

Rainfall data.

| Stations. | Elevation. | Feb., 1902. | Stations. | Elevation. | Feb., 1902. |
|------------------------|------------|-------------|-----------------------------|------------|-------------|
| HAWAII. | | | MAUI—Continued. | | |
| HILO, e. and ne. | | | Paia, n. | 180 | 2.76 |
| Waiakea | 50 | 3.56 | Haleakala Ranch, n. | 3,000 | 6.86 |
| Hilo (town) | 100 | 2.92 | Walluku, ne | 200 | 2.54 |
| Kaumana | 1,250 | 10.33 | Waiakoa | 2,700 | 2.59 |
| Pepeekeo | 100 | 4.07 | OAHU. | | |
| Hakalau | 200 | | Punahou (W. B.), sw. | 47 | 1.25 |
| Honohina | 300 | | Kulaokahua, sw. | 285 | 2.88 |
| Laupahoehoe | 500 | 9.89 | School street (Bishop), sw. | 50 | 1.49 |
| Ookala | 400 | | Pacific Heights, sw. | 700 | 2.14 |
| HAMAKUA, ne. | | | Insane Asylum, sw. | 30 | 1.02 |
| Kukuihale | 250 | 3.52 | Kamehameha School | 75 | 0.94 |
| Pauulo | 750 | | Kalihi-Uka, sw. | 260 | 2.60 |
| Pauuhau (Mill) | 300 | 2.84 | Nuuanu (W. W. Hall), sw. | 50 | 1.49 |
| Honokaa (Muir) | 425 | 2.59 | Nuuanu (Wyllie street), sw. | 250 | 2.14 |
| Kukuihale | 700 | 5.49 | Nuuanu (Elec. Station), sw. | 405 | |
| KOHALA, n. | | | Nuuanu (Luakaha), e. | 850 | 3.45 |
| Awini Ranch | 1,100 | | Waimanalo, ne. | 25 | 1.43 |
| Niuli | 200 | 3.28 | Maunawili, ne. | 300 | 2.05 |
| Kohala (Mission) | 521 | 3.89 | Kaunoe, ne. | 100 | |
| Kohala (Sugar Co.) | 235 | 2.27 | Ahuimanu, ne. | 350 | 2.04 |
| Hawi | 300 | | Kahuku, n. | 25 | 3.34 |
| Hawi Mill | 600 | 3.97 | Waiakoa, n. | 20 | 1.92 |
| Waimea, e. | 2,730 | 4.91 | Waiakoa, c. | 900 | |
| KONA, w. | | | Ewa Plantation, s. | 60 | 0.64 |
| Kailua | 950 | 1.48 | Waipahu, s. | 200 | 0.70 |
| Holualoa | 1,350 | 1.08 | Moanalua, sw. | 15 | 1.13 |
| Kealahou | 1,580 | 1.29 | Magnetic Station | 50 | 0.68 |
| Napooipo | 25 | 0.47 | KAUAI. | | |
| KAU, se. | | | Lihue (Grove Farm), e. | 200 | 3.78 |
| Kahuku Ranch | 1,680 | 1.04 | Lihue (Molokaa), e. | 300 | 4.27 |
| Waiohinu | 1,000 | | Lihue (Kukaua), e. | 1,000 | 6.39 |
| Honuaopo | 15 | 0.55 | Kealia, e. | 15 | 4.26 |
| Naalehu | 650 | 0.59 | Kilauea, ne. | 325 | 7.70 |
| Hilea | 310 | 0.80 | Hanalei, n. | 10 | 12.34 |
| Pahala | 850 | | Haena | 15 | 10.42 |
| Moaula | 1,700 | | Waiawa, sw. | 32 | 2.21 |
| PUNA, e. | | | Eleele, s. | 200 | |
| Volcano House | 4,000 | 2.16 | Wahiawa Mountain, s. | 2,100 | |
| Olaa | | | McBryde (Residence) | 850 | 8.21 |
| Olaa (17-mile) | 1,700 | 8.18 | Lanai | 450 | 5.96 |
| Kapoho | 110 | | MAUI. | | |
| Kalapana, se. | 8 | | Lahaina, w. | | |
| MAUI. | | | Waiopae Ranch, s. | 700 | 0.46 |
| Lahaina, w. | | | Kaupo (Mokulau), s. | 285 | 2.84 |
| Waiopae Ranch, s. | 700 | 0.46 | Kipahulu, s. | 300 | 1.89 |
| Kaupo (Mokulau), s. | 285 | 2.84 | Hamao Plantation, se. | 60 | 1.42 |
| Kipahulu, s. | 300 | 1.89 | Nahiku, ne. | 60 | |
| Hamao Plantation, se. | 60 | 1.42 | Nahiku (Nishwitz), ne. | 800 | 12.60 |
| Nahiku, ne. | 60 | | Haiku, n. | 700 | 3.42 |
| Nahiku (Nishwitz), ne. | 800 | 12.60 | Kula (Waiakoa) | 2,700 | 2.59 |
| Haiku, n. | 700 | 3.42 | Kula (Erehwon), n. | 4,500 | 3.64 |
| Kula (Waiakoa) | 2,700 | 2.59 | Puuomalei, n. | 1,400 | 5.12 |
| Kula (Erehwon), n. | 4,500 | 3.64 | | | |
| Puuomalei, n. | 1,400 | 5.12 | | | |

