Meteorological observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, Meteorologist to the Government Survey.

September, 1895.	Pressure at sea level.			Temperature.					Humidty.			Wind.		Cloudiness.	Rain measured at 6 a. m.
									Relative.						
	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Maximum.	Minimum.	9 a. m.	9 p. m.	Absolute.	Direction.	Force.		
	Ins.	*Ins.*	*Ins.*	°	°	°	°	°	%	%					*Ins.*
1..	30.06	30.00	30.06	76	82	76	84	73	61	74	6.7	ne.	3	3-6	0.04
2..	30.05	29.98	30.04	76	81	77	84	74	61	70	7.0	e-ne.	4	4	0.06
3..	30.02	29.95	29.98	74	81	76	82	73	72	74	7.3	ne.	3	7	0.13
4..	29.99	29.92	29.98	74	81	79	85	73	75	82	8.6	e-ne.	4	5-10	0.08
5..	30.04	29.96	30.05	76	81	72	85	75	82	91	8.7	s-n.	1-4-0	10	0.81
6..	30.01	29.96	30.01	75	81	77	83	70	67	70	7.1	ne.	4	3-6	1.03
7..	30.00	29.95	29.98	73	76	77	79	72	77	70	7.4	ne.	3	6	0.33
8..	29.98	29.92	29.96	76	80	77	81	71	68	74	7.4	ne.	6	4	0.41
9..	30.06	30.00	30.07	76	82	78	83	75	69	75	7.4	ne.	5	6	0.06
10..	30.07	30.00	30.06	74	81	77	82	73	68	72	7.4	ne.	4	5	0.06
11..	30.01	29.94	30.02	76	82	76	83	75	60	76	7.1	ne.	4	4	0.02
12..	29.99	29.94	30.00	76	81	77	81	73	75	74	7.5	e-ne.	4	5	0.02
13..	30.01	29.96	30.04	75	81	75	82	72	72	68	7.2	e-ne.	5	5	0.08
14..	30.05	29.98	30.03	74	81	78	83	73	71	69	7.2	ne.	3	3	0.13
15..	30.06	29.97	30.05	76	81	78	83	74	68	71	7.2	ne.	3-5	3	0.09
16..	30.05	29.98	30.07	75	83	79	84	73	71	71	7.5	ne.	3	2	0.07
17..	30.11	30.02	30.08	77	82	78	83	74	68	70	7.4	n-ne.	4	3	0.05
18..	30.09	30.03	30.08	77	81	78	82	75	70	68	7.1	ne.	3	8	0.00
19..	30.08	29.99	30.07	76	82	77	83	74	64	68	6.9	ne.	4	3	0.11
20..	30.06	30.00	30.07	74	80	77	82	71	68	68	7.0	ne.	5	5	0.30
21..	30.10	30.01	30.09	75	80	78	82	75	64	68	7.0	ne.	4	3	0.07
22..	30.06	30.02	30.10	74	80	77	81	72	68	71	7.1	ne.	5	4	0.32
23..	30.08	29.99	30.07	74	80	75	81	72	68	77	7.1	ne.	4	4	0.06
24..	30.08	29.97	30.04	74	79	76	81	72	71	74	7.1	ne.	4	4	0.23
25..	30.03	29.96	30.03	74	81	77	83	72	68	71	7.2	ne.	3	5	0.07
26..	30.03	29.96	30.06	73	79	74	81	70	77	77	7.4	ne.	2	10	0.01
27..	30.05	29.96	30.06	69	81	76	82	67	79	74	7.4	ne.	1-3	10-2	0.01
28..	30.08	29.98	30.08	71	80	73	81	67	73	77	7.2	n-ne.	2-0	8-2	0.03
29..	30.09	29.99	30.07	73	80	76	83	70	68	64	6.6	n-ne.	2	1	0.16
30..	30.05	29.95	29.99	72	79	76	81	72	68	70	6.9	n-ne.	3	4	0.00
	30.05	29.98	30.04	74.5	80.6	76.6	82.3	72.4	69.7	72.6	7.3	ne.	3.5	4.7	4.34

Mean temperature: 6+2+9+3 is 77.2; the normal is 77.4; extreme temperatures, 85° and 67°. Two directions of wind, connected by a dash, indicate change from one to the other; also same for force.

