

Heights of rivers referred to zeros of gauges—Continued.

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Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Cumberland River—Con.	Miles. 257	Feet. 30	Feet. 39.0	10	Feet. 9.7	14	Feet. 26.3	29.3
Carthage, Tenn.	175	40	39.0	11	21.0	16	31.3	18.0
Nashville, Tenn.								
Arkansas River.								
Wichita, Kans.	730	10						
Webbers Falls, Ind. Ter.		23	9.5	1	3.0	31	4.6	6.5
Fort Smith, Ark.	345	22	11.5	1	4.1	14	6.0	7.4
Dardanelle, Ark.	250	21	11.0	2	3.4	17	6.0	7.6
Little Rock, Ark.	170	23	12.2	4	4.9	17, 18	7.9	7.3
White River.								
Newport, Ark.	150	26	16.8	1	9.4	17	12.9	7.4
Yazoo River.								
Yazoo City, Miss.	80	25	25.2	31	17.1	3-5	21.2	8.1
Red River.								
Arthur City, Tex.	688	27	6.1	22	4.3	7	4.7	1.8
Fulton, Ark.	565	28	9.3	4	3.8	18-20	5.5	5.5
Shreveport, La.	449	29	6.7	7	3.1	23, 24, 27, 31	4.3	3.6
Alexandria, La.	139	33	12.3	20	6.2	7, 14	8.5	6.1
Ouachita River.								
Camden, Ark.	340	39	18.6	2	7.3	30	11.3	11.3
Monroe, La.	100	40	29.2	24, 25	23.4	13	26.4	5.8
Atchafalaya Bayou.								
Melville, La.	100+	31	33.2	31	27.7	5, 6	30.1	4.5
Susquehanna River.								
Wilkesbarre, Pa.	178	14	14.0	6	4.7	31	8.7	9.3
Harrisburg, Pa.	70	17	13.0	7	5.8	12, 13	7.9	7.2
W. Br. of Susquehanna.								
Williamsport, Pa.	35	30	18.1	6	5.4	11	7.5	7.7
Juniata River.								
Huntingdon, Pa.	80	24						
Potomac River.								
Harpers Ferry, W. Va.	170	16	15.5	6	3.7	27	6.6	11.8
James River.								
Lynchburg, Va.	257	18	19.0	5	2.6	28	5.1	16.4
Richmond, Va.	110	12	20.5	7	1.9	29, 29	5.7	18.6
Roanoke River.								
Clarksville, Va.	155	12	17.0	21	3.6	14	7.1	13.4
Weldon, N. C.	90	27						
Cape Fear River.								
Fayetteville, N. C.	100	38	42.0	17	8.7	14	22.1	33.3
Lumber River.								
Fairbluff, N. C.	10	6	6.8	8.9	5.1	24-26	5.9	1.7
Edisto River.								
Edisto, S. C.	75	6	5.7	7	4.7	19	5.2	1.0
Pedee River.								
Cheraw, S. C.	145	27	32.7	22	7.0	14	19.7	25.7

