	27th	28th	29th	30th	31st	1st	2nd	3rd	4th	5th	6th	7th	8th
0000	----	213	234	----	279	301	316	340	357	380	402	423	445	----	----
0015	----	214	235	----	280	----	317	341	358	381	403	424	446	----	----
0245	----	215	236	257	281	302	318	342	359	382	404	425	447	----	----
0300	----	216	237	258	282	----	319	----	360	383	405	426	448	----	----
0315	----	217	238	259	283	----	320	343	361	384	406	427	----	----	----
0545	----	218	239	260	284	303	321	----	362	385	407	428	449	----	----
0600	----	219	240	261	285	304	322	344	363	386	408	429	450	----	----
0615	----	220	241	262	----	305	323	345	364	387	409	430	451	----	----
0845	----	221	242	263	286	306	324	----	365	388	410	431	----	----	----
0900	----	222	243	264	287	307	325	----	366	389	411	432	----	----	----
0915	----	223	244	265	288	308	326	346	367	390	412	433	----	----	----
1145	201	224	245	266	----	309	327	347	368	391	----	434	----	----	----
1200	202	225	246	267	289	310	328	348	369	392	413	----	----	----	----
1215	203	226	247	268	290	----	329	----	370	393	414	435	----	----	----
1445	204	227	248	269	291	----	330	----	371	394	----	436	----	----	----
1500	205	----	249	270	292	----	331	349	372	395	415	437	----	----	----
1515	206	----	250	271	293	311	332	----	373	396	416	438	----	----	----
1745	207	228	251	272	294	----	333	350	374	----	417	439	----	----	----
1800	208	----	252	273	295	----	334	351	375	397	418	----	----	----	----
1815	209	229	253	274	296	----	335	352	----	398	419	440	----	----	----
2045	----	230	254	275	297	312	336	353	376	----	----	441	----	----	----
2100	210	231	255	276	298	313	337	354	377	399	420	442	----	----	----
2115	211	232	256	277	299	314	338	355	378	400	421	443	----	----	----
2345	212	233	----	278	300	315	339	356	379	401	422	444	----	----	----

* Blanks indicate no photograph was obtained.

PLACE: BRUCE

INDEX NUMBERS FOR CLOUD PHOTOGRAPHS, SERIES A, AUGUST 21 - 31, 1957**
(Degrees show direction in which camera was pointed.)

TABLE C

HOUR:*** DATE	0600	0900	1200	1500	1800
21	0655: 331° B2-9*		241° B3-3* 331° B3-4	241° B3-5 331° B3-6	241° B3-7 331° B3-8
22	0645: 241° B3-11	241° B3-12	241° B4-1* 331° B4-2	241° B4-3 331° B4-4	241° B4-5 331° B4-6
23	0645: 241° B4-7* 331° B4-8		241° B4-9 331° B4-10*	241° B4-11 331° B4-12	241° B4-13 331° B4-14
24	0645: 241° B4-15 331° B4-16	241° B4-17* 331° B4-18*	241° B4-19	241° B5-1 331° B5-2	241° B5-3 331° B5-4*
25	0620: 241° B5-5* 331° B5-6*		331° B5-11*	241° B5-12* 331° B5-13*	241° B5-14 310° B5-16 331° B5-15
26		No photographs available			
27		No photographs available			
28				241° B7-14* 331° B7-15*	241° B7-7* 331° B7-8*
29	0645: 241° B7-5 331° B7-6	200° B7-2 241° B7-3			
30		0945: 60° B8-12 241° B8-14 331° B8-13	241° B8-10* 331° B8-9	241° B8-8* 331° B8-7*	241° B8-6 331° B8-5
31	0645: 241° B8-4* 331° B8-3*	241° B8-2* 331° B8-1*			

* Quality fair only.
** In requesting photographs listed above, be certain to refer to A Series.
*** The 3-hourly times given at the top of the columns apply except where other times are entered.

PLACE: KEITH

INDEX NUMBERS FOR CLOUD PHOTOGRAPHS, SERIES A, AUGUST 18 - 31, 1957**
(Degrees show direction in which camera was pointed.)

TABLE D

HOUR:*** DATE	0600	0900	1200	1500	1800
18			61° K1-1 151° K1-2	61° K1-5 151° K1-6	61° K1-8 151° K1-11
19	0630: 61° K1-12 151° K1-13	61° K1-17 151° K1-18			
20			1210: 61° K2-2 151° K2-3	1510: 61° K2-5 151° K2-4	1810: 61° K2-6
21		0910: 61° K2-8 151° K2-9	61° K2-10	61° K2-12* 151° K2-13	61° K2-14* 151° K2-15*
22	0640: 61° K2-16* 151° K2-17*	0900: 61° K3-9* 151° K3-8*			
23		40° K5-1* 151° K5-2	61° K5-3		
24		No photographs available			
25			61° K6-20* 151° K6-19*	61° K6-18* 151° K6-17*	61° K6-16* 151° K6-15*
26	0655: 61° K6-14 151° K6-13	61° K6-12 151° K6-11	61° K6-9* 151° K6-10*	61° K6-6 151° K6-5	61° K7-2*
27	0700: 61° K7-4* 151° K7-5		61° K7-6 151° K7-7	61° K7-8 151° K7-9*	151° K7-11
28	0650: 61° K7-12				61° K8-2 151° K8-1
29	0645: 61° K8-4 151° K8-3*	61° K8-6* 151° K8-5	61° K8-8 151° K8-7*	61° K8-10 151° K8-9	61° K8-12 151° K8-11
30	0700: 61° K8-14 151° K8-13	61° K8-16*	61° K9-11* 151° K9-10*	61° K9-9 151° K9-8	30° K9-5 61° K9-7 151° K9-6*
31	0645: 61° K9-4 151° K9-3	61° K9-2 151° K9-1*			

* Quality fair only.
** In requesting photographs listed above, be certain to refer to A Series.
*** The 3-hourly times given at the top of the columns apply except where other times are entered.

PLACE: BRUCE

INDEX NUMBERS FOR CLOUD PHOTOGRAPHS, SERIES B, JANUARY 29 - FEBRUARY 8, 1958**
(Degrees show direction in which camera was pointed.)

TABLE E

HOUR:***	0900	1200	1500	1800
DATE				
29		241° B2-1 331° B2-3	241° B2-4 331° B2-5	241° B2-6 331° B2-7
30	241° B2-8* 331° B2-9*	241° B2-10 331° B2-11	241° B2-12 331° B2-13	241° B2-14 331° B2-15
31	241° B2-16* 331° B2-17	241° B2-18 331° B2-19	241° B2-20 331° B2-21	241° B2-22 331° B2-23
1	241° B2-24* 331° B2-25*	241° B2-26* 331° B2-27*	241° B2-28 331° B2-29	241° B2-30 331° B2-31
2		241° B3-1* 331° B3-2	241° B3-3 331° B3-4	250° B3-5 331° B3-6
3	280° B3-7* 331° B3-8	241° B3-9 331° B3-10	241° B3-11 331° B3-12	241° B3-13 331° B3-14
4	241° B3-15 331° B3-16	241° B3-18 331° B3-17	241° B3-20 331° B3-19*	241° B3-22 331° B3-21
5	241° B3-24 331° B3-23	241° B3-26 331° B3-25	241° B3-28* 331° B3-27*	241° B3-30 331° B3-29*
6	241° B4-1 331° B4-2*	241° B4-3* 331° B4-5	241° B4-6 331° B4-8	
7	0830: 241° B4-9 331° B4-10	241° B4-11	241° B4-13* 331° B4-14	331° B4-15*
8	200° B4-18* 241° B4-16 331° B4-17			

* Quality fair only.
** In requesting photographs listed above, be certain to refer to B Series.
*** The 3-hourly times given at the top of the columns apply except where other times are entered.

PLACE: KEITH

INDEX NUMBERS FOR CLOUD PHOTOGRAPHS, SERIES B,
JANUARY 25 - FEBRUARY 8, 1958**
(Degrees show direction in which camera was pointed.)

TABLE F

HOUR: DATE	0900	1200	1500	1800
25			151° K1-1	61° K1-2* 151° K1-3*
26	61° K1-4 151° K1-5	61° K1-6 151° K1-7	61° K1-8 151° K1-9	61° K1-10* 151° K1-11*
27		61° K1-15 151° K1-16*	61° K1-17 151° K1-18	61° K1-19 151° K1-20
28	61° K1-26* 151° K1-28	61° K1-29 151° K1-30	61° K1-31 151° K1-32	
29	70° K2-28 190° K2-27	50° K2-26 140° K2-25	140° K2-24	50° K2-23 140° K2-22
30	50° K2-21 140° K2-20	50° K2-19 140° K2-18	50° K2-17 140° K2-16*	50° K2-15 140° K2-14
31	50° K2-13 140° K2-12	70° K2-10 160° K2-11	70° K2-8 160° K2-9	70° K2-6 160° K2-7
1	40° K2-5	70° K2-4 160° K2-3		
2	70° K2-2 160° K2-1	50° K3-33 140° K3-32	140° K3-31*	50° K3-30 140° K3-29
3	50° K3-28 140° K3-27	50° K3-26 140° K3-25	50° K3-24* 140° K3-23*	50° K3-22 140° K3-21
4	50° K3-20 140° K3-19	50° K3-17 140° K3-18		50° K3-15* 140° K3-16*
5			50° K3-13 140° K3-14	
6	50° K3-2 110° K3-1 140° K3-3	50° K4-1 140° K4-2		
7		50° K4-3 140° K4-4	50° K4-5 140° K4-6	50° K4-7 140° K4-8
8	50° K4-9 170° K4-10			

* Quality fair only.
** In requesting photographs listed above, be certain to refer to <u>B Series</u>.

APPENDIX III.

BIBLIOGRAPHY

NOTE: The following bibliography is not intended to be comprehensive. Rather it lists works cited in this publication together with a few additional items that may prove particularly useful to those analyzing the data presented in this study.

A. For general information on geology, hydrography, and geography:

(1) Emery, Kenneth O., "Submarine Geology of Bikini Atoll," Bull. GSA, LIX, 855-60, 1948.

(2) Emery, Kenneth O., J. I. Tracey, Jr., and H. S. Ladd, "Geology of Bikini and Nearby Atolls," Geol. Surv. Prof. Paper 260-A, Washington: GPO, 1954.

