

WEATHER, FORECASTS, AND WARNINGS FOR THE MONTH.

By EDWARD H. BOWIE, in charge of Forecast Division.

During the first few days of the month, unsettled conditions with showers and thunderstorms prevailed generally over the country east of the Rocky Mountains. In the South temperatures for the week ending September 5, averaged above normal while in the northern half of the country they were decidedly below normal.

The weekly forecast issued Sunday, September 4, follows:

A disturbance that is moving eastward from the Rocky Mountain region will be preceded and attended by unsettled, humid weather and showers and local thunderstorms during the first half of the week in all districts from the Mississippi Valley to the Atlantic coast. This disturbance will be followed by generally fair weather and a change to somewhat lower temperatures, reaching the Eastern States by Thursday. There will be light frosts in the Northwestern States during the first half of the week. Another disturbance will appear in the Northwest by Thursday, attended by showers in that region and the North Pacific States. At the present time there are no indications of a tropical storm in the West Indies.

The storm that moved from the Rocky Mountain region to Maine from the 4th to 7th caused rains generally throughout the country east of the Rocky Mountains and high winds on the Lakes; exceptionally heavy rains occurring in Texas on the 6th. Warnings were issued for high winds in connection with this storm on western Lake Superior the night of the 7th and were extended the following morning to the balance of Lake Superior, Lake Huron, and the northern and eastern shores of Lake Michigan. Advisory warnings were also sent to the balance of Lake Michigan and to the lower Lakes. In connection with this storm it is reported that a car ferry foundered on Lake Michigan on the 8th and a number of persons were lost; storm warnings were displayed, however, when she left port.

On the morning of the 7th the most pronounced high pressure area of the season appeared in the Northwest, causing a marked change to cooler weather. It moved slowly eastward and was attended by heavy to killing frosts in eastern Montana and the Dakotas and light frosts in Wisconsin, Minnesota, and Michigan, which were successfully forecast. During the first half of the week, the weather was unusually warm in the Eastern States and was followed during the latter part of the week by a change to cooler.

On the morning of the 6th conditions over the eastern Caribbean Sea were unsettled and a 6 p. m. special from San Juan, Porto Rico, showed a steady fall in the barometer accompanied by high wind. During the night of the 6th, at San Juan, the velocity of the wind increased to 72 miles an hour from the northeast, with lowest barometric pressure 29.76 inches at 7:20 p. m. The center of the storm passed south of the island, causing considerable damage thereon, which was confined largely, however, to the north coast, east of San Juan; great havoc was reported by the telegraph and telephone companies to their lines and considerable damage was caused by phenomenally heavy rain, which washed cane fields and raised rivers to unprecedented flood heights. Rainfall at some stations broke all previous records for intensity, a fall of 13 inches in 12 hours being reported from Comerio. Brisk to high northeast winds, occasionally reaching hurricane force, prevailed over practically the entire island during the late afternoon and the night of the 6th, the highest winds occurring between 7 and 8 p. m., with a secondary high velocity between midnight and 2 a. m. On the morning of the 7th the storm was apparently central southwest of Porto Rico, moving in a west-northwest direction. All shipping was advised as to the location, intensity, and probable direction of movement of the storm. On the 8th the storm was apparently central south of the east end of the Island of Cuba, and on the 10th was near the north coast of Yucatan and moving northwest. It reached the Texas coast near the mouth of the Rio Grande River on the 14th. High winds and unusually

high tides were reported on the Louisiana and Texas coasts. Torrential rains were recorded along the Texas coast. No wrecks of vessels or loss of lives have so far been reported. Ample warnings were issued in connection with this storm, particularly to Gulf interests affected.

The following is an extract from a report by the district forecaster at New Orleans, La., on the above-mentioned storm:

The advisory warnings relative to the location and probable movement of the tropical disturbance were received daily commencing September 6, and were distributed by telegraph to shipping in ports along the Gulf coast and by wireless to several vessels in the Gulf of Mexico and Caribbean Sea. Among other advices the following was issued on the 13th: "Continue northeast storm warnings 10 p. m. all stations Texas coast. Tropical storm apparently approaching south Texas coast. High northeast to north winds indicated for next 24 hours." The next day the following was issued: "Advisory 9:10 a. m. Texas coast. The tropical disturbance is moving inland near the mouth of the Rio Grande, where it shows considerable intensity this morning. High east winds and dangerous high tides will continue on the coast of Texas to-day and possibly to-night." A wind velocity of 60 miles from the east was reported from Corpus Christi during the 12 hours ending 8 p. m., the 14th, and again at 8 a. m. of the 15th. The tide in the bay at Corpus Christi was higher than for several years. The warnings of the Weather Bureau were so well and efficiently distributed that no loss of life has been reported from the Texas coast and there have been no reports of damage to shipping within the territory that could be reached by the warnings.

