RAINFALL NOTES.

B. G. Challis.

"What is it moulds the life of man?
The weather.
What makes some black and others tan?
The weather.
What makes the Zulu live in trees,
And Congo natives dress in leaves,
While others go in furs and freeze?
The weather."

W. J. Humphreys.
(*Weather Proverbs and Paradoxes.*)

Rainfall has a considerable influence on all crops. It regulates their germination, production and harvesting. It has a bearing on the life cycles of pests and incidence of diseases associated with various crops, while the period and quantities of its precipitation, whether light or heavy showers, makes all the difference on growth and yield. For instance, in New Guinea, it has been observed that the peak periods of coffee yield correspond with the periods of low rainfalls, and there is practically no yield during months of heavy rainfall.

Rainfall also greatly concerns many other items such as transport, factories, engineering and general public health matters and is of supreme importance for our domestic water supply in this territory where we have no irrigation or reticulation schemes or means of conserving water, other than by small domestic rainwater tanks.

Rain is a condensation of water vapour in the atmosphere in the form of drops which fall towards the earth, but may evaporate before reaching the ground. Clouds are usually the origin. If the temperature of the upper part of a cloud falls below the dew-point or temperature of complete saturation, large drops form round the comparatively few dust particles suspended in the atmosphere and these fall through the cloud, embodying the smaller drops round the more numerous dust nuclei in the lower part of the cloud as they pass, and emerging as quite large drops of water.

The distribution of rain is determined mainly by the direction and route of the prevailing winds, by the varying temperatures of the earth's surface over which they blow and the physiographical features generally.

The atmosphere has been described as "a vast still of which the sun is the furnace, and the sea the boiler while the cool air of the upper atmosphere and of the temperature zones plays the part of condenser, and we on a wet day catch some of the liquid which distills over."

The pressure of the atmosphere is an important factor in precipitation. At ordinary elevations it is not appreciable to the senses but its action is amply illustrated in a pump where a piston diminishes the pressure of air in the cylinder and the atmospheric pressure outside forces the water up the cylinder of the pump.

By correlating the various barometrical pressures over wide areas meteorologists are able to predict forecasts with a considerable measure of success.

When air ascends over high ground it expands because there is less air above; hence the pressure becomes less and it usually results in the loss of its water content. It then passes on as a dry wind and as it subsequently descends it will be warmed at 5½ degrees Fahrenheit for every 1,000 feet of descent as a result of compression when it comes down into levels of high pressure.

Generally speaking rainfall increases with elevation on the windward side of mountains up to a level of about 9,000 feet in New Guinea after which precipitation decreases with higher elevation.

The direct influence of rainfall on forests may be debated by some authorities, but there is a decided beneficial effect which warrants their extension and protection because they act as wind breaks, control evaporation and arrest soil erosion by wind or rain, one of the gravest concerns of agriculturists to-day throughout the world. Trees as wind breaks and controllers of soil erosion, could be successfully planted on kunai plains. They should be planted at right angles to the direction of the prevailing winds and if planted at distances of not less than half a mile apart, they will afford shelter for the enclosed areas. The abundant rainfall and uniformly high temperatures experienced in New Guinea will make for profuse growth.

Historical records prove however that the destruction of forests has ruined nations. Deserts to-day in parts of North Africa were once the granaries of the Roman Empire where Greek, Roman and Venetian cities thrived. The destruction of the forests caused an unequalizing effect on their climate, the shade temperatures and evaporation increased together with a higher relative humidity, with the consequence that the land became burnt up and those countries to-day form part of a great desert.

The forest countries of Palestine, Mesopotamia, Sicily and China, now barren, once supported a dense and prosperous people who cut down and burnt off their forests with disastrous results.

Lord Lugard in his *Dual Mandate* states—

> Forests serve as a reservoir which feeds the head-waters of streams, and with their destruction the torrential rains carry away the surface soil, and deposit sand and debris on the plains, thus rendering them unfit for cultivation, while the rivers cease to be navigable.

Trees distribute rain water evenly and allow the water to filter through to springs and rivers. Their canopy keeps the ground underneath cool and prevents the rapid drying up of the moisture by the heat of the surrounding atmosphere.

Tests have proved that about 90 per cent. of the rainfall is absorbed by the leaf mould of the forests and the distribution of such water takes a little over two years.

In the absence of forests no such conservation is made and with heavy rains the top soil and humus are washed away so that gradually the productiveness of the land declines, property values are reduced and unless preventive measures are adopted starvation will present itself.

A local example of the beneficial influence by partial clearing of a forest, on climate, may be observed in the Edie Creek area of the Morobe District.

