CARIBBEAN FOOD CROPS SOCIETY

PROCEEDINGS

ELEVENTH ANNUAL MEETING

THE CLIMATE OF BARBADOS

by

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INTRODUCTION

The island of Barbados has an area of 166 sq. miles, is lowlying with a fairly smooth surface rising at its highest point to just over 335 metres (1,100 feet) and is located in latitude between 13° 02'N and 13° 20'N and in longitude 59° 25'W and 59° 39'W. It lies therefore about 100 miles to the east of the Windward island chain and about 3,000 miles west of the coast of West Africa.

The surface layer of rocks over about 86% of the island consists of coral limestones. Over the other 14% of the island the coral limestones have been removed by erosion and tectonic movements, and the older rocks, mostly shales and sandstones, are exposed at the surface. This region is situated in the north-eastern part of the island and is subject to much soil erosion and land slippage, especially during and after periods of heavy rainfall.

Topographically, the island is relatively smooth except for the Scotland District of the north-east. The land rises generally from the western, north-western and south-western coastlines towards the centre of the island in a series of terraces to a maximum height of just over 335 metres (1,100 feet) at Mount Hillaby, (See Fig. 1). From the south-western coastline, the land rises to a little over 91 metres (300 feet) in what is known as the Christ Church Ridge, then descends to the St.

George Valley before rising again, in terraces, northwards towards the Central Uplands. From the eastern and north-eastern coastlines, the land rises quite abruptly in the Scotland District and is characterised by ridges and valleys giving a much rougher aspect.

FACTORS DETERMINING THE CLIMATE

The main factors are radiation, sea surface temperature and air flow characteristics.

Barbados lies within the belt of the Easterlies or Trade Winds associated with the southern region of the semi-permanent high pressure area located south of the Azores. It is, therefore, almost constantly under an easterly flow of warm moist air. Secondly, it is located in a tropical ocean whose surface temperature varies little from 26.7°C (80° F) at any time. Thirdly, it receives an almost constant amount of solar radiation at its surface from month to month. These three factors combine to give a climate with a fairly constant, high air temperature rarely rising about 33° C (92°F) or falling below 15.6°C (60° F). Broadly, the year may be divided into a dry season and a wet season. The wet season falls roughly from the beginning of June through to the middle of December, when most of the rainfall is received during the passage of tropical disturbances through the region. The dry season starts in mid-December and ends around the end of May. However, these are generalizations since it is quite possible to experience 'dry' spells in the 'wet' season and 'wet' spells in the 'dry' season. These latter are caused by the effect of the intrusion of mid-latitude systems into the region.

CLIMATIC ELEMENTS

Temperature

As the island is quite small, the air temperature is determined to a great extent by the temperature of the winds blowing off the surrounding oceans, which, as mentioned earlier on, have a surface temperature varying little from around 26.7°C (80° F) all the year round. Therefore, there is

little variation either annually or diurnally in air temperatures over the island. Temperatures are lowest in the months of December through to March, an effect due to the sun's low angle in the southern sky and the slight reduction in sea surface temperature. Temperatures are highest in May and early June, the last part of the dry season when radiation is highest and vapour pressure is low. With the advent of the wet season in the latter half of June there is a fall in air temperatures from those of the previous months. This is due to the combined influence of the increase in cloud cover at this time, reducing radiation received at the surface, and of the loss of heat from the land surface used up in evaporating some of the rainfall. It has, therefore, been observed that if there is a prolonged dry spell in the wet season there is an immediate increase in air temperatures. The constancy of temperature is well illustrated by data from the former station at Codrington where in the period 1903 – 1964, the mean monthly temperature ranged from a high of 26.8°C (80.3° F) in June to a low of 24.6°C (76.3° F) in February, a range of only 4° F. The extreme maximum temperature in the same period was 35°C (95° F) in August 1943 and extreme minimum 16° C (61° F) in January 1949 and February 1944. (See Figure 2).

These temperatures and their ranges are not as uninteresting as they might appear since they are in the critical region for important physiological processes from many crop plants, e.g. night time temperature must be less than 72° F (22° C) for fruit set for tomatoes. When it is realised that the optimum growing temperature for some crops may be sensitive to within a few degrees, it can be appreciated that the seasonal temperature variation is important in the seasonal performance of some crops, (Thompson 1942). Corn seedlings have an optimum growing temperature of about 32° C whereas for cucumber seedlings the optimum growing temperature is about 35°C. It is therefore important to have a knowledge of the range and frequency of temperatures which can be expected at particular times of the year.

With regard to the distribution of temperatures over the island, it appears that there is a difference of about 2°C – 3° C (4° F – 6° F) between the mean temperatures occurring in the highest areas and the low lying areas, (Skeete 1963).

Grass minimum temperatures between 15.6° C (60° F) and 18.3° C (65°F) from May to November and between 12.8°C (55°F) and 15.6°C (60° F) from December to March were recorded at Waterford in St. Michael. The extreme minimum recorded there was 11.6° C (52.8° F) in December 1964.

Soil Temperatures

Reliable soil temperature data are sparse. Data taken over five years at Waterford Climatological Station show mean that monthly 2–inch soil temperatures at 9 a.m. are lowest in the months December, January, February and March with a mean for the period of 24.2° C (75.6° F) and highest in the months April to November with a mean of 26.9° C(80.4° F). Mean monthly 2–inch soil temperatures at 4 p.m. are lowest in the months October to February with a mean of 30.7° C (87.2° F).

Some attempts have been made to grow potatoes in Barbados. Unfortunately, it was not realised that potato tubers do not grow in soils when the temperature exceeds 29.2° C, and the optimum soil temperature for tuber growth is about 17°C. The temperature of the soil can greatly influence the growth of roots and in this way affect the growth of the plant.

Wind Speed and Direction

As the island lies in the belt of the north-east Trade Winds, the most frequently recorded wind directions were from the east through to the north-east. At Seawell Airport, over the period 1942 – 1951, the wind blew from either the east, east-north-east or north-east 85% of the time with a maximum percentage frequency of 95% occurring in December, and a minimum percentage of 70% in October. The corresponding figures for Codrington for the period 1933 –1952 showed a percentage frequency of 87% with a maximum percentage frequency in January of 94% and a minimum occurring in September of 75%. Tables 1 and 2 show wind direction data for these two stations.

During the months of December through to March, the wind blew almost exclusively from directions east through north-east. In the months of April to July there is a slight shift with south-easterly winds blowing occasionally. From August to November there is a more pronounced shift to south-easterly and south winds with the occasional wind from the south-west, these latter associated with tropical disturbances passing over or near the island.

Wind speed is highest on average during the months of January through to July, corresponding roughly with the dry season. At Seawell Airport over the period 1942 – 1970 wind speed averaged 6.6 metres per second (12.9 knots) during January to July and 5.2 metres per second (10.2 knots) during August to December, (See Table 3). Gusts of 15.6 to 22.4 metres per second (35 to 50 m.p.h.) are occasionally experienced with the passage of tropical disturbances. A speed of about 45 metres per second (100 m.p.h.) was estimated to have occurred during Hurricane Janet in 1955 in the southern coastal districts, with sustained maximum winds of 35.8 – 38.0 metres per second (80 – 85 m.p.h.)