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Black River.	Miles. 60	Feet. 12	Feet. 10.0	1	Feet. 6.5	23-29	Feet. 7.1	Feet. 3.5
Kingstree, S. C.								
Lynch Creek.								
Effingham, S. C.	35	12	15.9	4	8.1	20	10.6	7.8
Santee River.								
St. Stephens, S. C.	50	12	12.2	8, 28	8.3	19	10.1	3.9
Congaree River.								
Columbia, S. C.	37	15	14.0	1	1.8	13, 14	8.3	12.2
Waterlee River.								
Camden, S. C.	45	24	28.5	21	7.4	14	18.2	21.1
Waccamaw River.								
Conway, S. C.	40	7	8.6	1-3	4.8	26, 27	6.7	3.8
Savannah River.								
Calhoun Falls, S. C.			13.6		16		3.9	12
Augusta, Ga.	130	32	28.5	1	11.0	15	16.0	17.5
Broad River.								
Carlton, Ga.			18.3		16		3.3	11-13
Flint River.								
Albany, Ga.	80	20	15.9	4, 5	7.8	15	11.2	8.1
Chatahochee River.								
West Point, Ga.	20	20	14.5	1	4.8	12	7.6	9.7
Eufaula, Ala.	90	30	29.0	1	8.0	14, 15	14.7	21.0
Coosa River.								
Rome, Ga.	225	30	29.2	17	4.5	13	9.9	24.7
Gadsden, Ala.	144	18	24.8	21	5.8	13	13.3	19.0
Alabama River.								
Montgomery, Ala.	265	35	25.2	2	9.8	13	24.2	25.4
Selma, Ala.	312	35	38.8	3	13.9	13	28.3	24.9
Tombigbee River.								
Columbus, Miss.	285	33	31.4	17	1.4	13	13.5	30.0
Demopolis, Ala.	155	35	59.3	24	19.9	13	43.4	39.4
Black Warrior River.								
Tuscaloosa, Ala.	90	38	60.3	17	10.0	13	30.1	50.3
Columbia River.								
Umatilla, Ore.	270	25	4.6	37-39	2.0	17, 18	8.0	2.6
The Dalles, Ore.	166	40	6.7	30	3.7	19	4.8	3.0
Willamette River.								
Albany, Ore.	99	20	23.0	3	7.5	31	10.6	15.5
Portland, Ore.	10	15	13.2	4	4.1	22	7.1	9.1
Sacramento River.								
Red Bluff, Cal.	241	23	20.4	25	2.3	1	7.0	18.1
Sacramento, Cal.	70	25	24.1	31	11.6	1	16.3	12.5

* Frozen until 25th. † Distance to Gulf of Mexico. † Record for 19 days.
 ‡ Record for 18 days. ‡ Record for 21 days. ‡ Record for 30 days. ‡ Record for 28 days. ‡ No gauge.

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Rainfall is expressed in inches.

Alabama.—The mean temperature was 55.6°, or 1.0° above normal; the highest was 91°, at Union on the 26th and at Pineapple on the 27th, and the lowest, 4°, at Decatur, Oneonta, and Valleyhead on the 7th. The average precipitation was 6.68, or 1.08 above normal; the greatest monthly amount, 15.80, occurred at Maplegrove, and the least, 1.79 at Clanton.—*F. P. Chaffee.*

Arizona.—The mean temperature was 54.4°, or 1.8° below normal; the highest was 94°, at Parker on the 7th and at Blaisdell on the 24th, and the lowest, 6°, at Flagstaff on the 14th. The average precipitation was 0.16, or 0.62 below normal; the greatest monthly amount, 1.16, occurred at Oracle, while none fell at a number of stations.—*W. G. Burns.*

Arkansas.—The mean temperature was 50.6°, or 0.4° below normal; the highest was 87°, at Prescott on the 22d, and the lowest, 1°, at Jonesboro and Pond on the 6th. The average precipitation was 2.97, or 2.21 below normal; the greatest monthly amount, 8.40, occurred at Osceola, and the least, 1.09, at Texarkana.—*E. B. Richards.*

California.—The mean temperature was 51.2°, or 1.0° below normal; the highest was 103°, at Elsinore on the 6th, and the lowest, 4° below zero, at Boca, on the 13th. The average precipitation was 6.10, or 3.13 above normal; the greatest monthly amount, 26.31, occurred at Bowmans Dam, while none fell at several stations.—*G. H. Willson.*

Colorado.—The mean temperature was 33.0°, or 1.5° below normal; the highest was 85°, at Lamar on the 8th and 24th, and the lowest, 25° below zero, at Moraine on the 27th. The average precipitation was 1.64, or 0.67 above normal; the greatest monthly amount, 16.59, occurred at Ruby, and the least, trace, at Saguache.—*F. H. Brandenburg.*

Florida.—The mean temperature was 66.3°, or nearly normal; the

highest was 93°, at Plant City on the 27th, and the lowest, 23°, at De Funiak Springs on the 8th. The average precipitation was 1.96, or about 1.00 below normal; the greatest monthly amount, 7.61, occurred at Wausau, and the least, 0.14, at Key West.—*A. J. Mitchell.*

