in Mangalore, a station on the west coast almost in the same latitude as Madras, was particularly heavy.

If something like what I have attempted to do in this paper be tried for the whole of the east coast we may get interesting results.

If really the sun has something to do with our monsoons, we may perhaps be better able to predict about their strength, now that a solar physics observatory has recently been established in our midst at Kodaikanal.

A DARK DAY IN WASHINGTON.

By Rev. M. ELLIS, Voluntary Observer, Mason County, Wash., dated October 15, 1902.

Friday, September 12, 1902, was the darkest day that the oldest inhabitant of Hood Canal, in western Washington, ever knew here, owing largely to the smoke from heavy fires in western Washington and western Oregon. At Twana, in Mason County, it appeared as follows: The evening before was somewhat smoky, though not peculiarly so, with a few ashes occasionally falling. About 3 o'clock on the morning of the 12th the whole heavens were a very bright red, according to the statement of a young lady who waked up, as she supposed, about that time, the light being similar in appearance to a certain kind of northern lights only it covered the whole heavens. By 5:30 a. m., when the writer first looked out, it had faded to a dull red. By 7 a. m. the reddish appearance had disappeared, it having turned to a gray color. At 9 a. m. it was possible to read in the house only by getting near a window, and even then it was quite trying to the eyes. By 11:30 a. m. the dull reddish color appeared all around, soon growing very bright in the north, but by 12:30 p. m. the brightest red was in the south. Between 12 noon and 1 p. m. was the darkest part of the day, it being utterly impossible to read out of doors. After 1 p. m. it began to lighten a little, the chickens, which had gone to roost, began to crow; 1:15 p. m. it was again possible to read out doors; at 2 p. m. there was considerable dull red in the sky, but it then disappeared to be seen no more, the heavens becoming again of grayish color. After 3 p. m. was the brightest part of the day.

There were four noticeable peculiarities about the smoke. One was the reddish color above mentioned, another the fact that the smoke did not seem to make the eyes smart, a third that the smoke did not have even the bluish color that dense smoke generally has, and the fourth that any light seen at a distance of twenty or more yards, whether coming from a lamp or a brush fire, was exceedingly white, in fact, very similar to an electric light, and the blaze from a brush fire rose up very slim and tall.

Mr. W. A. Hunter and wife started for their home on the upper Skokomish, 6 miles west of Twana, from the Canal Logging Company's camp, a mile distant, about noon. The road led through the heavy timber but they found it so dark that although Mr. Hunter tried to get along, he found it impossible to drive a team over the road without a lantern, so one was borrowed, which Mrs. Hunter carried, walking ahead, while Mr. Hunter drove the team behind. It was as dark in that timber, Mr. Hunter said, at noon as the darkest night he had ever seen.

The next day the atmosphere returned to its normal condition, and while it was very smoky, so as to make a person's eyes smart considerably, yet it was light enough to read anywhere in the house. The sun was not visible on the 12th.

The darkness seems to have traveled like a wave northward. At Astoria, Oreg., about seventy-five miles to the south, the darkness began on the 11th, so that it was necessary to have lights at 3 p. m. The sky was of a yellowish green and fog from the ocean was said to have mixed with the smoke. At Olympia, 30 miles southeast of Twana, on the 12th, it was darkest about 10 a. m. At Shelton, 10 miles south of Twana, there was considerable yellow mingled with the reddish appearance. Ten miles west of Twana, in the Olympian Mountains, the red appearance continued all day, though toward evening it was somewhat greenish; the brush fires not only had a tall, slim blaze, but were of a greenish color, as if some kind of a gas were burning. At Brinnon, 30 miles north of Twana, the sun was barely visible as a red ball in the morning, and it was not necessary to use lights in the houses until about 3 p. m., while at Twana they were used all day in most houses.

On the eastern part of Puget Sound, at Tacoma and Seattle, the darkness was very marked, but not so much so as on the western side at the base of the Olympian Mountains.

What caused the reddish appearance has not been satisfactorily explained. Some attributed it to the light from the fires, but this does not seem possible. The writer attributed it to the sun's rays working through the darkness, until he learned that the brightest red was seen about 3 a. m. There certainly seems to have been a very peculiar state of the atmosphere that day, which can only be explained by wiser meteorologists than the writer, but the day will be remembered as one in a lifetime.

INDIAN SUMMER.