In 1926, when the upper area of the Edie was discovered by Messrs. Royal and Glasson, the mountains and the slopes of the gorge, through which the creek flows, were heavily timbered down to the edge of the river bed. As the alluvial workings were developed, it was found that terraces and slopes of the gorge were rich in gold, and to work these, it became necessary to fell the forest on either side of the creek. Later still, when the large companies such as "Edie Creek Pty. Ltd.," "Day Dawn Ltd.," and "New Guinea Goldfields Ltd.," commenced operations on a large scale, huge areas of forests had to be felled and cleared to provide quarters, stores, roads and water races. The introduction of hundreds of native labourers further called for the provision of rigorous sanitation schemes to cope with the prevalence and danger of infectious diseases such as dysentery, etc. The only way to deal with such a danger, having regard to the ignorance of the native, and the difficulties of supervision over sanitary conditions in a thickly afforested area, was to clear and expose the whole of the locations where the natives were housed and employed.

In this way also vast areas were cleared of timber, and to-day the whole aspect of the Edie Creek area is quite unrecognizable from the densely timbered district of 1926.

The early prospectors and miners who invaded the rich alluvial area from 1926 to 1928 describe the misery and discomfort which prevailed at that time.

The ground was completely covered with a deep moss and humus, in which one sunk to one's ankles. Sunshine was conspicuous by its entire absence, under the dense canopy of the foliage, and an incessant moisture fell day and night from the low hung clouds and mist which lay just on the tree tops at this altitude of 7,000 feet. Hardly a day passed without its complement of rainfall, and the cold winds which blew through those gloomy mountain gorges made life an abject misery.

To-day the scene is completely changed. From an aeroplane one can trace the roads from Wau to the source of the Edie Creek. Huge mining camps lie exposed to the sun and terraces and gardens flourish in their new environment. Moss and fungus are non-existent, and except in very rainy weather, living conditions are very comfortable, and even more desirable than in the heat of the coastal areas. Warm sunshine, the absence of mist and the introduction of good motor roads have completely revolutionized the Edie Creek area, and those who live there to-day would not exchange their habitat for any other in the Territory.

If, however, the forest slopes are indiscriminately and completely cut away in these areas, erosion may occur and the only remedy (if adopted in time) will be re-afforestation and the planting up of thickly matted cover crops which have close packed roots.

Apart from forestry there is nothing man can do to influence rainfall. The theories that gunfire or other atmospheric concussion promotes rain is exploded by the fact that during the Great War in spite of the terrific and incessant bombardments, the rainfall in Europe was only about normal.

Rainfall is measured in terms of the depth of water which would be collected on a level area of any size supposing the rain to fall uniformly over the area at the rate at which it falls into the gauge. An inch of rain means 100 tons of water per acre, or about 64,000 tons to the square mile. For record purposes it is registered in a rain gauge and its amount is stated in the number of inches or millimeters. (To convert points of rain into millimeters divide by 40). It should always be recorded to tenths of a millimetre or to hundredths of an inch and it is desirable to note the time of beginning and ending of heavy showers. Any day on which one point (.01 inch) or more of rain is recorded is regarded as a rain day.

There are two types of rain gauges used, either 5 inches (12.5 centimeters) or 8 inches (20 centimeters) in diameter. The amount of rain measured in a rain gauge with a rim of 5 inches does not vary much from that measured in the gauge with a diameter of 8 inches, although the recorder must be careful to note that his glass or other measure is properly certified for either an 8-inch or 5-inch gauge, otherwise his recordings will be far from accurate as was proved recently when one plantation manager forwarded returns which appeared excessive coming from his particular district.

Instructions as issued by the Commonwealth Meteorologist in the use of a rain gauge were published in the last issue of this *Gazette*.

The Measuring Glass.

With each instrument a graduated measuring glass is supplied, to a capacity of ½ inch of rain water. It is important to see that the proper gauge glass has been supplied, for ½ inch of rain will naturally give a much smaller volume of water in a 5-inch, than it does in an 8-inch gauge. On all reliable glasses, a figure is engraved showing the size of the gauge for which it is intended to be used.

Occasionally the measuring glass may be mislaid or broken. In such a case, before a new one is obtained, it is always possible to use a graduated ounce—or c.c.—measure from the nearest hospital. The area of a circle of 5 inches diameter is 19.64 square inches: 1 inch of rain will, therefore, be equivalent to a similar number of cubic inches of water, in such a gauge. And 19.64 cubic inches are equivalent to 324 c.c., or 11.4 fluid ounces. If, therefore, we measure 11.4 fluid ounces from the collecting glass of a 5-inch gauge, we know that it represents 1 inch of rain.

An 8-inch gauge has an area of 50.28 square inches, and 1 inch of rain will give approximately 29 fluid ounces, or 825 c.c.