Unfortunately, the Caribbean Agriculturalist seems to recognize the damage that is done to his crop by gale force winds only. Equally important, however, is the loss which can accrue from removal of blossoms and the deformation of tree crowns by winds far below gale force. Over the whole of Barbados, this deformation of plant tops can be seen on permanent tree crops and other trees. It seems likely that in the near future wind breaks and shelter belts will become a feature of Barbadian agriculture.

With the increase in the number of cane fires and the increased frequency of crop damage due to wind borne agricultural chemicals it is hoped that the local agriculturalists will begin to pay more attention to wind speeds and directions.

Cloud Cover

Convectional clouds are the predominant type seen over Barbados, ranging in size from the small cumulus humilis to the giant towering

cumulo-nimbus seen during the months of August, September and October. Data from Seawell Airport give a mean annual cloud cover of 3.6 expressed in oktas or eights, i.e. lying between 3/8ths and 4/8ths of sky covered by cloud, (See Figure 3). Cloud cover is highest during the daytime hours. The months of greatest cloud-cover during the daytime are June through to December with a mean of 3.91, but April also shows a high figure of 3.81. Mean daytime cloud cover for the months January through to May was 3.66.

Day to day variation can be quite large, cloud amounts ranging from 2/8 to 6/8 of sky covered, with days of completely overcast or completely cloud-free sky being very rare. There is a tendency for clouds to form over the more elevated parts of the island and also to line themselves up in 'streets' parallel to the prevailing wind. These factors contribute greatly to the observed variations in the amounts of solar radiation received by different surfaces across the island. Diurnally, cloud amounts are highest in the day and lowest between 8 p.m. and 2 a.m. (See Figure 4).

Cloud cover influences the temperature of plant leaves. Leaf temperature is extremely important in the germination of some fungal spores. Thus the occurrence of certain crop diseases at some times of the year, or at certain locations may, in some cases, be attributed to the difference in cloud cover.

Solar Radiation

The quantity of daily solar radiation received at the top of the atmosphere for latitude 13° 21' N varies from a maximum of 932 langleys in mid-May and around the end of July, when the sun is overhead on its path northwards and returning southwards, respectively, to a minimum of 719 langleys around the middle of December when the sun is at its farthest point south of the island. (See Figure 5). However, average cloud cover over the island is higher over most of the months of high radiation than over the months of low radiation, and this tends to give a more even

distribution of the radiation received at the surface over the period of a year. The exceptions to this are March, April and May when low cloud cover coincides with high radiation values to give high surface values of radiation.

Measurements of solar radiation are available for a comparatively short period of time, but sunshine duration has been recorded for longer periods.

Data obtained from a study made in 1964 at the Brace Experiment Station, St. James showed that total radiation received at the surface is greatest in the months of March, April and May and least in the months of September to December. (See Figure 5).

The range of monthly values of mean radiation is not large, the largest value occurring in March with 513 langleys out of a possible 888 langleys, and the smallest in September with 411 langleys out of a possible 896 langleys, a difference of about 180 langleys. Cloud cover is the factor responsible for the smoothing out of these values since cloud amounts increase during June at the beginning of the wet season and remain high until December. (See Figures 3 and 5).

Cloud cover is also the most important factor in determining the proportion of diffuse radiation in the total radiation. As cloud cover increases, the percentage of diffuse radiation in total radiation increases also.

Table 5 shows the distribution of the daily total radiation. The number of days in a month in which total radiation was greater than or less than certain amounts are shown as well as the highest and lowest daily amounts for each month. On some days in March, April and May the total radiation was greater than 600 langleys. These months also have the highest number of days with more than 500 langleys. The months of July, September, October, November and December have the highest number of days with less than 400 langleys per day and September is the only month with more than 10 days recording less than 400 langleys.

Table 6 shows the distribution of radiation by hours of the day. The greatest hourly value of total radiation usually occurs between 11 a.m. and noon and for diffuse radiation one hour later.

Radiation values vary widely over the island, (Tout 1968) and this is mostly due to the distribution of cloud cover. Clouds tend to form more frequently over the elevated regions in the centre of the island, while the coastal areas in the south-west, east and south-east remain comparatively free of cloud. The high regions thus benefit from the effects of reduced radiation and higher rainfall, combining to produce a much more favourable water balance in the soil.

The amount of solar radiation received by a crop influences the amount of dry matter produced. It seems likely that the mineral consumption of the crop can in this way be influenced by the radiation climate. Thus the use of fertilizer may not only be dependent on the soil conditions but on the climate as well.

Annual totals of sunshine duration from Codrington and Seawell Airport are both just over 3,000 hours, with little variation from year to year. Mean daily sunshine at both stations is highest during the months of March and April, the figure at Codrington being 8.9 hours and at Seawell Airport 9.0 hours. This pattern agrees with that obtained from the measurements of solar radiation quoted from the Brace Experimental Station.

Rainfall

Rainfall is lowest in the period from mid-December to the end of May, with March as the driest month. (See Table 4). The wet season runs from early June to mid-December with September and October as the wettest months. Monthly totals of rainfall vary quite considerably from year to year, especially in the drier areas, for example 330 mm (12.98 ins) were recorded at Waterford in St. Michael in July 1963 and 69 mm (2.71

ins) in July 1959. Annual rainfall is also quite variable, (See Figure 6). Eighty years of data for the period 1843 – 1922 from Oughterson Plantation, St. Philip give a maximum of 1905 mm (75 ins) in 1853 and a minimum of 787 mm (31 ins) in 1885 with a mean of 1369 mm (53.9 ins).

As mentioned earlier, the volume of rainfall in the wet season is determined mostly by the frequency of tropical disturbances which account for most of the rain in this period. Local convectional showers account for most of the remainder.

In the dry season, most rainfall originates from the effects of mid-latitude systems intruding into the region. Since the intrusions of these systems tend to be somewhat randomly distributed in time, i.e. they do not intrude predictably either in number or in time of occurrence, the rainfall they produce in the area is very variable over time. This is in contrast to the passages of tropical disturbances in the wet season, which, over a long period of years, tend to occur with a statistically predictable frequency roughly one every four days. (Riehl 1954). Thus the variability of rainfall in the wet season is lower than in the dry season. This is confirmed by the statistical study by Lirios and Farnum 1972, who report that there is a large coefficient of variation of rainfall in the months of low rainfall, while the coefficient of variation is small in months of high rainfall. There is a small contribution to the rainfall of the dry season by showers of local convectional origin, but the conditions for formation of these clouds are less favourable in the dry season than in the wet season.

Rainfall amounts vary from place to place across the island. (See Figure 7). The low lying areas of the south-east, south-west and the north are the driest with a mean annual rainfall in the period 1908 – 1970 of less than 1,270 mm (50 ins). The wettest areas are the central and north-central elevated regions which had mean annual rainfall amounts for 1908 – 1970 greater than 1,651 mm (65 ins.) with as high as 2,057 mm (81 ins) in places. According to Lirios and Farnum 1972, areas which receive high rainfall amounts have a low variability of rainfall from year to

year, while areas of low rainfall amount have a high variability from year to year.