A letter from W. M. Wilson, Section Director, Milwaukee, Wis., says:

Referring to your favor of recent date in regard to Indian Summer, I beg to enclose herewith the result of the examination of our records by Mr. J. W. Schaeffer, Observer, Weather Bureau.

After going through the records, Mr. Schaeffer is of the opinion that the conditions which are popularly regarded as belonging to Indian Summer obtain quite as frequently in other seasons as during the autumn months.

If you can suggest some better method of tabulating the data or desire a more complete statement I will be glad to have it done.

These periods relate to the seasons ordinarily designated in meteorologies as the mild, dry period, characterized by a hazy and smoky condition of the atmosphere, and occurring at the ending of October and the beginning of November.

The records at this office show that these periods do not occur with any regularity in the successive seasons, and in some years do not occur at all.

1872, Indian Summer set in apparently on September 30, with a hazy and smoky condition; lowest preceding temperature, 40°, on September 27; continued till October 28; cirrus clouds prevailing; rain, 0.56 inches; winds, from calm to 32 miles, generally, however, light from calm to 12 miles; variable, but mainly northwest; highest barometer, 30.49, on 24th; lowest, 29.44, on October 15; mean temperature, 46.7°; maximum, 75°, on 20th; minimum, 29°, on 11th; killing frost October 10; temperature, 32°; rain, 0.22 on 22d, 0.21 on 6th, and 0.13 on 22d of November. September, mean temperature, 62°; rainfall, 8.72. October, mean temperature, 47°; rainfall, 0.73. November, mean temperature, 30°; rainfall, 1.99.

1873, from October 7 to 25 hazy and smoky condition; lowest preceding temperature, 36°, on 6th; cirrus and upper cumulus clouds prevailing; rain, 0.06 on 16th, 0.72 on 17th, 0.01 on 21st, and 0.01 on 22d; winds, from calm to 10 miles, mainly southerly and southwest; highest barometer, 30.48, on 25th; lowest, 29.53, on 21st; minimum temperature, 26°, on 23d; maximum, 75°, on 15th; mean, 49°; evidently killing frost occurred on the 22d. Mean temperature for September, 60°; rainfall, 2.89; mean temperature for October, 46°; rainfall, 1.96; mean temperature for November, 30°; rainfall, 1.72.

1874, evidently beginning September 28 and ending October 25. Clear, hazy and smoky weather predominating, but stratus clouds frequently occurring; rain, 0.11 on 5th, 0.07 on 10th; winds, 2 to 26 miles, generally averaging 10 miles, mainly northwest to southwest, few easterly; maximum barometer, 30.56, on 13th; lowest barometer on 1st, 29.54; mean temperature for the period, 54.4°; maximum, 78°, on 20th; minimum, 28°, on 13th; killing frost on the 12th; mean temperature for September, 65°; rainfall, 4.51; mean temperature for October, 50°; rainfall, 1.90; mean temperature for November, 35°; rainfall, 2.69.

1875, from October 18 to 24, haze on all days; lowest preceding temperature, 29°, on September 27; killing frost; no clouds; no rain; winds southwest, from 5 to 20 miles; highest barometer, 30.16, on 18th; lowest on 23d, 29.68; mean temperature, 48.8°; maximum, 78°; minimum, 33°. Here are six days only that can be called Indian Summer, such periods are common to all months of the year. September, mean temperature, 57°; rainfall, 4.31. October, mean temperature, 44°; rainfall, 2.37. November, mean temperature, 31; rainfall, 1.16.

1876, from October 1 to 28, light haze and smoke occurred on six days

only; lowest preceding temperature, 32°, on September 30; weather generally cloudy, very few clear days; rain, 0.38 on 5th, 0.07 on 13th, 0.43 on 19th, 0.54 on 20th; highest barometer, 30.48, on 15th; lowest on 5th, 29.33; mean temperature for the period, 44°; maximum, 68°, on 2d; minimum, 23°, on 15th. Practically no conditions of Indian Summer. September, mean temperature, 58°; rainfall, 3.66. October, mean temperature, 44°; rainfall, 1.62. November, mean temperature, 35°; rainfall, 3.57.

1877, four days of haze and smoke; lowest preceding temperature, 33°, on October 5; few clouds; no rain; winds southwest, from 4 to 20 miles; barometer about normal; mean temperature, 52°; no conditions of Indian Summer. September, mean temperature, 63°; rainfall, 0.48. October, mean temperature, 50°; rainfall, 7.15. November, mean temperature, 35°; rainfall, 4.95.