The following is an editorial from the Times-Democrat, New Orleans, La., of September 15:

About one week ago the United States Weather Bureau sent out advices warning shipping that a tropical storm had made its appearance in the vicinity of Porto Rico. Daily advices were distributed by wireless to ships at sea and by telegraph to coast stations so that vessels at sea were kept as well posted as to the location, movement, and severity of the storm as the vessels lying at anchor in the harbors along the coast. Monday night reports received by the Weather Bureau indicated that the storm was 100 to 150 miles out in the Gulf, south of Louisiana. Tuesday morning the slow rain and gusty winds, which characterize an approaching storm, prevailed over southern Louisiana, and sugar and rice planters were greatly alarmed, because a severe wind storm would have damaged the cane badly and rice being ripe, the grain would have been thrashed out and the yield greatly reduced. With every local prospect indicating the approach of the storm, the United States Weather Bureau sent warnings broadcast announcing that the tropical storm was some distance southeast of the Texas coast, moving northwestwardly toward the mouth of the Rio Grande, and that brisk winds and high tides would prevail along the Texas coast. Wednesday morning the hurricane was moving inland near the mouth of the Rio Grande, as predicted by the Weather Bureau twenty-four hours previous.

The following editorial appeared in the Daily Picayune, New Orleans, La., September 15:

Notwithstanding the threatening weather which prevailed over southern Louisiana Tuesday no damage was experienced, as the storm passed southward some distance out in the Gulf. However, sugar and rice planters were greatly alarmed. A severe wind storm at this season of the year would lodge the cane and would result in great injury to the rice crop, because few of the rice planters are prepared to flood their rice fields to such an extent as would prevent great damage from high winds. The excellent advices issued from day to day by the United States Weather Bureau in connection with this storm from the date of the inception has been in keeping with its past record. Tuesday morning, long before the storm was being felt at any coast station, shipping, commercial, and agricultural interests along the Gulf coast were advised that the storm was some distance out in the Gulf southeast of the Texas coast, and was moving in a northwesterly direction toward the mouth of the Rio Grande. Yesterday morning the storm was moving inland, with its center near the mouth of the Rio Grande, and the high winds and high tides had occurred along the Texas coast, as though conditions had been made to fit the Weather Bureau's warnings. The value of a service which can foretell where such storms will strike the coast, as was done in this case, can not be estimated. These are but a few of the many great services rendered the public by the Weather Bureau since Prof. Willis L. Moore became its chief. He has given special attention to the improvement of forecasts and warnings, and the general public can testify as to the marked degree of success which he has attained.

A weekly forecast issued Sunday, September 11, follows:

An extensive area of high barometric pressure that has moved to the far Northwest from Alaska will advance eastward over the United States at-

tended by unseasonably cool weather the first half of the week in all sections from the Plains States to the Atlantic coast, with frosts probable in the Northern States from the Missouri Valley to the interior of New England. Preceding this change to cooler, the weather will be unsettled with showers from the Mississippi Valley to the Atlantic coast and in the west Gulf States. Another disturbance will appear on the north Pacific coast Monday or Tuesday and move eastward, attended by unsettled weather and showers and preceded by rising temperature. This disturbance will reach the Eastern States by the close of the week.

On the 11th and 12th warnings of high northwest winds were issued for the Great Lakes, except Ontario, and they occurred as forecast. Another area of high pressure that appeared in the Northwest moved eastward from the 12th to 16th, causing frosts in the Northwest, the upper Mississippi Valley, the Lake region, and interior of New England. In connection with a disturbance that appeared in the extreme West on the 13th rains occurred over the Pacific States, the Rocky Mountain region, the northern Plains States, and thence eastward over the upper Mississippi and Ohio valleys, and the Lake region. There were well-distributed rains in California, in connection with this storm, for the first time in several months. During the first half of the week scattered showers occurred in the Lake region, Ohio Valley, along the Atlantic coast, and over the Southwest, but during the latter half of the week but little precipitation occurred in any part of the country. For the week, as a whole, the temperature averaged below the normal over the Lake region, Ohio Valley, and Atlantic coast districts, and over the Pacific States from central California northward; in other parts of the country temperatures averaged low for the season.