LIGHTNING FLASHES BY PAIRS.

In regard to the electric storm of September 17 at Montpellier, Ohio, the observer, Mr. Waterston, states that—

One of the strange features of the lightning was that many of the bolts appeared to descend in pairs, about 10 feet apart. * * * I examined a tree that was struck by lightning, and it looked as though three bolts had come down it. * * * Parties living near by say that one of those double bolts was plainly seen coming down in the direction where the tree stood. Other persons report that where bolts came down and struck the ground several good-sized holes were made.

[NOTE.—It is not uncommon for a lightning flash to divide into several parts as it nears the ground, but these will hardly be called double or triple bolts. It is, however, rare to find the exact spot where a bolt has struck the ground, and if a hole is identified as certainly caused by the lightning, then it will always be interesting to dig down and recover, at least, a fragment of the long fulgurite, or tube, that is apt to be formed by the melting together of the grains of soil by the lightning as it passes downward.]

THE NOR'WESTERS OF CANTERBURY.

In the New Zealand Alpine Journal, Vol. II., No. 8, the editor, Mr. J. T. Meeson, has a paper on the hot, dry winds that blow from the northwest across the mountains and over the eastern plains of both islands, and are felt in their greatest intensity in the Province of Canterbury, in the South Island. The following abstract is from the Bulletin of the American Geographical Society, Vol. XXVII, p. 409:

These winds are most frequent in the late spring and summer, from October to March, with their greatest strength perhaps in February at the time of the wheat harvest. The "nor'wester" comes on as follows: The wind blows for two or three days from the northeast and then dies away, or veers to the north; light, cirrus clouds drift in the upper sky from the northwest; the barometer falls, sometimes very fast, and the thermometer rises. A few hours of delicious weather succeed, and then, within twenty-four hours or less, comes the northwest wind, gentle at first, and even cool, with an occasional warm puff. A beautiful arch of cumulus clouds stretches across the heavens from the north to the west or southwest, and below it the sky is of a peculiar, soft blue. The arch sometimes remains through the storm, sometimes it is dissipated in a few hours. The force of wind increases to a gale, with clouds of dust and a stifling heat. Vegetation droops and withers, and human beings suffer with lassitude, headache, and neuralgia. The mountains to the west are covered with black clouds—*the true fœhn wall*—and heavy rain falls there.

This state of things lasts sometimes for days, sometimes for a few hours, when the wind veers to the west, the barometer rises, the thermometer falls, and a cold southwest wind sets in for a time, and often the process begins again. Mr. Meeson regards this hot wind as a true *fœhn*, and he accounts for it in this way: The northwest wind, charged with moisture, strikes the west coast at a temperature of 60° F. By the time it reaches the tops of the mountains, at 9,000 feet, it loses 30° of heat, while in descending the eastern side of the mountains it gains 50°, and reaches the Canterbury plains as a dry wind, with a temperature of 80° F. To this temperature is added the heat always developed in front of a cyclone.

The "nor'wester" is, on the whole, a beneficial agent. Some persons hold that it is essential to the maturity of the wheat crop; it kills or blows away the germs of disease, purifies the atmosphere, melts the snows, and plays a great part in the development of animal and vegetable life.

THE MOVEMENT OF THUNDERSTORMS AGAINST THE WIND.