(3) Gordon, Jr., A. R., Digest of Oceanographic Data for the Marshall Islands Area, U. S. Navy Hydrographic Office (duplicated), March, 1956.

(4) U. S. Department of Commerce, Coast and Geodetic Survey, Tide Tables 1958, "Central and Western Pacific Ocean and Indian Ocean." Washington: GPO.

(5) U. S. Navy Hydrographic Office, Sailing Directions for The Pacific Islands, I (H.O. Pub. No. 165A), Washington: GPO, 1952.

B. For meteorological data and discussions of the weather and climate of the Marshall Islands area:

(1) Reports by Joint Task Force Meteorological Center:

(a) JTFMC TP-1 Meteorological Report on Operation REDWING
Volume 1, Eniwetok
15 Nov 1956

(b) JTFMC TP-5 A Study of the 30,000 Foot Wind Field over the West Central Pacific
20 Dec 1957

(c) JTFMC TP-8 Meteorological Report on Operation HARDTACK
Volumes 1 - 6
March-July 1958

(d) JTFMC TP-15 A Study of the Mean Vertical Wind Structure over the Eniwetok Proving Ground Area
8 May 1959

NOTE: There are several other JTFMC reports that provide marginal information that may be of interest. For a list of these and of reports issued since February 1, 1960, inquiry may be made to: JTF-7 Meteorological Center, c/o Fleet Weather Central, FPO 128, San Francisco, California.

(2) U. S. Weather Bureau, Climatological Data, Hawaii and Climatological Data, Pacific. Prior to 1956, daily rainfall and temperature reports for stations in the Marshall Islands appeared in CD, Hawaii; thereafter they have appeared in CD, Pacific.

(3) U. S. Weather Bureau, Local Climatological Data, Majuro. This provides fairly detailed climatologic data in monthly and annual summary form.

(4) Central Meteorological Observatory, Climatic Records of Japan and the Far East Area. Tokyo: CMO, 1954. This provides mean monthly data for the period of Japanese occupancy of the Marshall Islands.

(5) Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten, various volumes, 1906-1914. Gives daily rainfall values for stations in Micronesia.

(6) Schott, Gerhard, "Klimakunde der Südsee-Inseln," Handbuch der Klimatologie, IV, Part T, Berlin, 1938.

(7) Tüllman, Hubert, Die Niederschlagsverhältnisse der Südsee-Inseln: Archiv der Deutschen Seewarte, LVI, nr. 5. Hamburg.

C. The references cited above (especially the first three items) provide data that can be used to compile frequency distributions for meteorological variables in the Marshall Islands area. Types of distributions common in meteorology are discussed in the following:

(1) Brooks, C. E. P. and N. Carruthers, Handbook of Statistical Methods in Meteorology, M. O. 538. London, 1953.

(2) Panofsky, Hans A. and Glenn W. Brier, Some Applications of Statistics to Meteorology, Penn. State Univ., 1958.

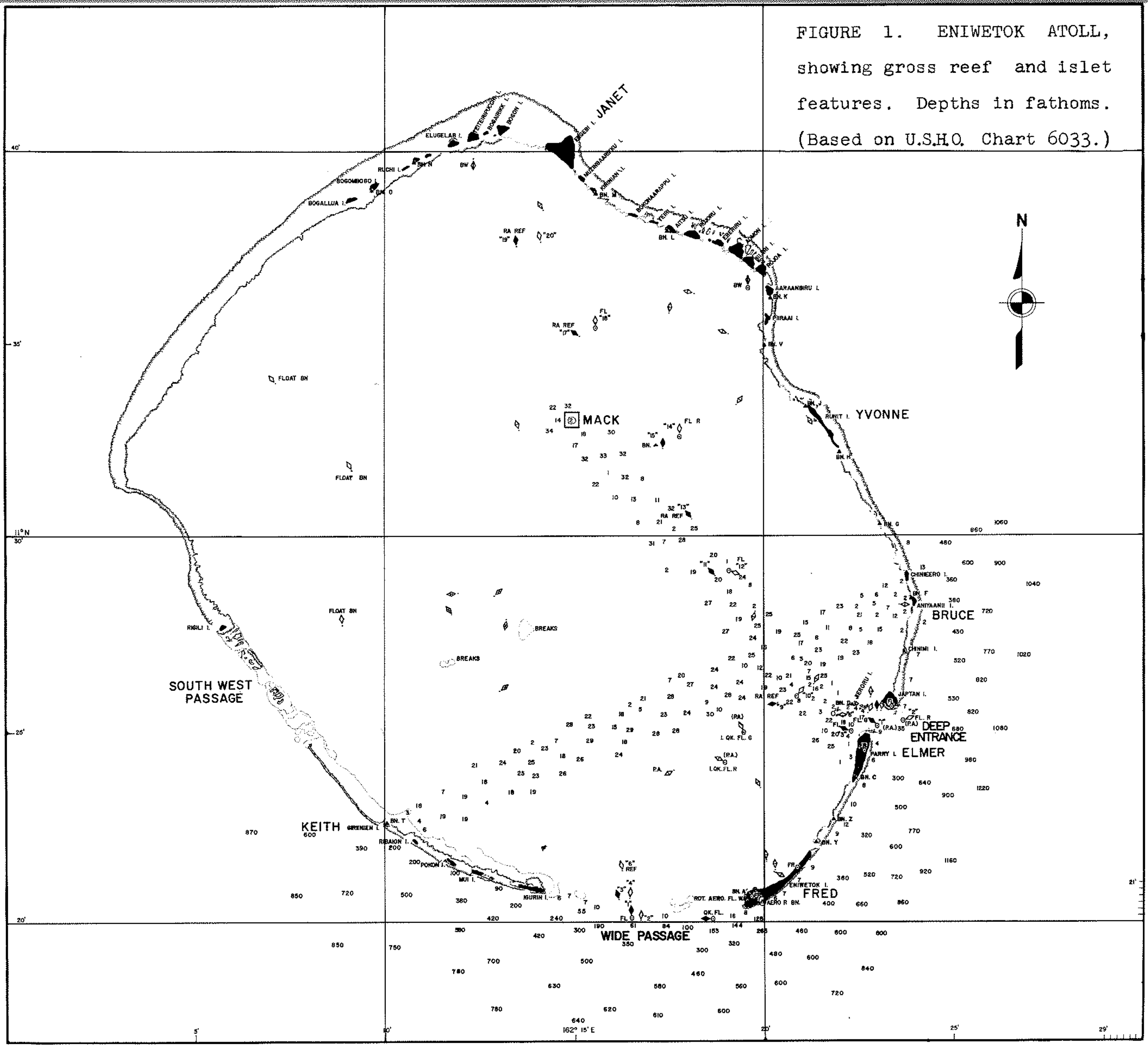


FIGURE 1. ENIWETOK ATOLL, showing gross reef and islet features. Depths in fathoms. (Based on U.S.H.O. Chart 6033.)

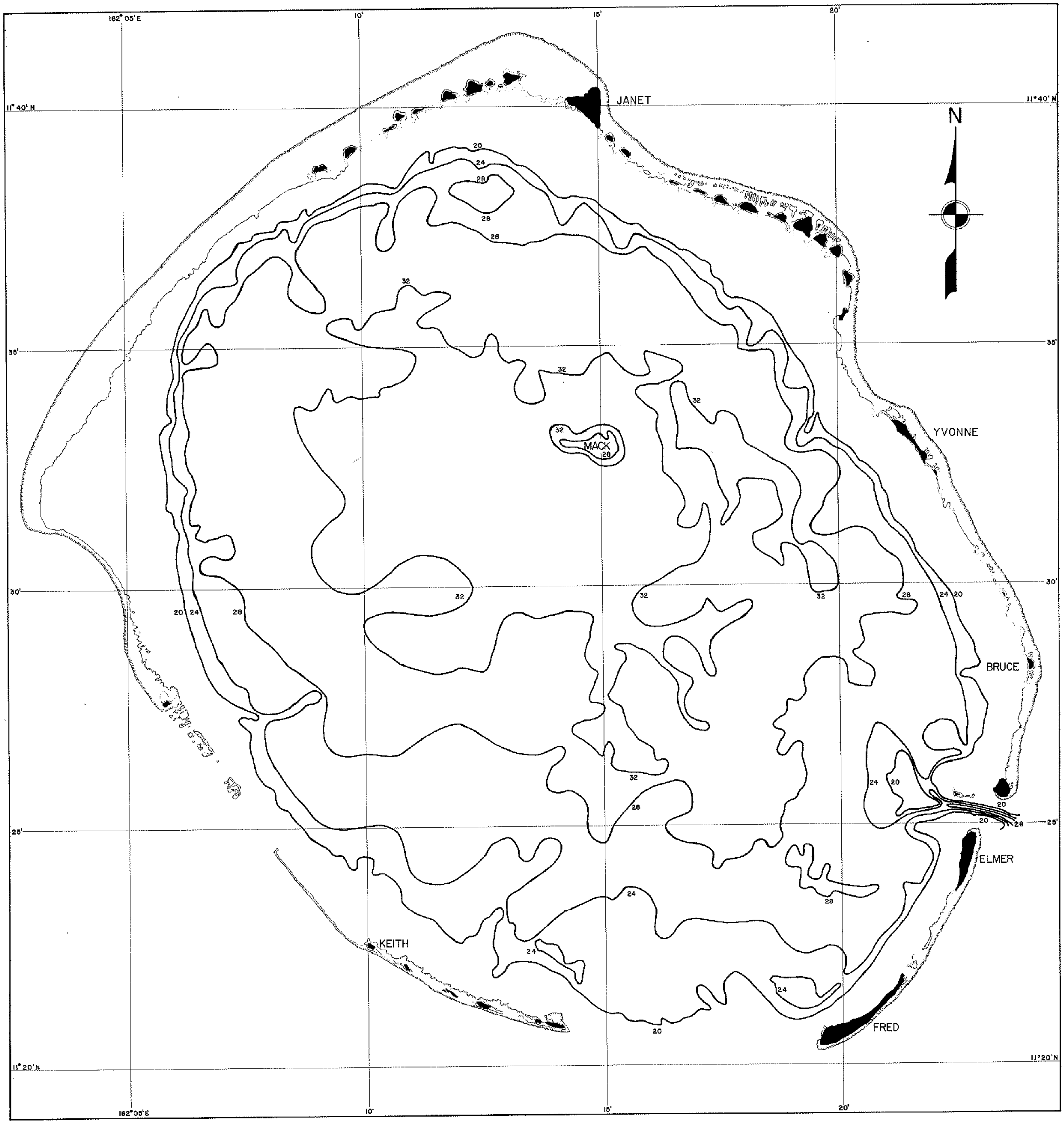


FIGURE 2. BATHYRITHMS, ENIWETOK LAGOON. Values are in fathoms below mean low tide. (Generalized bathyrithms, omitting coral heads and other details, adapted from Emery, <u>Bull. GSA.</u>, LIX, 858.)

