

## WEATHER, FORECASTS, AND WARNINGS.

By H. C. FRANKENFIELD, Professor of Meteorology.

## NORTHERN HEMISPHERE PRESSURE DISTRIBUTION.

Over the east-central Pacific Ocean, as indicated by the observations at Honolulu, the pressure fluctuations were small, with a tendency toward a slight excess above the normal during the first half of the month. There was, however, a quite well defined depression on the 14th. Over the Aleutian Islands high pressure prevailed almost uniformly, with exceptionally high crests on the 5th, 6th, and 12th. The only low area of the month occurred on the 29th. Conditions over northwestern Alaska corresponded with those over the Aleutians, but to the southward and eastward moderately low pressure was the rule, except from the 20th to the 24th, inclusive.

Over the Northwest (both in the United States and Canada) there were the usual alternations of moderate high and low areas, except during the seven days beginning with the 16th, when high pressure ruled. The most pronounced low area of the month occurred on the 11th, and its southern edge extended southward into the lower Missouri Valley. Over the eastern and southern portions of the country there were no developments of special interest, although the general pressure tendency was toward below-normal conditions, with well-defined lows on the 7th, 10th, 13th, and 19th over the northeastern districts.

Over the Atlantic Ocean the usual high pressure prevailed, with relatively high barometer readings, as a rule, over the western ocean. Over the Azores moderately low pressure prevailed from the 20th to the 25th instant.

Marked high pressure also prevailed over Iceland and the British Isles, while over western Europe there were alternations of moderate high and low areas.

Low pressure prevailed over Russia, except over the extreme northern portion. Over Siberia and eastern China high pressure during the first half of the month was followed by moderately low pressure during the second half, the only exception having been a severe north coast depression on the 4th and 5th. Over the Philippines normal pressure prevailed during the first half of the month and moderately low pressure thereafter.

## WEATHER IN THE UNITED STATES.

The weather of the month was of a character that could ordinarily be expected during July. There were the usual alternations of high and low pressure areas, bringing with them periods of warm and dry and cool and showery weather, but perhaps only one of the pressure types is deserving of special mention. Abnormally low pressure prevailed over the Northwest on the 10th and 11th, with the lower end of the depression extending down over Kansas. However, this lower end was quickly filled up and the upper end first passed eastward to Lake Superior and afterward northeastward.

While heavy local showers occurred over various sections of the country, there was a general deficiency as a whole during the first half of the month, and very dry conditions were reported from Virginia northward. During the third week of the month there was plenty of rain in the Southeast, but none of consequence west of

Alabama and over the Great Central Valleys except in the upper Ohio Valley. Dry weather also continued from Virginia northward, and there was but little rain west of the Mississippi River, except over a narrow strip of country extending from northern Arizona and northern New Mexico northeastward into South Dakota and southern Minnesota.

During the fourth week of the month no well-defined low-pressure area moved over the country, but precipitation occurred over practically all sections. It was, however, not of great consequence except in the South Atlantic and east Gulf States, where there were frequent showers of substantial quantity. Over the western portion of the country low temperatures for the season prevailed, but elsewhere throughout the United States temperatures were moderate. The last three days of the month were characterized by low pressure over the Northwest and the persistence of the Atlantic Ocean high area, resulting in some of the highest temperatures of the season over the Middle Atlantic States, the Great Central Valleys, and the Plains States, although a high area over the Northwest on the 30th was attended by falling temperature, that on the last day of the month extended over the central and northern districts west of the Mississippi River. On the afternoon of the 30th, following several days of extreme heat, there was a severe local storm in the vicinity of Washington, D. C. Several lives were lost, and the property losses were estimated at about \$1,000,000. The wind reached a velocity of 68 miles an hour from the northeast, but the storm limits did not extend more than a few miles beyond the city. In the South and far West moderate temperatures continued. Precipitation during these last three days was in the form of local thundershowers over limited areas, except in the South Atlantic and east Gulf States where, as during the previous week, thundershowers were of daily occurrence.

There were no tropical disturbances noted during the month.

## Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since Jan. 1.	Average departures since Jan. 1.
New England.....	12	69.8	+1.0	+15.1	+2.2
Middle Atlantic.....	15	75.2	+0.8	+20.7	+3.0
South Atlantic.....	10	80.5	+1.5	+16.1	+2.3
Florida Peninsula <sup>1</sup> .....	9	81.7	+0.5	+9.9	+1.4
East Gulf.....	11	81.1	+0.8	+5.4	+0.8
West Gulf.....	11	83.1	+1.1	-4.7	-0.7
Ohio Valley and Tennessee.....	14	78.4	+1.6	+9.8	+1.4
Lower Lakes.....	11	71.4	-0.3	+8.2	+1.2
Upper Lakes.....	13	67.1	+1.0	+2.3	+0.3
North Dakota <sup>1</sup> .....	9	65.5	-2.6	-2.8	-0.4
Upper Mississippi Valley.....	14	76.7	-1.3	+3.3	+0.5
Missouri Valley.....	12	77.9	+2.1	+7.5	+1.1
Northern slope.....	9	66.2	-1.9	-9.5	-1.4
Middle slope.....	6	70.0	+2.2	-0.8	-0.1
Southern slope <sup>1</sup> .....	8	81.9	+1.5	-6.4	-0.9
Southern Plateau <sup>1</sup> .....	9	80.3	-1.6	-18.9	-2.7
Middle Plateau <sup>1</sup> .....	10	69.4	-1.7	-8.7	-1.2
Northern Plateau <sup>1</sup> .....	11	67.4	-1.7	-14.2	-2.0
North Pacific.....	6	61.9	+0.7	-3.9	-0.6
Middle Pacific.....	7	65.2	+0.7	-4.3	-0.6
South Pacific.....	4	71.4	+1.6	-2.9	+0.4

