

and killing frosts were confined to high level stations; they were accurately forecast, as were most of the light frosts reported.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

There were moderate rains of the sonora type in the Colorado Valley section on the 14th, 15th, and 16th, and thunderstorms in the extreme southern portion of the State on the 15th. On the 23d a moderate disturbance moved rapidly southward along the coast, and showers occurred from San Francisco northward. Some high winds were reported in the San Joaquin Valley and Nevada with the passage of this disturbance. The month closed with extremely warm weather in the vicinity of Los Angeles.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.

As a rule the storms of the month past too far north to cause severe weather in the north Pacific coast States. Rainfall was heaviest—one to two inches above the normal amount—in western Washington and slightly below normal elsewhere. Temperature averaged from one to nearly four degrees above normal. There were two stormy periods, 6th to 8th and 12th to 14th. The maximum wind during the first period was 72 miles an hour from the southeast at North Head and during the second period 64 miles from the southeast at the same station. Light frosts were general the mornings of the 11th and 26th, and they occurred in scattered places on other dates. Timely warnings were issued for all storms and frosts and no casualties or damage of note is known to have occurred.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

There were but few stations where flood stages were recorded during the month, and these were in the southeastern and central Gulf States.

The highest water in the rivers of North Carolina and South Carolina was the result of the heavy rains of the preceding month, altho high water occurred from the 15th to the 20th in these rivers.

During the last few days of the month the heavy rains over the middle Gulf States caused the rivers of that section to rise rapidly. With the exception of the Black Warrior River, flood stages were not reached. In some instances the highest readings were caused by the high wind backing the water upstream. Warnings were issued for the high water in all cases except in the Meridian and Mobile districts where the loss of communication prevented the distribution.

On September 24 the steamer *Lora*, laden with freight from St. Louis, Mo., docked at the wharf in Kansas City, Mo. This event marks the renewal of traffic on the Missouri River, after the lapse of more than a decade.

The highest and lowest water, mean stage, and monthly range at 270 river stations are given in Table VI. Hydrographs for typical points on seven 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.

THE WEATHER OF THE MONTH.

By Mr. P. C. DAY, Assistant Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure for September over the United States and Canada is graphically shown on Chart VI, and the average values and departures from the normal are shown for each station in Tables I and V.

Pressure was high over the entire central portion of the country from the Atlantic to the Pacific, with the crest over the Appalachian region, and diminished rapidly north and south.

The high area over the Ohio Valley and Middle Atlantic States was more pronounced than usual, and extended well into the lower Lake region and New England. On account of the rather persistent presence of high pressure areas over the central sections of the country, the low areas that crost from the Pacific, or that formed on the Rocky Mountain slope, pursued courses well to the north and were not accompanied by severe weather of any description. The barometer averaged unusually low over the lower Mississippi Valley, owing to the passage over that section of the severe and destructive hurricane from the 26th to the 27th and the stormy conditions that prevailed for several days thereafter.

Pressure was also lower than the average over the entire northern border from the Great Lakes to the Pacific and over New England and the Maritime Provinces of Canada.

Under the influence of the high pressure over the Ohio Valley and Lake region the surface winds over the Mississippi Valley and the Great Plains were generally from an easterly quarter, while over New England and along the northern border as far west as the the Rocky Mountains they were from the south.

TEMPERATURE.

The month was one of unusual warmth, altho no extended periods of excessive heat occurred. Over all sections of the United States, except the southern Rocky Mountain and Plateau region, and extending into the Canadian Provinces as far north as observations extend, the temperature averaged

well above the normal. Over the Missouri, upper Mississippi and Ohio valleys, and the Lake region the daily average was from 4° to 6° above the normal. The monthly mean temperature was slightly below the average in Nevada, Utah, western Colorado, northwestern Arizona, and southeastern California.

While warm weather was the rule, the daytime temperatures were not excessive, and maximum readings of 100°, or above, were recorded in small areas only. In the upper Missouri Valley temperatures of 100°, or above, were recorded from the 7th to the 9th and unusually high temperatures prevailed over southern California during the closing days of the month. Temperatures below the freezing point were recorded over small sections during the latter part of the month, but over the greater part of the country, including the corn-belt, vegetation was untouched by frost at the end of the month.