1878, practically no period without rain; none of haze or smoke; no distinguishing periods to suggest the possibility of Indian Summer. September, mean temperature, 63°; rainfall, 4.03. October, mean temperature, 49°; rainfall, 4.13. November, mean temperature, 41°; rainfall, 1.01.

1879, from October 19 to November 1, generally clear, smoke and haze to some extent, not marked; rain, 0.03, on 27th; trace of snow on November 1; lowest preceding temperature, 30°, on September 24, evidently killing frost; highest barometer, 30.60, on 25th; lowest, 29.63, on 27th. Mean temperature, 43°; maximum, 68°, on 22d; minimum, 17°, on November 1.

1880, from October 1 to 15, generally clear, haze and smoke prevailed; rain, 0.01 on 3d, 0.20 on 14th; lowest preceding temperature, 35°, on September 30; killing frost on October 18, or temperature of 30°. Mean temperature, 56.8°; maximum, 77°, on 10th; minimum, 38°, on 13th; winds averaging 16 miles, and southwest to northwest; highest barometer, 30.46, on 12th; lowest, 29.60, on 14th. September, mean temperature, 60°; rainfall, 1.85. October, mean temperature, 48°; rainfall, 0.51. November, mean temperature, 27°; rainfall, 0.82.

1881, no period of haze or smoke; rain abundant in October, light and scattered in November; 2 clear days in October, 6 clear in November. September, mean temperature, 64°; rainfall, 4.28. October, mean temperature, 52°; rainfall, 6.04. November, mean temperature, 37°; rainfall, 1.69.

1882, no conditions of Indian Summer; from October 17 to 27 no rain fell; dense haze on the 21st; wind, average 16 miles, south prevailing. September, mean temperature, 63°; rainfall, 1.31; October, mean temperature, 56°; rainfall, 2.83, November, mean temperature, 40°; rainfall, 2.05.

1883, ice formed October 20; temperature gradually increased till November 11; snow on the 14th; heat lightning on the 20th; thunderstorm on the 26th; very few records of light haze and smoke; maximum temperature of the period, 60.5°, November 5; minimum, 24°, on November 11; northerly winds predominated, the last of October averaging 12 miles, and to November 20 mainly northwest and southwest, averaging 15 miles; highest barometer, 30.50, October 20; lowest, 29.46, October 29; haze on the 19th and 21st; total rain in October, 0,52; in November, 1.34. September, mean temperature, 57°; rainfall, 2.32; October mean temperature, 49°; rainfall, 1.92; November, mean temperature, 35; rainfall, 1.81.

1884, from October 9 to November 23, or from the first killing frost to the ending of the high mean temperature, light haze recorded in ten instances; maximum temperature of the period, 74°, October 20; minimum, 25.6°, November 26; highest barometer, 30.52, October 14; lowest, 29.55, November 22; winds, southwest and averaging 16 miles; total rain of October period, 0.61, and of November, 1.35. September, mean temperature, 64°; rainfall, 2.82; October, mean temperature, 53°; rainfall, 2,18; November, mean temperature, 35°; rainfall, 1.45.

1885, after killing frost on October 21, no mention made of haze as occurring in October or November; rain October 24, 0.27 and on 31st, 0.28; maximum temperature, 69.5°, on the 26th of October; minimum, 22.5°, November 16; highest barometer, 30.34, November 27; lowest, 29.49, on the 11th; wind, westerly and averaging 12 miles. September, mean temperature, 60°; rain, 3.30; October, mean temperature, 46°; rain, 2.40; November, mean temperature, 38°; rain, 1.53.

1886, dry period beginning October 25, ending practically on November 15; rain on the 2d, 3d, 9th, and 10, and snow on the 6th; total, 0.28 inch; no haze recorded; lowest preceding temperature, 31°, October 2; highest barometer, 30.56, October 26; lowest, 29.69, November 2; temperature shows a gradual decrease; maximum, 69.4°, October 31; minimum, 15.4°, November 19; winds, southwest in October and west in November. September, mean temperature, 61°; rain, 2.38; October, mean temperature, 53°; rain, 2.31; November, mean temperature, 34°; rain, 1.62.