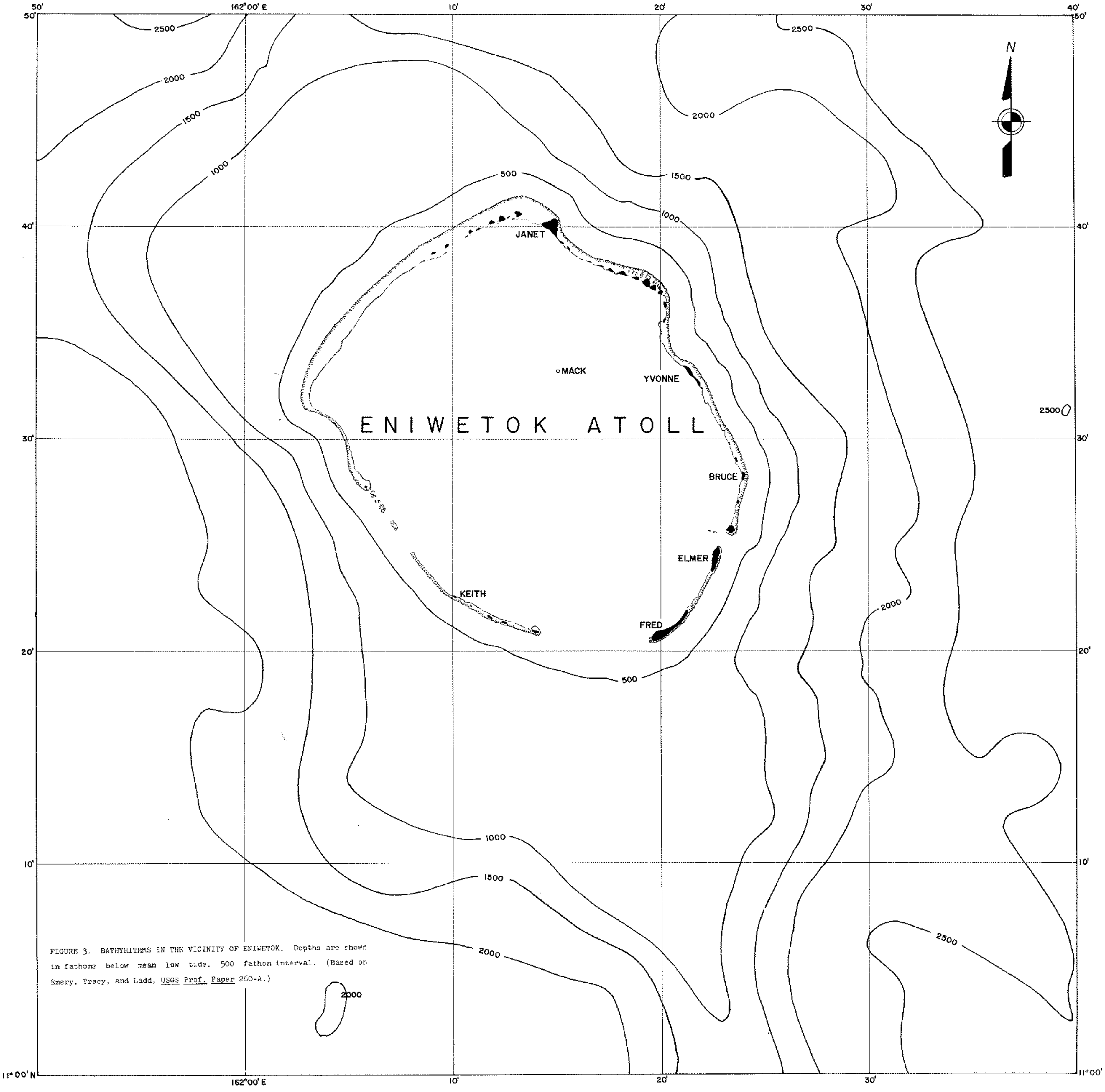


FIGURE 3. BATHYRITHMS IN THE VICINITY OF ENIWETOK. Depths are shown in fathoms below mean low tide. 500 fathom interval. (Based on Emery, Tracy, and Ladd, USGS Prof. Paper 260-A.)

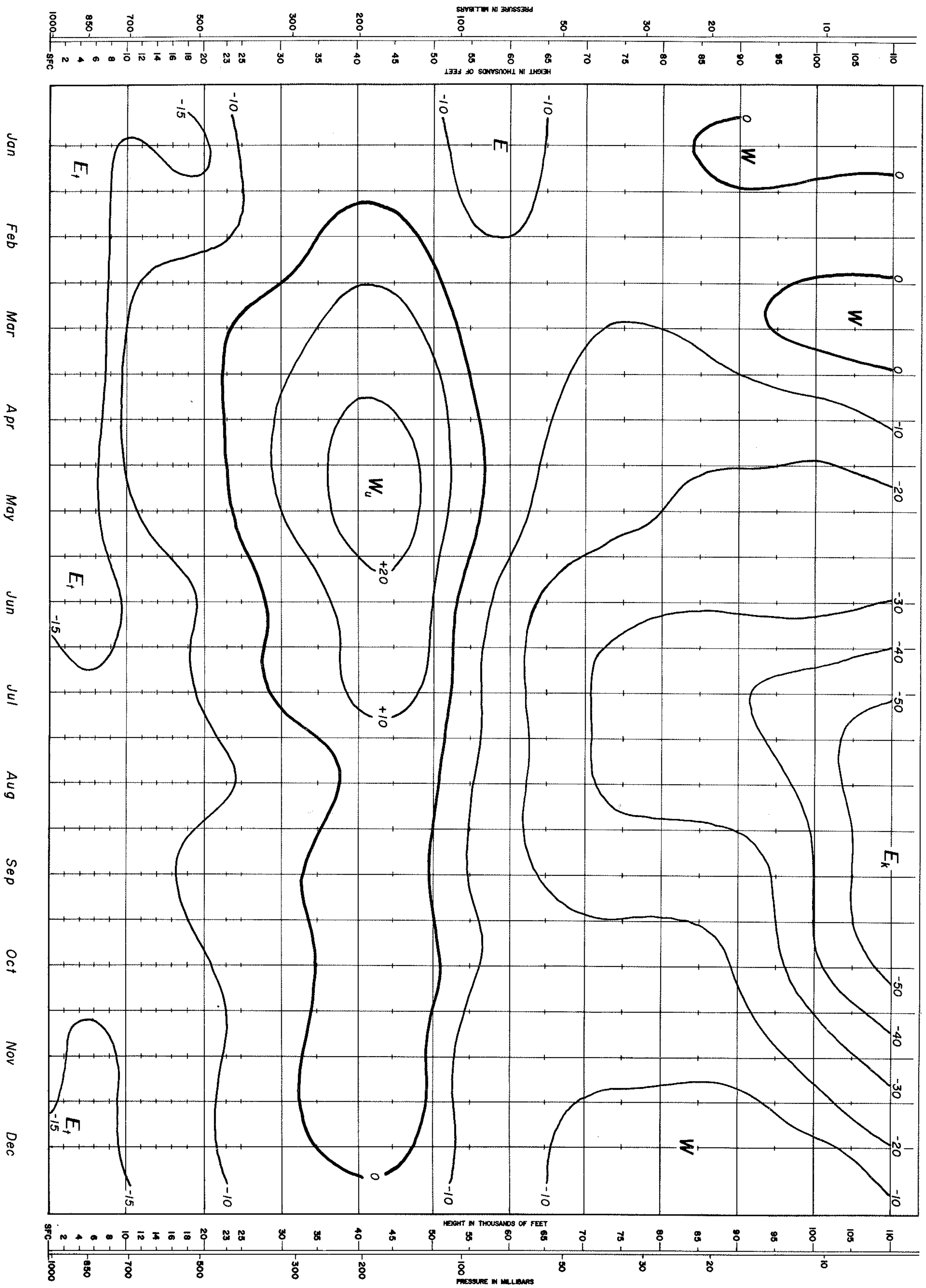


FIGURE 4. MEAN MONTHLY EAST-WEST WIND COMPONENTS, ENIWETOK, AS A FUNCTION OF ALTITUDE. Values in m.p.h., with west wind components positive. E_T: tradewind flow; W_U: upper westerly flow; E_E: equatorial easterlies; E_K: Krakatoa easterlies; W_B: Berson westerlies. (Based on twice-daily soundings, 1949 through 1958, and on additional soundings during test periods. From JTFMC TP-20.)

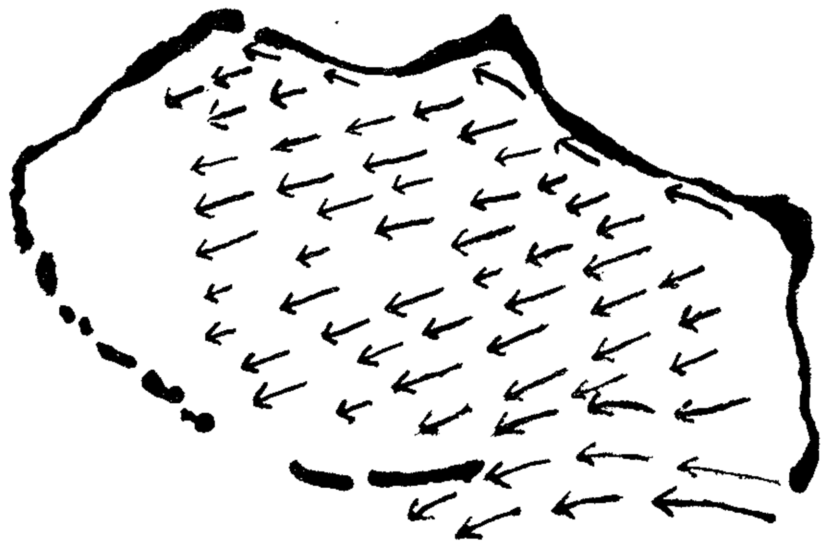


FIGURE 5-A. SURFACE WATER CURRENTS IN BIKINI LAGOON WITH AN ENE WIND. North is at the top of the map. Arrows show the flow pattern. (After A. R. Gordon, Jr.)