PRECIPITATION.

The precipitation was generally ample in all sections of the interior from the Rocky Mountains eastward. Over Nebraska, Colorado, western Kansas, and surrounding districts the precipitation was abnormally heavy for September, which is usually a month of light rainfall.

At Dodge, Kans., the fall for the month, 9.26 inches, was twice the amount recorded in any previous September during the past thirty years. The month was also one of heavy precipitation over the lower Mississippi Valley and east Gulf States. The larger portion of the precipitation over this region occurred, however, during the last few days of the month, attending the passage of the severe tropical storm of the 26th and 27th over that section. Much damage was done by the latter storm from wind and high water, a full account of which will be found in another portion of this REVIEW. The rainy season on the north Pacific coast began early in the month, and amounts far in excess of the average were recorded over the western sections of both Washington and Oregon.

Along the entire Atlantic coast from Maine to Florida the

month was one of very light precipitation. This deficiency was very pronounced over northeastern Florida, where at Jacksonville it amounted to more than six inches. In marked contrast to the above record the amount at Pensacola, in the western section of the same State, was nearly twelve inches above the average.

In nearly all sections the month was one of abundant sunshine, affording ideal conditions for ripening and harvesting.

*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               | 9                   | 62.4  | + 1.3                             | + 6.8                                   | + 0.8                               |
| Middle Atlantic           | 13                  | 70.9  | + 3.9                             | +11.8                                   | + 1.3                               |
| South Atlantic            | 10                  | 77.1  | + 3.8                             | + 4.8                                   | + 0.5                               |
| Florida Peninsula *       | 8                   | 81.2  | + 1.9                             | + 0.8                                   | + 0.1                               |
| East Gulf                 | 8                   | 78.5  | + 3.1                             | - 3.5                                   | - 0.4                               |
| West Gulf                 | 7                   | 78.8  | + 2.9                             | - 1.3                                   | - 0.1                               |
| Ohio Valley and Tennessee | 12                  | 72.3  | + 4.1                             | + 4.1                                   | + 0.5                               |
| Lower Lake                | 8                   | 67.2  | + 4.0                             | +13.5                                   | + 1.5                               |
| Upper Lake                | 10                  | 64.4  | + 5.1                             | +18.8                                   | + 2.1                               |
| North Dakota *            | 8                   | 62.8  | + 5.4                             | +20.0                                   | + 2.2                               |
| Upper Mississippi Valley  | 13                  | 69.1  | + 4.5                             | + 7.5                                   | + 3.8                               |
| Missouri Valley           | 11                  | 67.9  | + 2.7                             | +10.4                                   | + 1.2                               |
| Northern Slope            | 7                   | 60.7  | + 2.6                             | + 9.3                                   | + 1.0                               |
| Middle Slope              | 6                   | 68.0  | + 0.3                             | + 1.3                                   | + 0.1                               |
| Southern Slope *          | 6                   | 72.1  | - 0.2                             | - 9.3                                   | - 1.0                               |
| Southern Plateau *        | 13                  | 68.9  | - 0.8                             | - 0.1                                   | 0.0                                 |
| Middle Plateau *          | 8                   | 60.2  | - 1.2                             | - 1.2                                   | - 0.1                               |
| Northern Plateau *        | 12                  | 61.0  | + 2.7                             | +15.2                                   | + 1.7                               |
| North Pacific             | 7                   | 57.7  | + 0.6                             | +11.7                                   | + 1.3                               |
| Middle Pacific            | 5                   | 63.0  | + 0.1                             | + 9.5                                   | + 1.1                               |
| South Pacific             | 4                   | 69.2  | + 0.8                             | + 6.8                                   | + 0.8                               |

\* Regular Weather Bureau and selected cooperative stations.