Georgia.—The mean temperature was 55.1°, or 1.9° above normal; the highest was 92°, at Columbus on the 28th, and the lowest, 3° below zero, at Diamond on the 7th. The average precipitation was 4.81, or 1.85 below normal; the greatest monthly amount, 10.35, occurred at Ramsey, and the least, 1.00, at Brag.—*J. B. Marbury.*

Indiana.—The mean temperature was 37.3°, or 1.3° below normal; the highest was 76°, at Peru on the 11th, and the lowest, 3° below zero, at Rockville and Syracuse on the 7th. The average precipitation was 4.42, or 0.66 above normal; the greatest monthly amount, 7.83, occurred at Crawfordsville, and the least, 0.95, at Valparaiso.—*C. F. R. Wappenhans.*

Iowa.—The mean temperature was 23.0°, or about 10.0° below normal; the highest was 75°, at Mount Pleasant on the 10th and 11th, and the lowest, 16° below zero, at Charles City and Cresco on the 7th. The average precipitation was 1.62, or nearly normal; the greatest monthly amount, 5.90, occurred at Ridgeway, and the least, 0.37, at Monticello.—*J. R. Sage, Director; G. M. Chuppel, Assistant.*

Kansas.—The mean temperature was 37.3°, or 4.1° below normal; the highest was 87°, at Englewood on the 8th, and the lowest, 1° below zero, at Morantown on the 6th. The average precipitation was 1.90, or 0.26 above normal; the greatest monthly amount, 6.22, occurred at Centropolis, and the least, 0.20, at Winona.—*T. B. Jennings.*

Kentucky.—The mean temperature was 43.9° or 2.2° below normal; the highest was 80°, at Russellville on the 3d, and the lowest, 3° below zero, at Alpha on the 7th. The average precipitation was 8.10, or 2.14 above normal; the greatest monthly amount, 12.80, occurred at Mount Herman, and the least, 5.36, at Canton.—*H. B. Hersey.*

Louisiana.—The mean temperature was 61.3°, or 0.8° below normal; the highest was 91°, at Wallace on the 27th, and the lowest, 25°, at Plaquemine on the 6th, at Robeline on the 7th, and at Plain Dealing on 29th. The average precipitation was 3.02, or 1.80 below normal; the

greatest monthly amount, 8.81, occurred at Ruston, and the least, 0.26, at Houma.—*W. T. Blythe.*

Maryland and Delaware.—The mean temperature was 41.4°, or 0.3° below normal; the highest was 77°, at Hancock, Md., on the 12th, and the lowest, 1°, at Sunnyside, Md., on the 7th. The average precipitation was 4.92, or 1.50 above normal; the greatest monthly amount, 7.42, occurred at Sunnyside, Md., and the least, 2.44, at Boonsboro, Md.—*F. J. Walz.*

Michigan.—The mean temperature was 23.6°, or 4.9° below normal; the highest was 68°, at Mount Clemens on the 11th, and the lowest, 21° below zero, at Sidnaw on the 11th, at Wetmore on the 16th, and at Lathrop on the 17th. The average precipitation was 3.29, or 1.24 above normal; the greatest monthly amount, 6.72, occurred at Berrien Springs, and the least, 1.08, at Calumet. The average snowfall, 22.5 inches, is 9.8 inches greater than the snowfall for any previous March of which there is record.—*C. F. Schneider.*

Minnesota.—The mean temperature was 14.7°, or about 9.0° below normal; the highest was 52°, at Moorhead on the 8th, and the lowest, 38° below zero, at Pokegama on the 1st. The average precipitation was 1.58, or about normal; the greatest monthly amount, 6.51, occurred at New Ulm, and the least, 0.30, at Morris.—*T. S. Outram.*

Mississippi.—The mean temperature was 56.6°, or about normal; the highest was 90°, at Yazoo City on the 27th, and the lowest, 9°, at Booneville on the 6th and at Okolona on the 8th. The average precipitation was 5.78, or 0.37 below normal; the greatest monthly amount, 11.67, occurred at Biloxi, and the least, 2.05, at Hattiesburg.—*H. E. Wilkinson.*

Missouri.—The mean temperature was 37.3°, or 5.0° below normal; the highest was 78°, at Wylie on the 9th, and the lowest, 8° below zero, at McCune Station on the 7th. The average precipitation was 2.93, or 0.56 below normal; the greatest monthly amount, 7.03, occurred at Sublett, and the least, 1.09, at Mineralsprings.—*A. E. Hackett.*