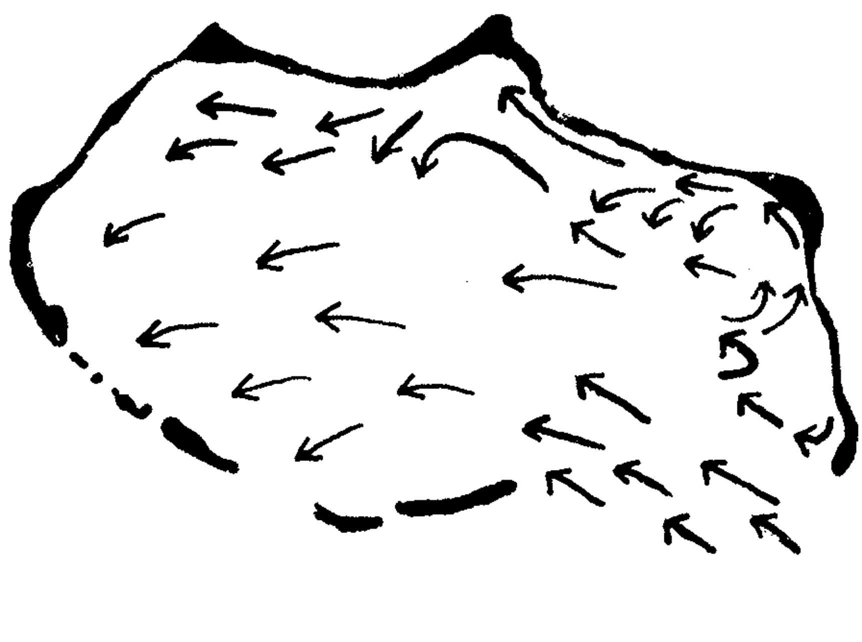


FIGURE 5-B. SURFACE WATER CURRENTS IN BIKINI LAGOON WITH A SE WIND. North is at the top of the map. Arrows show the flow pattern. (After A. R. Gordon, Jr.)

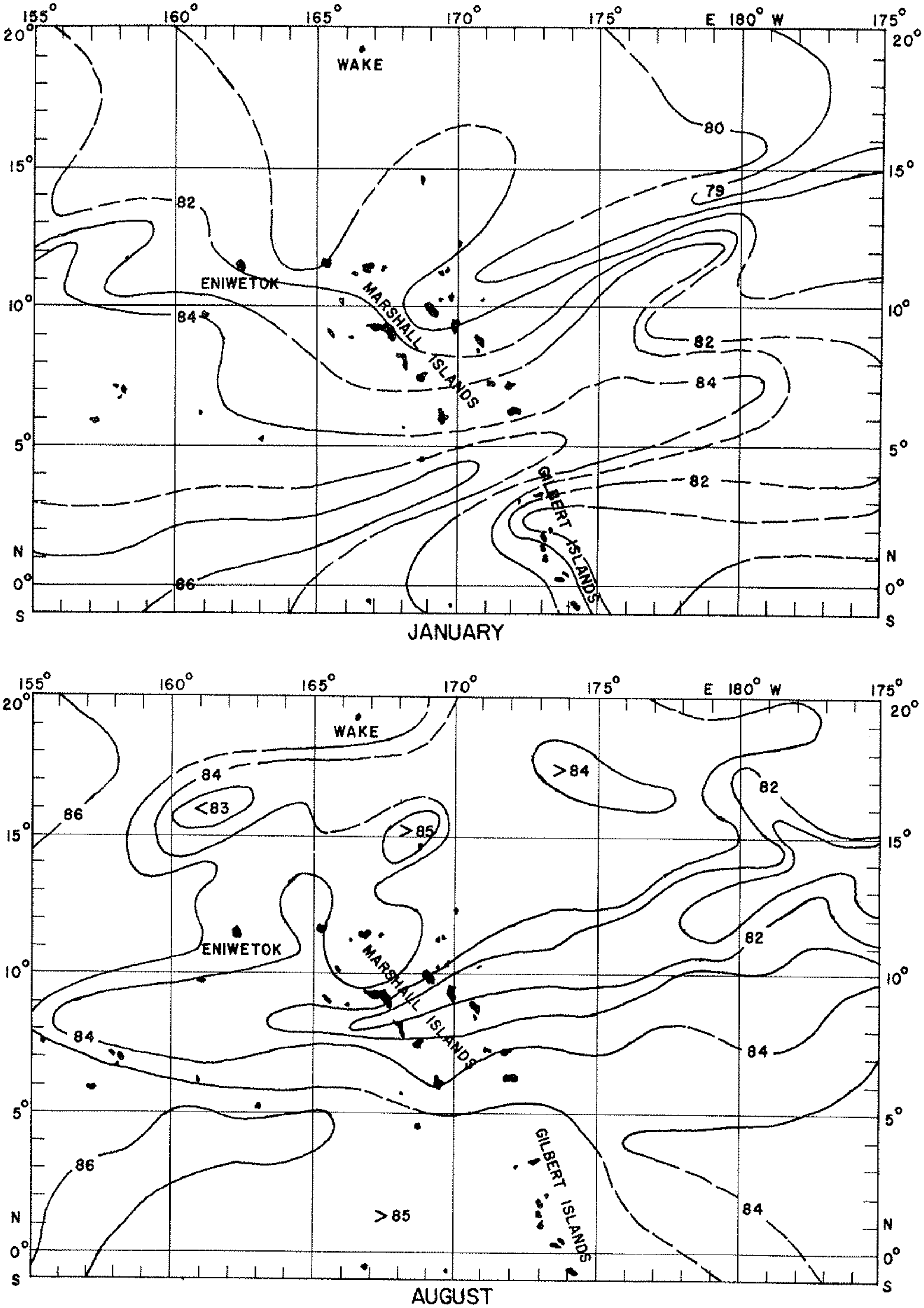


FIGURE 6. SURFACE WATER TEMPERATURES IN JANUARY AND AUGUST. Temperatures in °F. (From Emery, Tracy, and Ladd.)

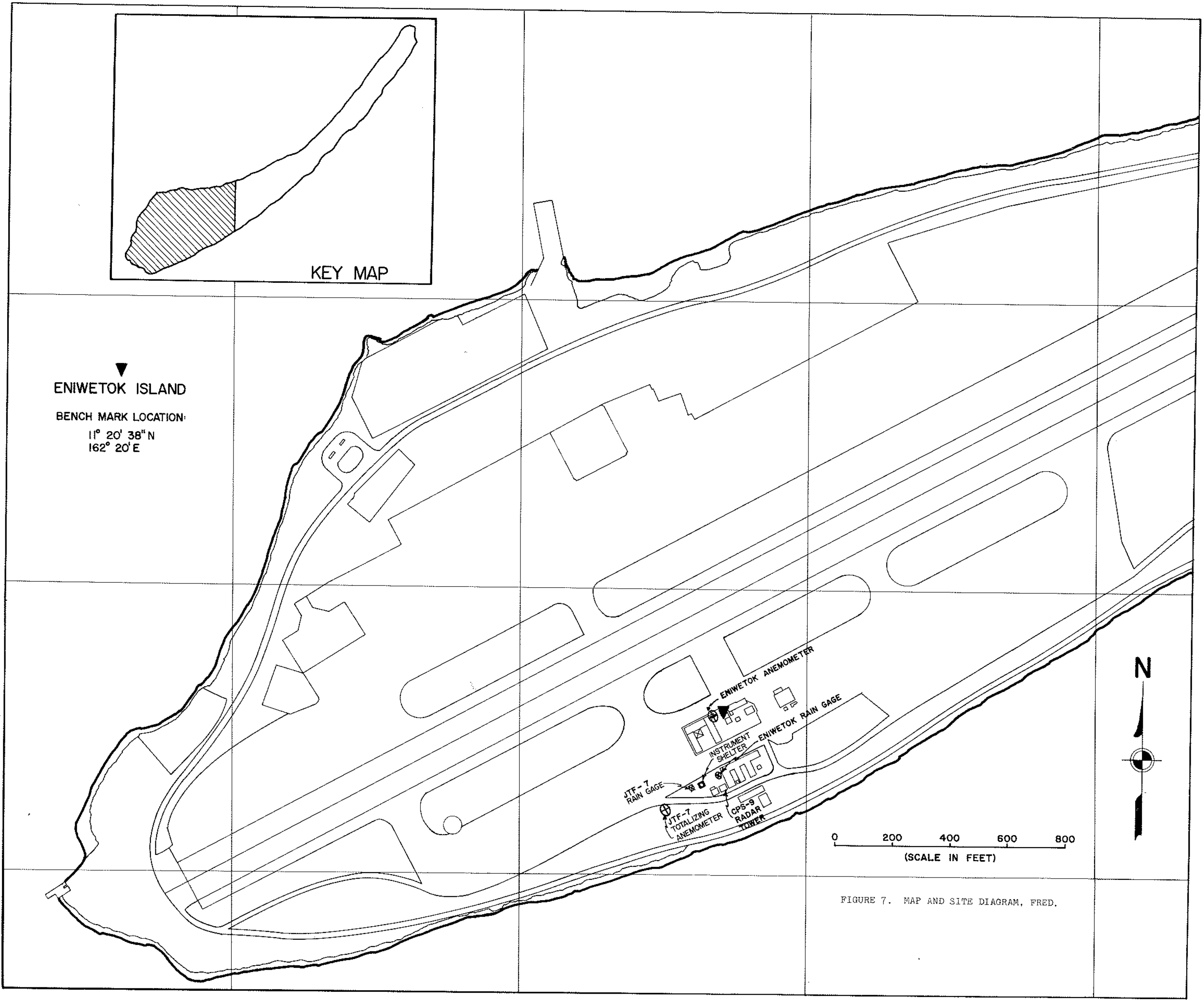
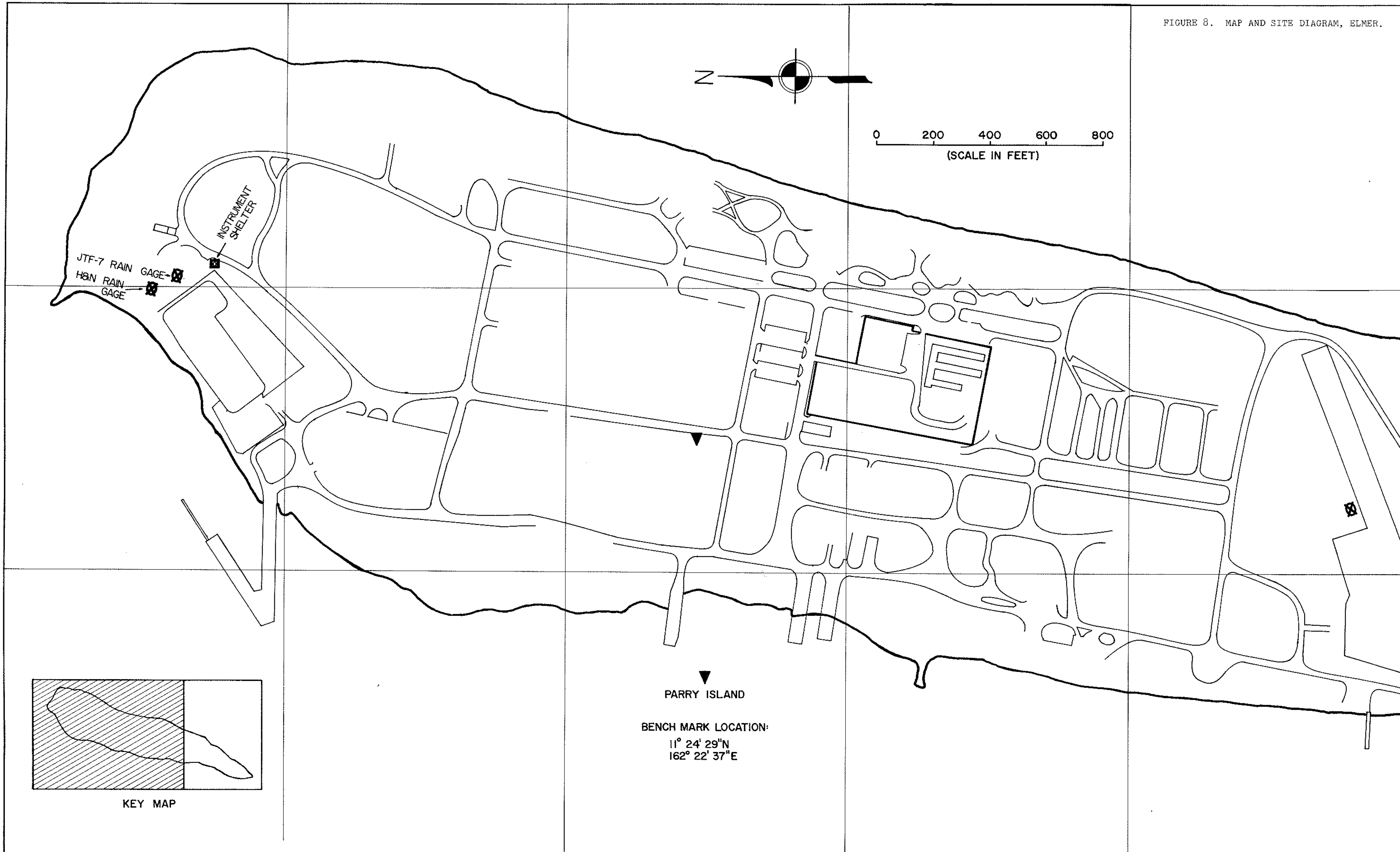