1887, dry period began October 24, ended November 17; rain, 0.01, on the 29th October and 0.32, on November 9; light haze October 25 and November 7; lowest preceding temperature, 24.5°, October 22; maximum temperature of period, 68.7°, November 6; minimum, 14.8°, on November 25; first killing frost, October 8; thunderstorms, 2d, 5th, 6th, and 7th of October; highest barometer, 30.53, on October 25; lowest, 29.19, on 19th of November; prevailing wind, southwest and west, averaging 16 miles. September, mean temperature, 60°; rain, 4.36; October, mean temperature, 46°; rain, 2.43; November, mean temperature, 36°; rain, 0.85 inch.

1888, killing frost October 3; dry period from November 11 to 27; no record of haze or smoke; temperature shows gradual decrease; maximum, 59°, on 14th; minimum, 14°, on 17th; winds, light and mainly northwest, averaging 7 miles; highest barometer, 30.68, on the 20th; lowest, 29.90, on the 15th; first snow, November 10. September, mean temperature, 57°; rain, 0.99; October, mean temperature, 46°; rain, 1.18; November, mean temperature, 39°; rain, 1.46.

1889, September 27, killing frost; first snow October 6, 0.01 inch; from October 1 to 31, 0.56 rain only; maximum temperature, 74°, on 11th; minimum, 31°, on 21st; lowest preceding temperature, 34°, on September 27; light haze recorded on 3d, 13th, and 18th; average wind, 11 miles; prevailing, 27 per cent, north; highest barometer, 30.52, on 23d; lowest, 29.62, on 25th. September, mean temperature, 60°; rain, 3.45; October, mean temperature, 47°; rain, 0.56°; November, mean temperature, 36°; rain, 2.71.

1890, short, dry period from November 18 to 29th; killing frost October 20th; no haze nor smoke recorded; temperature, normal for October; November temperature about normal; few traces of rain.

1891, October 18 to November 7, dry, smoky and hazy; killing frost October 16th; temperature, 30°; maximum temperature, 70°, on 29th of October; minimum, 27°, on November 3; rain, 0.01, on October 26; highest barometer, 30.50 November 2; lowest, 29.85 November 5; winds, mainly southwest, averaging 10 miles. September, mean temperature, 67°; rain, 0.18. October, mean temperature, 51°; rain, 1.66. November, mean temperature, 33°; rain, 3.40.

1892, from October 3 to 30, inclusive, light haze on 9th; rain, 0.14, on 15th, and 0.04 on 18th; mean temperature of period, 52°; maximum, 74°, on 3d and 15th; minimum, 29°, on 30th; highest barometer, 30.33, on 30th; lowest, 29.56, on 7th; average wind velocity, 9 miles west and northwest; total rainfall, 1.66; mean temperature, 52.2°. September mean, 62°; rainfall, 2.21. November mean, 33°; rain, 1.84.

1893, November 3 to 20, inclusive; 0.12 inch rain on 12th; no record of haze or smoke; dense fog 6th, 8th, 9th, 10th, and 11th; average wind, 10 miles, mainly westerly; highest barometer, 30.25, on 11th; lowest, 29.70, on 16th; maximum temperature, 67.6°, November 16th; minimum, 16°, on the 18th; average temperature for the period, 39°; for the month, 35°; total rain for the month, 1.20. September mean temperature, 62°; rain, 3.24. For October, mean temperature, 50°; rain, 1.62.

1894, dry period from November 14 to December 6, inclusive; mean temperature, 31°, about normal for the month of November; maximum, 50°, on the 19th; minimum, 6°, on 19th; highest barometer, 30.71, on November 28; lowest, 29.45, on November 15; no mention of haze or smoke; dense fog on 22d and 30th, also December 1; average wind, 11 miles, westerly and northwest; killing frost on September 25th; total rain, 1.69; 0.10 snow on 28th.

1895, practically entire month of October dry; total rain, 0.52 inch, 2.03 below the normal; temperature, 5° below the normal; traces of snow occurred; maximum temperature, 74°, on the 2d; minimum, 20°, on the 30th; killing frost on the 30th of September; highest barometer, 30.51, on the 30th; lowest, 29.59, on the 26th; Dense smoke mentioned on the 25th and 30th only; no haze recorded; westerly winds, averaging 11 miles. September, mean temperature, 66°; rain, 1.82. October mean, 45°; rain, 0.52. November, mean temperature, 34°; rain, 2.77.