The following table of reference will give an emergency reading for use in such circumstances, until a new measuring glass can be obtained.

EMERGENCY TABLE FOR ESTIMATING RAINFALL WHEN THE RAIN-GAUGE GAUGE-GLASS IS MISLAID OR BROKEN.*

With a 5-in. Rain-Gauge.		Approximate Equivalent Rainfall.		With a 8-in. Rain-Gauge.	
Fluid Ounce Measure.	Cubic Centimetre Measure.	Inches.	Millimetres.	Fluid Ounce Measure.	Cubic Centimetre Measure.
M 30	1	0.004†	†0 1	1 dram	3.5
1 dr.	3.5	0.01	0.24	2 dr.	8
1¼ dr.	4	0.012	0.25	3 dr.	10
1½ dr.	5	0.016	0.41	4 dr.	13.5
1¾ dr.	6	0.018	0.45	4½ dr.	15
2 dr.	7	0.022 ‡	‡ 0.55	5 dr.	18
2¼ dr.	8	0.025	0.63	6 dr.	20.5
2½ dr.	9	0.028	0.7	6½ dr.	23
2¾ dr.	10	0.03	0.75	7 dr.	25
3 dr.	11	0.034	0.85	1 fl. oz.	28.4
3½ dr.	13	0.04	1.0	9 dr.	32
4 dr.	14	0.044	1.1	10 dr.	37
4¼ dr.	15	0.048	1.2	11 dr.	40
4½ dr.	16.5	0.051	1.3	1½ fl. oz.	42
5 dr.	18	0.056	1.4	13 dr.	46
5¾ dr.	20	0.61	1.5	14 dr.	50
6 dr.	21	0.065 §	§ 1.6	15 dr.	53
6½ dr.	23	0.07	1.8	2 fl. oz.	56.5
7 dr.	24	0.075	1.9	17 dr.	60
1 fl. oz.	28.4	0.087	2.0	2½ fl. oz.	71.5
8½ dr.	30	0.098	2.4	22 dr.	80
9 dr.	33	0.1	2.5	23 dr.	84
1¼ fl. oz.	35	0.105	2.6	3 fl. oz.	90
10½ dr.	39	0.12	3.0	3½ fl. oz.	99
11 dr.	40	0.125	3.1	3¾ fl. oz.	100
1½ fl. oz.	42.5	0.13	3.3	4 fl. oz.	106
2 fl. oz.	56	0.17	4.4	5 fl. oz.	137
17 dr.	60	0.18	4.6	5¼ fl. oz.	150
2¼ fl. oz.	65	0.20	5.0	5½ fl. oz.	163
2½ fl. oz.	71	0.22	5.5	6 fl. oz.	184
2¾ fl. oz.	80	0.24	6.0	7 fl. oz.	200
3 fl. oz.	85	0.26	6.6	8 fl. oz.	212
3¼ fl. oz.	95	0.30	7.6	9 fl. oz.	240
3½ fl. oz.	100	0.31	7.7	9½ fl. oz.	250
4 fl. oz.	112	0.35	9.0	10 fl. oz.	280
4¼ fl. oz.	119	0.37	9.2	10½ fl. oz.	300
4½ fl. oz.	126	0.39	9.5	11 fl. oz.	325
4¾ oz.	133	0.40	10.0	12 oz.	330
5 oz.	140	0.44	11.0	13 oz.	350
5½ fl. oz.	150	0.49	12.3	14 fl. oz.	400
5¾ fl. oz.	159	0.50	12.7	15 fl. oz.	425
6 fl. oz.	168	0.53	13.2	16 fl. oz.	437
6¼ fl. oz.	175	0.55	13.8	16½ fl. oz.	450
6½ fl. oz.	182	0.57	14.3	17 fl. oz.	475
53 dr.	188	0.60	15.2	18 fl. oz.	490
6¾ fl. oz.	190	0.61	15.3	18½ fl. oz.	500
7 fl. oz.	196	0.62	15.4	19 fl. oz.	510
7¼ fl. oz.	200	0.63	15.5	19¼ fl. oz.	520
7½ fl. oz.	208	0.66	16.5	19¾ fl. oz.	545

* The Malayan Agricultural and Horticultural Association Magazine—January, 1934. † Mark as: "A trace". ‡ Slight Precipitation. § "If more than the above, is 'wet day'."