FIGURE 7. MAP AND SITE DIAGRAM, FRED.

FIGURE 8. MAP AND SITE DIAGRAM, ELMER.



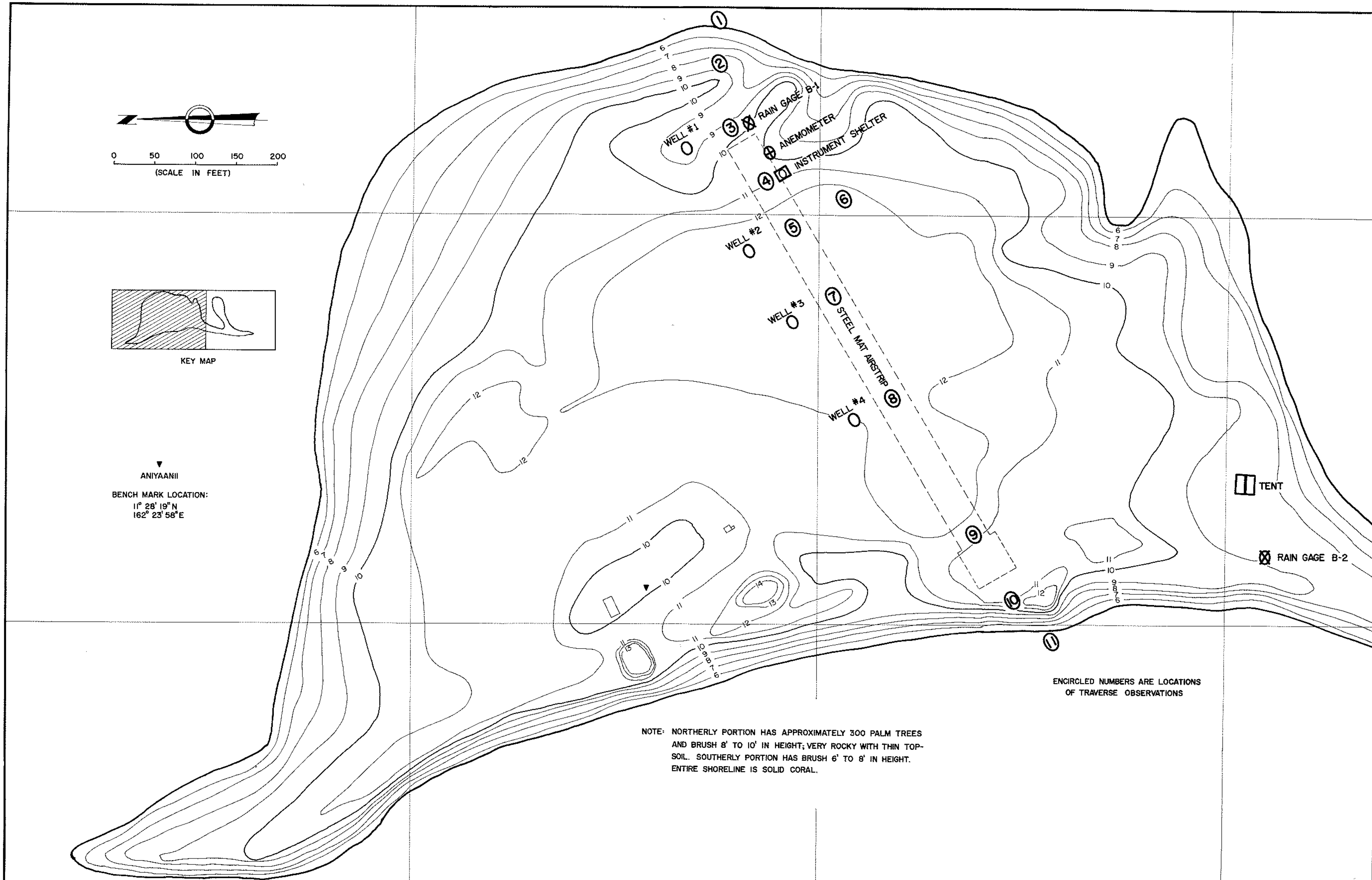


FIGURE 9. MAP AND SITE DIAGRAM, BRUCE.

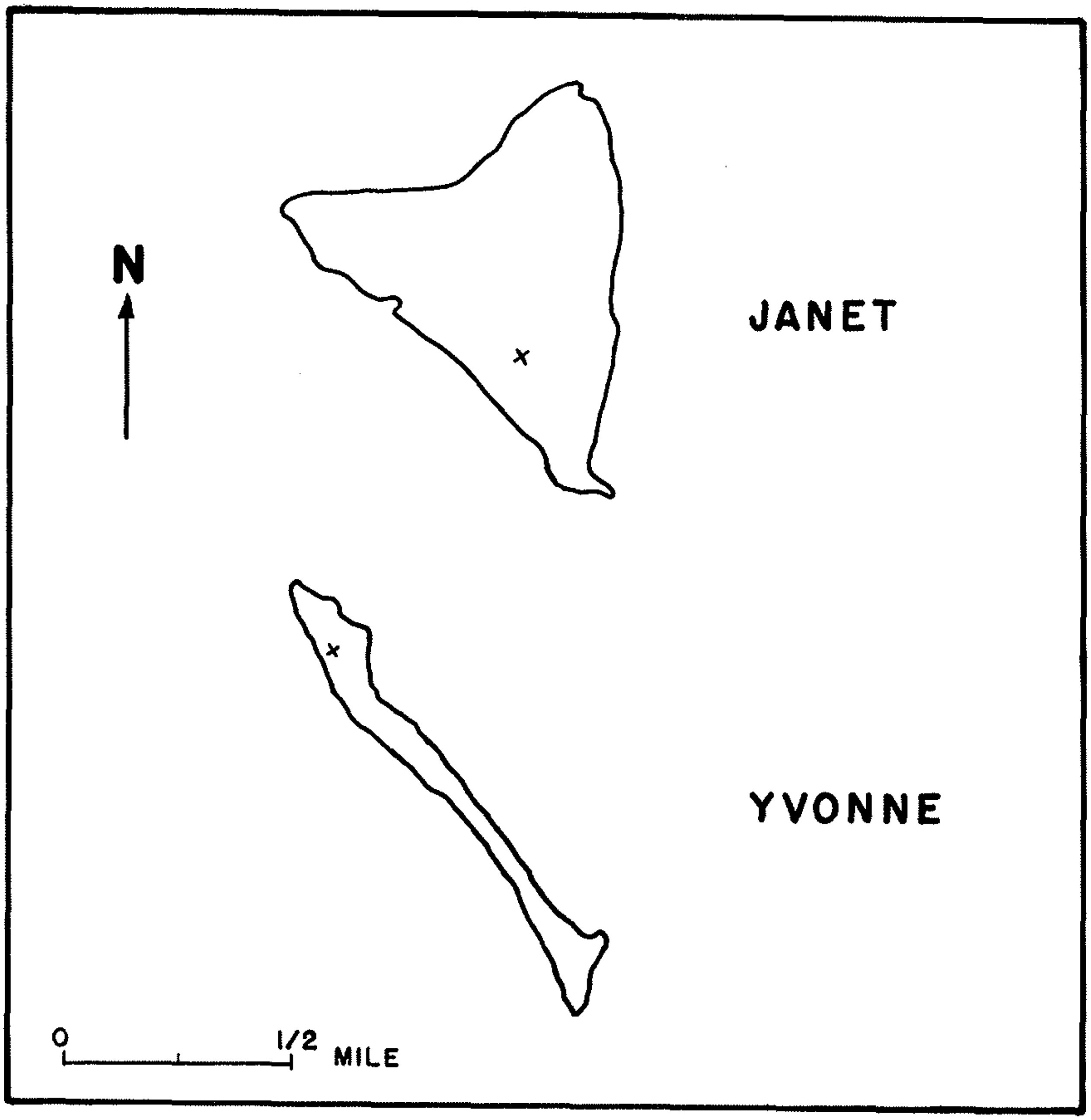


FIGURE 10. SKETCH MAPS OF JANET AND YVONNE ISLETS. Maps are approximate only. Scale correct within 15%. Raingage locations shown by "X". For positions of islets on the reef, see Figure 1.