Delayed January reports.

| | | |
|----------------------|--|------|
| Ewa Mill | | 0.10 |
| Kipahulu | | 2.83 |
| Wyllie Street | | 0.51 |
| Moaula | | 2.64 |
| Pahala | | 2.80 |
| Hawi Mill | | 3.16 |
| Hilo Boarding School | | 2.40 |

Water level in the artesian well fell slightly during the month from 33.95 to 33.80 feet above mean sea level. March 1, 1901, it stood at 34.37. The average daily mean sea level for the month was 9.89 feet on the scale, 10.00 representing the assumed annual mean.

Trade wind days, 6 (north-northeast one-half day); normal, 15; average force of wind (during daylight), Beaufort scale, 1.8; cloudiness, tenths of sky, 4.9; normal, tenths of sky, 4.4.

Approximate percentages of district rainfall as compared with normal: Hilo, 40; Hamakua, 40; Kohala, 85; Waimea, 107; Kona, 42; Kau, 25; Puna, (?); Olaa, 60; Maui, 110; Oahu, 25; Kauai, 90. January and February have both been dry months.

Mean temperatures: Pepeekeo, Hilo district, 100 feet elevation, average maximum, 78.4°; average minimum, 65.5°; Waimea, Hawaii, 2,730 elevation, 71.8° and 59.0°; Kohala, 521 elevation, 78.5° and 64.2°; Waiakoa, Kula, Maui, 2,700 elevation, 75.5° and 52.1°; Ewa Mill, 50 elevation, 78.4° and 62.4°; United States Magnetic Observatory, 80.5° and 62.0°; W. R. Castle, 60 feet elevation, highest, 78°; lowest, 53°; mean, 69.3°. (The mean monthly temperature is reckoned at this office as 0.7° lower than the mean of maximum and minimum.)

Mr. Fleming, at the Magnetic Observatory, reports the mean dew-point, 9 a. m., 60.5°; 9 p. m., 60.2°; relative humidity, 67.8 and 75.

Dr. B. D. Bond, at Kohala, reports mean dew-point, 59.4°; relative humidity, 72.7.

Ewa Plantation, mean dew-point, 61°; relative humidity, 72.5.

Strong north to northeast winds prevailed during the first seven days of the month; from the 7th to the 27th westerly winds were unusually persistent, with a decided cold wave the 16th and 20th, having a minimum of 51° at sea level. Newspaper reports give ice at 4,000 feet elevation. On the night of the 27th a northerly gale set in which continued into March.

It is probable that Hawaii was on the south side of a very extensive disturbance which produced the storms of the first days of March on the mainland.