The following contribution to this subject is sent by Mr. Fred. W. Rausch, now living at Topeka, Kans., in a letter dated January 20, 1896:

In regard to the phenomenon reported by Mr. E. D. Hicks in the April REVIEW, page 131, I would say that I have often observed the same in western Missouri, eastern and south central Kansas, but more so during my eight years' residence in eastern Colorado. In Colorado thunderclouds would almost always move in a southeast direction [i. e., from northwest to southeast.—C. A.]. As nearly all our rain during summer in southeast Colorado fell from thunderclouds, I gave the same particular attention. The clouds would form apparently above the mountains during the day, and in the evening break away to the southeast. If the wind was strong from the east or southeast the same would form in a solid black bank; otherwise, float off apart; in either case with more or less rain. The longer the wind would hold out against the cloud the heavier the rain. If the wind changed in the northwest in advance of the cloud, we received mostly wind. When the clouds came from the southwest against the wind, we seldom received rain in paying quantities; the same would appear to roll over one another, and where accompanied by a gale of wind the rain would do more harm than good, causing the dust to settle on the side exposed to the rain and to form a coat of mud. We called these dry rains. Side views of the falling rains traveling against the wind would show a front like this, and sometimes [The sketches are omitted; they simply show the curved streaks of falling rain stretching from the rain cloud to the ground, the convex side of the streak being on the side toward which the wind is blowing and the cloud moving. Sometimes such streaks have a double curvature, indicating two or more layers of wind from different directions.—C. A.], the wind seeming to be the strongest at the curve of the rain streak. Such rains would never last long, but were quite heavy. After the clouds were over [passed overhead] the wind would for a time return to the southeast and often blow the rain back when it was clear overhead; in fact, the wind would spread from the cloud in all directions, but always traveling with the cloud as the same passed over.

On the same subject Mr. W. D. Bruner, Weather Bureau Observer at Mobile, Ala., under date of January 21, 1896, writes:

In reference to the interesting "Notes by the Editor" in the April and August (1895) numbers of the MONTHLY WEATHER REVIEW, under the heading "Do thunderstorms advance against the wind?" I wish to offer the following remarks, which will, perhaps, serve as an explanation. Having led a pastoral life on the western plains I have frequently remarked the phenomena mentioned.

The thunderstorms of the western plains are, perhaps, not unlike those of any other part of the country, but the topography of the country, absence of trees, etc., facilitate the wide range of observation. These storms usually move from a westerly direction, dissipating in their easterly movement, and for short periods are noted for violence and energy. They have a limited rainfall area which is confined to the path of the storm. The storms are generally preceded by a stratum of high cirrus clouds, followed by dark stratus and nimbus clouds, boiling and seething with the conflicting air currents, often presenting a picture of grandeur seldom equaled. As the storm nears the point of observation the wind freshens toward the storm, but a calm prevails for a short period as the nimbus cloud approaches.

The wind veers or backs immediately when the rain begins, and blows from the opposite direction, with increasing force and falling temperature. The wind from any point around the storm blows toward the center, conforming to the general law, consequently any direction of movement taken by the storm would be against the wind.

Rainfall does not result from this opposition of the storm movement and the wind direction. It is a fact that points on either side of the the storm path are not favored with rain, not because there is no opposition between the wind and storm, but because the rain area is small and confined to the storm path.

Rain may continue to fall for a short time after the storm center has passed with the wind blowing with the storm movement, but these storms usually move suddenly or dissipate rapidly, giving place to a clearing sky, light, variable winds and rising temperature.

CLIMATE AND CROP SERVICES.

In 1874 the system of voluntary meteorological observers, that had for many years been maintained by the fostering care of the Smithsonian Institution, was officially turned over to the Chief Signal Officer of the Army, and in 1891 it became an integral part of the Weather Bureau of the Department of Agriculture. In 1881 a circular letter was sent to the governors of States recommending the organization of State weather services under the proper State official and the appropriation of money for the necessary expenses. Since that date several States have taken the necessary action, and in some other States the work has been provided for by special local interests, but the great burden of expense still devolves upon the Weather Bureau. In order to encourage this important work the successive Chiefs of the Weather Bureau have assigned experienced observers to assist in the respective States, and in many cases the work that is done by these officers and the voluntary observers far exceeds that done by the State officials. Moreover, an undesirable diversity has developed in the methods and style of publication and the distribution of the climatological data.