Montana.—The mean temperature was 21.9°, or 3.7° below normal; the highest was 68°, at Kalispel on the 26th, and the lowest, 31° below zero, at Glasgow on the 22d. The average precipitation was 1.14, or 0.18 above normal; the greatest monthly amount, 3.00, occurred at Fort Yellowstone National Park, and the least, 0.25, at Kalispel.—*E. J. Glass.*

Nebraska.—The mean temperature was 26.8°, or about 7.0° below normal; the highest was 82°, at Alma and Beaver City on the 8th, and the lowest, 15° below zero, at Kimball on the 26th. The average precipitation was 0.92, or 0.23 below normal; the greatest monthly amount, 3.40, occurred at Bassett and Rulo, and the least, trace, at Callaway.—*G. A. Loveland.*

Nevada.—The mean temperature was 38.6°, or about normal; the highest was 79°, at Panaca on the 24th, and the lowest, 4°, at Empire Ranch on the 13th. The average precipitation was 1.83, or 0.76 above normal; the greatest monthly amount, 8.51, occurred at Lewers Ranch, while none fell at Las Vegas.—*J. H. Smith.*

New England.—The mean temperature was 29.9°, or 1.1° below normal; the highest was 65°, at Boston, Mass., on the 12th, and the lowest, 19° below zero, at Berlin Mills, N. H., on the 18th. The average precipitation was 6.43, or 2.91 above normal; the greatest monthly amount, 9.67, occurred at Kingston, R. I., and the least, 3.45, at Cornwall, Vt.—*J. W. Smith.*

New Jersey.—The mean temperature was 38.6°, or 1.4° above normal; the highest was 73°, at Beverly, Bridgeton, and Port Norris on the 12th, and the lowest, 13°, at Chester on the 21st. The average precipitation was 6.54, or 2.57 above normal; the greatest monthly amount, 9.58, occurred at Lebanon, and the least, 3.45, at Cape May City.—*E. W. McGann.*

New Mexico.—The mean temperature was 45.2°, or 0.6° above normal; the highest was 92°, at Eddy on the 22d, 23d, and 24th, and the lowest, 10° below zero, at Fort Union on the 27th. The average precipitation was 0.50, or 0.07 below normal; the greatest monthly amount, 1.62, occurred at Monero, and the least, trace, at Rincon.—*R. M. Hardinge.*

New York.—The mean temperature was 30.1°, or 0.3° below normal; the highest was 72°, at Nunda on the 12th, and the lowest, 12° below zero, at North Lake on the 17th. The average precipitation was 4.65,

or 1.31 above normal; the greatest monthly amount, 11.24, occurred at Kings Station, and the least, 1.03, at Hemlock Lake.—*R. G. Allen.*

North Carolina.—The mean temperature was 50.0°, or 1.5° above normal; the highest was 81°, at Sloan on the 4th, and the lowest, 7° below zero, at Highlands on the 7th. The average precipitation was 7.04, or 2.40 above normal; the greatest monthly amount, 14.24, occurred at Highlands, and the least, 1.01, at Wilmington.—*C. F. von Herrmann.*

North Dakota.—The mean temperature was 7.8°, or 12.5° below normal; the highest was 72°, at Berthold Agency on the 8th, and the lowest, 30° below zero, at Milton and Woodbridge on the 6th. The average precipitation was 1.06, or 0.10 above normal; the greatest monthly amount, 2.99, occurred at Fullerton, and the least, 0.11, at Woodbridge.—*B. H. Bronson.*

Ohio.—The mean temperature was 36.9°, or 1.6° below normal; the highest was 76°, at Portsmouth on the 11th, and the lowest, zero, at Bethany on the 7th. The average precipitation was 4.66, or 1.21 above normal; the greatest monthly amount, 7.70, occurred at Hanging Rock, and the least, 2.31, at Bladensburg.—*J. Warren Smith.*