Evaporation

From the very limited data on evaporation available, the data from four complete years of Class 'A' pan evaporation measurements taken at Waterford Climatological Station show that monthly evaporation is least in the months September to February, the mean for the period being 147 mm (5.8 ins) of water with a minimum in November of 132 mm (5.2 ins), and is greatest in the months March to August with a mean of 203 mm (8.0 ins) and a maximum in May of 226 mm (8.9 ins). (See Figure 7A for a plot of some evaporation data.)

Moisture Balance

Rouse and Watts (1966), made a study of the moisture balance of the island in which a slightly modified version of Thornthwaite's system was used to estimate the moisture balance in the soil.

They estimated potential evapotranspiration and actual evapotranspiration. The first of these, the P.E., is the amount of water which will be evaporated and transpired from vegetation provided that this water is available in the soil. The A.E. is the amount of water which will actually be evaporated and transpired, this amount being controlled or limited by the amount of rainfall received by the soil and its moisture retention capacity.

They found that the potential evapotranspiration is closely related to the elevation. The areas with high potential evapotranspiration 1676 – 1778 mm (66 – 70 ins) lie exclusively where elevations are less than 61 meters (200 feet); those with moderate P.E., 1295 – 1651 mm (51 – 65 ins) in regions with elevation between 61 – 244 meters (200 –800 feet); those with low P.E., 1168 –1260 mm (46 –50 ins) usually above 244 meters (800 feet).

Actual evapotranspiration showed a different areal distribution. A.E. is lowest where the P.E. is highest. Thus, the areas of greatest moisture requirement do not receive or retain sufficient moisture and there is a large moisture deficit. Along a narrow zone of the southern coast, this deficit exceeds 508 mm (20 ins) per year. An exception to the above is the coastal areas of St. James and St. Peter and North-western St. Lucy where higher rainfall and soils of greater moisture retention capacity combine to give the highest A.E. for the whole island. A.E. is low to moderate in the areas of higher elevation where P.E. is low to moderate and there is little or no moisture deficit.

Vapour Pressure and Relative Humidity

Vapour pressure of the air is lowest in the dry season months of January to April with a mean value of 24.5 mb at Seawell Airport and 22.9mb at Codrington Agricultural Station. It is highest in the wet season months of July to November, with a mean of 28.7 mb at Seawell and 27.4 mb at Codrington. The values at Codrington are lower in all months than those at Seawell, reflecting the reduction of moisture in the air in a low lying area away from the sea coast. (See Figure 8.)

The figures for relative humidity at the two stations show a similar pattern to that for vapour pressure. Relative humidity is lowest in the months January to April with mean at Seawell of 72.5% and at Codrington of 67.6%, and highest in months July to November with mean at Seawell of 78.8% and at Codrington of 74.8%. (See Figures 9 and 10.)

SUMMARY

Barbados has an even climate, with a broad division of the climatic year into a wet and dry season. Topography and elevation determine the variations experienced in the climate at different locations on the island especially with regard to radiation received, cloudiness and rainfall, the areas of higher elevation receiving generally less radiation, but having more cloudiness and rainfall. The temperature variation is small, both from month to month and from place to place, but diurnally can reach up to 10°C (18°F). Winds are predominantly from the East, and are strongest in the dry season, except during passage of the occasional hurricane. There is a moisture deficit over most of the low lying areas in the southern regions of the island, with little or no deficit in other regions.

ACKNOWLEDGEMENT

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REFERENCES

1. Lirios, J.F. and Farnum, F.C., 1972 – A Rainfall Study for Barbados, W.I. Part II – Maps of Isopercental Values and Relative Variability of Rainfall – 1937 – 1970, Caribbean Meteorological Institute.

2. Riehl, H., 1954 – Tropical Meteorology – McGraw Hill, N.Y., U.S.A.

3. Rouse, W.R. and Watts D., 1966 – Two Studies in Barbadian Climatology, McGill University Climatological Bulletin No.1.

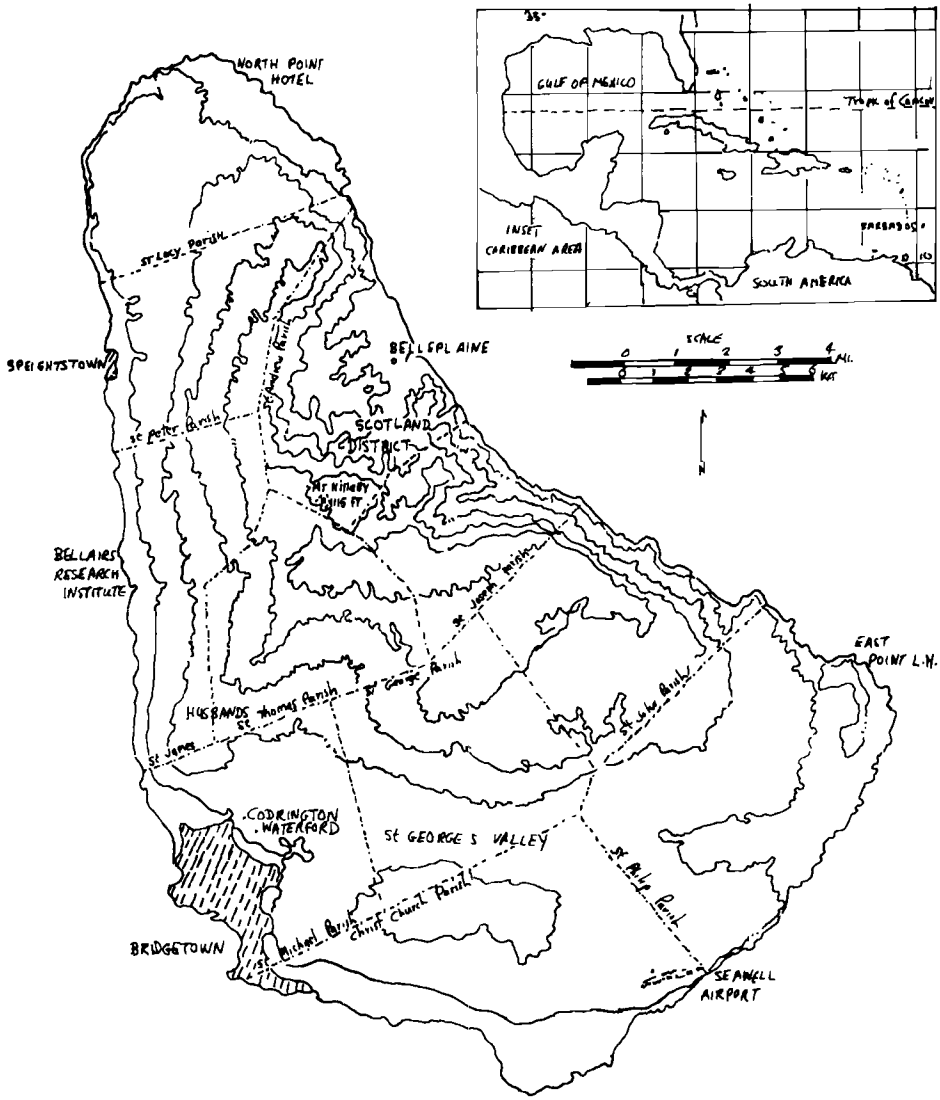
4. Tout, D.G., 1967 – An Analysis of the 1964 Solar Radiation Record at the Brace Experiment Station, St. James, Barbados, McGill University Climatological Bulletin No. 2.