*In Canada.—Prof. R. F. Stupart says :*

The temperature was average or slightly below in the eastern portion of Quebec and over the Maritime Provinces, also in a considerable portion of British Columbia; elsewhere in the Dominion the average was exceeded, and in most districts to a marked extent. Alberta was from 1° to 4° above the average, Saskatchewan 2° to 7° above, Manitoba 7° above, Ontario 2° to 6° above. Toronto recorded the warmest September on record but one, that of 1881.

*Average precipitation and departures from the normal.*

| Districts.                | Number of stations. | Average.       |                       | Departure.     |                           |
|---------------------------|---------------------|----------------|-----------------------|----------------|---------------------------|
|                           |                     | Current month. | Percentage of normal. | Current month. | Accumulated since Jan. 1. |
|                           |                     | Inches.        |                       | Inches.        | Inches.                   |
| New England               | 9                   | 2.57           | 81                    | -0.6           | -1.0                      |
| Middle Atlantic           | 13                  | 1.61           | 43                    | -2.1           | +0.4                      |
| South Atlantic            | 10                  | 3.65           | 72                    | -1.4           | -1.4                      |
| Florida Peninsula *       | 8                   | 4.57           | 60                    | -3.0           | +6.0                      |
| East Gulf                 | 8                   | 9.77           | 266                   | +6.1           | +1.8                      |
| West Gulf                 | 7                   | 3.08           | 81                    | -0.7           | -7.3                      |
| Ohio Valley and Tennessee | 12                  | 4.60           | 153                   | +1.6           | -3.8                      |
| Lower Lake                | 8                   | 2.39           | 80                    | -0.6           | -4.1                      |
| Upper Lake                | 10                  | 3.42           | 97                    | -0.1           | -2.2                      |
| North Dakota *            | 8                   | 0.93           | 90                    | -0.1           | +2.0                      |
| Upper Mississippi Valley  | 13                  | 3.97           | 121                   | +0.7           | -0.5                      |
| Missouri Valley           | 11                  | 4.01           | 154                   | +1.5           | +0.9                      |
| Northern Slope            | 7                   | 1.57           | 162                   | +0.6           | +2.1                      |
| Middle Slope              | 6                   | 4.28           | 240                   | +2.5           | +2.0                      |
| Southern Slope *          | 6                   | 3.49           | 130                   | +0.8           | +4.0                      |
| Southern Plateau *        | 13                  | 0.98           | 111                   | +0.1           | +3.0                      |
| Middle Plateau *          | 8                   | 1.24           | 148                   | +0.4           | +4.4                      |
| Northern Plateau *        | 12                  | 0.58           | 59                    | -0.4           | -0.3                      |
| North Pacific             | 7                   | 4.31           | 148                   | +1.4           | -6.9                      |
| Middle Pacific            | 5                   | 0.36           | 47                    | -0.4           | +4.1                      |
| South Pacific             | 4                   | 0.05           | 100                   | 0.0            | +6.4                      |

\* Regular Weather Bureau and selected cooperative stations.

*In Canada.—Professor Stupart says:*

The chief characteristics of the precipitation for September were the unusually heavy rainfalls in the lower mainland of British Columbia and in Cariboo, and the deficiency of the rainfall in the Western Provinces generally, also in the more northern and eastern portions of Ontario, as well as over the greater portion of the Maritime Provinces. In the Peninsula of Ontario the average amount was exceeded in some localities and was not maintained in others, whereas in Quebec it was average in the western and exceeded the average by from one to two inches in the eastern portion. The most noticeable positive departures were: New Westminster, 6.3 inches; Barkerville, 4.6 inches; and the most pronounced negative departures, Calgary, 1.3 inches; Medicine Hat, 1.1 inches; Port Arthur, 2.3 inches; White River, 2.2 inches; Rockliffe, 1.1 inches; St. Johns, 1.3 inches; Sydney, 1.3 inches.