EMERGENCY TABLE FOR ESTIMATING RAINFALL WHEN THE RAIN-GAUGE GAUGE-GLASS IS MISLAID OR BROKEN—*continued.*

With a 5-in. Rain-Gauge.		Approximate Equivalent Rainfall.		With an 8-in. Rain-Gauge.	
Fluid Ounce Measure.	Cubic Centimetre Measure.	Inches.	Millimetres.	Fluid Ounce Measure.	Cubic Centimetre Measure.
7¾ fl. oz.	210	0.67	17.0	19¾ fl. oz.	550
8 fl. oz.	224	0.70	17.8	1 pint	575
8¼ fl. oz.	230	0.74	18.5	21 fl. oz.	600
8½ fl. oz.	238	0.75	19.0	22 fl. oz.	625
9 fl. oz.	250	0.80	20.0	23½ fl. oz.	650
9½ fl. oz.	262	0.84	21.0	24¾ fl. oz.	675
10 fl. oz.	275	0.86	21.5	26 fl. oz.	700
10½ fl. oz.	287	0.90	22.9	27 fl. oz.	750
11 fl. oz.	300	0.98	24.5	28 fl. oz.	800
11¼ fl. oz.	307	1.00	25.4	29 fl. oz.	825
11½ fl. oz.	325	1.05	26.5	30 fl. oz.	850
12 fl. oz.	350	1.10	27.6	33 fl. oz.	900
13 oz.	375	1.17	29.0	35 oz.	950
14 oz.	400	1.25	31.0	37 oz.	1 litre
15 fl. oz.	450	1.39	34.9	2 pints (1 quart)	1146
17½ fl. oz.	500	1.50	38.1	45 fl. oz.	1315
1 pint	550	1.76	44.1	2½ pints	1400
21 fl. oz.	600	1.86	46.6	55 fl. oz.	1½ litres
23 fl. oz.	650	2.00	50.8	3 pints	1700
25 fl. oz.	700	2.17	54.4	70 fl. oz.	1800
28 fl. oz.	800	2.48	62.2	75 fl. oz.	2 litres
30 fl. oz.	850	2.50	63.5	77 fl. oz.	2010
32 fl. oz.	900	2.78	69.7	4 pints	2200
25 fl. oz.	1 litre	3.00	76.2	90 fl. oz.	2500
2 pints (= 1 quart)	1100	3.25	87.8	5 pints	2750
45 fl. oz.	1200	3.50	88.9	110 fl. oz.	3 litres
47 fl. oz.	1290	3.75	95.2	120 fl. oz.	3250
2½ pints	1375	4.00	101.6	130 fl. oz.	3500
54 fl. oz.	1445	4.25	107.9	135 fl. oz.	3700
55½ fl. oz.	1510	4.50	114.3	140 fl. oz.	3800
57 fl. oz.	1580	4.75	120.6	145 fl. oz.	3900
3 pints	1650	5.00	127.0	150 fl. oz.	4 litres
3¼ pints	1790	5.25	133.3	155 fl. oz.	4250
67 fl. oz.	1895	5.50	139.7	1 gal. (= 8 pints)	4500
3½ pints	2 litres	5.75	146.0	175 fl. oz.	4700
72 fl. oz.	2040	6.00	152.4	180 fl. oz.	4900
75 fl. oz.	2080	6.25	158.7	185 fl. oz.	5 litres
77 fl. oz.	2120	6.50	165.1	192 fl. oz.	5200
78½ oz.	2160	6.75	171.4	200 oz.	5400
4 pints	2200	7.00	177.8	207 oz.	5600

EMERGENCY TABLE FOR ESTIMATING RAINFALL WHEN THE RAIN-GAUGE GAUGE-GLASS IS MISLAID OR BROKEN—*continued.*

With a 5-in. Rain-Gauge.		Approximate Equivalent Rainfall.		With an 8-in. Rain-Gauge.	
Fluid Ounce Measure.	Cubic Centimetre Measure.	Inches.	Millimetres.	Fluid Ounce Measure.	Cubic Centimetre Measure.
82 fl. oz.	2240	7.25	184.1	215 fl. oz.	5800
85 fl. oz.	2280	7.5	190.5	220 fl. oz.	6 litres
87½ fl. oz.	2320	7.75	196.8	225 fl. oz.	6200
4½ pints	2360	8.00	203.2	240 fl. oz.	6400
95 fl. oz.	2440	8.50	215.9	250 fl. oz.	6800
97 fl. oz.	2480	8.75	222.2	260 fl. oz.	7 litres

The average rainfall in various parts of the world differs considerably, for instance, in the British Isles, the average annual rainfall for England is 37.4 inches, but in Styhead, Cumberland, a rainfall of 247.3 inches was recorded in 1923. The wettest station in the world is Cherrapunji in Assam, where the annual fall exceeds 500 inches, and the daily fall has reached 40 inches, whilst in one year just over 900 inches is alleged to have fallen. For New Guinea the record rainfall was registered at Pal Mal Mal in the Jaquenot Bay district in New Britain, viz., 320.12 inches, although it should be noted that in 1934 the rainfall for this particular station was 166.64 inches, while in 1936, 213.36 inches were recorded. In 1927 Talasea Government station recorded 312 inches. The lowest rainfall for the Territory is at our inland stations, Ramu 78.57 inches, Bulolo (six years) 55.06 inches, Baiune 65.90 inches (three years).