5. Tout, D.G., 1968 – The Climate of Barbados – McGill University Climatological Bulletin No. 3.

6. Skeete, C.C., 1963 – A Historical Description of the Weather of the Island of Barbados, West Indies – Barbados Government Printing Office.

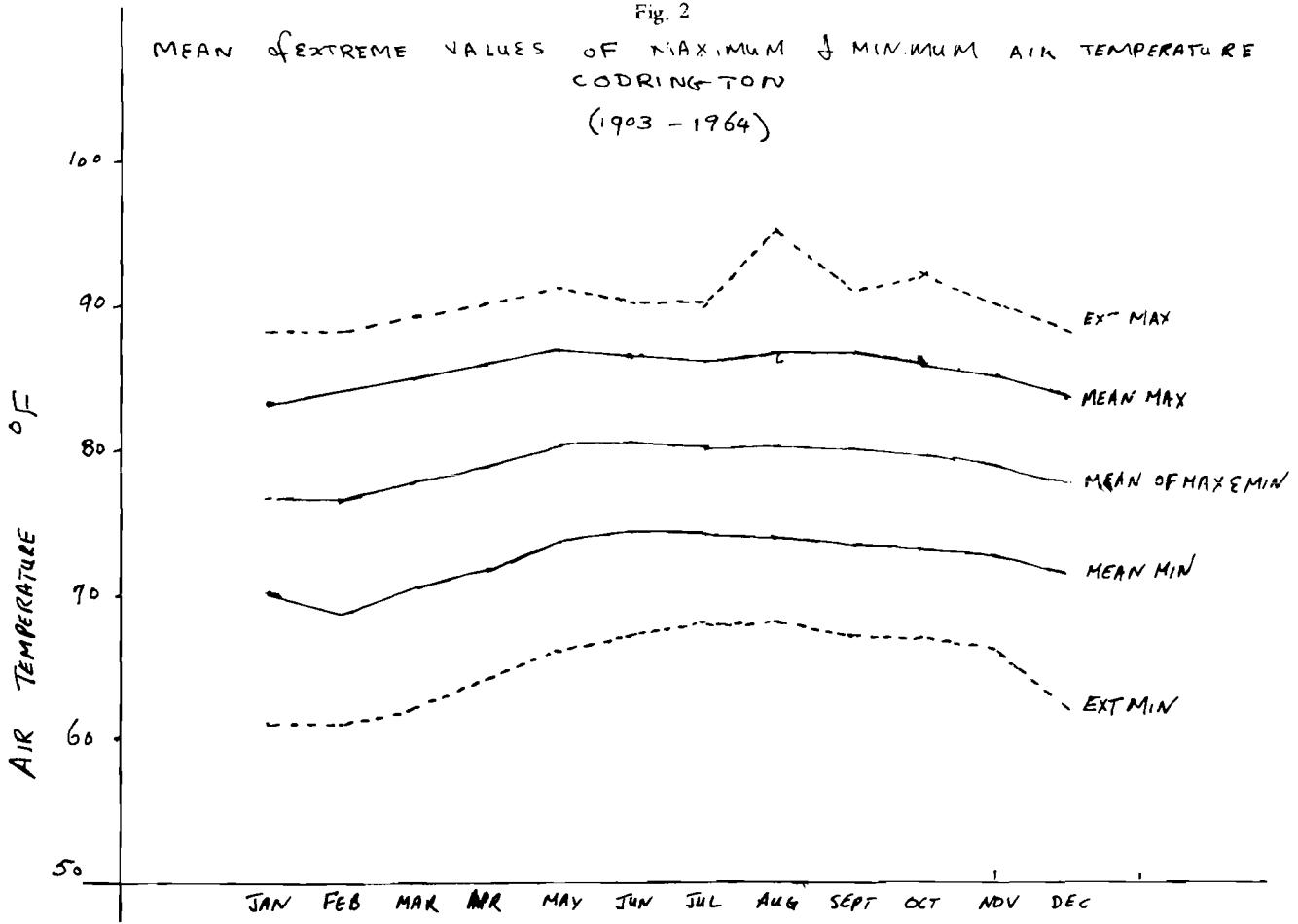
7. World Meteorological Organization, 1972 – Proceeding of the WMO Seminar on Agricultural Meteorology with Special Reference to Tropical Areas of Regions 3 and 4 – WMO NO. 310.

8. Thompson, 1942 – On Growth and Form – Cambridge University Press.



BARBADOS
LOCATION MAP
FIG. 1

Fig. 2


MEAN & EXTREME VALUES OF MAXIMUM & MINIMUM AIR TEMPERATURE
CODRINGTON
(1903 - 1964)
AIR TEMPERATURE °F
100
90
80
70
60
50
EXT MAX
MEAN MAX
MEAN OF MAX & MIN
MEAN MIN
EXT MIN
JAN FEB MAR APR MAY JUN JUL AUG SEPT OCT NOV DEC

