Thermometer ascensions made at Bergen Point, Bayonne, N. J., by the Bayonne kite corps.

Number.	Ascension. Date.	P. M. Began.	P. M. Ended.	Kite record. Altitude.	Temperature. Max.	Temperature. Min.	Local conditions. Temperature. Beginning.	Temperature. Ending.	Wind.	Sky.	New York. Temperature. Beginning.	Temperature. Ending.	Winds during ascensions. Direction.	Winds during ascensions. Velocity.	Average daily temperature observed by Mr. Eadie, at Bayonne, N. J. Same day.	Second day.	Third day.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		H. M.	H. M.	Feet.	°	°	°	°			°	°		Miles.	°	°	°
61	February 7, 1899	8 40	9 40	400	23	22	23	22	nne.	Cloudy.	28	28	ne.	20	24.5	25.5	11
62	February 11, 1899	9 50	10 10	200	12	8	12	12	nw.	Cloudy and snowing.	8	8	nw.	12	6	8	9
63	February 13, 1899	3 00	3 30	100	10	6	10	10	nnw.	Cloudy; snowstorm.	4	4	ne.	38	9	17.5	16
64	February 22, 1899	2 10	3 45	942*	56	49	56	56	sw.	Partly cloudy.	47	49	w.	9	43.5	40	33.5
65	February 27, 1899	9 15	10 15	.....	36	31	34	31	w.	Clear; moonlight.	40	40	nw.	26	42.5	36	40
66	March 25, 1899	8 15	9 35	753	32	30	32	32	se.	Cloudy; snowing.	31	31	se.	20	34	39	36.5
67	April 17, 1899	7 20	7 45	300	52	48	51	50	wsw.	Clear.	59	58	n.	19	49.5	50.5	52.5
68	April 22, 1899	4 35	5 22	400	57	52	56	53	s.	Clear.	55	52	se.	13	48.5	59.5	57.5
69	April 22, 1899	9 05	9 17	300*	45	43	44	44	sw.	Clear.	48	47	s.	10	48.5	59.5	57.5
70	April 22, 1899	9 35	10 45	525*	48	43	44	43	sw.	Clear.	47	46	sw.	10	48.5	59.5	57.5
71	April 25, 1899	8 12	9 50	750*	66	61	64	61	ssw.	Partly cloudy.	64	63	sw.	18	58	68.5	59.5
72	April 29, 1899	5 21	9 02	600*	66	58	66	58	sw.	Clear.	58	56	se.	14	57	65	72
73	April 29, 1899	9 32	10 00	300*	56	54	56	56	sw.	Clear.	56	56	s.	12	57	65	72
74	May 6, 1899	5 32	5 55	250	62	60	61	61	ssw.	Partly cloudy.	58	59	se.	8	59	64	59
75	May 6, 1899	8 27	10 26	2,100*	61	56	60	59	ssw.	Cloudy.	61	59	sw.	13	59	64	59
76	May 20, 1899	9 42	10 45	500*	54	50	54	50	nw.	Partly cloudy.	54	53	nw.	24	55.5	58	58.5
77	May 30, 1899	10 17†	12 03	715*	79	70	78	82	w.	Partly cloudy.	72	76	w.	12	70	74.5	76.5
78	May 30, 1899	3 50	5 30	1,667*	85	73	84	80	wsw.	Partly cloudy.	79	79	nw.	20	70	74.5	76.5
	May 30, 1899	.....	.....	500*	84	77	84	80	wsw.	Partly cloudy.	.....	.....	.....	.....	70	74.5	76.5
79	June 3, 1899	8 37	10 45	1,605*	70	66	70	66	sw.	P. cloudy to clear.	71	68	s.	7	74.5	71.5	79
80	June 8, 1899	8 42	9 37	400	82	76	82	76	w.	Clear.	82	81	n.	14	78.5	75	68.5
81	June 12, 1899	9 32	10 17	410*	68	66	67	66	sw.	Clear.	67	66	se.	11	68	71.5	80.5
82	June 19, 1899	8 47	9 30	481	75	72	75	70	wsw.	Partly cloudy.	75	75	sw.	7	73	80.5	75
83	June 23, 1899	8 50	9 26	400	72	66	72	69	sw.	Partly cloudy.	66	66	s.	12	68	79.5	74
84	June 24, 1899	4 05	4 53	568*	92	80	92	84	sw.	Partly cloudy.	82	79	se.	8	79.5	74	75
85	June 24, 1899	8 55	9 34	325	72	68	72	69	ne.	Cloudy and shower.	72	71	ne.	12	79.5	74	75
86	June 27, 1899	8 21	9 02	600*	72	70	70	70	ssw.	Partly cloudy.	72	71	s.	20	73	73	71
87	June 29, 1899	8 20	9 35	1,480*	70	65	70	64	nw.	Clear.	71	69	nw.	21	71	69	68.5
88	July 1, 1899	8 50	9 18	600*	68	66	68	66	s.	Clear.	.....	.....	.....	.....	68.5	75	79.5
89	July 4, 1899	11 05†	12 00‡	400*	91	84	91	91	s. to sw.	Partly cloudy.	.....	.....	.....	.....	78.5	78	78
90	July 4, 1899	1 55	5 00	2,400*	90	80	90	88	se. to s.	Partly cloudy.	.....	.....	.....	.....	78.5	78	78

* Piano wire used. † A. M. ‡ Meridian.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of the Central Meteorologico-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the *Boletin 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 have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.

