

TABLE VII.—Heights of rivers referred to zeros of gages, October, 1903—Continued.

Table with columns for Stations, Distance to mouth of river, Danger line on gage, Highest water (Height, Date), Lowest water (Height, Date), Mean stage, Monthly range, and similar columns for various rivers like Trinity, Red River of the North, Columbia, Willamette, Colorado, and Sacramento.

129 days.

HAWAIIAN CLIMATOLOGICAL DATA.

By R. C. LYDECKER, Territorial Meteorologist.

Rainfall data for October, 1903.

Table of rainfall data for October 1903, listing Stations, Elevation, Amount (Feet, Inches), and similar data for various locations across Hawaii including Hilo, Maui, Kauai, and Puna.

Meteorological Observations at Honolulu, October, 1903.

The station is at 21° 18' N., 157° 50' W. It is the Hawaiian Weather Bureau station Punahou. (See fig. 2, No. 1, in the MONTHLY WEATHER REVIEW for July, 1902, page 365.)

Hawaiian standard time is 10° 30' slow of Greenwich time. Honolulu local mean time is 10° 31' slow of Greenwich.

The pressure is corrected for temperature and reduced to sea level, and the gravity correction, —0.06, has been applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given.

The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force, or amounts of cloudiness, connected by a dash, indicate change from one to the other.

Rainfall for twenty-four hours is measured at 9 a. m. local, or 7.31 p. m., Greenwich time.

The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet and the barometer 50 feet above sea level.

Table of meteorological observations at Honolulu for October 1903, including Date, Pressure at sea level, Temperature (Dry bulb, Wet bulb), Wind (Direction, Force), Cloudiness (Average, Maximum, Minimum), Sea-level pressures, and Total rainfall at 9 a. m. local time.

Mean temperature for the month of October, 1903, (6 + 2 + 9) ÷ 3 = 75.1°; normal is 76.2°. Mean pressure for the month of October, 1903, (9 + 3) ÷ 2 = 29.972; normal is 29.967.

\* This pressure is as recorded at 1 p. m., Greenwich time. † These temperatures are observed at 6 a. m. local, or 4.31 p. m., Greenwich time. ‡ These values are the means of (6 + 9 + 2 + 9) ÷ 4. § Beaufort scale.

Maximum thermometer set at 9 p. m. and minimum at 2 p. m., local time. ¶ 7-10-8.

NOTE.—The letters n, s, e, w, and c show the exposure of the station relative to the winds.



Temperature table for October, 1903.

Stations.	Elevation.	Mean max.	Mean min.	Cor. av'ge.	Highest.	Lowest.
	<i>Feet.</i>	°	°	°	°	°
Hilo .....	40	82.4	66.7	73.9	87	62
Pepeekeo .....	100	78.9	69.7	73.6	83	63
Kohala .....	521	79.4	67.6	72.8	85	64
Naalehu .....	1,903	76.0	62.0	68.3	80	58
Waimea .....	2,730	73.4	60.5	66.2	82	53
Volcano House .....	4,000	73.1	53.6	62.7	80	51
Waiakea .....	2,700	81.4	58.6	69.3	89	54
W. R. Castle .....	60	80.6	71.4	75.1	84	66
Ewa Plantation .....	60	83.0	68.0	74.9	86	61
United States Experimental Station .....	350	81.3	69.8	75.0	86	69

GENERAL SUMMARY FOR OCTOBER, 1903.

*Honolulu.*—Temperature mean for the month, 75.1°; normal, 76.2°; average daily maximum, 80.4°; average daily minimum, 70.5°; mean daily range, 9.9°; greatest daily range, 19° (12th); least daily range, 4° (14th); highest temperature, 83° (several); lowest temperature, 64° (12th).

Barometer average, 29.972; normal, 29.967; highest, 30.07; (several); lowest, 29.72 (14th); greatest 24-hour change, that is from any given hour of one day to the same hour on the next, .13 (12th to 13th); lows passed this point, 13th to 16th, inclusive, and 20th; highs, 1st to 3d, 7th to 9th, and 26th to 31st, inclusive.

Relative humidity average, 73.9 per cent; normal, 70.5 per cent; mean dew-point, 65.7°; normal, 66°; mean absolute moisture, 6.87 grains per cubic foot; normal, 7.06 grains.

Rainfall, 2.16 inches; normal, 2.75 inches; rain record days, 17; normal, 20; greatest rainfall in one day, 0.56 (from 9 a. m. 22d to 9 a. m. 23d); total at Luakaha, 7.89; normal, 11.69; at Kapiolani Park, 0.72; normal, 1.12.

The artesian well water level rose during the month from 33.10 to 33.30 feet above mean sea level; October 31, 1902, it stood at 32.95. The average daily mean sea level for the month was 9.94 feet, the assumed annual mean being 10.00 feet above datum; for October, 1902, it was 10.05.

Trade wind days, 23, (one of nne.); normal, 22; average force of wind during daylight, Beaufort scale, 2.3; average cloudiness, tenths of sky, 4.3; normal, 4.3.