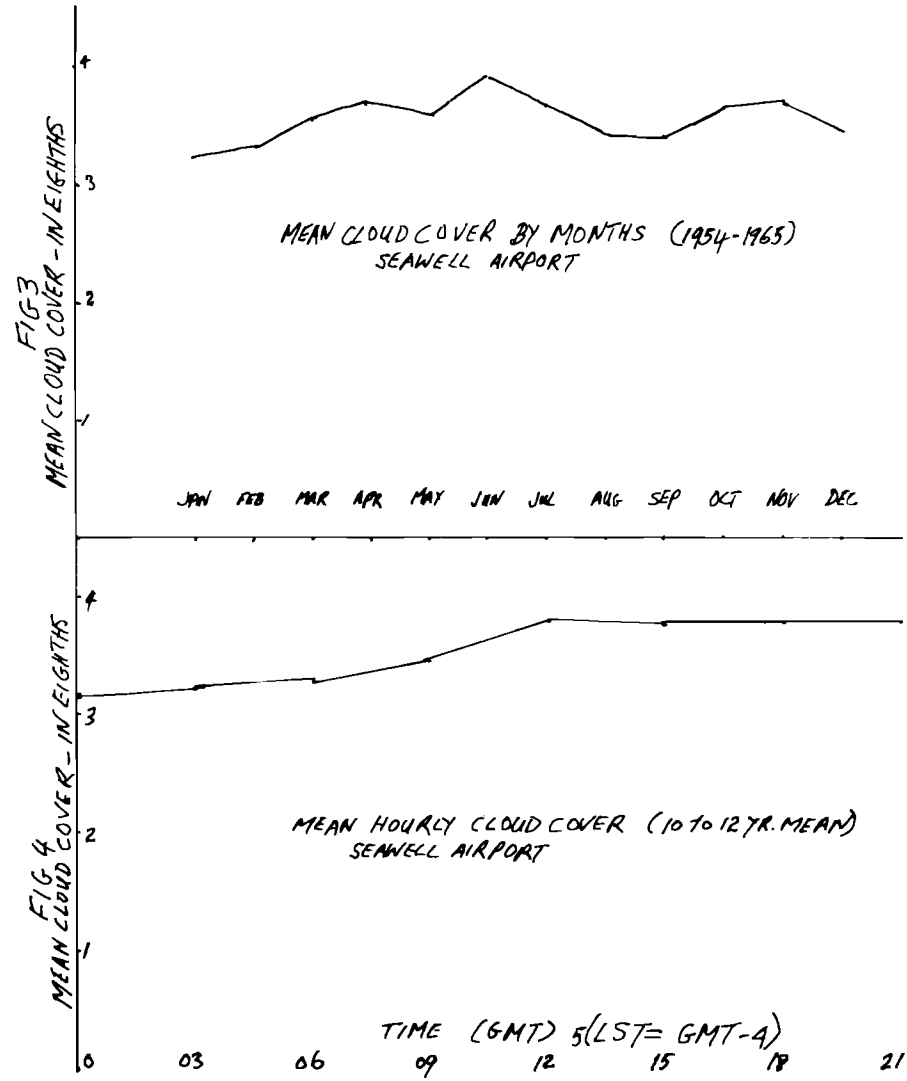


FIG 3
MEAN CLOUD COVER - IN EIGHTHS
4
3
2
1
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
MEAN CLOUD COVER BY MONTHS (1954-1965)
SEAWELL AIRPORT
FIG 4
MEAN CLOUD COVER - IN EIGHTHS
4
3
2
1
0
03
06
09
12
15
18
21
TIME (GMT) 5(LST = GMT-4)
MEAN HOURLY CLOUD COVER (10 to 12 YR. MEAN)
SEAWELL AIRPORT

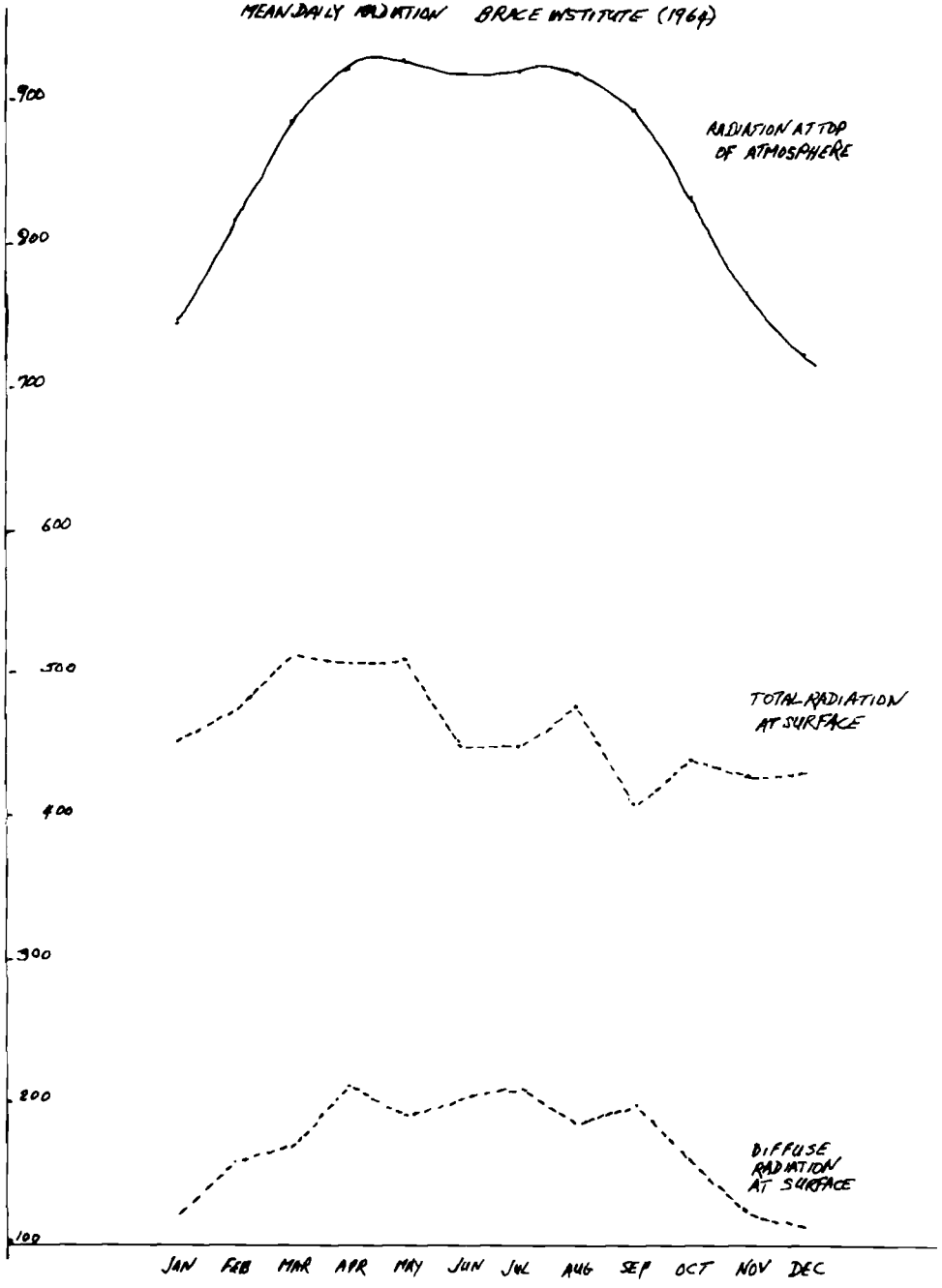

MEAN DAILY RADIATION BRACE INSTITUTE (1968)
900
800
700
600
500
400
300
200
100
RADIATION AT TOP OF ATMOSPHERE
TOTAL RADIATION AT SURFACE
DIFFUSE RADIATION AT SURFACE
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Fig. 6