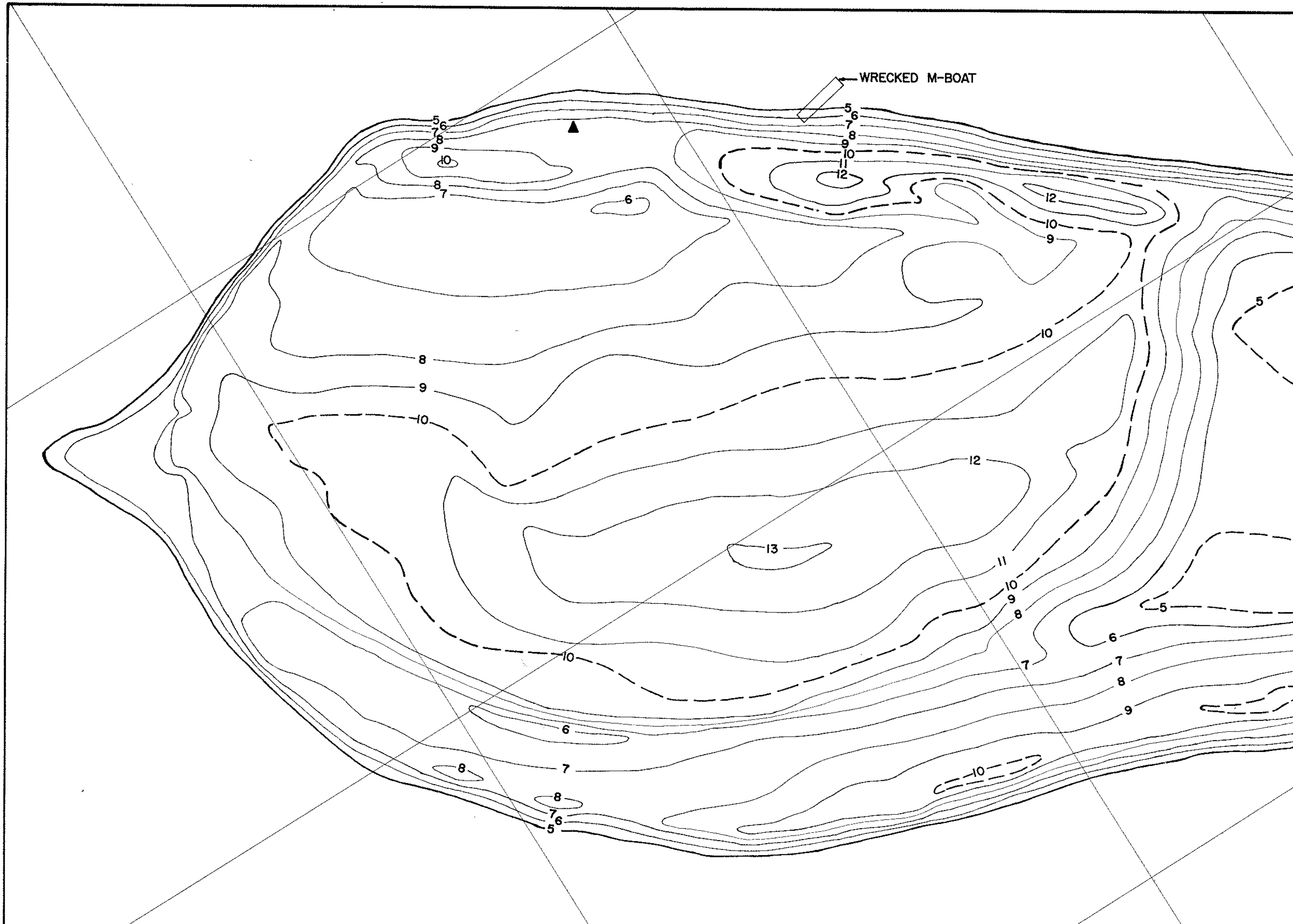


Figure 11.

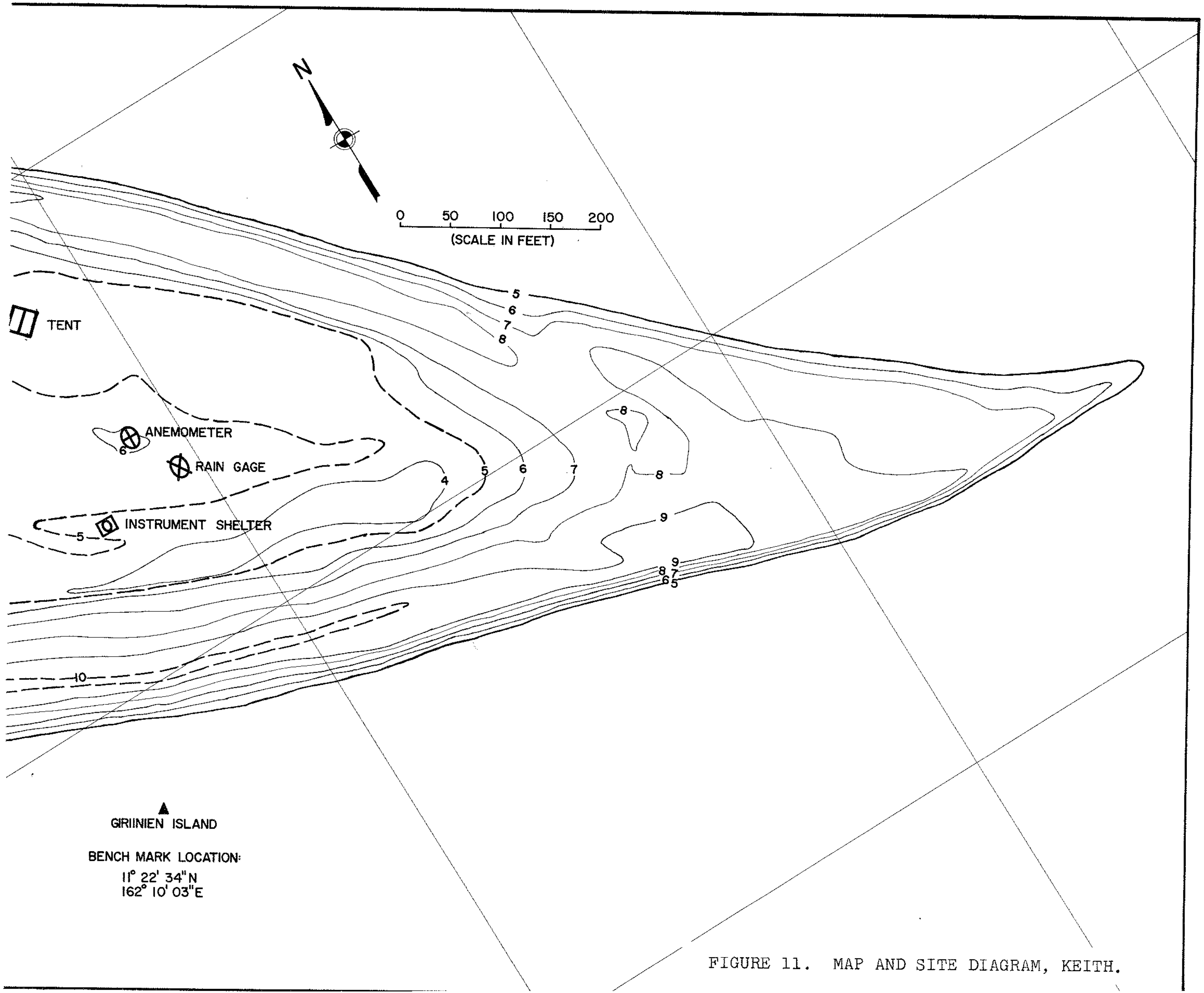


FIGURE 11. MAP AND SITE DIAGRAM, KEITH.