Approximate percentages of district rainfall as compared with normal: Hawaii, Hilo district, 96 per cent; Hamakua, 126; Kohala, 109; Waimea, 83; Kona, 79; Kau, 23; Puna, 23; Island of Maui, variable from 137 at Puuomalei to 280 per cent at Wailuku; Oahu, 60; Southeast Kauai, 87; North and West Kauai, 187.

The heaviest 24-hour rainfalls for the month were at Hilo, 3.99, (5th); Nahiku, Maui, 5.84 (25th); and Waiakea, Hawaii, 5.85 inches, (5th). The heaviest monthly rainfall reported was at Laupahoehoe, Hawaii, 17.80 inches.

Naalehu; mean relative humidity, 74 per cent; barometer average, 29.39; lowest, 29.24; highest, 29.49; greatest 24-hour change, 13.

Kohala; dew-point, 66.0°; relative humidity, 77.4 per cent. Ewa plantation; dew-point, 63.0°; relative humidity, 65.2 per cent; barometer average, 29.97.

The principal features of the month were the eruption of Mauna Loa, the heavy electric storm on Maui and Lanai and the low average temperature. Smoke was first observed issuing from the crater of Mauna Loa (Mokuaweoweo) at 12:45 p. m. on the 6th, and activity has continued up to the present time. At the close of the month the lava lake was reported to have risen to within 700 feet of the crater's rim, but as this is an eye estimate due allowance must be made; the best authority gives an estimated rise of the lava as from 25 to 30 feet above the floor of the crater, which when the volcano was not in an active state, was 800 feet below the crater's summit. This crater is oblong in shape being 3.7 miles long and 1.74 miles in width. The mountain has thus far withstood the pressure from within, and no outbreak from its sides has occurred,

hence no flow of lava. In connection with this eruption the report of Captain Coath of the British ship *Ormsary* is of more than passing interest. Captain Coath reports having experienced a remarkable disturbance of the sea lasting from the afternoon of the 5th to the morning of the 6th, currents and high cross seas in every direction, the vessel making no headway and unmanageable, Mauna Loa bearing east-southeast distant about 80 miles, on the afternoon of the 6th the activity of the volcano was noticed from the ship. There are no reports of earthquakes previous to the outbreak which occurred without warning, and an interesting question arises as to whether this disturbed condition of the sea was the result of a cause, or an effect of volcanic activity.

The electric storm on Maui began on the afternoon of the 14th, and lasted until the morning of the 15th, being most severe during the night; considerable damage was done by lightning both on this island and Lanai which also experienced the same storm.

The mean temperature for the month, 75.1°, is the lowest October mean, with one exception (74.7° in 1894), on record during twenty-one years observations at the Weather Bureau, and is 1.1° below the normal for that month. The mean relative humidity was 3.4 above the normal. Dew eight mornings. Bright glow on the morning of the 11th. Smoke haze on southeast horizon 16th. Distant thunder from southeast a. m. and p. m. 14th, and lightning during the night, the latter also reported from Hilo to the northwest (electric storm of 14th and 15th on Maui and Lanai). Thunder morning of the 15th.

Reports from other stations: Hilo, earthquake 6:05 a. m. on the 2d; lightning to northwest on the evening of the 14th; heavy thunder shower on the 16th, Kohala, Hawaii, "Kona" (wind from south-southwest) 14th to 16th, inclusive, trade winds on all other days of the month. Pepeekeo, Hawaii, winds east and east-northeast 19 days, other days from north to northeast; average force, 1.3; heavy surf, 4th to 7th, inclusive, also 28th and 29th; distant lightning, 15th; lunar halo same date, volcanic smoke all day, the latter on the 24th also; thunder-storm from 1 to 7 p. m. 16th, with distant lightning in evening; fine morning and afterglows numerous during the month, with more or less reflection from volcano at night; dew, 7 mornings. Waimea, Hawaii, fresh and strong northeast winds first and last portions of month with gale on the 8th and 9th, calms and light winds 10th to 21st. Naalehu, Hawaii, trade winds 26 days; medium earthquake on the 7th at 2:45 p. m.; eruption of Mauna Loa first observed about 2 p. m. on 6th. Volcano House reports a very dry month.

CLIMATOLOGICAL DATA FOR JAMAICA.

Through the kindness of Mr. H. H. Cousins, chemist to the government of Jamaica and now in charge of the meteorological service of that island, we have received the following table in advance of the regular monthly weather report for Jamaica:

Comparative table of rainfall for October, 1903.

[Based upon the average stations only.]

Divisions.	Relative area.	Number of stations.	Rainfall.	
			1903.	Average.
	<i>Per cent.</i>		<i>Inches.</i>	<i>Inches.</i>
Northeastern division .....	25	24	8.98	13.44
Northern division .....	22	53	6.24	7.67
West-central division .....	26	23	3.40	12.30
Southern division .....	27	32	5.49	10.42
Means .....	100	213	7.28	10.96

The rainfall for October was therefore below the average for the whole island. The greatest rainfall, 19.25 inches, occurred at Moore Town, in the northeastern division, while 0.50 inch fell at Denbigh in the southern division.