Mexican data for June, 1899.

Stations.	Altitude.	Mean barometer.	Temperature. Max.	Temperature. Min.	Temperature. Mean.	Relative humidity.	Precipitation.	Prevailing direction. Wind.	Prevailing direction. Cloud.
	Feet.	Inch.	° F.	° F.	° F.	%	Inch.		
Aguascalientes	6,106	23.87	84.6	50.9	71.4	58	7.43	se.	ese., s.
Colima	1,600	28.27	95.7	64.8	77.2	80	15.23	wsw.	ene., sw.
Culiacán Rosales (E. d. S.)	112	29.70	98.6	63.5	85.8	55	.....	sw.	ne.
Durango (Seminario)	6,243	24.04	89.6	51.8	72.3	52	2.13	sw.	e.
Leon (Guanajuato)	5,934	24.29	89.1	53.4	68.7	63	4.31	s.	ne.
Mexico (Obs. Cent.)	7,472	23.04	79.7	52.0	62.4	67	4.15	n.	ne.
Morelia (Seminario)	6,401	23.97	78.3	55.4	54.9	78	7.22	s., se.	ne.
Oaxaca	5,164	25.02	94.6	53.6	68.7	78	10.10	nw.	ne.
Puebla (Col. Cat.)	7,112	23.35	81.9	50.9	65.5	82	9.90	ene., e.	n.
Saltillo (Col. S. Juan)	5,399	25.01	95.2	56.8	71.1	70	6.50	n.	sw.
Tuxpan	19	30.14	104.9	66.2	82.0	78	9.49	e.	w.
Zapotlan (Seminario)	5,078	25.09	88.9	57.2	69.4	69	9.60	sse.	e.

THE PRECIPITATION OVER THE PACIFIC NORTHWEST AND THE POSSIBILITY OF HIGH WATER IN THE COLUMBIA FROM THE MELTING SNOW IN THE MOUNTAINS.

By B. S. PAGUE, Forecast Official.

The Columbia River, with its tributaries, drains that portion of the United States west of the one hundred and eleventh meridian and north of latitude 42°, except a portion of northwestern Washington and southwestern Oregon. The greater portion of the eastern half of British Columbia is also drained by the tributaries of the Columbia. The total area drained is approximately 350,000 square miles, or about 250,000,000 acres; an area nearly equal to one-half of that portion of the United States east of the Mississippi. The main tributaries of the Columbia are the Snake, Clark's Fork, Kootenai, Okanogan, Yakima, John Day, Deschutes, and Willamette. The Snake drains southern and eastern Idaho. It has two principal tributaries, the Clearwater, and the Salmon, the latter being much the larger. Western Montana, and northern Idaho are drained by the Kootenai and Clark's Fork. Eastern British Columbia is drained by lakes and streams all finally running into the Columbia. The Okanogon drains the northern portion of central Washington; the Yakima in Washington and the Deschutes in Oregon drain the eastern slope of the Cascades, and the John Day drains the southern slope of the Blue Mountains in northeastern Oregon. The Willamette drains the northwestern portion of Oregon between the Coast and Cascade mountains, north of the Calapooia Mountains. There are many other streams which are important tributaries to the Columbia, but for the purpose of this paper it is not necessary to mention them.

The country drained by the Columbia is, for the most part, mountainous, or high plateau. There are many valleys, all having elevations of over 1,000 feet, and the greater number having 2,000 feet and upward. The plateau country ranges in elevation from 1,800 to 5,000 feet. The mountains range in elevation from 2,500 to 12,000 feet. The line of perpetual snow, in the region under discussion, ranges from 6,000 to 8,000 feet. As few of the mountains have any considerable area above the snow line, it is seen that the winter's snowfall is almost entirely melted each year and the water carried off by the Columbia.

For the six months, from May 1 of each year, the total precipitation averages about six inches over the country drained by the Columbia, hence it is seen the rainfall occurring after the snow begins to melt is too small in amount to be considered in this discussion.

The precipitation over the country drained by the Columbia from October to April amounts to from 8 to 16 inches, and is principally in the form of snow; it settles and packs

on the mountains and in the canyons and is always sufficient to produce a flood, if rapid melting occurs over the entire country. Should the melting occur at intervals or be gradual, as is usually the case, then high water occurs, but not a flood. A flood will not occur if the country drained by the Snake loses its snow before the snow melts from the upper Columbia country, but should the snow melt over both sections at the same time, as in 1894, a flood is inevitable. The greatest amount of snow is usually found in the mountains of northeastern Oregon and northern Idaho. An examination of the physical condition prevailing over the Pacific northwest will make it clear why this is so. A very large amount of snow is found in eastern British Columbia and the northern portion of central Washington; in the other sections the snowfall is of much less amount, hence it is not so important for the purpose of this paper.