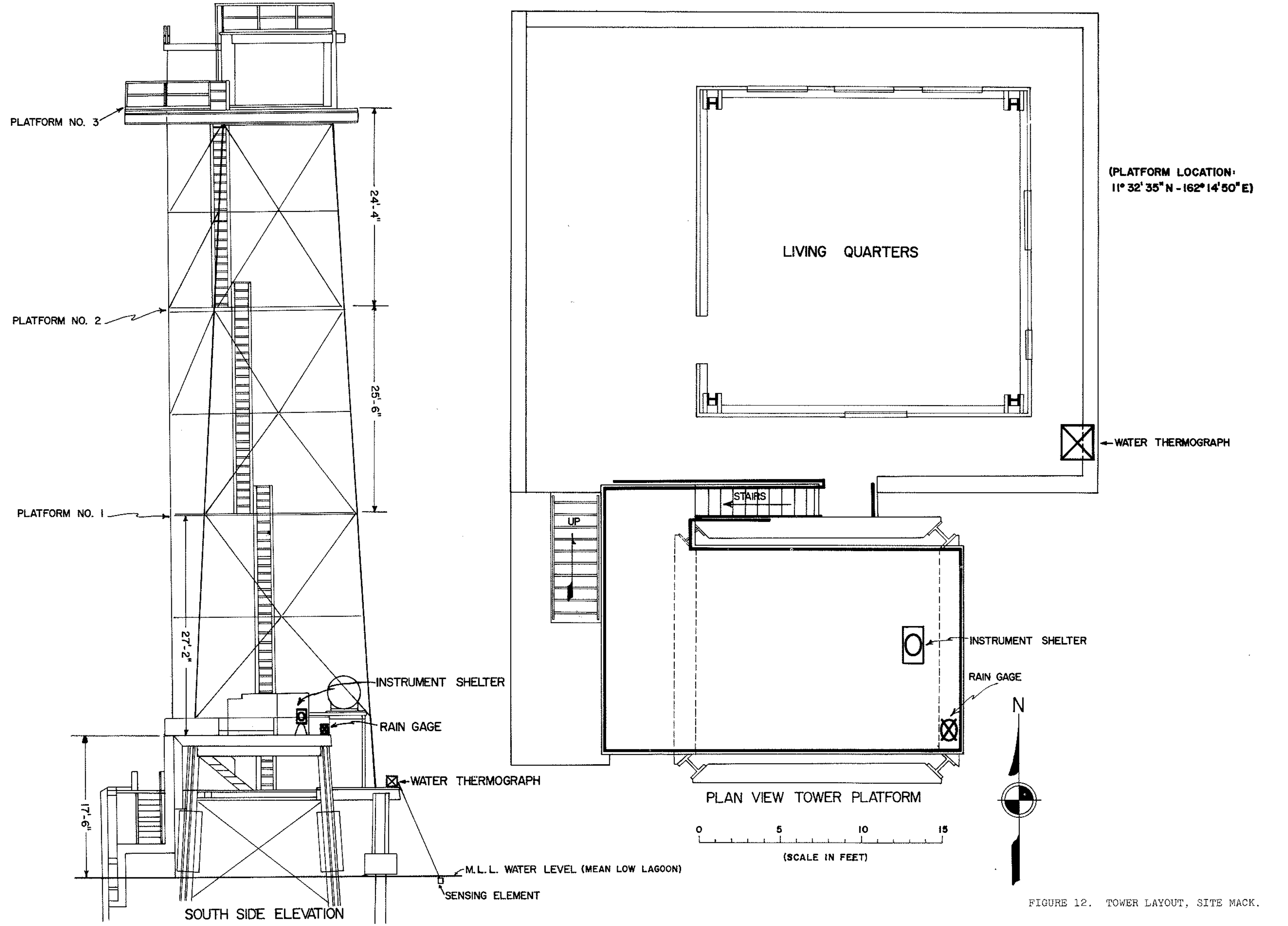


FIGURE 12. TOWER LAYOUT, SITE MACK.