Plantation managers and private individuals have assisted considerably in the supply of rainfall information and returns, and it is hoped they will continue to do so. Additional rainfall records are also desirable from other stations, and persons interested who may care to supply such information, will be assisting in a great service towards acquiring essential data concerning the general potential knowledge of this territory. Rainfall records are really invaluable to all agriculturists and horticulturists. They will determine the best time to plant, the type of crops to plant, and the most favorable season to produce the best germination. The expense of installing a rain gauge will be found small, and the illuminating results will well repay the observer, and even if instruments are not available, a diary kept of the weather will be found of great interest over an extended period, and throw light on crop failures or successes, activities of pests and diseases, results of spraying, &c.

It may be of interest to quote the following table showing the rainfall and temperatures of various world cities:—

RAINFALL AND TEMPERATURES—VARIOUS CITIES.

Place.	Annual Rainfall.				Temperature.					
	Height above M.S.L.	Average.	Highest.	Lowest.	(a) Mean Summer.	(b) Mean Winter.	Highest on Record.	Lowest on Record.	Average Hottest Month.	Average Coldest Month.
	Ft.	In.	In.	In.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.	Fahr.
Adelaide ..	140	21.17	30.87	11.39	72.9	53.1	116.3	32.0	74.0	51.9
Berlin ..	161	22.72	30.04	14.25	64.8	33.0	98.6	−13.4	66.0	31.8
Bombay ..	32	70.54	114.89	33.42	82.7	74.7	100.2	53.2	84.3	73.9
Brisbane ..	137	45.31	88.26	16.17	76.7	59.8	108.9	36.1	77.2	58.6
Calcutta ..	21	61.82	98.48	38.43	85.6	68.0	111.3	44.2	86.0	66.4
Canberra ..	1,920	23.03	33.71	16.31	67.7	43.9	104.2	14.0	68.6	42.8
Colombo ..	24	88.53	123.96	53.56	81.6	78.7	97.2	61.6	82.0	78.6
Hobart ..	177	24.06	43.39	13.43	61.4	46.9	105.2	27.0	62.2	45.8
Hong Kong ..	109	85.61	119.72	45.84	81.5	60.5	97.0	32.0	82.0	58.8
Johannesburg	5,750	31.63	50.00	21.66	65.4	54.4	93.6	20.8	68.2	48.0
London ..	18	23.80	38.18	12.16	60.8	39.9	94.0	9.0	62.3	39.1
Madras ..	22	49.85	78.92	21.74	89.0	76.8	113.0	57.5	89.9	76.1
Madrid ..	2,149	16.23	27.48	9.13	73.0	41.2	107.1	10.5	75.7	39.7
Melbourne ..	115	25.72	38.04	15.61	66.6	50.1	111.2	27.0	67.6	48.8
New York ..	314	44.63	58.68	33.17	71.4	31.8	102.0	−13.0	73.5	30.2
Paris ..	164	22.68	29.80	10.94	63.5	37.9	101.1	−19.5	64.8	36.7
Rome ..	166	32.57	57.89	12.72	74.3	46.0	103.0	21.4	76.1	44.6
Shanghai ..	21	45.00	62.52	27.92	78.0	41.1	102.9	10.2	80.4	37.8
Singapore ..	8	91.99	158.68	32.71	81.2	78.6	94.2	63.4	81.5	78.3
Sydney ..	138	47.32	82.76	23.01	70.9	54.3	108.5	35.7	71.6	53.0

Meteorological Records—Madang.

(New Guinea Central.)

The driest month in the Madang district is August, and the wettest April. The rainy season is practically continuous from October to May, and the dry season a short one during July, August and September. There are, however, parts of this district which have a considerably longer dry season.

The district immediately north of Madang—Sepik—has a similar dry season, though it continues comparatively dry for two months longer; nor are the monsoonal rains so heavy when experienced.

The rainfall in Madang for April is the heaviest recorded on the mainland of New Guinea, and is exceeded in few districts in the Territory. December is also an exceedingly wet month in this district.