Previously to the 13th, a disturbance apparently developed to the eastward of the Lesser Antilles and moved thence in a northwest course. On the 16th wireless reports showed its presence a considerable distance off Cape Hatteras; and on this date advisory warnings of high northeast winds off the Atlantic coast from Cape Hatteras to Cape Cod were issued. This disturbance moved north-northeast a considerable distance off the middle Atlantic coast and on the 18th was off the Newfoundland Banks. Strong north and northeast winds prevailed along the middle Atlantic and New England coasts, while this storm was passing northward.

The weekly forecast issued Sunday, September 18, follows:

The general pressure distribution over the North American Continent and the adjacent oceans is such as to indicate that the temperature over the greater portion of the country during the week beginning September 19 will average above the normal for the season. A change to somewhat lower temperature will overspread the New England and Middle Atlantic States Monday, followed by rising temperature Tuesday and several days thereafter. A disturbance that now covers Alaska will advance eastward along the northern border and reach the Atlantic States Thursday or Friday; this disturbance will be followed by cooler weather, the change to lower temperature appearing in the Northwestern States by Wednesday. Generally fair weather is indicated for the Southern States.

A disturbance that appeared in the Northwest on the 21st, advanced slowly eastward, attended by showers and thunderstorms, and reached the Middle Atlantic States on the 24th (Friday). A high pressure area advanced along the northern border from the 21st to 24th, attended by frosts in New England and freezing temperatures in Vermont. It is interesting to note in this connection that the coldest weather of the season was reported from the Alaskan stations on the 21st and 22d. On the 21st the lowest reported was 10° from Tanana and 8° from Eagle. On the morning of the 21st there were indications of a disturbance southwest of St. Kitts, W. I. This storm recurved to the northward and was next observed near the Island of Bermuda on the morning of the 25th, apparently moving north-northeast. The average temperature for the week ending the 26th was slightly below the normal along the northern border from the Rocky Mountains eastward to New England; over remaining districts the temperature was above the seasonal

average, departures being as much as 8° to 12° over Oklahoma, northern Texas, and Arkansas.

The weekly forecast issued Sunday, September 25, follows:

A hurricane that was central Sunday morning near and immediately east of Bermuda will move north-northeast and cause dangerous winds and stormy weather during the next several days over the North Atlantic steamship routes. On Sunday morning advices concerning this disturbance were sent the principal ports on the Atlantic coast and wireless telegraph stations were requested to advise vessels at sea of the position and direction of movement of this storm. Some indications were shown by reports from the West Indies of a disturbance Sunday east of the Windward Islands.

In the United States the weather east of the Rocky Mountains will be unsettled, with rains, within the next three days, attending the eastward movement of a disturbance from the southwest; this disturbance will be followed by somewhat cooler weather, which will overspread the Middle West Monday and Tuesday and the Eastern States Wednesday. Another disturbance has formed over Bering Sea, whence it will move eastward across the United States, attended by showers and unsettled weather, and reach the Atlantic States by the close of the week. This disturbance will, in all probability, be followed by a marked change to cooler weather in all parts of the country east of the Rocky Mountains.

A disturbance that appeared in the Southwest on the 24th moved northeastward, attended by an extension area of showers and thunderstorms, to the mouth of the St. Lawrence on the 28th. It was followed by an area of high pressure that caused frosts in South Dakota, Nebraska, and Kansas on the 27th. Another disturbance appeared in the Northwest on the 28th and moved eastward along the northern border. The month closed with temperatures about or slightly above normal.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England.....	81	+ 0	Missouri Valley.....	73	+ 7
Middle Atlantic.....	78	+ 1	Northern slope.....	66	+ 11
South Atlantic.....	82	+ 2	Middle slope.....	59	+ 6
Florida Peninsula.....	78	+ 4	Southern slope.....	44	+ 4
East Gulf.....	76	0	Southern Plateau.....	43	+ 4
West Gulf.....	71	+ 3	Middle Plateau.....	44	+ 3
Ohio Valley and Tennessee.....	78	+ 6	Northern Plateau.....	46	+ 6
Lower Lakes.....	79	+ 6	North Pacific.....	60	+ 8
Upper Lakes.....	80	+ 3	Middle Pacific.....	63	+ 5
North Dakota.....	73	+ 6	South Pacific.....	65	- 1
Upper Mississippi Valley.....	78	+ 6			