Earthquakes on Hawaiian Islands: 9th, 6:25 p. m.; 20th, 5:30 a. m., at Waimea, Kohala, and Hilo.

OBSERVATIONS AT HONOLULU.

The station is at 21° 18' N., 157° 50' W. Hawaiian standard time is 10^h 30^m slow of Greenwich time. Honolulu local mean time is 10^h 31^m slow of Greenwich.

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.

The rainfall for twenty-four hours is measured at 9 a. m. local, or 7.31 p. m., Greenwich time, on the respective dates.

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.

Meteorological Observations at Honolulu, February, 1902.

| Date. | Pressure at sea level. | | Temperature. | | During twenty-four hours preceding 1 p. m. Greenwich time, or 1:30 a. m. Honolulu time. | | | | | | Total rainfall at 9 a. m., local time. | | |
|-----------|------------------------|-----------|--------------|----------|---|--------------------|-----------------------|---------|---------------------|----------------------|--|----------|-------|
| | Dry bulb. | Wet bulb. | Temperature. | | Dew-point. | Relative humidity. | Wind. | | Average cloudiness. | Sea-level pressures. | | | |
| | | | Maximum. | Minimum. | | | Prevailing direction. | Force. | | Maximum. | | Minimum. | |
| 1 | 30.07 | 73 | 69 | 79 | 72 | 66.5 | 76 | | | 4-6 | 30.11 | 29.95 | 0.00 |
| 2 | 30.08 | 69 | 67 | 77 | 72 | 66.0 | 78 | ne. | | 4-8 | 30.16 | 30.07 | 0.11 |
| 3 | 30.15 | 72 | 64 | 74 | 69 | 63.7 | 78 | ne. | | 3-6 | 30.17 | 30.07 | 0.44 |
| 4 | 30.15 | 70 | 64 | 75 | 70 | 60.0 | 65 | ne. | | 6-1 | 30.21 | 30.15 | 0.13 |
| 5 | 30.14 | 70 | 62.5 | 74 | 68 | 62.3 | 75 | ene. | | 1-1 | 30.22 | 30.12 | 0.65 |
| 6 | 30.08 | 69 | 62 | 74 | 68 | 59.5 | 69 | ne. | | 5 | 30.18 | 30.08 | 0.28 |
| 7 | 30.04 | 69 | 62.5 | 75 | 68 | 58.3 | 65 | ne. | | 4 | 30.11 | 30.01 | 0.04 |
| 8 | 30.05 | 62 | 60 | 77 | 67 | 59.7 | 70 | ene-ne. | 3-0 | 4-0 | 30.08 | 29.99 | 0.00 |
| 9 | 30.07 | 59 | 57.5 | 76 | 61 | 59.0 | 76 | s-w. | 1-0 | 4-0 | 30.09 | 29.98 | 0.00 |