On the coastline of Madang, recent deposits of coral limestone may be seen from the head of Astrolabe Bay to Stephen Strait. All the islands about Madang and Sek (Alexishafen) consist of it. The limestones do not extend very far inland, and cannot be more than 50 feet thick. It rests on some recent volcanic rocks near Isumrud Strait, and is frequently interbedded with friable volcanic material. Beyond Stephen Strait the deltaic deposits of the Sepik and Ramu rivers have prohibited the growth of coral reefs, even as far back as early Pleistocene, and consequently no occurrences of limestone are seen. Again, at Melamu (Konstantine Harbour), large deposits of boulders and river gravels have invaded the coral strands, the Kabenau and Minjem rivers being responsible for the denudation of the thin veneer of coral limestone replacing it with river sediment during the process of elevation.

On the coastline between Sarang and Dylup plantations the raised coral reefs are interbedded with coarse, partly fossiliferous grits and conglomerates containing magnetite sand occasionally cemented with lime. The limestone outcrop on the plantation of Dylup occasionally exhibits a peculiar banded or striated structure not unlike phosphatic rock.

The soil around the foreshore of Madang is a sandy coral loam; pure coral being met at depths ranging from less than 1 foot to 2½ feet.

Towards the back of Modilon, the adjoining plantation, the soil is a heavier volcanic nature with coral outcrops and a clayey sub-soil.

Madang experiences many thunderstorms, and the tall trees are often affected by the visitations of lightning strike.

The only other stations in this district from which official records are received, are Kulili and Kurum on Kar Kar Island. The department would welcome rainfall records from additional plantations on the mainland.

MONTHLY AND YEARLY RAINFALL TOTALS (IN POINTS), MADANG.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Total.
1917 ..	1,379	1,015	1,745	1,284	1,999	1,212	928	671	1,255	1,755	1,491	693	15,427
1918 ..	617	1,131	1,269	1,007	1,654	625	447	311	428	1,209	642	441	9,781
1919 ..	1,250	2,424	2,792	2,449	1,679	1,607	165	3	133	795	1,484	1,749	16,530
1920 ..	1,362	1,004	2,583	1,218	1,725	1,333	553	207	912	2,074	1,400	1,660	16,031
1921 ..	1,804	947	831	3,120	965	1,313	1,446	310	539	862	1,777	1,360	15,274
1922 ..	1,569	1,219	1,407	2,085	785	872	451	598	524	1,098	1,357	*	*
1923 ..	384	1,687	1,682	1,284	2,444	2,765	579	307	86	738	1,666	696	14,318
1924 ..	1,324	654	1,217	1,007	1,549	879	461	*	*	*	1,637	607	*
1925 ..	10	482	495	1,164	703	1,246	963	129	370	373	1,644	765	8,344
1926 ..	2,120	1,498	1,533	1,700	2,247	1,135	598	53	175	1,085	803	1,747	14,694
1927 ..	701	744	1,057	1,077	1,523	1,285	501	782	472	616	1,042	3,180	12,980
1928 ..	1,316	1,283	955	2,177	2,033	920	449	762	720	1,911	1,277	1,013	14,816
1929 ..	1,200	930	1,009	1,973	2,004	856	1,108	1,152	169	1,041	1,158	1,506	14,108
1930 ..	861	1,146	2,089	2,562	1,581	761	1,577	268	6	297	1,206	1,782	14,136
1931 ..	1,023	962	2,083	1,896	737	274	309	275	125	802	981	1,890	11,357
1932 ..	1,895	1,245	693	1,404	722	1,247	685	141	489	348	1,721	1,189	11,779
1933 ..	1,815	1,296	1,617	1,081	1,112	1,088	1,279	394	1,129	1,173	756	2,104	14,844
1934 ..	334	560	794	1,358	677	1,124	1,234	300	712	930	1,277	814	10,114
1935 ..	2,127	1,267	1,226	3,047	2,523	579	617	610	819	586	1,377	550	15,328
1936 ..	1,136	1,366	1,871	479	1,677	370	925	1,495	786	729	2,085	2,483	15,402
Average ..	1,211	1,143	1,447	1,669	1,517	1,075	764	461	518	970	1,339	1,380	13,626