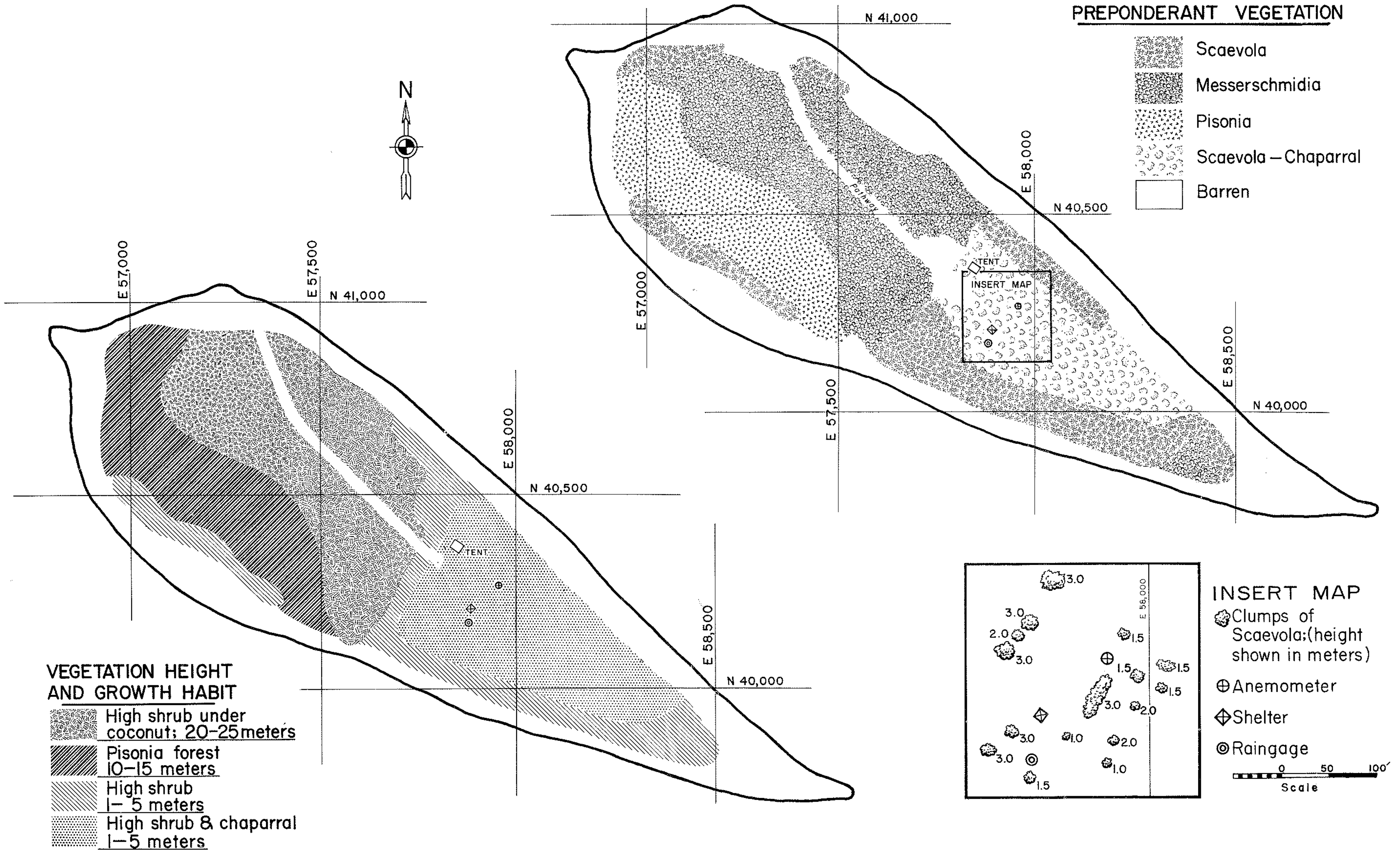


FIGURE 13 VEGETATION, KEITH ISLET

0 400′
Scale

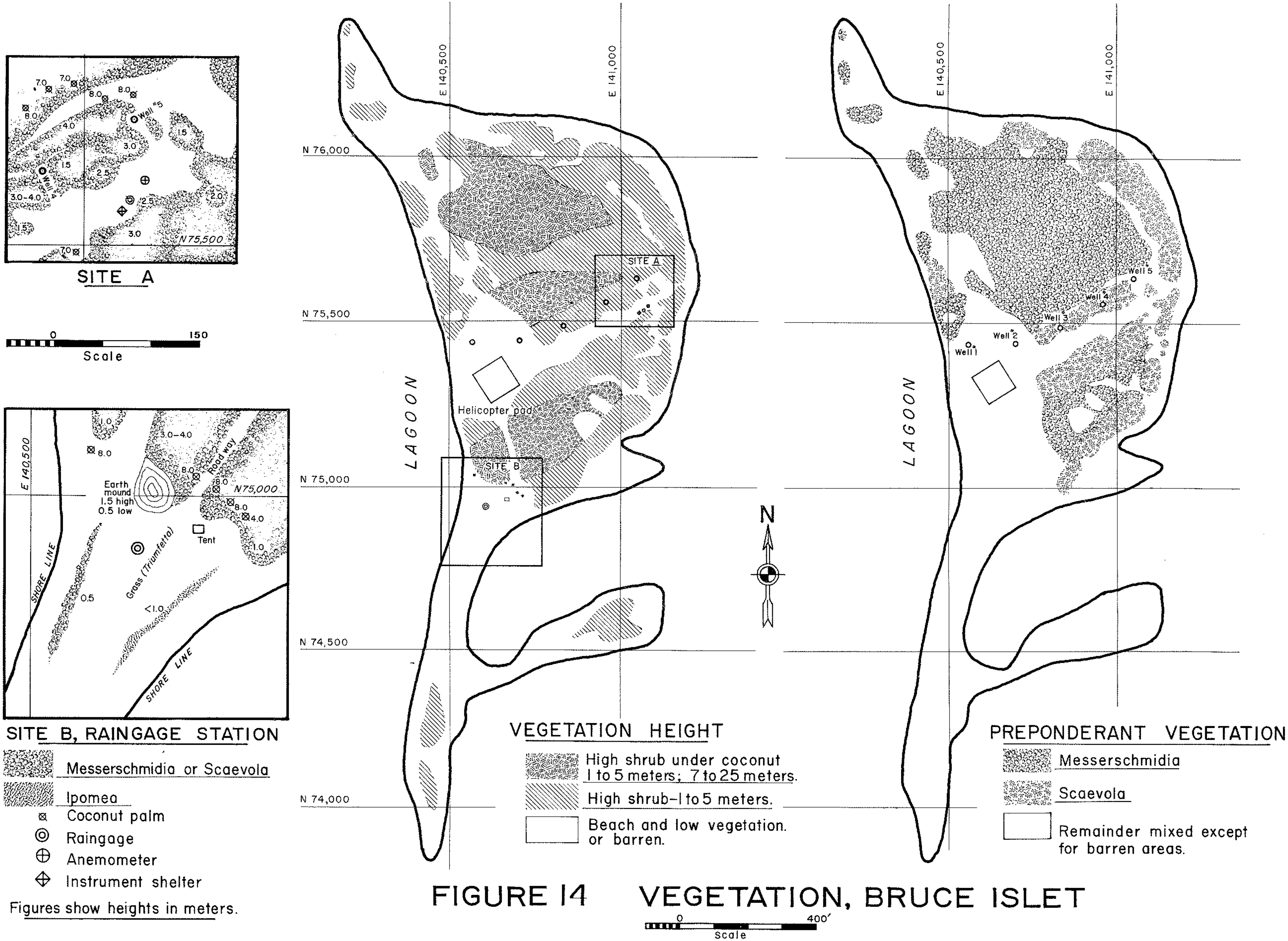


FIGURE 14 VEGETATION, BRUCE ISLET

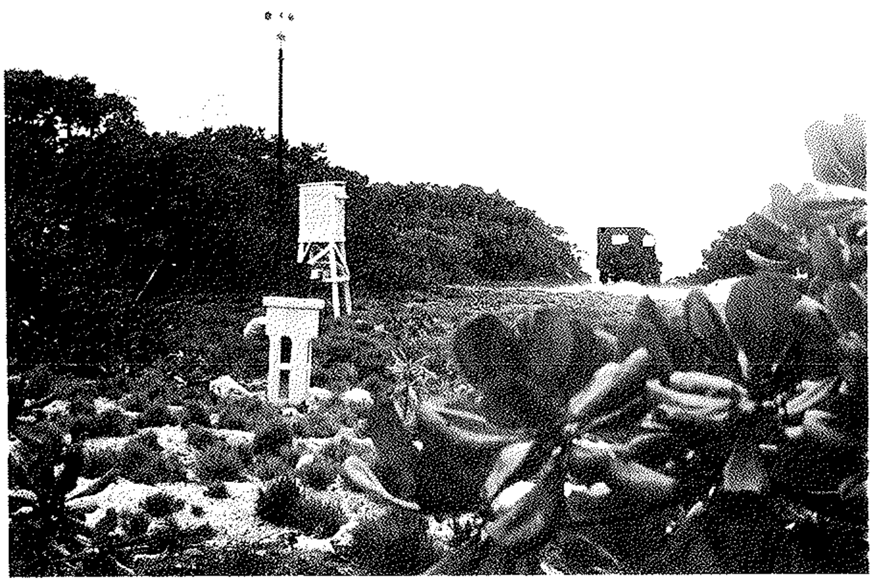


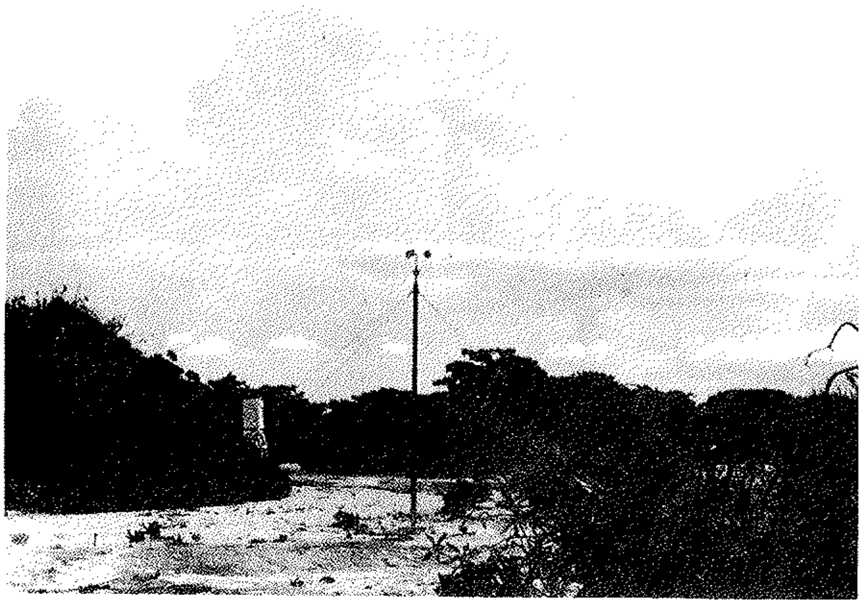
PLATE I-A. WEATHER INSTRUMENTS, BRUCE Islet, ocean side location.

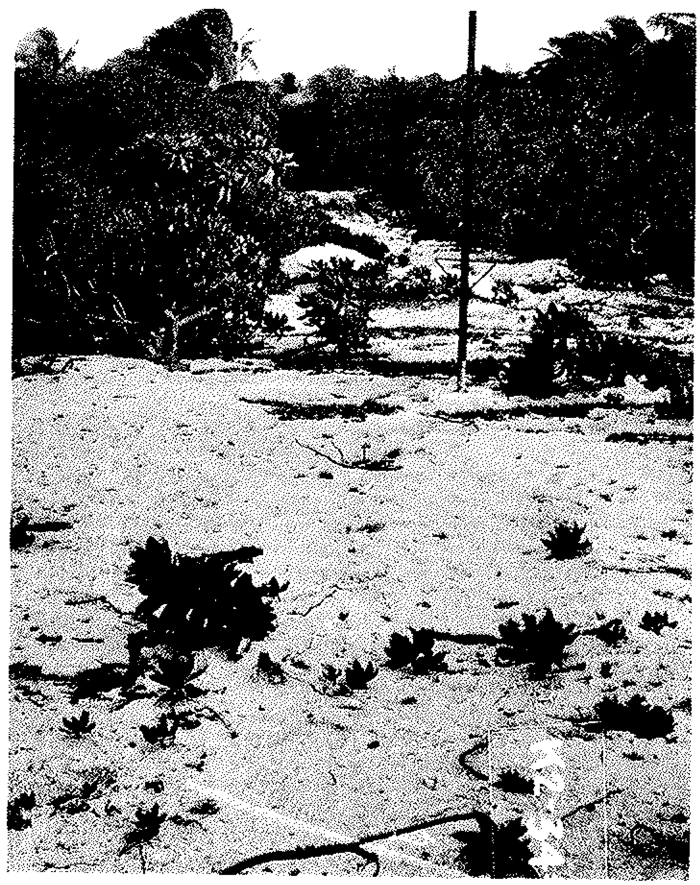
<u>Above</u>: Shelter, anemometer, and raingage, looking east (toward ocean).

<u>Below</u>: Same, looking west (down old runway toward lagoon).

PLATE I-B. RAINGAGE, BRUCE Islet, lagoon side location.

Above: Looking east (toward ocean). Below: Looking west (toward lagoon).

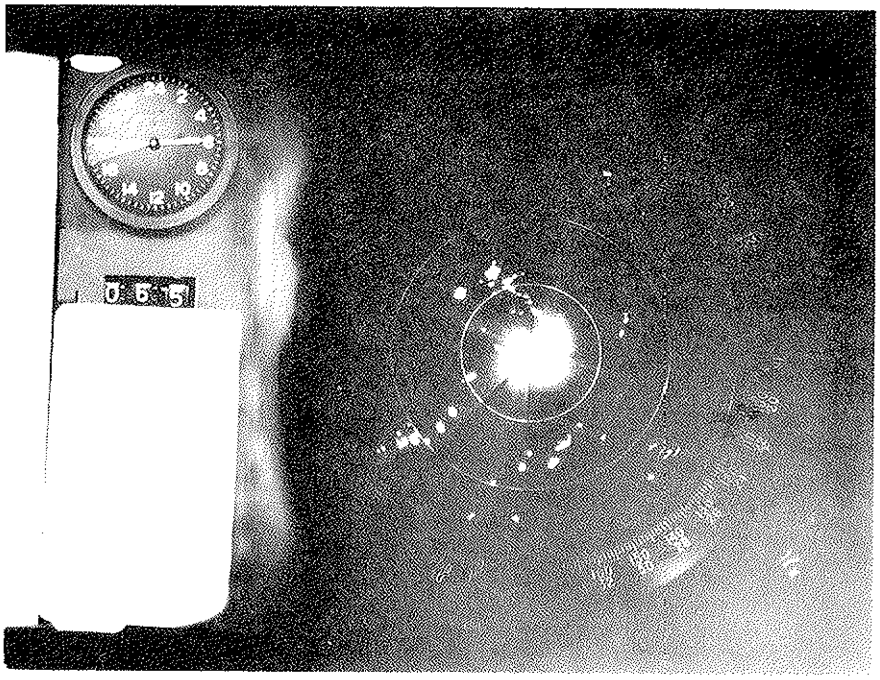




Above: Anemometer and shelter, looking SSW (toward ocean). Rain-gage is to right beyond shelter.

Right: Anemometer mast, showing barren nature of surrounding ground and looking SW.

PLATE II. WEATHER INSTRUMENTS, KEITH Islet.



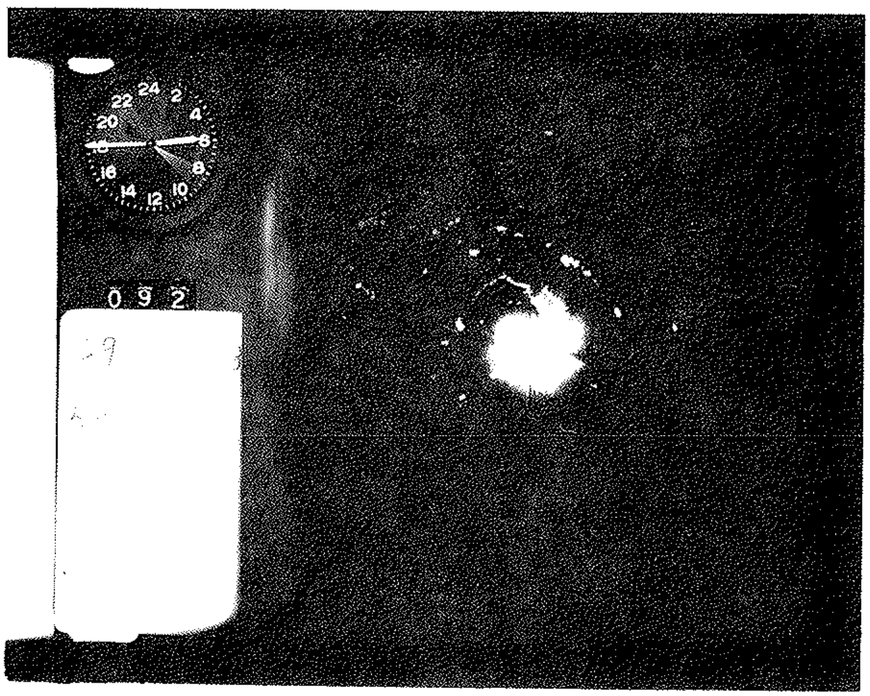


PLATE III. TYPICAL RADARSCOPE VIEWS.

Range: 75 miles. North is at the top of the scope.

PLATE IV. REPRESENTATIVE CLOUD PICTURES. The two shown were taken from KEITH Islet, January, 1958.