| 10 | 29.97 | 58 | 55.5 | 77 | 56.5 | 59.0 | 80 | w. | 1-0 | 0-6 | 30.06 | 29.97 | 0.00 |
| 11 | 29.91 | 61 | 58.5 | 75 | 56 | 56.5 | 75 | w-sw. | 1-0 | 0 | 30.06 | 29.90 | 0.00 |
| 12 | 29.89 | 71 | 68 | 76 | 58 | 60.5 | 75 | w-sw. | 1-0 | 0-10 | 29.95 | 29.86 | 0.01 |
| 13 | 29.88 | 66 | 65 | 78 | 69 | 67.3 | 84 | ws-w. | 3-0 | 4-1 | 29.95 | 29.87 | 0.00 |
| 14 | 29.79 | 73 | 67.5 | 78 | 64 | 66.5 | 82 | sw. | 3-1 | 4 | 29.94 | 29.79 | 0.00 |
| 15 | 29.90 | 61 | 57 | 78 | 71 | 65.0 | 83 | sw-w. | 3-1 | 10-3 | 29.90 | 29.72 | 0.15 |
| 16 | 30.05 | 54 | 52.5 | 72 | 59 | 51.0 | 63 | n. | 3-0 | 2 | 30.11 | 29.90 | 0.00 |
| 17 | 30.03 | 64 | 61 | 76 | 62 | 65.3 | 72 | n-sw. | 0-1 | 0-8 | 30.12 | 30.02 | 0.00 |
| 18 | 29.91 | 65 | 64 | 74 | 61 | 61.0 | 79 | sw. | 1-0 | 8 | 30.04 | 29.92 | 0.01 |
| 19 | 29.98 | 54 | 52 | 76 | 63 | 56.5 | 66 | n-w. | 4-2 | 6-0 | 30.04 | 29.90 | 0.00 |
| 20 | 30.05 | 56 | 54.5 | 74 | 53 | 53.7 | 75 | w-sw. | 0 | 0 | 30.06 | 29.97 | 0.00 |
| 21 | 30.00 | 62 | 60.5 | 74 | 54.5 | 55.7 | 75 | s. | 1-0 | 0 | 30.09 | 29.99 | 0.00 |
| 22 | 29.91 | 70 | 65 | 77 | 58 | 60.5 | 72 | sw-w. | 3-1 | 1-8 | 30.02 | 29.91 | 0.00 |
| 23 | 29.89 | 69 | 67 | 79 | 70 | 64.3 | 76 | ws-w. | 3-1 | 4 | 29.93 | 29.85 | 0.00 |
| 24 | 29.91 | 72 | 67 | 78 | 66 | 66.7 | 80 | sw. | 3-0 | 7 | 29.98 | 29.89 | 0.00 |
| 25 | 29.95 | 69 | 66.5 | 79 | 70 | 65.7 | 80 | sw. | 2 | 8-3 | 29.99 | 29.89 | 0.00 |
| 26 | 29.96 | 70 | 67.5 | 79 | 66 | 63.5 | 75 | w-n. | 1-0 | 8-1 | 30.00 | 29.92 | 0.01 |
| 27 | 29.96 | 67 | 65.5 | 78 | 65 | 65.7 | 84 | sw-n. | 1-0 | 8 | 30.01 | 29.93 | 0.01 |
| 28 | 30.01 | 65 | 58.5 | 79 | 65 | 61.7 | 72 | sw-n. | 2-6 | 4 | 30.02 | 29.92 | 0.01 |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | |
| Sums | | | | | | | | | | | | | 1.25 |
| Means | 29.989 | 65.7 | 63.0 | 76.1 | 64.4 | 60.7 | 75.0 | 1.8 | | | 30.056 | 29.950 | |
| Departure | +0.040 | | | | | -1.3 | 0 | | | | | | -4.45 |