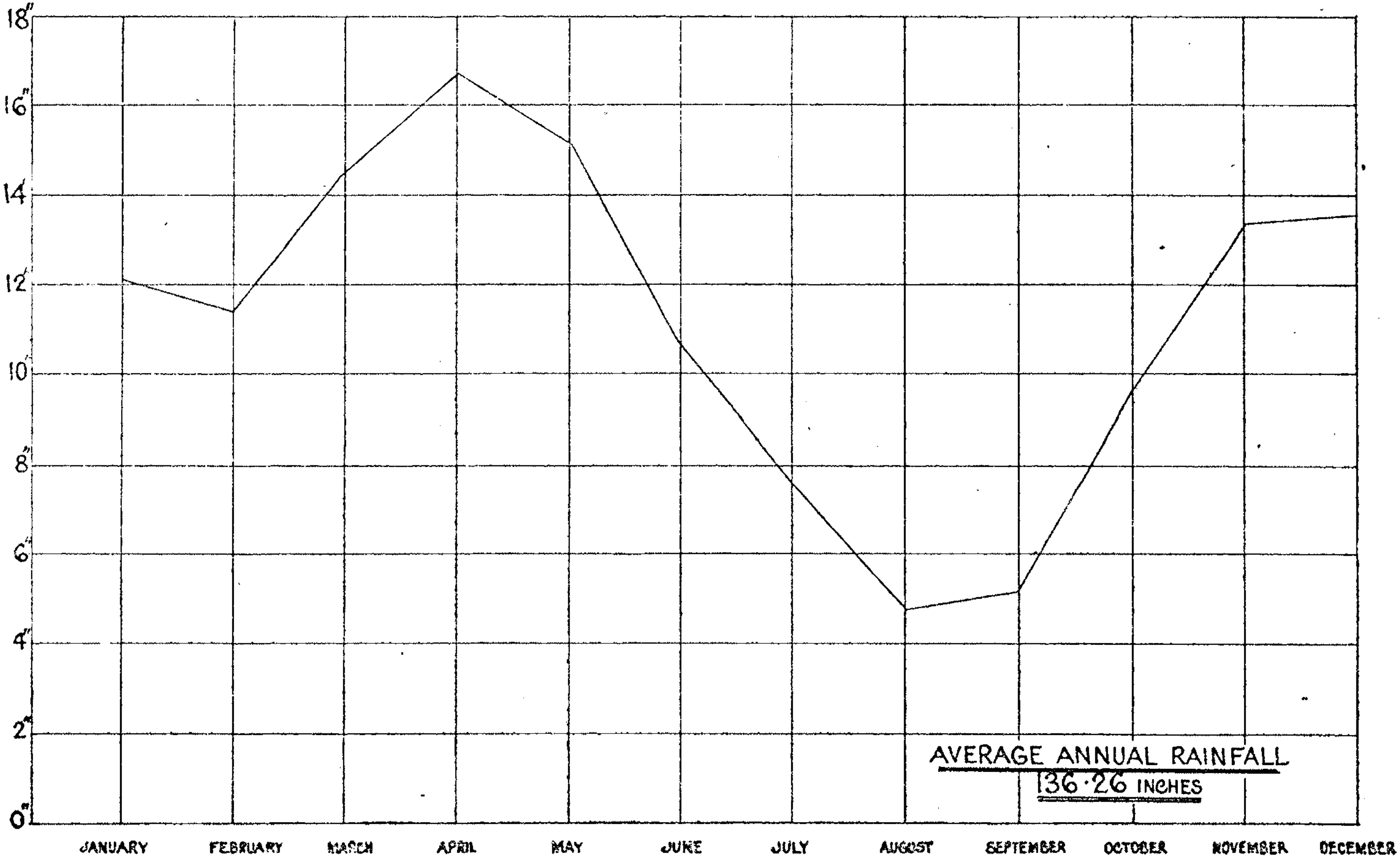
* No records taken during these months.

MADANG (MAINLAND), 5° 11′ S., 145° 48′ E.