In order to remedy these difficulties and bring about a more equable division of responsibilities the Chief of the Weather Bureau has issued "Instructions No. 18," dated January 30, 1896, from which we make the following extracts:

1. The State Weather Service Division of the Central Office will hereafter be known as "Climate and Crop Division," and the latter designation is hereby officially adopted.

It is desired to emphasize the distinction between "climate" and "weather." The term "climate" refers especially to seasonal meteorological conditions and to the variations between places in their average meteorological features. The work of voluntary observers and crop correspondents has to do almost entirely with "climate" and not with "weather," which latter term refers more especially to the drift of changing air conditions from day to day. The weather-crop bulletins of the Weather Bureau will hereafter bear the following caption:

U. S. DEPARTMENT OF AGRICULTURE.

CLIMATE AND CROP BULLETIN OF THE WEATHER BUREAU.

The attention of directors of State Weather Services, supported wholly or in part by State funds and cooperating with the Weather Bureau, is respectfully called to the advisability of changing the titles of their services so as to omit the word "weather." Probably something like the following designation would be acceptable: "Ohio Climate and Crop Service."

Services wholly supported by funds from the Department of Agriculture will not, after March 1, 1896, be termed "State Weather Services." Such designation is misleading and manifestly improper, as the States have nothing to do with their maintenance.

The following caption for letters, crop bulletins, and monthly meteorological tables will be adopted, and will clearly indicate the status of these services:

U. S. DEPARTMENT OF AGRICULTURE.

CLIMATE AND CROP SERVICE OF THE WEATHER BUREAU.

ILLINOIS SECTION.

C. E. LINNEY, Section Director. CHICAGO, ILL.

The necessary change may go into effect at once where possible, but it must not be delayed longer than March 1st, next.

Where the meteorological tables are printed in journals supported by private means care will be exercised not to designate such journals as "official."

All observers and other officials of the Weather Bureau are forbidden to approach State legislators or committees of State legislatures for the purpose of inducing them to appropriate public funds to be used in State Weather Service work, or for other purposes. They may appear before the proper committees for the purpose of explaining the need of such appropriation, if invited by the proper State officials, but in no way will they solicit legislative action in the interest of their work. The work of the Climate and Crop Service of the Weather Bureau should be extended along all proper lines, so as to meet the needs of the people as fully as the resources of the national service will permit.

If legislatures desire to appropriate funds for the purpose of cooperating with the national service in still further extending its benefits to their States, that matter must be left to the determination of such legislatures, without solicitation on the part of any Weather Bureau employee.

It is hoped soon to perfect printing appliances so that each Section of the Climate and Crop Service of the Weather Bureau may be able to print its own daily weather maps, crop bulletins, and monthly publications, and that the long-sought object of issuing uniform publications may at last be realized. If this is accomplished, it is intended to set apart proper space for text or editorial notes, so that the individuality of the official at the head of the Section may be fully recognized.

METEOROLOGICAL TABLES.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

Table I gives, for about 130 Weather Bureau stations making two observations daily and for about 20 others making only the 8 p. m. observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation.

Table II gives, for about 2,400 stations occupied by voluntary observers, the extreme maximum and minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station; the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (. . . .).

Table III gives, for about 30 Canadian stations, the mean pressure, mean temperature, total precipitation, prevailing wind, and the respective departures from normal values. Reports from Newfoundland and Bermuda are included in this table for convenience of tabulation.

Table IV gives, for 29 stations, the mean hourly temperatures deduced from thermographs of the pattern described and figured in the Report of the Chief of the Weather Bureau, 1891–'92, p. 29.

Table V gives, for 28 stations, the mean hourly pressures as automatically registered by Richard barographs, except for Washington, D. C., where Foreman's barograph is in use. Both instruments are described in the Report of the Chief of the Weather Bureau, 1891–'92, pp. 26 and 30.

Table VI gives, for 136 stations, the arithmetical means of the hourly movements of the wind ending with the respective