Oregon.—The mean temperature was 42.9°, or 1.6° below normal; the highest was 75°, at Vernonia on the 5th, and the lowest, 6°, at Joseph on the 14th. The average precipitation was 4.03, or 0.25 below normal; the greatest monthly amount, 13.28, occurred at Government Camp, and the least, 0.23, at Arlington.—*B. S. Pague.*

Pennsylvania.—The mean temperature was 36.3°, or 0.6° above normal; the highest was 75°, at Confluence on the 11th and at Aqueduct on the 12th, and the lowest, 3°, at Smethport on the 21st. The average precipitation was 4.87, or 1.44 above normal; the greatest monthly amount, 10.30, occurred at Hawthorn, and the least, 1.91, at Shinglehouse.—*T. F. Townsend.*

Texas.—The mean temperature for the State, determined by comparison of 46 stations distributed throughout the State, was 1.4° above the normal; there was a slight deficiency over the northwestern portion of the State, while there was a general excess or nearly normal conditions elsewhere; the highest was 107°, at Llano on the 25th, and the lowest, 1° below zero, at Tulia on the 28th. The average precipitation, determined by comparison of 52 stations distributed throughout the State, was 1.69 below the normal; there was a general deficiency, ranging from 1.00 to 4.78 over north, central, southwest, and east Texas and the coast district, with the greatest in the vicinity of Sulphur Springs; there was only a slight deficiency over west Texas and the panhandle, where the normal rainfall for the month does not amount to as much as 1.00; the greatest monthly amount, 2.35, occurred at Huntsville, while none fell at a number of stations.—*I. M. Cline.*

Utah.—The mean temperature was 38.5°; the highest was 84°, at St. George on the 7th, and the lowest, 3° below zero, at Woodruff on the 14th. The average precipitation was 2.46; the greatest monthly amount, 5.40, occurred at Manti, and the least, 0.10, at Tropic.—*L. H. Murdoch.*

Tennessee.—The mean temperature was 47.8°, or about normal; the highest was 85°, at Madison on the 3d, and the lowest, 8° below zero, at Silverlake on the 8th. The average precipitation was 8.12, or 2.51 above normal; the greatest monthly amount, 17.06, occurred at Benton, and the least, 3.04, at Memphis.—*H. C. Bate.*

Virginia.—The mean temperature was 44.9°, or slightly above normal; the highest was 78°, at Williamsburg on the 11th, and the lowest, 2°, at Monterey on the 7th. The average precipitation was 6.37 or 2.61 above normal; the greatest monthly amount, 11.50, occurred at Bigstone Gap, and the least, 3.47, at Woodstock.—*E. A. Evans.*

Wisconsin.—The mean temperature was 20.1°, or 7.8 below normal; the highest was 60°, at Delavan, Milwaukee, Racine, and Sharon on the 11th; the lowest was 27° below zero, at Butternut on the 1st. The average precipitation was 2.39, or 0.25 above normal; the greatest monthly amount, 5.20, occurred at Spooner, and the least, 0.28, at Beloit.—*W. M. Wilson.*

Wyoming.—The mean temperature was 25.0°, or 3.3 below normal; the highest was 67°, at Fort Laramie on the 8th, and the lowest 23° below zero, at Centennial on the 27th. The average precipitation was 1.86, or 0.33 above normal; the greatest monthly amount, 6.00, occurred at Centennial, and the least, 0.31, at Cody.—*W. S. Palmer.*

SPECIAL CONTRIBUTIONS.

EXPERIMENTS IN WEATHER PREDICTION.

By WM. A. EDDY, Bayonne, N. J.

The kite weather predictions that I have been making at Bayonne, N. J., and which extend back to 1891 (see American Meteorological Journal, July 1891, Vol. VIII, pp. 122-125), deal with a condition of the air at a height of only a few hundred feet. I have left the investigation of greater altitudes to the United States Weather Bureau and the Blue Hill Observatory.

The Weather Bureau forecasts, based on observations at surface stations, have a much greater range and variety and extend over a greater period of time than mine, besides including deductions from a vast organization of stations with studies involving both hemispheres, or the entire circuit of the globe. It is obvious that the Weather Bureau runs a much greater risk than I in many cases; the reason of this, as I believe, is because the conditions forecasted have neither arrived aloft nor at the earth. But the most striking difference between the few predictions which I have made and