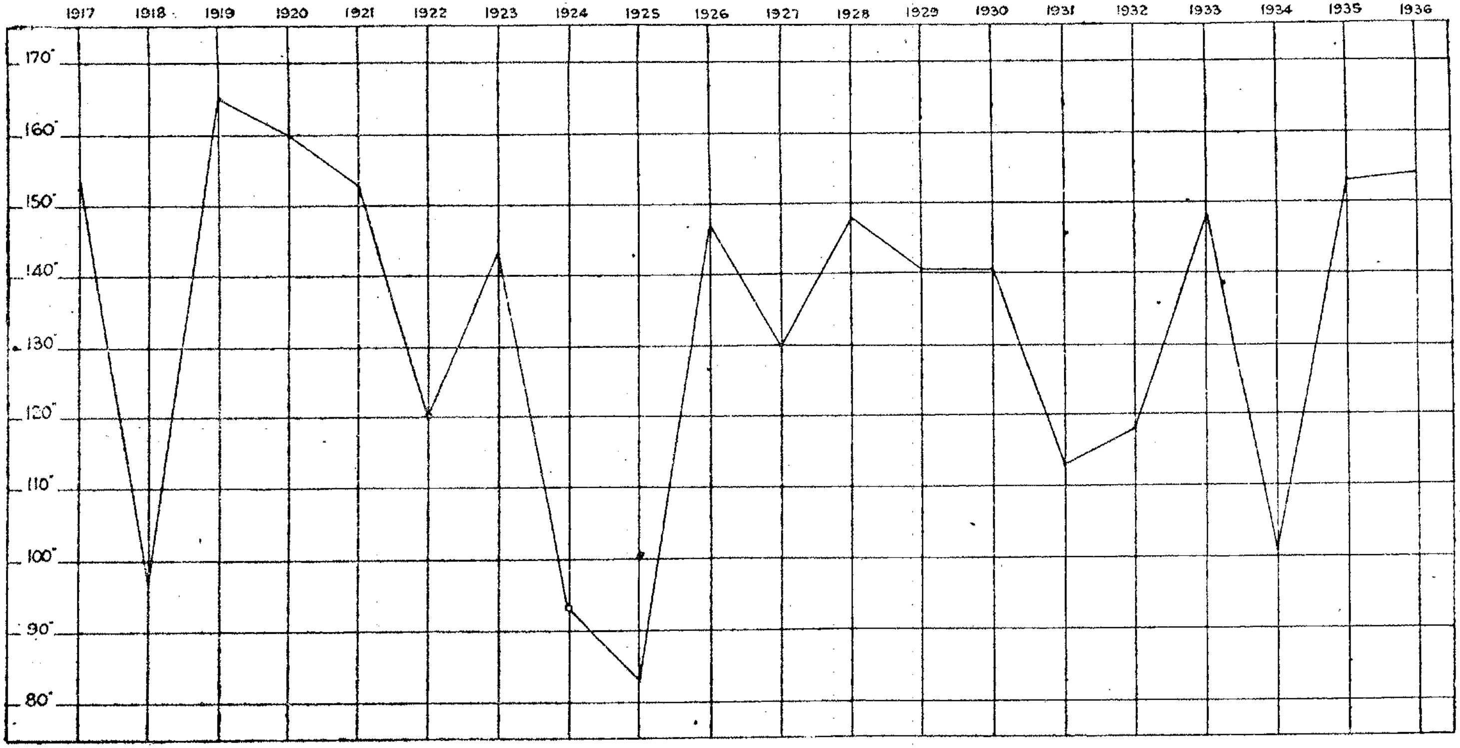
Month.	1936.		Averages for 20 years (1917–1936).	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
January	11.36	23	12.11	19.4
February	13.66	19	11.43	17.8
March	18.71	22	14.47	20.7
April	4.79	12	16.69	20.4
May	16.77	25	15.17	19.4
June	3.70	14	10.75	17.3
July	9.25	15	7.64	14.0
August	14.95	17	4.61	9.0
September	7.86	15	5.18	14.2
October	7.29	15	9.70	13.2
November	20.85	27	13.39	16.3
December	24.83	21	13.80	19.5

Rainfall for 1936—154.02 inches. Rainfall average for 20 years—136.26 inches.

GRAPH SHOWING MONTHLY AVERAGES RAINFALL 1917-1936 (20 YEARS) FOR MADANG, TERRITORY OF NEW GUINEA.



GRAPH SHOWING ANNUAL RAINFALL FOR MADANG, TERRITORY OF NEW GUINEA.



o — Incomplete

KULILI PLANTATION (KAR KAR ISLAND)—MADANG DISTRICT.

Month.	1936.		Averages for Two Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
January	14.43	28	14.43	25.5
February	14.60	24	14.60	22.0
March	14.05	17	17.73	14.5
April	10.76	19	11.09	19.0
May	9.66	17	11.33	20.0
June	8.10	13	6.52	14.0
July	5.71	18	4.83	14.5
August	9.05	20	6.41	16.0
September	4.93	18	6.33	17.0
October	14.02	22	12.97	21.0
November	20.14	20	23.38	21.5
December	21.29	18	16.51	16.5

Total rainfall for 1936—146.74 inches. Annual average for 2 years—146.13 inches.

KURUM (KAR KAR ISLAND)—MADANG DISTRICT.

LUTHERAN MISSION STATION.

Month.	1936.		Averages for Thirteen Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
January	22.90	17	11.08	17.5
February	9.10	13	10.77	16.2
March	11.74	13	12.13	17.6
April	7.73	9	10.48	17.6
May	9.90	7	11.88	17.4
June	4.25	8	7.83	15.8
July	6.37	11	6.65	12.9
August	11.60	14	6.82	12.4
September	6.42	16	6.23	12.6
October	15.35	19	11.25	15.8
November	9.61	23	9.65	16.0
December	19.44	19	10.30	15.8

Rainfall for 1936—134.41 inches. Annual average for 13 years—115.07 inches.