In 1893–94, the greatest excess of precipitation occurred in January, December, and March. In 1898–99, there was no month with any marked excess of precipitation occurring in the entire district under discussion. Considering that a deficiency of precipitation occurred at all places named, and such was the case in 1898–99, it is reasonable to assume, and it is assumed, that a similar deficiency occurred over the surrounding mountain region; if this be true, then there was not the amount of snowfall in the mountains during the past winter that there was in the winter of 1893–94. Floods in the Columbia do not depend so much upon the total precipitation of winter, as upon the amounts of snow in the mountains when the thawing in April begins. It is well known that the influence of chinook winds removes great quantities of snow from the foot hills and lower mountains during the winter season, and an absence of chinooks or even normal temperatures will allow much of the snow that falls during the winter to remain unmelted until spring. Such snow packs, hardens, and becomes a greater mass, for each new fall of snow adds to that already fallen and remains unmelted. These facts being established, the temperature conditions during the winter then become as important as the precipitation.

[Here follow statements giving the departure from the normal temperature, at various places for the winters of 1893–94 and 1898–99.—ED.]

A summary of the these shows that the various places were colder in 1898–99 than in 1893–94, as follows: Spokane, 3.7°; Walla Walla, 12.4°; Idaho Falls, 3°, and Helena, 19.5°. At Baker City, owing to the warmth of January, 1899, the past winter has been 2.7° warmer than the winter of 1893–94. This warmth was purely local at Baker City, and can have no material influence on the subject as a whole.

The winter of 1893–94 had, on an average, over the country drained by the Columbia and tributary rivers, 10.22 inches of precipitation, and in 1898–99 it had 7.34 inches; or the former had 2.88 inches more precipitation than the latter. While this is true as regards the precipitation, the temperature record shows that the last winter averaged 5.2° colder than the winter of 1893–94. Considering the absence of the usual number of chinook winds during the last winter, and the almost continuous deficiency in temperature, the consequent increased accumulation of snow, for up to April 1, there has been practically no melting, it is reasonable, therefore, to assume that there is, on April 1, 1899, as much or possibly more snow in the mountains than there was on April 1, 1894. This deduction from the actual records is proven by the reports from over 200 persons, living at the present time, nearest to the snow line.

Assuming, then, that there is as much snow in the mountains on April 1, 1899, as on the same date five years ago, it is apparent that the Columbia will have to carry to the ocean the same number of gallons of water during the next three months that it carried in 1894.

The amount of snow now in the mountains is sufficient to produce a flood, if May has a period of warm weather. If there are alternate warm and cool periods there is less possibility of a flood. If the warm weather covers Idaho and Oregon before it reaches Washington, British Columbia, and Montana, the water will not be as high in the river as it will be should the warm weather invest the entire Pacific northwest at the same time.

It can safely be assumed that the river at Portland will rise to from 20 to 25 feet, and at Umatilla about 2 feet more; at The Dalles the height will be from 37 to 45 feet. These heights will probably occur during the month of June; higher water in the river will prevail if temperatures much above the normal prevail during the latter part of May and the fore part of June.

NOTES BY THE EDITOR.

CLIMATOLOGICAL DATA FOR CANADA.

The Annual Reports for the Meteorological Service of Canada for the years 1895 and 1896 have been published in quarto volumes, the previous reports for many years past having been confined to octavo. The new style gives room for the publication of much more climatological data than previously, and doubtless in future years the quantity will be still further increased. The Canadian stations are classified as *first-class* when all observations are made three times a day; *second-class*, when temperature, wind, weather, and rain are observed three times a day; *third-class*, when only precipitation and the general state of the weather are recorded. *First order* (international program), when self-registering instruments are maintained for pressure, temperature, evaporation, and wind, as the Magnetic Observatory at Toronto; *chief stations*, when all ordinary observations are taken at regular intervals not exceeding four hours; *telegraph reporting stations*, when the observations are taken three times a day—at 8 a. m., 3 p. m., and 8 p. m., seventy-fifth meridian time.

There are one first order, about thirty telegraph stations, about two hundred ordinary stations of the first, second, and third class, and eight chief stations whose records are given in the Report for 1895. The first part of the Report gives the monthly and annual summaries from telegraph and ordinary stations of the first class; sixty-four such stations are given on as many pages. Part II gives similar summaries for stations of the second class; in all about one hundred and sixty-three stations are given on eighty pages. Part III contains the monthly and annual mean temperatures and total precipitations for all stations; the mean temperatures are, when possible, computed by the formula $1/4\ (7 + 2 + 2 \times 9)$, otherwise by the average of the daily maximum and minimum or by the observations at various hours corrected to the daily mean by using the normals for Toronto; mean temperatures are given for about two hundred and twenty stations, as also the absolute maximum and minimum and the mean daily range of temperature; the monthly and annual rainfall is given for about two hundred and fifty stations, and the monthly and annual snowfall for the same. In Part IV the amount of sunshine, as registered for each day of the year, is given for fourteen stations, and the temperature observed every two hours for each day of the year at Regina, Kingston, Montreal, and Quebec, and for each hour at Toronto. These