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England.....	5.5	+ 0.3	Missouri Valley.....	4.8	+ 0.8
Middle Atlantic.....	4.6	+ 0.3	Northern slope.....	5.0	+ 1.0
South Atlantic.....	4.6	- 0.1	Middle slope.....	4.1	- 0.7
Florida Peninsula.....	4.7	- 0.7	Southern slope.....	3.7	- 0.1
East Gulf.....	4.1	- 0.5	Southern Plateau.....	3.3	- 0.3
West Gulf.....	3.3	- 0.9	Middle Plateau.....	3.6	- 0.2
Ohio Valley and Tennessee.....	5.2	+ 0.8	Northern Plateau.....	4.3	+ 0.7
Lower Lakes.....	5.1	+ 0.3	North Pacific.....	3.0	+ 0.7
Upper Lakes.....	5.4	+ 0.2	Middle Pacific.....	3.8	+ 0.4
North Dakota.....	5.0	+ 0.6	South Pacific.....	3.0	+ 0.4
Upper Mississippi Valley.....	5.1	+ 0.8			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Corpus Christi, Tex.....	9	59	ne.	North Head, Wash.....	29	52	s.
Do.....	14	61	e.	Point Reyes Light, Cal.	11	60	nw.
Denver, Colo.....	25	51	n.	Do.....	12	55	nw.
Galveston, Tex.....	9	54	ne.	Do.....	16	53	nw.
Mount Tamalpais, Cal.....	6	51	nw.	San Juan, P. R.....	6	72	ne.
Do.....	7	51	nw.	Do.....	7	50	e.
Do.....	10	50	nw.				

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 January 1.	Average departures since January 1.
New England.....	12	60.6	- 0.1	+13.4	+ 1.5
Middle Atlantic.....	15	68.4	+ 2.1	+11.1	+ 1.2
South Atlantic.....	10	75.0	+ 1.8	+ 4.3	+ 0.5
Florida Peninsula*.....	8	79.6	+ 0.4	- 2.5	- 0.3
East Gulf.....	11	77.9	+ 3.1	+ 2.1	+ 0.2
West Gulf.....	10	79.6	+ 4.2	+ 8.6	+ 1.0
Ohio Valley and Tennessee.....	13	71.0	+ 2.6	+ 1.9	+ 0.2
Lower Lakes.....	10	62.4	- 0.6	+ 6.7	+ 0.7
Upper Lakes.....	12	58.5	- 0.4	+18.6	+ 2.1
North Dakota*.....	8	54.9	- 1.5	+22.1	+ 2.5
Upper Mississippi Valley.....	14	65.1	+ 0.2	+10.1	+ 1.1
Missouri Valley.....	12	65.8	+ 0.5	+15.3	+ 1.7
Northern slope.....	9	56.7	- 0.8	+19.6	+ 2.2
Middle slope.....	6	70.0	+ 2.4	+17.8	+ 2.0
Southern slope*.....	8	77.5	+ 4.4	+15.3	+ 1.7
Southern Plateau*.....	11	77.2	+ 2.9	+14.5	+ 1.6
Middle Plateau*.....	10	62.5	+ 2.6	+12.8	+ 1.4
Northern Plateau*.....	9	58.4	- 1.1	+ 8.4	+ 0.9
North Pacific.....	7	56.2	- 0.7	- 2.9	- 0.3
Middle Pacific.....	5	62.2	- 2.2	- 4.1	- 0.5
South Pacific.....	4	68.9	+ 1.6	+ 9.6	+ 1.1

*Regular Weather Bureau and selected cooperative stations.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
New England.....	11	Inches. 2.47	78	Inches. - 0.7	Inches. - 4.0
Middle Atlantic.....	15	2.52	78	- 0.7	- 4.5
South Atlantic.....	11	2.92	62	- 1.8	- 5.3
Florida Peninsula*.....	8	3.27	43	- 4.3	-10.3
East Gulf.....	11	2.17	56	- 1.7	- 6.2
West Gulf.....	10	2.66	79	- 0.7	- 6.0
Ohio Valley and Tennessee.....	13	3.25	114	+ 0.4	- 0.6
Lower Lakes.....	10	2.87	104	+ 0.1	- 1.8
Upper Lakes.....	12	3.10	94	- 0.2	- 4.9
North Dakota*.....	8	1.85	119	+ 0.3	- 6.1
Upper Mississippi Valley.....	15	2.21	97	- 0.1	- 6.8
Missouri Valley.....	12	4.46	175	+ 1.8	- 2.6
Northern slope.....	9	1.45	126	+ 0.3	- 2.5
Middle slope.....	6	1.04	54	- 0.9	- 5.3
Southern slope*.....	8	0.83	30	- 1.9	- 9.8
Southern Plateau*.....	11	0.65	62	- 0.4	- 2.5
Middle Plateau*.....	11	0.95	146	+ 0.3	- 3.7
Northern Plateau*.....	10	1.19	134	+ 0.3	- 2.4
North Pacific.....	7	1.65	65	- 0.9	- 3.9
Middle Pacific.....	7	0.13	25	- 0.4	- 6.2
South Pacific.....	4	0.40	200	+ 0.2	- 4.7

*Regular Weather Bureau and selected cooperative stations

RIVERS AND FLOODS.