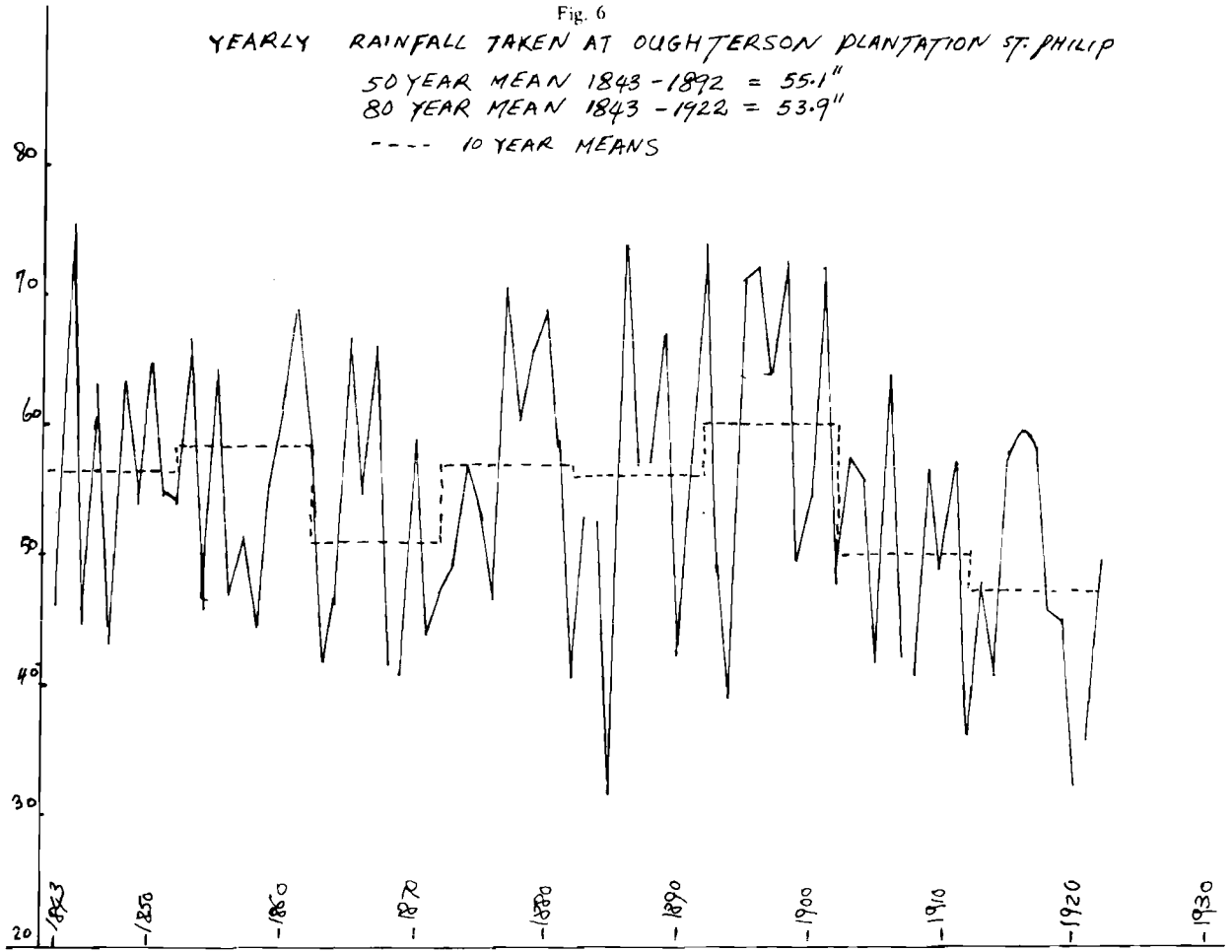
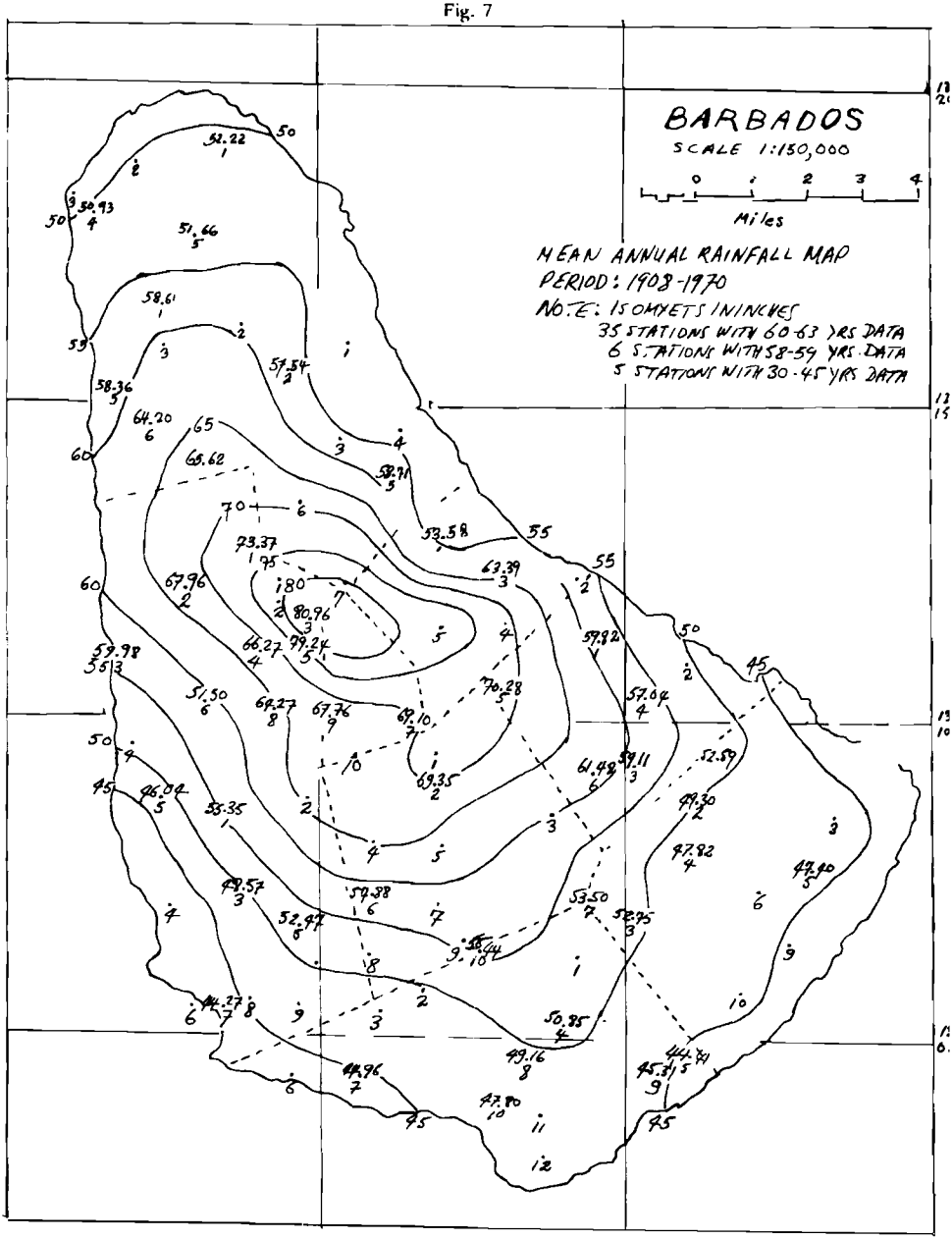

