

**THE RAINFALL OF
THE HAWAIIAN
ISLANDS**

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The Rainfall of the Hawaiian Islands by Curtis J. Lyons

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CURTIS J. LYONS

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ISLANDS**

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THE RAINFALL

OF THE

HAWAIIAN ISLANDS.

CURTIS J. LYONS,
DIRECTOR OF WEATHER BUREAU.

—
CALIFORNIA

HAWAIIAN WEATHER BUREAU,
1902.

CP

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PRELIMINARY STATEMENT.

The collection of rainfall statistics on the part of the government began in 1890. A number of private individuals, however, had prior to that period established rain-gauges of their own, and several series of records of more or less continuity were available. These were collected and tabulated by months and years in the first pamphlet issued by this office as a Report to the Surveyor-General and through him to the Minister of the Interior and Legislature of that same year.

The allotment of rain-gauges to persons willing to make returns began at that time, and has been kept up ever since. Many of the sugar plantations, however, have provided their own. At first cheap three-inch gauges were used but were soon generally replaced by eight-inch gauges, lately of copper with glass measuring tubes, which are in some respects preferable to rods. A large proportion of the reports come directly from plantation managers.

The monthly publication of rainfall began in the Honolulu papers in 1892 and has been kept up ever since. The annual reports, beginning with 1892, have also contained the monthly rainfall.

This is the first series of tables arranged by stations that has been issued. Nearly all the stations established prior to 1897 are included. As the names of the observers are published in the Annual Reports, and are subject to frequent changes, they are not given in this pamphlet, excepting a few that serve to identify the station. The thanks of the office and of the public, and of scientific men abroad, are hereby sincerely given to those who by voluntary effort have made these statistics possible.

The monthly reports are made in detail, i. e., for each day of the month, and of course are kept on file for any future students, or future publication. Where the monthly amounts in this publication are enclosed in brackets it is indicated that

figures are interpolated by estimation from the nearer stations, for the purpose of securing totals and averages. For the reason that half years are used for monthly averages, but not for annual totals, the rule has been to use the latter only for annual average or "normals."

It has been the rule of the Bureau from the first to make the daily measurement in the morning as early as convenient, presumably, as most observers are early risers, at six o'clock, and to enter as on the date of observation, and not for the day before. The subject was well considered, and decided thus, partly because on account of the fact that a large proportion of the lighter rains fall at night, country observers naturally repair to the rain-gauge in the morning; and also that where other observations are made it is best to put everything down when observed. The essential thing for purposes of comparison is uniformity, even at the expense of offending the prejudices of some, while added to this should be a clear understanding of just what period is covered.

Rain-gauges should be directly on the ground, but this has not been insisted upon. There has not been an inspection of gauges, as there always should be, owing to the fact that the meteorological office has been merely a subdivision of the Government Survey. A circular was issued at the early part of the enterprise relating to proper exposure, etc.

As exposure to prevailing winds, and elevation above sea-level are the two determining factors regulating the relative amount of rainfall at different stations, the approximate elevations are given. These in most cases are only approximate, but are abundantly accurate enough for the purpose required. The exposure to winds can easily be obtained from the accompanying maps. It must be remembered that the trade winds which blow on an average 260 days in the year, are from the direction of about N. 52° E. true, but are locally deflected by the trend of the coasts and slopes of the mountains. As is well known the heaviest rains are where the winds blow from the sea up the face of the mountain.

The southwesterly winds are most prevalent in the winter

season. Where both winds are felt the heaviest rains occur in February and November. Where the S.W. wind has less effect March and November have the heaviest rainfall. The trade wind varies in direction in some seasons, so when N.N.E. winds prevail Hamakua, i. e., Honokaa, &c., has the heavier rains, and when E.N.E. winds are frequent Hilo and Puna, i. e., Kapoho, &c., exceed the usual amount.

The Kona or west district of the island of Hawaii is exceptional, being in the lee and depending on the sea-breeze for rain effect. As this is strongest in summer the heavier rains are in July and August.

The consecutive arrangement of the tables is topical, i. e., with the stations following in order around each island counter-clock-wise, being thus convenient for comparison, and a natural method for those familiar with the country. Some stations have been introduced on the maps which have only lately been occupied. The tables are confined, as was said above, to those stations reported earlier than 1897.

Through the courtesy of the United States Weather Bureau the monthly rainfall of Hawaii, which is now a Territory of the United States, is published regularly in the Monthly Weather Review.

It is hoped that this pamphlet will be of use to the agricultural and commercial interests of the Territory as well as to those of scientific research everywhere.

CURTIS J. LYONS,
Territorial Meteorologist.