By Prof. H. C. FRANKENFIELD, in charge River and Flood Division.

Drought conditions continued during the month over that portion of the country extending from Virginia northeastward, seriously threatening the water supply of many cities, and it was not until after the beginning of the third decade of the month that the situation was relieved by substantial rains. Over the remainder of the country the usual seasonal low-water conditions prevailed, except in the lower Rio Grande, where floods occurred from September 15 to 24, inclusive. A tropical disturbance moved westward over the Gulf of Mexico from September 10 to 14, inclusive, reaching the mouth of the Rio Grande on the latter date. It was attended by excessive rains, and by the morning of September 16 the flood was well under way. Warnings were issued on this date, and the crest of the high

water reached Brownsville, Tex., on September 23. The flood was not as great by from 4 to 6 feet as that of September, 1909, and no serious damage was done. Some small crops were overflowed and railroad traffic was interrupted for a time, but the total losses were small. At Brownsville the levees prevented the flood waters from entering the town.

Hydrographs for typical points on several principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

SPECIAL PAPERS ON GENERAL METEOROLOGY.

JACOB W. BAUER.

By H. E. WILLIAMS, Assistant Chief of Bureau.

Mr. Jacob W. Bauer, whose death at Columbia, S. C., occurred on September 4, 1910, entered the service on July 23, 1883. He attained the rank of Sergeant in the Signal Corps of the Army and afterward the position of Section Director in the Weather Bureau. He served as assistant at Boston, Mount Washington, and New York City, and Official in Charge at Thatchers Island, Mount Washington, Duluth, and Columbia, S. C., which latter assignment he held from November 2, 1893, until the time of his death. He was a faithful and conscientious official and had a good record in the Bureau for the efficient performance of duty.

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Librarian.

The following have been selected from among the titles of books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Anonymous publications are indicated by a —.

Alfani, Guido.

L'osservatorio Ximeniano e il suo materiale scientifico. I. (Sezione meteorica). Pavia. 1910. 38p. 8°.

Bartholinus, Erasmus.

De figura nivis dissertatio. Hafniae. [1661]. [6], 42p. 24°.

Belgium. Observatoire royal (Service astronomique).

Liste des observatoires magnétiques et des observatoires séismologiques, par E. Merlin et O. Somville. Bruxelles. 1910. x, 192p. 8°.

Borchardt, H.

Zur Theorie der Himmelshelligkeit. Kiel. [1909]. 8°. (S.-A., Schriften Nat.-wiss. Ver. Schleswig-Holstein. Bd. 14, Hft. 2, p. 386-396.)

Brounov, P. [L.].

Über die Abhängigkeit einiger geographischen Elemente von dem barischen Relief der Erdoberfläche. n. p. n. d. 12p. 8°. (Reprinted from Neuvième cong. internat. de géographie, Genève, 1908. C.-r., T. 2.

Carthaus, Emil.

Die klimatischen Verhältnisse der geologischen Vorzeit vom Präcambrium an bis zur Jetztzeit, und ihr Einfluss auf die Entwicklung der Haupttypen des Tier- und Pflanzenreiches. Berlin. 1910. v, 256 p. 8°.

Coellen, Ludwig.

Die Gegensatz in den aussertropischen Klimaten der continentalen West- und Ostküsten auf der Nordhemisphäre. Wien. 1901. 52p. 4°. (S.-A., Abhdl. K. k. Geogr. Gesell., Wien, Bd. 3, 1901, No. 3.)

Conservation of natural resources. Meeting of engineers called jointly in ... New York City, March 24, 1909. [New York]. [1909]. 56p. 8°.

Crammer, Hans.

Eishöhlen- und Windröhren-Studien. Wien. 1899. 62p. 4°. (S.-A., Abhdl. K. k. Geogr. Gesell., Wien, Bd. 1, 1899. p. 19-76.)

Dörr.

Die Beobachtungsergebnisse der meteorologischen Stationen niederer Ordnung im Herzogtum Braunschweig für die Jahre 1908 und 1909. [Braunschweig]. [1910]. 18p. f°. (S.-A., Beitr. Stat. Hztgm. Braunschweig. Hft. 24. 1910.)

Ebert, H[ermann].

Über Luftelektrizität. [Berlin]. n. d. 8°. (S.-A., Denkschr., Erste Internat. Luftschiff. Ausstell., Frankfurt, 1909. Bd. 1. Wissensch. Votr. p. 11-29.)