YEARLY RAINFALL TAKEN AT OUGHTERSON PLANTATION ST. PHILIP
50 YEAR MEAN 1843 - 1892 = 55.1"
80 YEAR MEAN 1843 - 1922 = 53.9"
---- 10 YEAR MEANS
80
70
60
50
40
30
20
1843
1850
1860
1870
1880
1890
1900
1910
1920
1930

Fig. 7


BARBADOS
SCALE 1:150,000
0 1 2 3 4
Miles
MEAN ANNUAL RAINFALL MAP
PERIOD: 1908-1970
NOTE: ISOHYETS IN INCHES
35 STATIONS WITH 60-63 YRS DATA
6 STATIONS WITH 58-59 YRS DATA
5 STATIONS WITH 30-45 YRS DATA

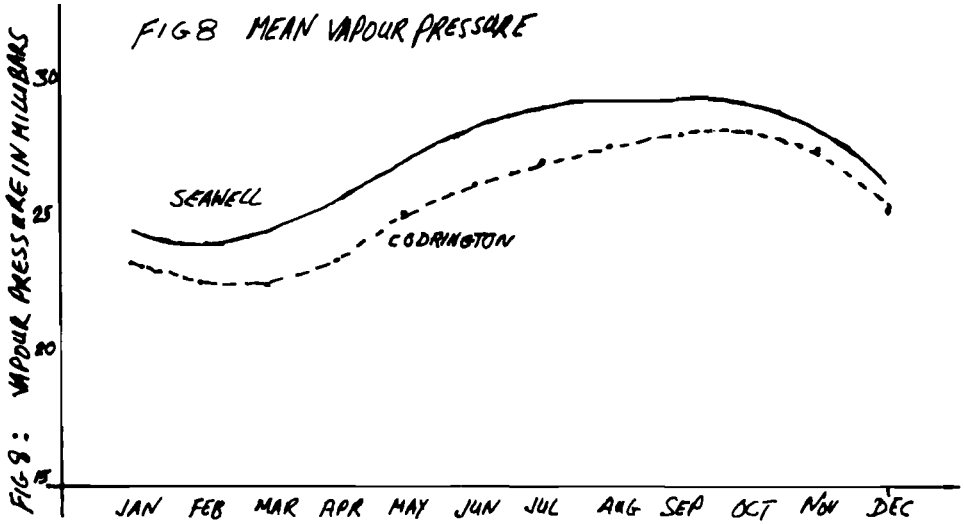
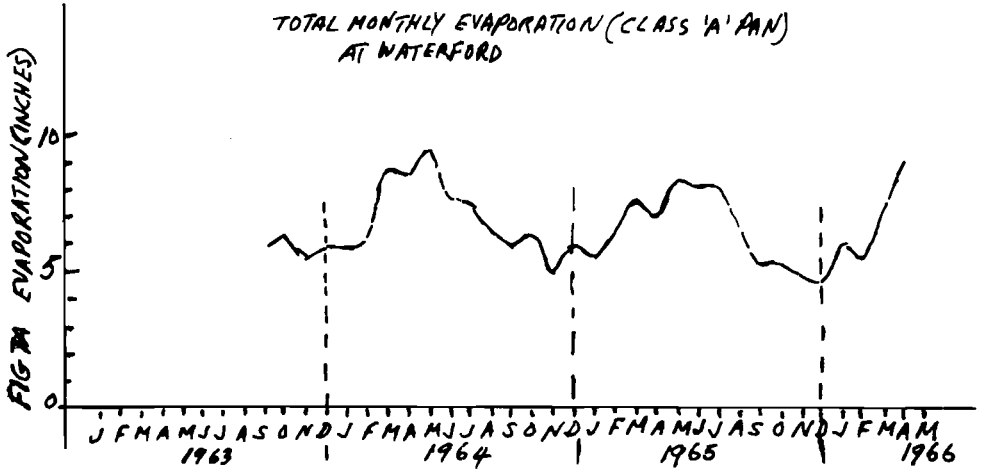
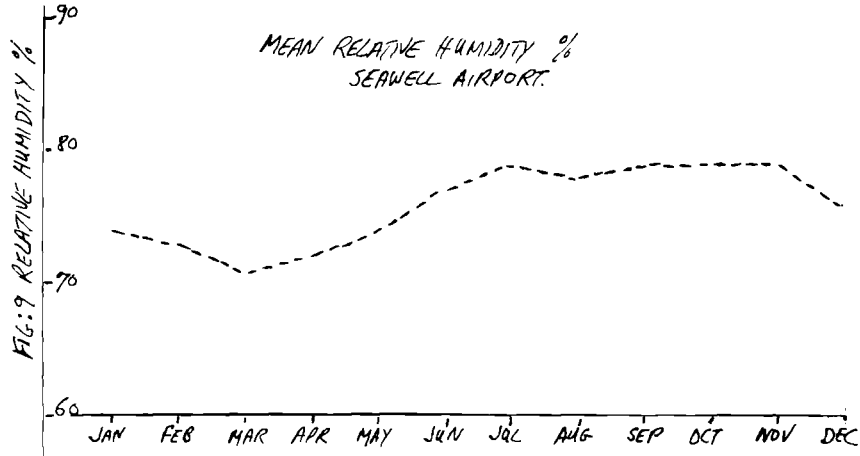


FIG 8 MEAN VAPOUR PRESSURE
FIG 8 : VAPOUR PRESSURE IN MILLIBARS
30
25
20
15
SEANELL
CODRINGTON
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC


TOTAL MONTHLY EVAPORATION (CLASS 'A' PAN) AT WATERFORD
FIG 9 EVAPORATION (INCHES)
10
5
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M
1963
1964
1965
1966


MEAN RELATIVE HUMIDITY %
SEAWELL AIRPORT.
FIG:9 RELATIVE HUMIDITY %
90
80
70
60
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