1896, October 1 to 31, inclusive; snow on the 17th and 19th, 0.46 melted; total for the month, 1.02 or 1.32 below the normal; slightly hazy on 7th and 13th; normal temperature, 49.3°; about normal for Nevember; mean for the month, 46.9; highest barometer, 30.41, on 8th; lowest, 29.50, on 30th; killing frost October 18; winds, northerly, average, 9.4. September, mean temperature, 58°; rain, 5.72. October, mean temperature, 47°; rain, 1.02. November, mean temperature, 36°; rain, 2.48.

1897, October 1 to 11, inclusive; total rain, 1.05; no snow; maximum temperature, 88°; minimum, 34°; mean, 56.1° or 7° above the normal; highest barometer, 30.50, on 17th; lowest, 29.43, on 11th; winds, southeast, 9.6 average; no haze, except on one date. September, mean temperature, 67°; rainfall, 1.48. October, mean temperature, 56°; rainfall, 1.05. November, mean temperature, 36°; rainfall, 1.87.

1898, Indian Summer evidently did not occur; entire month of October rainy; amount 4.38 or 2.04 above the normal; mean temperature equals the normal; light and scattered rains in November; no period free from showers; temperature of November slightly above the normal; light haze recorded on the 9th and 23d of November. September mean, 65°; rain, 1.98. October mean, 49°; rain, 4.38.

1899, no haze recorded; rain throughout the month of October light and regular although deficient, 1.13 below the normal. The temperature is, however, 7° above the normal; first twelve days of November comparatively dry, entire rain of period, 0.15; one inch of snow on the 2d. No haze or smoke recorded. Mean temperature about normal, or 43°. September, mean, 61°; rain, 3.04; October, mean, 56°; rain, 1.21; November, mean, 44°; rain, 1.61.

1900, from October 7 to 28, inclusive, rain 0.36 only. Total fall for the month, 2.22, slightly below the normal. Temperature for this period slightly below the normal, while for the month it is considerably above the normal. No haze recorded. Winds westerly and averaging 9.8 miles. September mean temperature, 65°; rain, 3.51; November mean temperature, 36°; rainfall, 2.25.

The complete records at this office show that haze and smoke occur in all months, and much oftener in summer than in autumn.

As a general occurrence after rains, the temperature falls temporarily and then gradually increases till the next rainfall.

There is a gradual decrease of temperature during September, October, and November; when the winds increase in velocity and rains occur the temperature falls rapidly and may produce killing frosts or even a trace of snow; then follows a general rise to the normal. Now, if a dry period sets in, the air becomes filled with dust, smoke, etc., which produce a hazy condition; but if in this period a light rain occurs the air will become clear and pure as before.

If rain falls throughout the entire period, these conditions are entirely lacking.

A gradual increase of temperature occurs usually in May. After a dry, warm period, a rain occurs, and the temperature falls sufficiently low for frost to form. This period, which Hon. J. R. Sage has so happily termed the "May Dip," occurs with much more regularity as regards time than the fall period.

Years in which the Indian Summer conditions were marked: 1873, 1874, 1880, 1884, 1886, 1887, 1891, 1892, 1895.

Years in which the conditions were slightly marked: 1872, 1875, 1876, 1879, 1883, 1885, 1888, 1889, 1890, 1896, 1897, 1900.

Years in which the conditions were entirely lacking: 1877, 1878, 1881, 1882, 1893, 1894, 1898, 1899.

HAWAIIAN CLIMATOLOGICAL DATA.

By CURTIS J. LYONS, Territorial Meteorologist.

OBSERVATIONS AT HONOLULU.