*Average relative humidity and departures from the normal.*

| Districts.                | Average. | Departure from the normal. | Districts.       | Average. | Departure from the normal. |
|---------------------------|----------|----------------------------|------------------|----------|----------------------------|
| New England               | 78       | - 3                        | Missouri Valley  | 73       | + 7                        |
| Middle Atlantic           | 79       | + 2                        | Northern Slope   | 63       | + 8                        |
| South Atlantic            | 84       | + 4                        | Middle Slope     | 72       | +14                        |
| Florida Peninsula         | 79       | - 3                        | Southern Slope   | 74       | +11                        |
| East Gulf                 | 86       | +10                        | Southern Plateau | 45       | + 6                        |
| West Gulf                 | 80       | + 6                        | Middle Plateau   | 43       | +10                        |
| Ohio Valley and Tennessee | 80       | + 8                        | Northern Plateau | 46       | + 6                        |
| Lower Lake                | 75       | 0                          | North Pacific    | 78       | + 6                        |
| Upper Lake                | 78       | + 1                        | Middle Pacific   | 62       | - 5                        |
| North Dakota              | 70       | + 4                        | South Pacific    | 65       | - 1                        |
| Upper Mississippi Valley  | 77       | + 5                        |                  |          |                            |

*Average cloudiness and departures from the normal.*

| Districts.                | Average. | Departure from the normal. | Districts.       | Average. | Departure from the normal. |
|---------------------------|----------|----------------------------|------------------|----------|----------------------------|
| New England               | 4.1      | - 0.9                      | Missouri Valley  | 4.5      | + 0.1                      |
| Middle Atlantic           | 4.8      | + 0.0                      | Northern Slope   | 3.5      | - 0.5                      |
| South Atlantic            | 5.0      | + 0.2                      | Middle Slope     | 4.3      | + 1.1                      |
| Florida Peninsula         | 4.1      | + 1.4                      | Southern Slope   | 4.4      | + 0.8                      |
| East Gulf                 | 6.1      | + 1.7                      | Southern Plateau | 1.9      | - 0.4                      |
| West Gulf                 | 5.0      | + 0.7                      | Middle Plateau   | 3.0      | + 0.5                      |
| Ohio Valley and Tennessee | 5.5      | + 1.2                      | Northern Plateau | 3.4      | + 0.7                      |
| Lower Lake                | 3.6      | - 1.2                      | North Pacific    | 6.2      | + 0.3                      |
| Upper Lake                | 4.3      | - 0.8                      | Middle Pacific   | 3.1      | + 0.3                      |
| North Dakota              | 4.4      | + 0.1                      | South Pacific    | 2.0      | - 0.5                      |
| Upper Mississippi Valley  | 4.6      | + 0.4                      |                  |          |                            |

*Maximum wind velocities.*

| Stations.             | Date. | Velocity. | Direction. | Stations.               | Date. | Velocity. | Direction. |
|-----------------------|-------|-----------|------------|-------------------------|-------|-----------|------------|
| Birmingham, Ala.      | 27    | 50        | se.        | Point Reyes Light, Cal. | 9     | 50        | nw.        |
| Cape Henry, Va.       | 16    | 50        | n.         | Do.                     | 12    | 57        | nw.        |
| Memphis, Tenn.        | 22    | 60        | nw.        | Do.                     | 13    | 74        | nw.        |
| Mobile, Ala.          | 27    | 55        | e.         | Do.                     | 23    | 58        | nw.        |
| Mount Tamalpais, Cal. | 12    | 70        | nw.        | Do.                     | 24    | 65        | nw.        |
| Do.                   | 13    | 61        | nw.        | St. Paul, Minn.         | 25    | 50        | w.         |
| Do.                   | 23    | 50        | nw.        | Sand Key, Fla.          | 24    | 54        | se.        |
| Do.                   | 24    | 56        | nw.        | Do.                     | 25    | 50        | se.        |
| North Head, Wash.     | 5     | 50        | se.        | Tatoosh Island, Wash.   | 5     | 58        | s.         |
| Do.                   | 7     | 74        | se.        | Do.                     | 6     | 54        | s.         |
| Do.                   | 12    | 62        | se.        | Do.                     | 7     | 54        | s.         |
| Pensacola, Fla.       | 26    | 52        | ne.        | Williston, N. Dak.      | 15    | 50        | w.         |
| Do.                   | 27    | 83        | e.         | Wilmington, N. C.       | 17    | 50        | ne.        |