<sup>1</sup> Regular Weather Bureau and selected cooperative stations.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Current month.	Percentage of normal.	Current month.	Accumulated since Jan 1.
New England.....	11	2.06	58	-1.50	-3.80
Middle Atlantic.....	15	3.32	77	-1.00	-2.00
South Atlantic.....	11	5.06	83	-1.00	-2.60
Florida Peninsula <sup>1</sup> .....	9	4.93	70	-2.10	-3.00
East Gulf.....	11	4.63	87	-0.70	0.00
West Gulf.....	10	2.05	63	-1.20	-3.70
Ohio Valley and Tennessee.....	14	3.83	95	-0.20	+2.20
Lower Lakes.....	10	2.48	73	-0.90	+2.50
Upper Lakes.....	14	3.73	119	+0.60	-0.20
North Dakota <sup>1</sup> .....	9	2.25	82	-0.50	-4.40
Upper Mississippi Valley.....	15	3.07	75	-1.00	-2.00
Missouri Valley.....	12	2.70	71	-1.10	-2.90
Northern slope.....	9	1.49	94	-0.10	-0.20
Middle slope.....	6	2.01	199	+1.00	-2.30
Southern slope <sup>1</sup> .....	8	1.98	69	-0.90	-2.50
Southern Plateau <sup>1</sup> .....	9	0.84	68	-0.40	-0.20
Middle Plateau <sup>1</sup> .....	11	1.03	141	+0.30	-0.80
Northern Plateau <sup>1</sup> .....	11	1.11	182	+0.50	+0.60
North Pacific.....	7	1.02	142	+0.30	-4.50
Middle Pacific.....	7	0.08	800	+0.10	-7.70
South Pacific.....	4	0.10	900	+0.10	-2.10

<sup>1</sup> Regular Weather Bureau and selected cooperative stations.

Average relative humidity and departure from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England.....	72	- 8	Missouri Valley.....	59	- 7
Middle Atlantic.....	69	- 6	Northern slope.....	56	+ 4
South Atlantic.....	78	- 2	Middle slope.....	52	- 8
Florida Peninsula.....	76	- 2	Southern slope.....	49	-10
East Gulf.....	77	- 1	Southern Plateau.....	42	+ 4
West Gulf.....	71	- 3	Middle Plateau.....	45	+13
Ohio Valley and Tennessee.....	68	- 1	Northern Plateau.....	52	+11
Lower Lakes.....	67	- 2	North Pacific.....	76	+11
Upper Lakes.....	70	- 2	Middle Pacific.....	59	- 7
North Dakota.....	68	+ 2	South Pacific.....	65	+ 1
Upper Mississippi Valley.....	65	- 3			

Average cloudiness and departure from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England.....	5.0	-0.1	Missouri Valley.....	3.3	-0.9
Middle Atlantic.....	4.5	-0.4	Northern slope.....	4.1	+0.4
South Atlantic.....	5.0	-0.2	Middle slope.....	3.8	-0.3
Florida Peninsula.....	4.3	-0.7	Southern slope.....	3.0	-1.5
East Gulf.....	5.7	+0.3	Southern Plateau.....	3.3	0.0
West Gulf.....	3.3	-0.8	Middle Plateau.....	3.9	+0.8
Ohio Valley and Tennessee.....	4.6	0.0	Northern Plateau.....	3.8	+1.1
Lower Lakes.....	4.1	-0.4	North Pacific.....	4.9	+0.3
Upper Lakes.....	4.7	+0.1	Middle Pacific.....	3.5	0.0
North Dakota.....	4.0	-0.4	South Pacific.....	3.3	+0.5
Upper Mississippi Valley.....	4.2	-0.1			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Alpena, Mich.....	27	52	sw.	Mt. Tamalpais, Cal.....	12	52	nw.
Buffalo, N. Y.....	4	54	nw.	Mt. Weather, Va.....	14	56	w.
Do.....	6	50	nw.	New York, N. Y.....	13	50	w.
Do.....	12	66	sw.	Norfolk, Va.....	2	60	n.
Do.....	13	62	sw.	North Head, Wash.....	6	54	s.
Cleveland, Ohio.....	27	66	nw.	Point Reyes Light, Cal.....	1	75	nw.
Dayton, Ohio.....	14	54	nw.	Do.....	2	67	nw.
Green Bay, Wis.....	5	50	nw.	Do.....	9	66	nw.
Hatteras, N. C.....	15	54	nw.	Do.....	12	56	nw.
Do.....	19	53	nw.	Do.....	13	54	nw.
Do.....	20	52	nw.	Do.....	14	54	nw.
Jacksonville, Fla.....	20	50	sw.	Do.....	14	54	nw.
Kansas City, Mo.....	11	57	nw.	Roswell, N. Mex.....	14	64	w.
Lander, Wyo.....	29	52	sw.	St. Paul, Minn.....	2	50	n.
Lexington, Ky.....	19	51	w.	Do.....	31	58	w.
Louisville, Ky.....	19	54	nw.	Syracuse, N. Y.....	23	54	sw.
Minneapolis, Minn.....	31	50	w.	Tatoosh Island, Wash.....	6	60	sw.
Mt. Tamalpais, Cal.....	1	56	nw.	Trenton, N. J.....	24	72	w.
Do.....	2	72	nw.	Toledo, Ohio.....	13	55	sw.
Do.....	3	71	nw.	Do.....	28	50	sw.
Do.....	7	52	nw.	Valentine, Nebr.....	15	52	nw.
Do.....	8	54	nw.	Washington, D. C.....	30	68	ne.
Do.....	9	61	nw.				
Do.....	10	64	nw.				