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

Hawaiian standard time is 10h 30m slow of Greenwich time. Honolulu local mean time is 10h 31m 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, September, 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.
				Temperature.		Means.		Wind.		Average cloudiness.	Sea-level pressures.		
		Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.		Maximum.	Minimum.	
	*	†	†			‡	‡		§				
1	29.97	75	69	82	73	64.5	65	ne.	5	5	30.03	29.94	0.02
2	29.91	75	71	83	72	65.7	68	ne.	5-4	5	30.01	29.90	0.10
3	29.91	74	71.5	83	73	71.5	83	ne.	3	7	29.97	29.88	0.14
4	29.99	73	70.5	85	73	69.5	75	nne.	3-0	3	30.01	29.89	0.00
5	29.95	77	71	85	71	68.3	73	ne.	1-3	2	30.01	29.94	0.01
6	29.95	76	69	84	74	67.3	69	ne.	3	5-2	29.98	29.89	0.01
7	29.99	76	70	84	74	66.5	69	ne.	3	5	30.03	29.94	0.01
8	29.99	76	69.5	84	74	66.7	70	ne.	3-1	3	30.05	29.97	0.01
9	29.98	75	69	83	73	66.7	72	ne.	3-4	3-5	30.03	29.96	0.27
10	29.89	75	69.5	82	71	66.5	71	nne.	3-0	5	30.01	29.89	0.06
11	29.90	72	69.5	82	71	68.0	77	ne.	2-0	7-1	29.96	29.85	0.25
12	29.95	68	67	84	69	70.0	81	s.	0-1	3	29.99	29.90	0.00
13	29.94	70	68.7	85	68	69.7	82	sw.	1-0	3-0	30.00	29.93	0.00
14	29.96	70	68.7	83	68	69.3	81	sw-nw.	1-0	3	30.00	29.90	0.00
15	29.94	70	68.7	83	69	69.5	78	sw.	1-0	4	30.02	29.93	0.00
16	29.95	71	69	86	69	69.7	80	n-se.	1-0	4-1	30.00	29.89	0.00
17	29.91	70	68.7	84	71	68.7	76	w.	1-0	3-10	29.96	29.88	0.00
18	29.93	69	67.8	85	69	69.7	80	se-ne.	1-0	4	29.98	29.88	0.01
19	29.93	68	67.5	83	69	69.3	87	se-ne.	1-0	0-8	29.97	29.90	0.17
20	29.83	69	68.3	83	67	69.7	85	se-ne.	1-0	1-9	29.93	29.83	0.51
21	29.84	73	70	82	68	70.0	83	se.	1-0	0-3	29.86	29.79	0.01
22	29.95	77	71.5	84	70	70.5	79	s-e.	1-0	2-10	29.99	29.89	0.27
23	29.99	77	69.5	84	73	68.7	72	ne.	3	5	30.04	29.95	0.10
24	29.96	76	68.5	83	75	65.7	66	ne.	4	4	30.04	29.94	0.01
25	29.98	76	68.5	83	75	65.5	65	ne.	4	3	30.00	29.91	0.01
26	29.99	75	69	83	75	65.0	64	ne.	4	3	30.01	29.92	0.02
27	29.98	76	68	83	74	65.5	67	ne.	4	2	30.06	29.93	0.00
28	29.94	76	69.5	82	75	65.0	65	nne.	4-3	2	30.01	29.91	0.02
29	29.93	75	69	83	75	68.3	76	ne.	3-1	3	29.98	29.90	0.23
30	29.91	73	69	82	72	67.7	74	ne.	2-0	6	29.99	29.89	0.03
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sums	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.27
Means	29.950	73.4	69.2	83.5	71.6	68.0	74.7	.....	1-9	3.9	29.907	29.904	.....
Departure	—.022	.....	.....	.....	.....	+2.5	+6.0	.....	.....	—0.1	.....	.....	+0.29

Mean temperature for September, 1902, (6+2+9+3)=77.2; normal is 77.3. Mean pressure for September, 1902, (9+3+2)=29.946; normal is 29.968.

* 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.

Rainfall data for September, 1902.