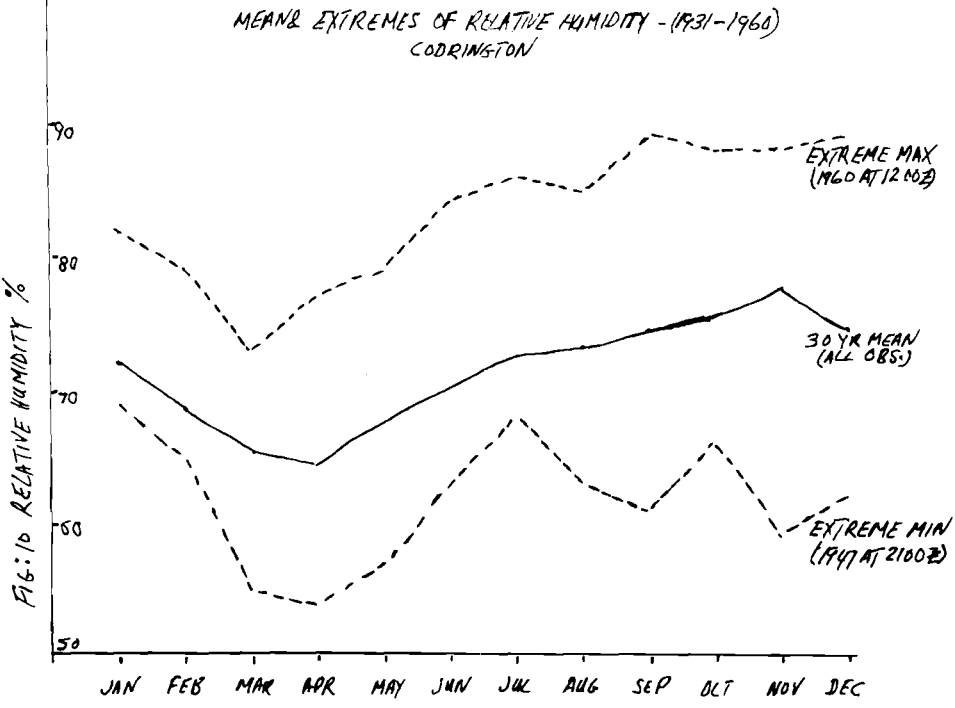

MEANS EXTREMES OF RELATIVE HUMIDITY - (1931-1960)
CODRINGTON
FIG:10 RELATIVE HUMIDITY %
90
80
70
60
50
EXTREME MAX
(1960 AT 12 00Z)
30 YR MEAN
(ALL OBS.)
EXTREME MIN
(1947 AT 2100Z)
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

TABLE 1

WIND DIRECTIONS BY FREQUENCY (%) – AVERAGE OF OBSERVATIONS AT 0800 AND 1400 FOR THE PERIOD 1942 – 1951 – SEAWELL AIRPORT.

	N	NE	E	SE	S	SW	W	NW	CALM
JAN.	5	45	46	2	0	0	0	1	1
FEB.	2	48	42	6	0	1	0	1	0
MARCH	3	40	51	5	0	0	0	0	1
APRIL	1	31	57	11	0	0	0	0	0
MAY	1	21	67	11	0	0	0	0	0
JUNE	0	29	64	7	0	0	0	0	0
JULY	1	32	57	8	1	0	0	0	1
AUG.	2	28	53	12	4	0	0	0	1
SEPT.	2	23	51	18	3	1	1	0	1
OCT.	1	16	54	24	3	1	0	0	1
NOV.	3	30	48	10	5	1	0	1	2
DEC.	2	49	46	3	0	0	0	0	0

TABLE 2

WIND DIRECTIONS BY FREQUENCY (%) – AVERAGE OF OBSERVATIONS AT 0900 AND 1500 LST FOR THE PERIOD 1933 – 1952 – CODRINGTON STATION.

	N	NE	E	SE	S	SW	W	NW	CALM
JAN.	2	34	60	2	0	0	0	1	0
FEB.	1	29	64	5	1	0	0	1	0
MARCH	1	30	63	5	0	0	1	0	0
APRIL	1	22	67	9	1	0	0	0	0
MAY	0	15	70	12	2	0	0	0	0
JUNE	0	19	71	9	1	0	0	0	0
JULY	0	22	68	7	1	1	0	0	0
AUG.	1	20	60	11	4	2	1	1	0
SEPT.	2	17	58	13	6	2	1	1	1
OCT.	2	17	60	13	5	2	0	1	1
NOV.	2	21	62	11	2	2	0	1	0
DEC.	2	27	65	4	1	0	0	1	0

TABLE 3

VALUES OF MEAN WIND SPEED IN KNOTS TAKEN AT SEAWELL AIRPORT FOR THE PERIOD – 1942 – 1970.

MONTH	WIND SPEED	EXTREME
January	12.1	15.5
February	12.5	17.4
March	12.6	15.8
April	12.9	15.9
May	13.3	17.8
June	14.0	18.2
July	12.6	16.5
August	10.5	13.1
September	9.7	13.4
October	9.9	12.6
November	9.6	13.0
December	11.2	14.0

TABLE 4

VALUES OF MEAN MONTHLY RAINFALL IN INCHES FOR THE PERIOD SPECIFIED AT THE FOLLOWING STATIONS:–

(a) Seawell Airport (1942 – 1970)
(b) Codrington (1903 – 1957)
(c) Island (1847 – 1960)

MONTH	SEAWELL	CODRINGTON	ISLAND*
January	2.65	2.43	3.37
February	1.78	1.52	2.20
March	1.36	1.36	1.93
April	1.79	1.57	2.34
May	2.65	2.03	3.21
June	4.22	4.46	5.41
July	5.75	5.30	6.26
August	5.79	6.48	7.31
September	6.34	6.83	7.65
October	6.65	6.94	7.89
November	5.59	6.65	7.74
December	3.87	3.57	4.77
TOTAL			60.08

FIG. 1 FIG. 2

*Calculated from returns of about 80 stations in various parts of the island.

TABLE 5

DAILY TOTAL RADIATION (LANGLEYS)
AT BRACE EXPERIMENTAL STATION, 1964

	Number of days H > 600	Number of days H >500	Number of days H < 400	Highest	Lowest
January	0	6	3	542	314
February	0	10	3	581	362
March	4	10	2	614	318
April	5	20	4	628	298
May	2	20	3	623	254
June	0	9	5	591	41
July	0	11	9	592	231
August	0	15	4	587	232
September	0	7	13	555	175
October	0	12	9	559	271
November	0	4	8	526	213
December	0	2	8	510	270
Year	11	134	71	628	41

TABLE 6

MEAN HOURLY VALUES OF RADIATION (IN LYS)

	A.M.						P.M.					
Hours:	6–7	7–8	8–9	9–10	10–11	11–12	12–1	1–2	2–3	3–4	4–5	5–6
January	1.6	11.1	34.9	49.8	62.2	69.0	67.2	60.0	49.1	30.7	15.5	1.6
February	2.8	17.3	36.3	53.5	65.0	70.5	67.4	62.4	49.0	32.8	15.3	2.1
March	4.6	23.3	41.7	58.7	67.6	70.5	72.3	62.3	52.9	38.4	17.4	3.6
April	6.6	21.4	39.9	56.5	66.1	71.4	70.5	61.1	51.3	38.3	20.5	5.7
May	7.6	24.0	40.6	56.7	65.8	70.2	68.6	59.4	51.8	37.1	22.6	6.2
June	6.0	19.9	34.2	45.1	58.3	62.7	62.9	55.1	44.6	33.4	19.9	6.9
July	5.3	18.0	35.6	46.8	56.5	61.1	60.2	55.8	49.1	34.3	20.9	6.7
August	5.7	21.9	37.7	54.1	59.7	64.3	65.0	58.8	49.8	37.0	19.8	4.9
September	4.2	18.0	33.2	46.6	54.3	56.7	55.0	52.5	41.4	30.7	15.3	3.6
October	2.6	16.7	37.3	51.4	60.3	64.0	62.0	54.8	43.9	32.9	13.1	2.6
November	1.6	12.1	37.1	50.5	60.1	66.9	58.4	53.9	42.9	29.2	14.1	2.3
December	1.1	7.5	33.8	49.6	63.0	64.8	59.7	55.2	47.6	32.3	16.1	1.9