Mean temperature for February, 1902, (6 + 2 + 9) ÷ 3 = 69.5; normal is 70.4. Mean pressure for February, 1902, (9 + 8) ÷ 2 = 30.000; normal is 29.960.

* 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.

CLIMATOLOGY OF COSTA RICA.

Communicated by H. PITTIER, Director, Physical Geographic Institute.

[For tables see page 108.]

Notes on the weather.—As is usual during February, the weather was fine on the Pacific slope until about the 22d, when the northers began to blow with unusual force, bringing occasional showers far down on the southern slope of the Cordilleras. In San Jose the rather heavy rainfall of the 24th, the heaviest experienced during February since 1888, was quite a

surprise to most people. The pressure was generally high (except during the three last days), and the temperature slightly above the normal. On the Atlantic side the rainfall was moderate, with many warm, fair days. [See page 108.]

Notes on earthquakes.—February 5, 6^h 20^m a. m., slight shock, ENE-WSW., duration 2 seconds, intensity II.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Manuel E. Pastrana, Director of the Central Meteorologic-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the Boletín Mensual. An abstract, translated into English measures, is here given in continuation of the similar tables published in the MONTHLY WEATHER REVIEW since 1896. The barometric means are now reduced to standard gravity.

Mexican data for February, 1902.

| Stations. | Altitude. | | Temperature. | | | Relative humidity. | Precipitation. | Prevailing direction. | |
|-----------------------------|-----------|-------|--------------|------|-------|--------------------|----------------|-----------------------|--------|
| | Feet. | Inch. | Max. | Min. | Mean. | | | Wind. | Cloud. |
| Chihuahua | 4,669 | 25.20 | 77.0 | 30.2 | 55.2 | 36 | | e. | |
| Guadalajara (Obs. del Est.) | 5,186 | 24.89 | 78.3 | 41.0 | 62.2 | 46 | T. | nw. | |
| Guanajuato | 6,640 | 23.62 | 79.7 | 38.8 | 60.8 | 43 | | w. | |
| Leon (Guanajuato) | 5,906 | 24.23 | 79.5 | 33.6 | 59.4 | 49 | T. | ene. | |
| Mazatlan | 25 | 20.92 | 77.2 | 58.5 | 67.5 | 77 | 0.04 | nw. | |
| Merida | 50 | 29.88 | 100.4 | 48.9 | 73.8 | 64 | 0.13 | ne. | |
| Mexico (Obs. Cent.) | 7,472 | 24.91 | 76.6 | 37.8 | 57.9 | 43 | T. | ne. | w. |
| Monterrey (Sem.) | 1,626 | 28.13 | 94.8 | 40.3 | 63.1 | 52 | 0.43 | w. | |
| Morelia (Seminario) | 6,401 | 23.89 | 77.9 | 39.2 | 59.4 | 57 | 0.03 | ws. | sw. |
| Puebla (Col. Cat.) | 7,125 | 23.26 | 71.6 | 41.0 | 59.7 | 55 | | csc. | |
| Puebla (Col. d Est.) | 7,125 | 23.28 | 74.1 | 32.2 | 56.3 | 53 | T. | ene. | |
| Queretaro | 6,070 | 24.09 | 77.9 | 37.1 | 60.3 | 46 | T. | w. | |
| Saltillo (Col. S. Juan) | 5,399 | 24.68 | 73.6 | 39.4 | 56.1 | 54 | 0.04 | uw. | |
| S. Isidro (Hac. de Gto.) | 8,812 | 21.89 | 68.9 | 50.9 | 50.7 | 48 | 0.19 | w. | |
| Toluca | 5,078 | 25.03 | 82.0 | 43.2 | 62.2 | 53 | T. | se. | |
| Zapotlan | | | | | | | | | |

CLIMATOLOGICAL DATA FOR JAMAICA.

Through the kindness of Mr. Maxwell Hall, the following data are offered to the MONTHLY WEATHER REVIEW in advance of the publication of the regular monthly weather report for Jamaica:

Jamaica, W. I., climatological data, January, 1902.

| | Negril Point Lighthouse. | Moisant Point Lighthouse. |
|---|--------------------------|---------------------------|
| Latitude (north) | 18° 15' | 17° 55' |
| Longitude (west) | 78° 23' | 76° 10' |
| Elevation (feet) | 33 | 8 |
| Mean barometer 7 a. m. | 29.971 | 29.967 |
| 3 p. m. | 29.927 | 29.925 |
| Mean temperature 7 a. m. | 72.7 | |
| 3 p. m. | 80.3 | |
| Mean of maxima | 82.9 | |
| Mean of minima | 71.2 | |
| Highest maximum | 88.0 | |
| Lowest minimum | 66.0 | |
| Mean dew-point 7 a. m. | 69.0 | |
| 3 p. m. | 71.2 | |
| Mean relative humidity 7 a. m. | 87.0 | |
| 3 p. m. | 74.0 | |
| Total rainfall (inches) | 1.32 | 6.86 |
| Average wind direction 7 a. m. | nne. | ne, ene. |
| 3 p. m. | nne. | nne, n. |
| Average hourly velocity (miles) 7 a. m. | 11.6 | 12.3 |
| 3 p. m. | 12.5 | 15.4 |
| Average cloudiness (tenths): | | |
| 7 a. m. Lower clouds | 1.8 | 1.9 |
| Middle clouds | 2.5 | 2.5 |
| Upper clouds | 2.0 | 1.2 |
| 3 p. m. Lower clouds | 1.6 | 2.5 |
| Middle clouds | 1.6 | 2.5 |
| Upper clouds | 0.9 | 1.1 |

NOTE.—The pressures are reduced to standard temperature and gravity, to the Kea standard, and to mean sea level. The thermometers are exposed in Stevenson screens.