Stations.	Elevation.	Amount.
HAWAII.		
HILO, e. and ne.	*Feet.*	*Inches.*
Hilo (town)	100	10.15
Pepeekeo	100	12.25
Hakalau	200	15.03
Honohina	300	13.01
Puuohua	.....	19.54
Laupahoehoe	500	11.26
Ookala	400	9.38
HAMAKUA, ne.		
Kukaiau	250	8.34
Paauilo	750	6.30
Paauhau (Mill)	300	5.30
Honokaa (Muir)	425	6.00
Kukuihaele	700	5.12
KOHALA, n.		
Niulii	200	5.37
Kohala (Mission)	521	4.63
Kohala (Sugar Co.)	235	4.90
Hawi Mill	600	4.48
Puuhue Ranch	1,847	2.99
Waimea	2,720	2.66
KONA, w.		
Holualoa	1,350	10.27
Kealakekua	1,580	9.18
Napoopoo	25	5.11
KAU, se.		
Kahuku Ranch	1,680	3.85
Honuapo	15	3.82
Naalehu	650	2.79
Hilea	310	2.30
Pahala	850	3.31
Moaula	1,700	4.85
PUNA, e.		
Volcano House	4,000	5.00
Olaa, Mountain View	1,690	13.86
Kapoho	110	10.80
MAUI.		
Kaupo (Mokulau), s	285	6.91
Kipahulu, s	300	7.74
Nahiku, ne	800	13.31
Haiku, n	700	2.74
Kula (Erehwon), n	4,500	5.61
Kula (Waiakoa), n	2,700	2.28
Puuomalei, n	1,400	3.35
Paia	180	1.40
Wailuku, ne	200	1.07
OAHU.		*Inches.*
Punahou (W. B.), sw	47	2.27
Kulaokahua (Castle), sw	50	1.83
U. S. Naval Station, sw	6	1.39
Makiki Reservoir	120	3.23
Kapiolani Park, sw	10	0.82
Manoa (Woodlawn Dairy), c	285	6.48
Manoa (Rhodes Gardens)	300	10.04
School street (Bishop), sw	50	2.44
Insane Asylum, sw	30	1.83
Kalihi-Uka, sw	260	6.22
Nuuanu (W. W. Hall), sw	50	2.36
Nuuanu (Wyllie street)	250	3.62
Nuuanu (Elec. Station), sw	405	5.22
Nuuanu (Luakaha), c	850	10.02
Waimanalo, ne	25	1.53
Maunawili, ne	300	6.74
Kaneohe	100	5.46
Ahuimanu, ne	350	9.37
Kahuku, n	25	5.48
Ewa Plantation, s	60	1.04
Waipahu	200	0.59
U. S. Experiment Station	350	2.84
U. S. Magnetic station	50	0.72
Nuuuna (Laniakea)	1,150	7.68
Tantalus Heights	1,360	6.93
KAUAI.		
Lihue (Grove Farm), e	200	2.12
Lihue (Molokoa), e	300	3.12
Lihue (Kukaua), e	1,000	7.77
Kealia, e	15	1.48
Kilauea, ne	325	2.31
Hanalei, n	10	3.59
Eleele, s	200	0.78
Wahiawa Mountain, s	2,100	10.20
McBryde (Residence)	850	3.81
Lawai	15	4.04
East Lawai	800	3.68
West Lawai	200	2.76
Delayed August reports.		
Waiawa	.....	0.00
Pahala	.....	2.14
Honokaa (1,100)	.....	16.59
Wyllie street	.....	4.42
Tantalus Heights	.....	9.39
Paia	.....	2.19

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

GENERAL SUMMARY FOR SEPTEMBER, 1902.

Honolulu.—Temperature mean for the month, 77.2°; normal, 77.3°; average daily maximum, 83.5°; average daily minimum, 71.6°; mean daily range, 11.9°; greatest daily range, 17°; least daily range, 7°; highest temperature, 86°; lowest, 67°.

Barometer average, 29.946; normal, 29.968; highest, 30.06, 26th; lowest, 29.79, 20th; greatest 24-hour change, that is, from any given hour on one day to the same hour on the next, .11; lows passed this point on the 10th, 20th and 30th; highs on the 7th, 14th and 26th. The barometer has been below the normal since the month of May; the average for the nine months of this year is also low.

Relative humidity average, 74.7 per cent; normal, 68.5 per cent; mean dew-point, 68°; normal, 66°; mean absolute moisture, 7.51 grains per cubic foot; normal, 7 grains; dewy mornings continuously, 11th to 21st.

Rainfall, 2.27 inches; normal, 1.98 inches; rain record days, 22; normal, 18; greatest rainfall in one day, 0.51, on the 20th; total at Luakaha, 10.02 inches; normal, 10.21 inches; total at Kapiolani Park, 0.82 inch; normal, 0.38 inch.

The artesian well level fell during the month from 33.10 to 32.95 feet above mean sea level. September 30, 1901, it stood at 33.20. The average daily mean sea level for the month was 9.68 feet, the assumed annual mean being 10.00 feet above datum. For September, 1901, it was 10.46. Trade wind days, 19 (3 of north-northeast); normal 26. Average force of wind during daylight, Beaufort scale, 1.9. Average cloudiness, tenths of sky, 3.07; normal, 4.0.

Approximate percentages of district rainfall as compared with normal: Hilo, 160 per cent; Hamakua, 300 per cent; Kohala, 165 per cent; Waimea (Hawaii), 200 per cent; Kona, 125 per cent; Kau, 200 per cent; Puna, 190 per cent; Maui, 175 per