Comparative table of rainfall for January, 1902.

(Based upon the average stations only.)

| Divisions. | Relative area. | Number of stations. | Rainfall. | |
|-----------------------|----------------|---------------------|-----------|---------|
| | | | Average. | 1902. |
| | | | Inches. | Inches. |
| Northeastern division | 25 | 20 | 5.40 | 8.26 |
| Northern division | 22 | 55 | 3.34 | 7.69 |
| West-central division | 26 | 23 | 2.37 | 4.37 |
| Southern division | 27 | 31 | 1.70 | 2.39 |
| Means | 100 | | 3.20 | 5.68 |

In taking the average rainfall, Mr. Hall uses only those stations for which he has several years of observations, so that the column of averages represents fairly well the normal rainfall for each division, while the column for the current month represents the average rainfall at those same stations. The relative areas of the divisions are very nearly the same, and are given in the preceding table as expressed in percentages of the total area of Jamaica. The number of rainfall stations utilized in each area varies slightly from month to month, according as returns have come in promptly or not, but will not differ greatly from the numbers in the second column of the table.

Jamaica, W. I., climatological data, February, 1902.

| | Negril Point Lighthouse. | Moisant Point Lighthouse. |
|---|--------------------------|---------------------------|
| Latitude (north) | 18° 15' | 17° 55' |
| Longitude (west) | 78° 23' | 76° 10' |
| Elevation (feet) | 33 | 8 |
| Mean barometer 7 a. m. | 29.967 | 29.959 |
| 3 p. m. | 29.912 | 29.918 |
| Mean temperature 7 a. m. | 73.4 | 76.8 |
| 3 p. m. | 80.6 | 82.4 |
| Mean of maxima | 83.3 | |
| Mean of minima | 70.7 | |
| Highest maximum | 86.0 | |
| Lowest minimum | 62.0 | |
| Mean dew-point 7 a. m. | 69.3 | |
| 3 p. m. | 72.6 | |
| Mean relative humidity 7 a. m. | 87.0 | |
| 3 p. m. | 76.0 | |
| Total rainfall (inches) | 0.10 | 6.80 |
| Average wind direction 7 a. m. | 9.9 | 7.4 |
| 3 p. m. | 14.1 | 8.9 |
| Average hourly velocity (miles) 7 a. m. | var. | var. |
| 3 p. m. | var. | var. |
| Average cloudiness (tenths): | | |
| 7 a. m. Lower clouds | 0.4 | 2.3 |
| Middle clouds | 5.0 | 2.2 |
| Upper clouds | 0.1 | 1.0 |
| 3 p. m. Lower clouds | 0.0 | 1.1 |
| Middle clouds | 5.4 | 2.2 |
| Upper clouds | 0.8 | 1.0 |

NOTE.—The pressures are reduced to standard temperature and gravity, to the Kea standard, and to mean sea level. The thermometers are exposed in Stevenson screens.

Comparative table of rainfall for February, 1902.

(Based upon the average stations only.)

| Divisions. | Relative area. | Number of stations. | Rainfall. | |
|-----------------------|----------------|---------------------|-----------|---------|
| | | | Average. | 1902. |
| | | | Inches. | Inches. |
| Northeastern division | 25 | 21 | 4.91 | 5.43 |
| Northern division | 22 | 47 | 2.32 | 3.97 |
| West-central division | 26 | 21 | 2.71 | 1.92 |
| Southern division | 27 | 33 | 1.80 | 0.98 |
| Means | 100 | | 2.94 | 3.06 |

THE TERM INDIAN SUMMER.

By ALBERT MATTHEWS, Boston, Mass., dated December 15, 1901.

[Continued from January REVIEW.]

In 1851 Francis Parkman wrote: "The summer had long since drawn to a close, and the verdant landscape around